The Principals' Influence on the Performance of Primary Teachers for Science Teaching

Vipula Kulathunga, Ooi B. Keat, Jacqueline Tham

Management and Science University, Malaysia

DOI: https://doi.org/10.51584/IJRIAS.2024.908009

Received: 16 August 2024; Accepted: 22 August 2024; Published: 30 August 2024

ABSTRACT

This study investigates the influence of principals' instructional leadership and supervision on the performance of primary-grade teachers and their self-efficacy in teaching science. The principle can influence the child's science education during the primary grades. To achieve this objective, the researcher gathered data from 375 primary school teachers in the western area of Sri Lanka. This study was conducted utilizing a quantitative approach and the survey method. The chosen method for sampling was stratified random sampling. The sample consists of primary grade instructors from all three stages of basic education. Data was collected using a Google Form questionnaire, which utilized a five-point Likert scale. The data analysis was conducted using both descriptive and inferential statistics. The proposed model suggests that the principal influence (PI) has a weak but significant direct impact on Science teaching performance. The relationship between the principal influence and science teaching performance is partially influenced by the primary teacher's self-efficacy, which is significantly and moderately high. Principals ought to actively endorse science education projects, allocate resources, and cultivate a positive school atmosphere. Implementing continual professional development programs for principals focused on instructional leadership and supervision can ensure the delivery of high-quality science education in elementary grades. It is recommended that schools and teacher training agencies integrate self-efficacy enhancement measures into teacher training programs. Effective collaboration among educators, school administrators, and policy makers is crucial in establishing a conducive atmosphere for high-quality science education. By considering and manipulating these characteristics, schools can enhance scientific education in the elementary grades and promote superior learning outcomes. Further investigation is necessary to examine the effect of a principal's influence on the performance of science education.

Keywords – Principals' influence, Self-efficacy, Primary science, Science education and teacher's performance

INTRODUCTION

The school principal is significant for the performance of teachers as a school leader (Kanya et al., 2021), and they have a crucial role to play in achieving the goals and objectives of the school (Sarwar et al., 2022). The principal's leadership and administrative skills guide students, teachers, and the community toward a school's vision and mission (Rodrigues & De Lima, 2021). Tan (2023) expressed that the activities show the leadership characteristics of a school principal. These are: 1. Stimulate the school's resources for the desired vision, mission, and goals of the school. 2. Manage learning and teaching programs. 3. Provide facilities for teachers' professional development. 4. Empower teachers by participating in the decision-making process. The school principals determine the level of students' achievements, knowledge, and skills as outcomes of the teaching and learning process in the school through their leadership (Kanya et al., 2021). They affect the performance levels of the teacher and students through many factors, such as creating a good learning and teaching environment, preparing and guiding the vision and mission as well as strategic plans, providing the necessary learning resources and infrastructure, getting the support of the community, including parents, providing the necessary instructional leadership (Rodrigues & De Lima, 2021), and solving problems by supervising the learning and teaching process and providing feedback, etc. (Suriagiri et al., 2022). These details clarify that the main responsibility of the principal is to establish and maintain an excellent teaching-learning environment for the educational programs taking place in the school. This study examines the effect of the principal on the performance of teachers for

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue VIII August 2024

science teaching in the primary grades.

Theoretically the findings of this study are very important because the theoretical facts can be further nurtured and the parties involved in the development of science education can use the findings effectively. When consider Jean Piaget's theories of cognitive development, almost all the first stages of cognitive development can be observed in the first twelve years of a child's life (Mcleod, 2020). Furthermore, other studies show that early childhood science education leads to later success in the science field (O'Connor et al., 2021). Thus, it appears that it is essential to look into the factors that affect science education in the primary stage. In the inquiry about science education in the primary stage, most of countries it is not given as a separate subject but as an integrated subject (Winarno et al., 2020). When it is a separate subject, there can be expected a separate science teacher for it, but when it is taught as an integrated subject, science is taught by the general primary teacher. In Sri Lanka, science is taught in the primary grades as an integrated subject as the environmental activities (National Institute of Education, 2021). According to the National institute of education in Sri Lanka, there is no separate science teacher for that, and it is done by a general primary teacher. Most of these general primary teachers do not have a science education background (Winarno et al., 2020). Thus, these discoveries will be important to examine the effects of the principal on the teacher's teaching of science and to find out the effect of the principal on the development of practical science education from the primary stage.

Literature

Leadership

Sarwar et al. (2022) show that effective leadership is essential for a teacher's success in the face of the challenges that comes with the technological revolution of the twenty-first century. Further the researchers show that the learning and teaching process of a school, human resource management, physical resource management, and time management, as well as school planning and implementation mainly depend on the school leadership. Therefore, they play a key role in creating the ideal learning environment that will support both effective teaching and learning (Smith et al., 2020). In order to accomplish the predetermined goals, their leadership need to get teachers, staff, students, parents, and other related people to cooperate (Pardosi & Utari, 2022). Rodrigues & De Lima (2021) and Polatcan et al. (2021) studies show that the principal's influence on the learning and teaching process can occur in two ways. Accordingly, one way is through the direct influence of the principal as a manager who creates a good learning environment in the school. Good processes, effective organization of institutions, ensuring the quality of the learning and teaching process, attention to assessment and evaluation, etc. are things that are directly influenced by the principal. Developing the learning process by connecting with teachers is the principal's indirect influence. Polatcan et al. (2021) find that the principal's leadership can positively impact teachers' self-efficacy, which leads to successful teaching outcomes. That is, the interventions carried out in a wide way that affect the teacher's role in the classroom activities and the development of the students can be mentioned under this. The principal's leadership indirectly affects students' learning in the classroom by influencing team commitment, motivation, and working conditions. As a result, school leaders obliquely enhance both teaching and learning in direct and indirect ways (Rodrigues & De Lima, 2021). For implementing of the direct and indirect ways, there are number of leadership styles that can be followed by the principal (Tan, 2023). Based on Tan (2023) studies, the leadership styles are, 1. Style Theory: The behaviour of the leader is based on style. Although a leader is not born successful, leadership can be achieved through learned behaviour. 2. Contingency leadership (situational leadership): The leader gives leadership according to the relevant situation. The leader has the ability to adapt to situations. 3. The Great Man Theory: It states that a good leader is born and that leadership cannot be taught or learned. 4. Management Theory: In this theory, leadership is focused on supervision and the employees of the organization. Democratic, laissez-faire and autocratic are another type of the leadership styles (Imhangbe et al., 2018). Sarwar et al (2022) describe the leadership style has strong, positive and significant impact on the teacher performance. Further the researchers explain that democratic and laissez-faire styles have positive impact to increase teachers' performances and autocratic style has negative impact on teachers' performances. Bad administration may result bad education and which leads country's backwards (Imhangbe et al., 2018). The methods of reward and punishment are used in the implementation of leadership. However, there is one significant type of leadership that is all too frequently disregarded: instructional leadership (Stroud, 2021).

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue VIII August 2024

Instructional leadership

Instructional leadership refers to the role that school principals play in shaping and improving the quality of teaching and learning in their schools (Smith, 2020). Principals must create a vision for instruction that aligns with the school's goals and values. This vision should be shared with teachers, parents, and the community to ensure that everyone is working towards the same goals. This influence happens, when the principal communicates the school's vision and mission to all students, teachers and parents, the objectives to be met become more obvious (Sukarmin & Sin, 2022).

The instructional leader plays a critical role in ensuring that students receive high-quality instruction (Pardosi & Utari, 2022). Tan (2023) described that students' performance can be positively correlated with principal's instructional leadership. Therefore, how far principal can be ensured to receive effective coaching to improve teaching is necessarily important to find out. But Rodrigues & De Lima (2021) show that principals were mainly busy with the administration and management of their school; they did not devote much time to manage instructional activities. It leads them to generally remove from concrete classroom life and the most immediate professional learning contexts in which teachers may develop as professionals. But Stroud (2021) point out that principal has been forced to adapt to new roles as curriculum and instructional leaders under No Child Left Behind and the Every Student Succeeds Act. Therefore, no longer can administrators just be the watchdogs of school budgets and staffing; they must lay the groundwork for instructional excellence in their schools. The level of teacher commitment to the school will rise as a result of principals exercising instructional leadership at a high level, which will motivate teachers to work harder, with the end result being an improvement in student academic performance (Sukarmin & Sin, 2022). Instructional leadership, such as coordinating the school curriculum and co-curricular programs, can have an effect on increasing teacher commitment (Sukarmin & Sin, 2022). The leadership can support primary teachers by providing them with professional development opportunities, resources, and materials to help them improve their science teaching skills (Sarwar et al., 2022). This support can also include creating time and space for teachers to collaborate and share best practices. Siswanto et al. (2020) study express that the teachers' pedagogical proficiency is significantly influenced by the instructional leadership. Overall, effective instructional leadership by principals is critical to improving student outcomes and creating a positive learning environment in the school. According to the instructional leadership theory, it is the principal's duty to supervise teachers so they can improve their teaching and learning techniques (Sukarmin & Sin, 2022). But the study of Rodrigues & De Lima (2021) is shown that the impact of most of principals' instructional leadership practices on student achievement as weak. Lord (2022) study too confirmed that successful science teaching is related with school's principal leadership.

Principals' Supervision

Amani et al. (2020) expressed that principal leadership and supervision can be named as external factors affecting teacher performance levels. The principal's job is to supervise school activities and thereby maximize productivity (Amani et al., 2020). The researchers further describe that through good regulation, the teacher's ability to make a lesson successful develops, which contributes to the success of the child's studies. Suriagiri et al. (2022) study shows that teachers' teaching successes are positively linked with the school principals' supervision. Further Smith et al. (2020) shows that principals are crucial cogs in promoting high level of student achievement and improving schools because effective management of a school is essential to advancing students' academic and social issues. Principal can support primary teachers by providing them with professional development opportunities, resources, and materials to help them improve their science teaching skills (Sarwar et al., 2022). According to Agasisti et al. (2019), the principals rarely supervise the students' learning, and they rarely give feedback to the teachers to develop their teaching skills. Further, Agasisti et al. (2019) find out that the principals do not observe the activities in the classroom in Italy.

A school leader's supervision of classroom will result in teachers receiving first-hand feedback from the school leader, which has a positive effect on the increase in teachers' commitment (Sukarmin & Sin, 2022). Similarly, fear of supervision and being judged on one's performance motivates teachers to perform well. Fear is one of the most instinctive human emotions, and it has been one of the key factors that have made it possible for the human species (Suriagiri et al., 2022). Second, motivation comes from more than just fear; it also comes from being

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue VIII August 2024

appreciated by those in positions of authority. If a supervisor is pleased with a person's performance, it will affect that person's motivation and job satisfaction (Suriagiri et al., 2022). The primary reason why fear of authority works is because it motivates people to perform better than they would otherwise, just as a person would run faster if it were necessary for its survival. While a manager or supervisor may occasionally contribute to the improvement of outcomes or outputs, in other instances, it can demotivate the staff. Supervision is a subtle and frequently misunderstood role that can produce multiple effects on an employee's performance (Suriagiri et al., 2022). Another study show that the principals were mainly busy with the administration and management of their school; they did not devote much time to managing instructional activities (Rodrigues & De Lima, 2021). There are several factors that can contribute to the low achievement level of the students. One factor is low headmaster leadership and supervision (Sukmaswati et al., 2020). Teachers are highly motivated when their superiors give them the go-ahead and when their peers cooperate, which also makes up for the lower pay and lower status of teaching (Suriagiri et al., 2022). This can improve teacher morale and job satisfaction, leading to better performance. Supervisors need to develop collegial relationships with teachers in the implementation of supervision as much as possible. This facilitates friendship which will help teachers in improving performance. School principal's motivation, supervision, and job satisfaction have positive and significant effect on teachers' performance both partially and simultaneously (Amani et al., 2020). Overall, effective supervision by school principals can positively impact teacher performance and ultimately improve student learning outcomes.

Problem Statement

National Institute of Education, Sri Lanka (2019) reported that the curriculum developers have made it plain that children's science learning and innovativeness are two of the primary education's final objectives. One of the goals of the environment-related activities is to equip junior high school students with the fundamental knowledge and process skills necessary for further scientific study. However, the researcher had difficulty locating many studies in Sri Lanka pertaining to environment-related activities and elementary science instruction. The level of achievement in the science subject at the GCE Ordinary Level and the number of students enrolling in the GCE Advanced Level science stream can be used to measure the success of science education in general education. The pass rate for science subjects on the GCE O/L examination-2019 is only 65.45%, according to the department of examination's evaluation report. The lower performance of G.C.E. Ordinary Level is indicative of fewer students enrolling in the science discipline at the GCE Advance level. According to data from the ministry of education-2020, of the number of students who qualify for the GCE Advanced Level, the percentage of students choosing the science stream is approximately 22% points lower. (National Education Commission of Sri Lanka, 2016) Science education at the secondary and tertiary levels did not seem to have produced the anticipated outcomes. The static report of the ministry of education indicates that, based on the total number of students enrolled in the primary level and the total number of STEM students enrolled in the advanced level, the percentage of STEM students is less than 25% (Ministry of Education, Sri Lanka, 2020). This is further evidence that the quantity of students pursuing science, mathematics, engineering, and technology is inadequate. According to a Ghanaian study (Husaini et al., 2019), school management has a positive effect on the academic performance of students. In accordance with the findings of another study (Taştan et al., 2018), it is necessary to take into consideration the essential role of school education for scientific learning, which includes the interference of teachers, school administration, and students' aspirations for success. Principals' poor leadership at all levels of the education hierarchy prevents the classroom environment and school supervision procedures from being aligned adequately with the new educational paradigm (NEC, 2022). To strengthen the principals' efforts, the time has come to conduct in-depth research on the primary teachers' scientific instruction. The gaps, inconsistencies and controversies found in the literature that the current study focuses areas as below. First thing is whether the principal is effectively supports for the efforts of teacher teams to align assessments and curriculum to standards across grade levels. The principal supports teacher to develop effective instructional strategies to address diverse teaching-learning needs. Whether the principal ensures a system of intervention and supports for a range of teacher needs. The principal establishes the systems and structures for teacher teams (e.g., professional learning communities, instructional teams) to work together effectively. Inadequate curriculum guidance for science teaching influence effective teaching and learning. Whether the principal is makes systematic visit to the primary classroom to supervise science lesson. Whether the principals are ensure constructive feedback after classroom observations. Based on the observation how far the principals encourage teachers to reflect their own practices. How far ensures to receive effective coaching to

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue VIII August 2024

improve teaching.

These gap, inconsistencies, controversies are led research problems and the research objectives.

The research objectives are;

1. To investigate the principal influence to the teacher's science teaching performance
2. To find out the relationship between the principal and teacher's self-efficacy
3. Determine the role of teacher's self-efficacy between principal influence and teacher's performance

The unit of analysis is primary general teachers of the schools in the western province of Sri Lanka. Sri Lanka intends to make reforms to education in 2025, thus the findings of this study will be crucial for formulating and implementing policy. Also, the findings of this study will be useful in improving science education in primary schools in all countries with untrained primary school teachers as well as implementing an integrated curriculum.

METHODOLOGY

This study aims to explore the relationship between school principal and primary teacher's performance in Sri Lanka education system. The study is a quantitative and survey type. This study's target population consisted of first-through-fifth-grade general cadre teachers in the primary grades of schools in the western province of Sri Lanka. In the present investigation, the researcher employed a stratified proportional random sample strategy, taking into consideration the degree of representativeness, generalizability, time constraints, and study objective (Azam et al., 2021). The unit of analysis was a primary school general cadre teacher in the primary divisions. Due to the one-time data collection, the research has a cross-sectional time horizon. The sample frame is the database of schools maintained by the Ministry of Education's national educational management information system (NEMIS) in 2020. A 60% response rate to the sample size, the study sample size is determined (Saunders et al., 2019). The total sample was 625 primary (general) educators in the institutions of Sri Lanka's western province comprised the sample size for the study. The research instrument for this study was created using questionnaires from prior investigations. The present research data were gathered through the use of a questionnaire as an instrument, which was designed based on the opinions of experts and prior studies pertinent to scientific education. The researcher selected descriptive and inferential statistics for correlation and regression analysis. Statistical software applications, such as AMOS and SPSS, are currently employed to analyze the data in an efficient manner. The primary purpose of ethical considerations is to protect respondents from physical and psychological harm; therefore, it is the researcher's duty to protect the respondents' privacy and confidentiality and to ensure the safety of the information they provide (Sekaran & Bougie, 2020). Before a subject agrees to participate in the current study, the researcher explains the purpose, objectives, methods, significance, privacy, and confidentiality of the information they provide.

ANALYSIS

Table 01 shows the allocation of primary teachers among five grade levels, ranging from grade 1.0 to grade 5.0. The data includes both the frequency, which represents the number of teachers, and the percentage for each grade level. The total sample size of teachers is 438. Out of the entire sample, the grade 01 teachers accounted for 16.7%. The group in the sample was the smallest, indicating that fewer teachers were allocated to the analyzed sample compared to the other grades. 20.3% of the sample consisted of grade 02 teachers. There was a significant rise in the number of instructors in Grade 1.0, suggesting an increase in the representation of teachers at this grade level. Out of the sample, the grade 03 teachers accounted for 22.8%. That was the most extensive assemblage in the sample. The respondents indicated that Grade 3.0 teachers were highly favored. The sample consisted of 21.0% of grade 04 teachers. The second-largest group had a minor decline from Grade 3.0, however still constituted a significant proportion of the sample. Out of the entire sample, the proportion of teachers in grade 05 was 19.2%. There was a further decline in the number of teachers assigned to this grade. The data had a distribution that closely resembled a bell curve, with Grade 3.0 being the most frequently occurring and Grades 1.0 and 5.0 having the lowest frequency. The sample is unambiguously partitioned into five discrete strata, which

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue VIII August 2024

correspond to the five grade levels (1.0 to 5.0) in primary education. The sample included students from all grade levels, therefore giving a comprehensive representation of elementary education across the full spectrum. The allocation among strata was quite even, with percentages varying from 16.7% to 22.8%. Nevertheless, the sample had a rather uniform distribution, with percentages ranging from 16.7% to 22.8% for each grade. This implies that the population distribution across grades may also be evenly distributed. This indicated that each stratum (grade level) was sufficiently included, which is a crucial characteristic of a well-constructed stratified sample. The distribution approximately conforms to a Gaussian distribution, which perhaps mirrors the true distribution of instructors across different grade levels in the larger population. If this is true, it indicates that the sample structure is in good agreement with the population structure. The study guarantees the inclusion of instructors from all grade levels, thereby ensuring a comprehensive representation of opinions and experiences across the entire primary education spectrum. The sampling fraction of approximately 3.73% was deemed appropriate for conducting a study on a large population. This sampling method seems well-suited for examining primary school teachers across various grade levels in the Western Province of Sri Lanka. The use of stratified random sampling, which employs simple random selection within the strata, along with an adequate sample size and distinct stratification based on curricular levels, establishes a strong and reliable basis for this investigation. This methodology will enable the acquisition of dependable insights into grade-specific matters while also offering a broad overview of elementary education in the region

Table 01: The grade distribution of the responded primary teachers' sample

Grade	**Frequency**	**Percent**
1.0	73	16.7
2.0	89	20.3
3.0	100	22.8
4.0	92	21.0
5.0	84	19.2
Total	438	100.0

The table 2 offers descriptive statistics for 34 items across three constructs: TSE (10 items), PI (11 items), and TPO (13 items) with have the mean, standard deviation, skewness, and kurtosis. The size of the sample was 438 answers. All the values of the items range from 3 to 4. The TSE had a range of values between 3.226 and 3.662. The highest mean value of 3.662 indicates that teachers felt highly efficacious in the domain of TSE 5. Nevertheless, TSE 2 exhibits the lowest average value of 3.226 in an area where teachers had lower levels of confidence. All items in the TSE exhibit negative skewness, indicating a propensity towards higher scores. Kurtosis exhibits variation, with certain things displaying platykurtic distributions (flatter) while others exhibit leptokurtic distributions (more peaked). The average range of PI ranged from 3.498 to 3.790. The area principals with the highest mean value of 3.790 are judged to have the biggest influence. The mean value of 3.498 is the lowest, indicating a significantly decreased but still favorable influence. All items exhibit negative skewness, which is more evident compared to the TSE items. The majority of items have positive kurtosis, indicating distributions that are more peaked. The average range of TPO ranged from 3.094 to 3.644. The highest mean score of 3.664 for TPO 22 indicates the most favorable perception of teacher performance in the specified region. The TPO 31 area has the lowest mean value of 3.094, indicating opportunity for improvement. All items in the TPO exhibit negative skewness, albeit typically less severe than the PI items. Kurtosis exhibits variation, encompassing both positive and negative values. All items in all constructs exhibit negative skewness, suggesting that scores tend to concentrate towards the higher end of the scale. This indicates generally favorable perceptions across all three constructs. Kurtosis: Varies among individual pieces and overall constructions. PI items typically have more positive kurtosis, indicating distributions that are more peaked, with responses

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue VIII August 2024

concentrated closer to the mean. Certain items, such as PI 19 and PI 20, exhibit pronounced negative skewness and elevated positive kurtosis, suggesting a high level of consensus among responders.

Table 2: The descriptive statistics for the principal influence (PI), the teachers' self-efficacy (TSE) and the teachers' performance (TPO)

Items	**Mean**	**Std. Deviation**	**Skewness**	**Kurtosis**
	Statistic	**Statistic**	**Statistic**	**Statistic**
TSE 1	3.395	.8907	-.569	.105
TSE 2	3.226	.9430	-.267	-.501
TSE 3	3.516	.8890	-.696	.390
TSE 4	3.614	.8844	-.758	.725
TSE 5	3.662	.9127	-.768	.696
TSE 6	3.477	.9316	-.471	-.095
TSE 7	3.416	.9081	-.456	-.166
TSE 8	3.361	.9264	-.446	-.202
TSE 9	3.568	.8865	-.664	.551
TSE 10	3.546	.8724	-.805	.735
PI 11	3.639	1.0664	-.390	-.578
PI 12	3.678	.8893	-.793	.774
PI 13	3.630	.9568	-.446	-.153
PI 14	3.582	1.0244	-.531	-.217
PI 15	3.498	.9095	-.488	.179
PI 16	3.760	.8714	-.974	1.407
PI 17	3.765	.8934	-1.029	1.538
PI 18	3.703	.8813	-.794	.897
PI 19	3.790	.8672	-1.060	1.636
PI 20	3.783	.8642	-1.105	1.807
PI 21	3.639	.8808	-.742	.717

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue VIII August 2024

TPO 22	3.644	.9182	-.091	-.837
TPO 23	3.623	.8569	-.968	1.428
TPO 24	3.557	.8314	-.818	1.180
TPO 25	3.402	.8521	-.538	.474
TPO 26	3.491	.8469	-.539	.352
TPO 27	3.358	.8620	-.568	.217
TPO 28	3.201	.8825	-.303	-.176
TPO 29	3.427	.8546	-.655	.386
TPO 30	3.260	.8641	-.444	-.063
TPO 31	3.094	.8887	-.302	-.145
TPO 32	3.322	.8084	-.520	.252
TPO 33	3.203	.8462	-.286	-.025
TPO 34	3.422	.8648	-.655	.481

Valid N was 438 responses

Table 3 displays the Pearson correlation coefficients for three variables: teachers' self-efficacy, principals' influence, and teachers' performance. The connection between teachers' self-efficacy and principals' influence was 0.604. b. The correlation coefficient between teachers' self-efficacy and teachers' performance was 0.719. c. The correlation coefficient between principals' influence and teachers' performance was 0.565. All relationships exhibited statistical significance at the 0.01 level, as determined by a two-tailed test. All correlations exhibited a positive relationship, signifying that as one variable experiences a rise, the others also demonstrate an increase. The most robust connection was observed between teachers' self-efficacy and teachers' performance (r = 0.719), indicating a significant and favorable association. The association between teachers' self-efficacy and principals' influence was moderate strong, with a correlation coefficient of 0.604. The link between the influence of principals and the performance of teachers was moderate strong (r = 0.565). The results indicated significant positive correlations across all three variables, with the highest correlation observed between instructors' self-efficacy and their performance.

Table 3: The Pearson correlation coefficient among the variables

		Teachers' Self-efficacy	**Principals' Influence**	**Teachers' performance**
Teachers' Self-efficacy	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	438		

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue VIII August 2024

Principals' Influence	Pearson Correlation	.604**	1	
	Sig. (2-tailed)	.000		
	N	438	438	
Teachers' performance	Pearson Correlation	.719**	.565**	1
	Sig. (2-tailed)	.000	.000	
	N	438	438	438
**. Correlation is significant at the 0.01 level (2-tailed).				

Exploratory factor analysis

Exploratory Factor Analysis (EFA) is a statistical method employed in multivariate statistics to uncover the fundamental structure of a given set of observed variables. The main objective of Exploratory Factor Analysis (EFA) is to decrease a substantial number of variables to a more concise set of components that elucidate the observed patterns in the data (Hair et al., 2019).

Table 4 presents the Kaiser-Meyer-Olkin (KMO) values, Cronbach's alpha coefficients, and number of items for the variables examined in the research. All KMO values given were higher than 0.9, indicating outstanding quality. This indicates that the sample size was sufficient for factor analysis, and that the data is likely to provide meaningful factors. All scales used to quantify these variables consistently had Cronbach's alpha values over 0.9, indicating a high level of internal consistency and dependability. The dimension reduction removed item 21 due to its lack of reliability. The principle component analysis extracted the remaining items from the principal influence variable as a single component. In the context of the schools in the Western Province of Sri Lanka, it was impossible to distinguish between the instructional leadership and the principals' supervision. The principle component analysis extracted the teachers' self-efficacy items as a single component. The initial iteration of the dimension reduction process for the teachers' performance led to the removal of unreliable items 27, 28, and 29 in the subsequent run. Two dimensions emerged, known as students' achievement (SAE) and teachers' achievement (TA). The results indicated that the measurement scales used in this work possess robust psychometric features, characterized by excellent reliability and sufficient sampling sufficiency for factor analysis.

Table 4: The KMO value and Cronbach's alpha for the studied variables

Variable	**Dimension**	**KMO value**	**Cronbach's Alpha**	**No. of Items**
Principal Influences (PI)		0.938	0.939	10
Teachers' Self-efficacy (TSE)		0.937	0.963	10
Teachers' Performance (TPO)	Students' Achievement (SAE)	0.922	0.919	5
	Teachers' Achievement (TA)			5

STRUCTURAL EQUATION MODELING (SEM)

Structural Equation Modeling (SEM) is a powerful statistical technique used for modeling and analyzing complex relationships among variables. It follows measurement model and then structural model method.

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue VIII August 2024

Figure 1 presents the final measurement model for this study. CMIN/Df 3.761 had a lower value than 5, which was a good fit. The CFI 0.912 value was above 0.9, and it is an acceptable fit. The value of RMSEA 0.079 was below 0.08, which is an acceptable fit. All fit indices of the measurement model could be accepted, according to Hair et al. (2019). According to the fit indices' values, the 30 items in the measurement model were acceptable to fit.

Hair et al. (2019) showed that if an item has a loading factor less than 0.5, it cannot be accepted and needs to be removed from the model. Therefore, the items SAE 70, IIL 52, 54, 55, and 56 were removed for the structural model due to the loading factor being less than 0.5.

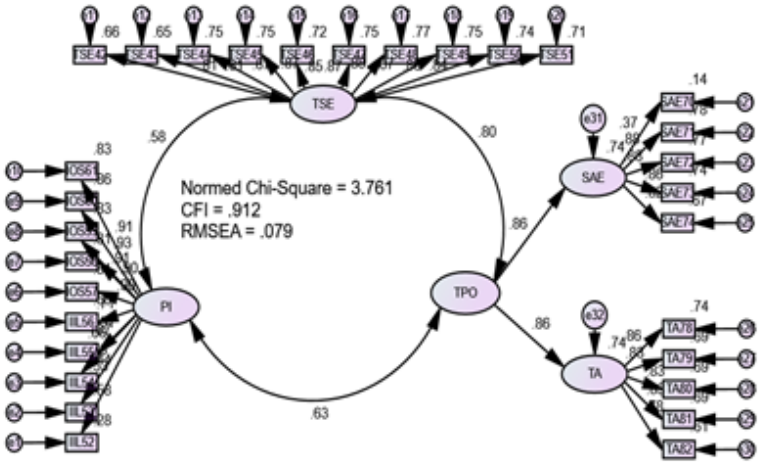

Figure 1: Final measurement model

Figure 2 presents the final structural model for this study. The principal influence acts as an exogenous variable (predictor) in the model. Teachers' self-efficacy acts as both an endogenous variable (influenced by PI) and a mediator. CMIN/Df 3.101 had a lower value than 5, which was a good fit. The CFI 0.951 value was above 0.9, and it is an acceptable excellent fit. The value of RMSEA 0.069 was below 0.08, which is an acceptable fit. All fit indices of the structural model could be accepted, according to Hair et al. (2019). According to the fit indices' values, the 25 items in the structural model were acceptable to fit.

The structural model suggested; principal Influence directly affects Teachers' Self-Efficacy, Principal Influence directly affects Teachers' Performance, and Teachers' Self-Efficacy mediates the relationship between Principal Influence and Teachers' Performance. Therefore, the model demonstrates that Principal Influence has both direct and indirect effects on Teachers' Performance, with Teachers' Self-Efficacy playing a significant mediating role. The strong path coefficient from TSE to TPO (.65) suggests that Teachers' Self-Efficacy has a substantial impact on their performance.

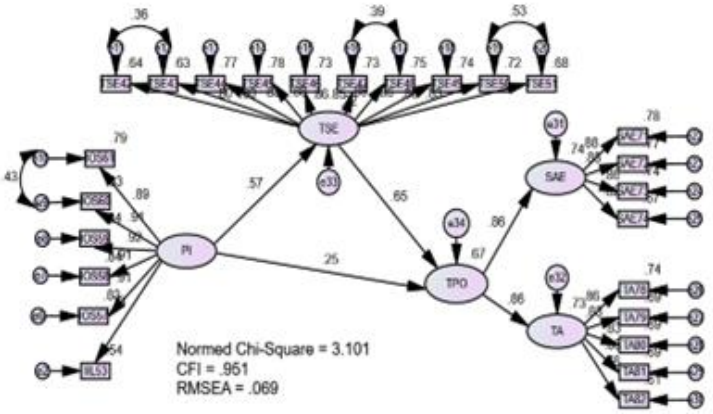

Figure 2: Final structural model

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue VIII August 2024

Table 5 displays the explicit and implicit impacts among primary influences (PI), teachers' self-efficacy (TSE), and teachers' performance (TPO). All effects exhibit statistical significance at a p-value of less than .001 (two-tailed). Principal impacts exert a significant and impactful direct influence on teachers' self-efficacy, whereas their direct influence on teachers' performance is relatively weaker. The influence of principals on teachers' performance is mostly mediated by teachers' self-efficacy. Thus, the teachers' self-efficacy serves as a partial mediator in the connection between the principal's influence and the instructors' performance. On the contrary, the self-efficacy of teachers has a significant and direct impact on their performance.

Table 5: The direct and indirect effects between the variables

Dependent variables	**Indirect effects**					**Direct effects**		
	PI			**TSE**		**PI**		**TSE**
	UB	**LB**	**UB**	**LB**	**UB**	**LB**	**UB**	**LB**
TSE					.74	.50	.00	.00
TPO	.48	.27			.38	.13	.72	.48

Significant at $p < .001$ (two-tailed)

(Note: UB- Upper bound, LB – Lower bound)

Table 6 presents, all hypothesis are supported. Principal influence is significantly impact on the teachers' self-efficacy as well as their performances. However, the direct impact between PI and TSE is moderately high and the relationship between PI and TPO is week. Due to the teachers' self-efficacy and teachers' performance has a strong positive correlation; principals need to make their influences for improving the teachers' self-efficacy.

Table 6: The hypothesis testing summary

	Hypothesis	**Results**
H1	There is a relationship between principal influence and science teaching performances in primary grades.	Supported
H2	There is a relationship between principal influence and the primary teachers' self-efficacy.	Supported
H3	The relationship between principal influence and the science teaching performances in primary grades is mediated by teachers' self-efficacy.	Supported

DISCUSSION, IMPLICATION, AND CONCLUSION

Agasisti et al. (2019) discovered that 73% of Italian principals reported infrequent supervision of students' work, over 50% rarely gave feedback to teachers to enhance their teaching, and approximately 46% rarely or never observed educational activities in the classroom. Agasisti et al. (2019) conducted the study that did not reveal the significant impact of principals on teachers' effectiveness and student progress. Nevertheless, Rodrigues & De Lima (2021) provide evidence that school leadership has a substantial impact as an internal element that can improve student outcomes. Moreover, there is an increasing worldwide movement advocating for school leaders to take on a more prominent position in the teaching process. As public education becomes more complicated, school stakeholders want administrative leaders to have a greater effect on both internal and external groups. This highlights the need for principals to have increased degrees of influence (Smith et al., 2020). As to the

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue VIII August 2024

instructional leadership theory, the principal has the responsibility to oversee teachers in order to enhance their teaching and learning methodologies (Sukarmin & Sin, 2022).

The direct oversight of teachers' classroom instruction by a school leader leads to teachers obtaining firsthand feedback from the leader, which positively impacts the enhancement of teachers' dedication (Sukarmin & Sin, 2022). The research conducted by Suriagiri et al. (2022) demonstrates that one of the primary objectives of principal supervision is to observe and assess teacher-student interactions within a classroom. Moreover, the study explicates that when a supervisor is content with an individual's performance, it will have an impact on that individual's motivation and job satisfaction. The motivation, supervision, and work satisfaction of school leaders have a substantial and meaningful impact on the performance of teachers, both individually and collectively (Amani et al., 2020). The level of supervision provided by the school administrator significantly affects the performance of the instructors (Amani et al., 2020). According to Asnawati et al. (2021), it is recommended that the principle uphold the practice of valuing and supervising teacher effectiveness by consistently overseeing instruction. These data indicate that the principle exerts a beneficial impact on the performance of the teachers. The study conducted by Pardosi and Utari (2022) demonstrates that effective principle leadership has a pivotal role in enhancing teachers' performance, which in turn positively impacts students' academic achievement. The principal's leadership skills have a notable correlation with teacher competency (Hero, 2020). According to Steinberg and Yang (2022), principal professional development has a significant influence on teacher effectiveness, and there are indications of a decline in teacher turnover. The principal's instructional leadership style significantly influences the level of commitment exhibited by the teachers (Sukarmin & Sin, 2022). The principal's instructional leadership action that influences teacher commitment is the tracking and evaluating of student success (Sukarmin & Sin, 2022). Siswanto et al. (2020) highlighted the need of a capable school principal in effectively handling a subpar environment and instructors of low quality. The direct oversight of teachers' classroom instruction by a school leader leads to teachers obtaining firsthand feedback from the leader, which positively impacts the enhancement of teachers' dedication (Sukarmin & Sin, 2022). The study conducted by Tan (2023) found a good correlation between students' enjoyment and interest in science and principals' instructional management. Furthermore, students who had high levels of these learning attitudes fared well in science. Sarwar et al. (2022) define a leader's leadership style as their method of issuing directives, executing strategies, and motivating subordinates. Principals have a crucial responsibility in establishing the optimal learning atmosphere that facilitates both successful instruction and student acquisition of knowledge (Smith et al., 2020).

Implication

Academic institutions ought to provide leadership development programs specifically designed for school principals. These programs should prioritize training principals with the requisite skills and expertise to effectively offer instructional leadership and supervision, as well as foster supportive school environments. Academic institutions can improve the quality of scientific education in elementary schools by promoting effective leadership.

While the statistical significance of the association between principal influence and science teaching performance is minimal, it does indicate the possibility for principals to have a positive impact on supporting successful science teaching techniques. It is essential for school administrators to provide high importance to establishing a favorable atmosphere that appreciates and encourages science education. This includes offering necessary resources, opportunities for professional growth, and effective instructional guidance.

Recommendations

Promotion of Teacher Self-Efficacy: Recognizing the significant relationship between primary teachers' self-efficacy and science teaching performance, efforts should be made to promote and nurture teachers' confidence in their ability to effectively teach science. School leaders should provide supportive environments that encourage risk-taking and innovation while also offering targeted interventions to address any barriers to self-efficacy development.

Principal Leadership Development: While the correlation between principal influence and science teaching

performance is low, there is still potential for principals to play a more significant role in supporting science education initiatives. Education management should implement leadership training programs to equip principals with the necessary skills and knowledge to provide effective instructional leadership and foster a positive school culture that supports science teaching and learning.

Future Research

Subsequent investigations should examine the precise leadership behaviors and strategies utilized by principals that positively impact the performance of scientific education in elementary schools. This may entail conducting qualitative research to discover optimal strategies and quantitative assessments to evaluate the efficacy of various leadership methods.

Conclusion

The research is in line with a robust theoretical framework as it specifically examines the self-efficacy of instructors in the domain of scientific teaching. In addition, the incorporation of principle impact indicates conformity with Distributed Leadership Theory, which views leadership as a distributed occurrence across an organization, rather than a hierarchical approach.

REFERENCES

1. Agasisti, T., Falzetti, P., & Soncin, M. (2020). School principals' managerial behaviours and students' achievement. *International Journal of Educational Management*, *34*(5), 937–951. https://doi.org/10.1108/ijem-11-2018-0350
2. Amani, M., Jumriadi, & Hafiz, A. M. (2020). THE INFLUENCE OF SCHOOL PRINCIPAL SUPERVISION, MOTIVATION, AND WORK SATISFACTION ON TEACHERS' PERFORMANCE. *International Journal of Early Childhood Special Education (INT-JECSE)*, *29*(5), 804–810. https://doi.org/10.24205/03276716.2020.1078
3. Asnawati, Arafat, Y., & Putra, A. Y. (2021). The Effect of Supervision and Work Motivation of School Principal to the Performance of Elementary School Teachers. *Advances in Social Science, Education and Humanities Research, 565*, 1–5.
4. Azam, S. M. F., Yajid, M. S. A., Tham, J., Khatibi, A., Johar, M. G. M., & Ariffin, I. A. (2021). *Research Methodology: Building Research Skills*. McGraw-Hill Education (Malaysia).
5. Ceylan, E., & Özbal, E. Ö. (2020). THE EFFECTS OF EXTRINSIC AND INTRINSIC FACTORS ON TEACHERS' JOB SATISFACTION IN TALIS 2018. *International Online Journal of Primary Education (IOJPE) ISSN: 1300-915X*, *9*(2), 244–259. http://files.eric.ed.gov/fulltext/EJ1283013.pdf
6. Cockpim, J., & Somprach, K. (2019). Learning Leadership of School Administrators and Teaching Behavior Affecting The Effectiveness of Teacher Professional Development: Hierarchical Linear Model. *The Turkish Online Journal of Educational Technology*, *18*(2), 52–57.
7. Enikanolaye, A. J., & Akanmu, M. A. (2020). Influence of Selected Variables on Mathematics Teaching and Learning in Ilorin South Local Government, Kwara State. *Anatolian Journal of Education*. https://doi.org/10.29333/aje.2020.517a
8. Hair, J. F., Page, M., & Brunsveld, N. (2020a). *Business Research Method* (4th ed.). Routledge.
9. Hair, J. F., Page, M., & Brunsveld, N. (2020b). *Business Research Method* (4th ed.). Routledge.
10. Hero, J. L. (2020). Level Shifting, Workload, School Location, Teacher Competency and Principal Leadership Skills in Public Elementary Schools. *International Journal of Academic Pedagogical Research*, *4*(7), 8–13.
11. Huaisheng, Z., Manu, B. D., Mensah, I. A., Mingyue, F., & Oduro, D. (2019). Exploring the Effect of School Management Functions on Student's Academic Performance: A Dilemma from Public Senior High Schools in Ghana. *Journal of Arts & Humanities*, *8*(6), 33–45.
12. Imhangbe, O. S., Okecha, R. E., & Obozuwa, J. (2018). Principals' leadership styles and teachers' job performance: Evidence from Edo State, Nigeria. *Educational Management Administration & Leadership*, *47*(6), 909–924. https://doi.org/10.1177/1741143218764178
13. Indajang, K., Sherly, Halim, F., & Sudirman, A. (2020). The Effectiveness of Teacher Performance in

Terms of the Aspects of Principal Leadership, Organizational Culture, and Teacher Competence. *Advances in Social Science, Education and Humanities Research, 560*.

14. Kanya, N., Fathoni, A. B., & Ramdani, Z. (2021). Factors affecting teacher performance. *International Journal of Evaluation and Research in Education (IJERE), 10*(4), 1462. https://doi.org/10.11591/ijere.v10i4.21693
15. Li, J., Chan, P. W. K., & Hu, Y. (2023). The Effects of Principals' Instructional Leadership on Primary School Students' Academic Achievement in China: Evidence from Serial Multiple Mediating Analysis. *Sustainability, 15*(3), 2844. https://doi.org/10.3390/su15032844
16. Mcleod, S. (2020, December 7). *Jean Piaget's Theory and Stages of Cognitive Development*. Simply Psychology. https://www.simplypsychology.org/piaget.html
17. Ministry of Education, Sri Lanka. (2020). *2019 Annual Performance Report*.
18. National Education Commission. (2017). *New Education Act for General Education in Sri Lanka*. National Education Commission, Sri Lanka. http://nec.gov.lk/wp-content/uploads/2017/12/Towards-a-New-Education-Act.pdf
19. National Institute of Education, Sri Lanka. (2019). *General Teacher Guide - Grade 5* (1st ed.). Education Publication Department, Sri Lanka.
20. NEC. (2022). NATIONAL EDUCATION POLICY FRAMEWORK (2020-2030). In *www.nec.gov.lk*. National Education Commission, Sri Lanka.
21. O'Connor, G., Fragkiadaki, G., Fleer, M., & Rai, P. (2021). Early Childhood Science Education from 0 to 6: A Literature Review. *Education Sciences, 11*(4), 178. https://doi.org/10.3390/educsci11040178
22. Pardosi, J., & Utari, T. I. (2022). Effective principal leadership behaviors to improve the teacher performance and the student achievement. *F1000Research, 10*(465), 1–29.
23. Rodrigues, H., & De Lima, J. R. P. (2021). Instructional leadership and student achievement: school leaders' perspectives. *International Journal of Leadership in Education*, 1–25. https://doi.org/10.1080/13603124.2020.1869312
24. Sarwar, U. N., Tariq, R., & Yong, Q. (2022). Principals' leadership styles and its impact on teachers' performance at college level. *Frontiers in Psychology, 13*. https://doi.org/10.3389/fpsyg.2022.919693
25. Saunders, M. N. K., Lewis, P., & Thornhill, A. (2019). *Research Methods for Business Students* (8th ed.). Pearson Education.
26. Sekaran, U., & Bougie, R. (2020). *Research Methods for Business A Skill-Building Approach* (8th ed.). John Wiley & Sons Ltd.
27. Siswanto, H., Hariri, H., Sowiyah, S., & Ridwan, R. (2020). The influence of principal performance on teachers' pedagogical competence. *Journal of Social, Humanity, and Education*. https://doi.org/10.35912/jshe.v1i1.259
28. Smith, P. A., Escobedo, P., & Kearney, W. S. (2020). Principal Influence: A Catalyst for Positive School Climate. *International Journal of Education Policy and Leadership, 16*(5). https://doi.org/10.22230/ijepl.2020v16n5a961
29. Steinberg, M. P., & Yang, H. (2022). Does Principal Professional Development Improve Schooling Outcomes? Evidence from Pennsylvania's Inspired Leadership Induction Program. *Journal of Research on Educational Effectiveness, 15*(4), 799–847. https://doi.org/10.1080/19345747.2022.2052386
30. Stroud, G. L. (2021, June 21). *Great Principals Are Strong Instructional Leaders First*. https://www.edpost.com/stories/great-principals-are-strong-instructional-leaders-first
31. Sukarmin, S., & Sin, I. (2022). INFLUENCE OF PRINCIPAL INSTRUCTIONAL LEADERSHIP BEHAVIOUR ON THE ORGANISATIONAL COMMITMENT OF JUNIOR HIGH SCHOOL TEACHERS IN SURAKARTA. *Malaysian Journal of Learning & Instruction, 19*. https://doi.org/10.32890/mjli2022.19.2.3
32. Sukmaswati, I., Lian, B., & Wardiah, D. (2020). The Influence of Principal's Leadership and Teacher's Performance on Student' Achievement. *International Journal of Progressive Sciences and Technologies, 20*(1), 247–254.
33. Suriagiri, S., Akrim, A., & Norhapizah, N. (2022). The influence of school principal supervision, motivation, and work satisfaction on teachers' performance. *Cypriot Journal of Educational Sciences, 17*(7), 2523–2537. https://doi.org/10.18844/cjes.v17i7.7684
34. Tan, C. Y. (2023). Influence of principal leadership across contexts on the science learning of students. *Asia Pacific Education Review*. https://doi.org/10.1007/s12564-023-09828-2

35. Taştan, S., Davoudi, S. M. M., Masalimova, A. R., Bersanov, A. S., Kurbanov, R. A., Boiarchuk, A. V., & Pavlushin, A. A. (2018). The Impacts of Teacher's Efficacy and Motivation on Student's Academic Achievement in Science Education among Secondary and High School Students. *EURASIA J Math Sci Tech Ed*, *14*(6), 2353–2366. https://doi.org/10.29333/ejmste/89579
36. Winarno, N., Rusdiana, D., Riandi, Susilowati, E., & Afifah, R. M. A. (2020). Implementation of integrated science curriculum: a critical review of the literature. *Journal for the Education of Gifted Young Scientists*, *8*(2), 795–817. https://doi.org/10.17478/jegys.675722