Teachers' Perceptions of the Effectiveness of Internal Supervision: A Study Among Science Teachers

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Abstract

Internal supervision is a critical collaborative process designed to enhance instructional quality, yet its subject-specific effectiveness remains underexplored in science education. With the aim of evaluating teachers' perceptions of internal supervision among science teachers in a target division of the Northern Province, Sri Lanka, this study focused on evaluating the effectiveness of internal supervision regarding **(**1) PCK enhancement, (2) laboratory management, (3) psychological environment, and (4) professional development among science teachers. Using a descriptive survey research design, a census sample (N = 14) was drawn from eight schools. Data were collected via a structured Google Forms questionnaire and analyzed quantitatively. The findings address four objectives: First, the perceived effectiveness of providing instructional support and enhancing PCK was high (M = 3.57). Second, Laboratory Management and safety protocols received the lowest rating (M = 3.08), hindered by an "Expertise Gap" where 78.6% of supervisors lack a science background. Third, while a robust psychological environment exists (M = 4.14), Mann-Whitney U tests indicated that the presence of feedback sessions did not yield statistically significant differences in perceived effectiveness (p = .059). Fourth, internal supervision strongly drives Professional Development (M = 3.91), supported by a very strong positive correlation (r = .820, p < .001) between PCK support and professional growth. As a pilot study, the results are context-specific and highlight the need for subject-matter congruence in supervisory roles. Therefore, it is recommended that the school transition toward a Subject-Specific Supervision Model, ensuring that science teachers are mentored by supervisors with relevant expertise. Furthermore, targeted professional development for current internal supervisors is essential to bridge the technical gap in laboratory safety and specialized science pedagogy.

Keywords: Internal Supervision, Science Education, Laboratory Management, Pedagogical Content Knowledge

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Introduction

Science education plays a pivotal role in the socio-economic development of a nation, fostering innovation and critical thinking (Avwiri & Okey, 2022). In Sri Lanka, the Ministry of Education has prioritized science and technology through specialized school establishments to enhance national performance in G.C.E. examinations (MOE, 2020). However, the quality of this instruction is inextricably linked to the efficacy of instructional supervision, which serves as the primary mechanism for school-based teacher development. Central to this process is the enhancement of Pedagogical Content Knowledge (PCK), a concept introduced by Shulman (1986), who argued that effective teaching requires an intersection of subject matter expertise and pedagogical skill.

In the Sri Lankan context, internal supervision is a collaborative process involving Principals and Subject Coordinators (Jayasinghe & Perera, 2020). While an official framework for School-Based Teacher Development exists, research suggests that supervision in local schools often remains predominantly administrative, focusing on record-book inspection rather than pedagogical growth (Kumari, 2022). For science teachers, these challenges are unique; unlike the humanities, science instruction necessitates laboratory management, safety protocols, and inquiry-based practical (Avwiri & Okey, 2022). As Thapa (2021) notes, the transition from general oversight to subject-specific supervision remains a significant challenge in South Asia, often resulting in a "supervisory mismatch" where generalist administrators oversee specialist educators.

This mismatch creates distinct operational hurdles. Jayasinghe and Perera (2020) identified that supervisor impact is frequently diluted by a lack of confidence in providing technical feedback for specialized subjects. This is particularly evident in practical components; Jayawardena (2021) emphasizes that laboratory safety and resource management in rural schools often fall below standard due to a lack of specialized oversight. These findings align with broader provincial analyses by Fernando et al. (2023), which suggest that while quality assurance structures are robust on paper, the qualitative impact on classroom instruction varies significantly based on the supervisor's background.

Furthermore, the relationship between the supervisor and teacher is a critical determinant of success. Tesfaw and Hofman (2021) demonstrate that supervision perceived as collaborative rather than punitive significantly increases teacher commitment. In the Northern Province specifically, Gunawardane (2022) found that the school environment, characterized by trust, plays a pivotal role in how teachers

internalize feedback (Dewodo et al., 2020). This highlights a unique duality: while there may be an "Expertise Gap" in technical subject matter, the "Psychological Environment" (Podador, 2025) often remains high. Understanding how these factors interact is essential for enhancing instructional quality. Consequently, this study seeks to evaluate the perceptions of science teachers regarding the effectiveness of these internal processes within the Northern Province.

Aim and Objectives

Aim

The aim of this research is to evaluate the perceived effectiveness of internal supervision practices among secondary school science teachers in the Northern Province of Sri Lanka, specifically focusing on how these practices influence instructional quality, laboratory management, and professional growth.

Objectives of the Study

1. To assess the perceived effectiveness of internal supervision in providing instructional support and enhancing the PCK of science teachers.
2. To evaluate the extent to which internal supervision addresses technical requirements specific to science education, such as laboratory management and safety protocols.
3. To investigate the influence of the psychological environment and professional trust on teachers' receptivity to internal supervisory feedback.
4. To determine the impact of internal supervision on the continuous professional development and instructional enhancement of science teachers.

Literature Review

Theoretical Framework: The Clinical Supervision Model

The foundation of modern instructional supervision is rooted in the Clinical Supervision Model, which emphasizes a face-to-face relationship between the supervisor and the teacher to improve classroom instruction. According to Podador (2025), this process must involve a five-stage cycle: the pre-observation conference, observation, analysis, post-observation conference, and post-analysis. For science teachers, this cycle is critical because it allows for the discussion of technical laboratory setups before the lesson and the evaluation of scientific inquiry after the lesson (Avwiri & Okey, 2022).

Dimension 1: Instructional Support and PCK

The primary goal of internal supervision is the enhancement of PCK, the ability of a teacher to transform complex subject matter into a form that students can understand. Shulman (1986) introduced PCK as a unique province of teachers, and in the context of science, this involves simplifying abstract theories.

Recent research in the South Asian context by Thapa (2021) suggests that supervisors often lack the subject-specific expertise to provide meaningful PCK support. This mirrors findings in Sri Lanka, where Kumari (2022) noted that supervision in Type 2 and Type 3 schools is often reduced to checking of lesson plans and records, rather than providing technical feedback on how to teach difficult science concepts. Furthermore, Fernando et al. (2023) emphasized that in the Sri Lankan "1AB" and "1C" school systems, supervisors prioritize syllabus coverage over the quality of instructional delivery, leaving science teachers with little guidance on innovative pedagogy.

Dimension 2: Laboratory Management and Technical Safety

Science education is distinct from other disciplines due to its heavy reliance on practical work and laboratory environments. Avwiri and Okey (2022) proposed a "Scientific Supervision Model," arguing that general instructional supervision is insufficient for science teachers. They contend that a supervisor must evaluate the teacher's ability to manage laboratory resources, ensure chemical safety, and facilitate student-led experiments.

In many developing nations, including Sri Lanka, laboratory resources are often limited. Jayawardena (2021) highlighted that science teachers in rural zones, such as the Northern and Eastern Provinces, face significant challenges in maintaining safety standards due to inadequate infrastructure. If internal supervisors do not possess a science background, they are often unable to assess whether a teacher is using equipment correctly or if safety protocols are being followed. This "expertise gap" creates a disconnect where the teacher feels the supervisor's feedback is irrelevant to the actual "hands-on" challenges of the science room (Jayasinghe & Perera, 2020).

Dimension 3: Psychological Environment and Professional Trust

The effectiveness of any supervisory process is filtered through the Psychological Environment of the school. Dewodo et al. (2020), in their study of schools in Ghana, discovered that when teachers perceive supervision as a "policing" or "fault-finding" mission, they become defensive and are less likely to implement feedback. This results in a "performance" for the supervisor rather than genuine professional growth.

In Sri Lanka, the hierarchical nature of the school system can often lead to an environment of anxiety. Gunawardane (2022) observed that the relationship between the Sectional Head and the teacher is frequently characterized by power distance rather than professional collaboration. For science teachers, who may face "failed experiments" during a lesson, a high-trust environment is essential. Without professional trust, teachers avoid taking pedagogical risks, such as trying new inquiry-based methods, for fear of a negative evaluation in their official records (Jayasinghe & Perera, 2020).

Dimension 4: Professional Development and Instructional Enhancement

The ultimate measure of supervisory effectiveness is Instructional Enhancement, the visible improvement in teaching quality and student learning outcomes. Podador (2025) argues that internal supervision must serve as a diagnostic tool for SBTD. Rather than being a repetitive annual check, it should identify the specific needs of the teacher, such as training in ICT integration or modern lab techniques.

However, a study by Muthusamy (2024) on Sri Lankan secondary schools found that there is a weak correlation between the frequency of supervision and the professional growth of teachers. This suggests that while supervision is happening regularly, the quality of the feedback is not high enough to drive development. Tesfaw and Hofman (2021) further noted that for supervision to lead to enhancement, there must be a follow-up mechanism where the supervisor and teacher collaborate on long-term goals, but this practice remains rare in the busy schedules of Sri Lankan schools (Jayasinghe & Perera, 2020).

Barriers to Effective Supervision in Sri Lanka

A consistent theme in local literature is the "Dual Burden" of internal supervisors. As Jayasinghe & Perera (2020) point out, Sectional Heads and Subject Coordinators are often full-time teachers themselves. This results in rushed

observations and a lack of post-observation conferences. Additionally, the lack of formal training in supervisory skills for school leaders is a major bottleneck. As Perera (2023) noted, being a "senior teacher" does not automatically make one a "good supervisor", yet seniority remains the primary criterion for appointment in most Sri Lankan schools.

Methodology

This study employed a descriptive survey research design using a quantitative approach. To maintain the anonymity of the participating schools and teachers, the study was conducted in a specific educational division within the Northern Province of Sri Lanka. Since the total population of science teachers across the eight schools in this division (one 1AB, one 1C, and six Type II schools) is inherently low (N = 14), census sampling was utilized to include every member of the population in the study. This research serves as a pilot study to evaluate the supervisory framework within this specific regional context and to provide a foundation for an expanded study involving a larger population. Data were collected via a self-administered Google Form consisting of 20 Likert-type questions categorized under four supervisory dimensions, developed based on existing literature and identified research gaps. The data were analyzed using SPSS, utilizing frequency and percentage distributions for demographic profiles, and Mean and Standard Deviation to assess the effectiveness of each dimension. Due to the small sample size, it was expected that the assumption of normality would not be satisfied; therefore, a non-parametric test, the Mann-Whitney U test, was performed to explore group differences, while the Pearson Correlation test was utilized to examine the relationships between dimensions.

Results and Discussion

Demographic Characteristics of the Respondents

The demographic profile of the respondents (N = 14) provides a comprehensive overview of the professional background of the science teachers participating in the study. In terms of educational qualifications, the majority of the participants (78.6%) hold a university degree, while 21.4% are diploma holders. This indicates that the sample is academically well-equipped to handle the secondary science curriculum. Regarding their professional qualifications, a significant proportion of the teachers (64.3%) have completed the Post Graduate Diploma in Education, followed by 28.6% who hold a Master of Education degree. This high level of professional training suggests that the respondents are theoretically grounded in pedagogical practices.

The distribution of teaching experience reveals a relatively mid-career workforce. Exactly half of the respondents (50%) have four to seven years of experience, while 28.6% fall into the eight to ten years. A smaller group consists of more seasoned educators with 11 to 15 years of experience (14.3%). This experience profile is ideal for a study on supervision, as these teachers have moved past the initial "induction" phase and can provide critical insights into how supervision affects their established teaching routines.

Finally, the teacher grade distribution shows that a vast majority of the participants **(**71.4%) belong to Grade 2-II of the Sri Lanka Teachers' Service (SLTS), with a smaller percentage represented in Grade 2-I (14.3%), 3-I A (7.1%), and 3-I B (7.1%). Collectively, these statistics describe a sample of professionally qualified, mid-career educators who are likely to have a balanced and mature perception of the internal supervision processes within their schools (Table 1).

Table 1

Demographic Characteristics of the Respondents

Demographic Characteristic	Category	Frequency	Percentage
Educational Qualification	Degree	11	78.6
	Diploma	3	21.4
Professional qualification	MEd	4	28.6
	National Diploma	1	7.1
	PGDE	9	64.3
Experience	11-15	2	14.3
	4-7	7	50.0
	7-10	1	7.1
	8-10	4	28.6
Teacher grade	2-I	2	14.3
	2-II	10	71.4
	3-I A	1	7.1
	3-I B	1	7.1

Nature and Frequency of Internal Supervision

This section explores the structural implementation of the supervision process within the schools. According to Table 2, half of the respondents (50.0%) are supervised three times per term, while 21.4% receive supervision more than three times. A smaller proportion of teachers reported being supervised twice (14.3%) or only once (14.3%) per term. These findings suggest that the frequency of internal

supervision for science teachers is remarkably high, exceeding the "once-per-term" administrative minimum often reported in broader Sri Lankan studies (Kumari, 2022). This high frequency indicates a robust monitoring system, potentially providing more opportunities for instructional intervention and continuous professional growth.

Furthermore, the nature of the supervision appears to be highly interactive and collaborative. A vast majority of the participants (85.7%) reported that their supervisors held a feedback session following the classroom observation, while only 14.3% indicated the absence of such sessions (Table 2). The high prevalence of feedback sessions in this sample suggests that supervision is moving beyond a mere "fault-finding" inspection and is instead functioning as a developmental dialogue. This aligns with the recommendations of Podador (2025), who emphasizes that effective supervision must be rooted in meaningful communication to achieve instructional enhancement.

Table 2

Nature and Frequency of Internal Supervision

Variable	Category	Frequency	Percentage
Number of supervisions per term	More than three	3	21.4
	Once	2	14.3
	Thrice	7	50.0
	Twice	2	14.3
Having Feedback session	No	2	14.3
	Yes	12	85.7

However, from a critical standpoint, this dense monitoring schedule creates a compliance trap if it is not paired with specialist expertise. When administrative checks occur up to three times a term, yet lack a subject-specific lens, they run the risk of becoming routine accountability exercises rather than transformative pedagogical interventions. For school leaders, the implication is clear: the existing administrative avenues and contact hours are fully sufficient, but the internal focus of these sessions must urgently pivot from verifying structural checklist compliance to cultivating deep, subject-specific mentorship.

Perceived Effectiveness of Internal Supervision Dimensions

The descriptive statistics for the four dimensions of internal supervision reveal a varied perception of effectiveness among science teachers. To interpret these results,

a mean score of 3.41 - 4.20 is considered “High Effectiveness”, while 2.61 - 3.40 is considered “Moderate Effectiveness”.

The highest-rated dimension is Psychological Environment, with a mean of 4.14 (*SD* = 0.75). This indicates that teachers perceive a high level of professional trust and a supportive atmosphere during the supervision process. This positive environment is likely a direct result of the high frequency of feedback sessions (85.7%) reported in the previous section. According to Dewodo et al. (2020), a positive psychological environment is essential for reducing teacher anxiety and ensuring that supervision is not viewed as a “fault-finding” mission.

The dimension of Professional Development also received a high rating with a mean of 3.91 (*SD* = 0.95). This suggests that science teachers generally believe the internal supervision process contributes to their long-term professional growth and instructional enhancement. This aligns with the findings of Podador (2025), who argues that when supervision is continuous and communicative, it effectively serves as a tool for teacher development.

Instructional Support and PCK were rated as highly effective but with a slightly lower mean of 3.57 (*SD* = 1.03). The higher standard deviation here suggests a greater level of disagreement among teachers; some feel very supported in their teaching methods, while others may feel the pedagogical advice is less relevant to their specific needs.

Notably, the lowest-rated dimension is Laboratory Management, which falls into the “Moderate” category with a mean of 3.09 (*SD* = 1.06) (Table 3). This explicit weakness mirrors the “expertise gap” highlighted by Avwiri and Okey (2022), who emphasize that supervisors often lack the subject-specific technical knowledge required to guide teachers in laboratory management and scientific inquiry.

Table 3

Perceived Effectiveness of Internal Supervision Dimensions

Dimensions	*N*	*M*	*SD*
PCK	14	3.57	1.03
Laboratory Management	14	3.09	1.06
Psychological Environment	14	4.14	0.75
Professional Development	14	3.91	0.95

The noticeable drop in effectiveness ratings when moving from the humanistic dimension of Psychological Environment to the technical dimension of Laboratory

Management exposes a critical vulnerability in the SBTD model. This pattern indicates that while internal supervisors possess the soft skills and leadership traits necessary to lower teacher anxiety and foster administrative trust, they face an operational barrier when stepping into specialized spaces like science laboratories. This disparity proves that a supportive school environment, while foundational, cannot compensate for a lack of practical, technical oversight. Consequently, internal supervision is currently functioning as an effective emotional and general professional anchor, but it fails to act as a mechanism for upgrading technical safety protocols or inquiry-based classroom practices.

Comparative Analysis of Feedback Sessions on Perceived Effectiveness

To further investigate the impact of the supervisory process, a Mann-Whitney U Test was conducted to determine if the presence of a post-observation feedback session significantly influenced teachers' perceptions of effectiveness. This non-parametric approach was selected due to the small, unequal group sizes (N = 12 for feedback; N = 2 for no feedback) and the requirement to analyze data without assuming a normal distribution. The consolidated results for all four dimensions are presented in Table 4.

Table 4

Mann-Whitney U Test Results Comparing Feedback Sessions and Perceived Effectiveness

Dimensions	Feedback Group	*N*	Mann-Whitney *U*	Wilcoxon *W*	*p*-value (2-tailed)
PCK	Yes No	12 2	6.00	9.00	.271
Laboratory management	Yes No	12 2	10.00	13.00	.712
Psychological Environment	Yes No	12 2	10.50	13.50	.781
Professional Development	Yes No	12 2	10.00	13.00	.711

The analysis indicates that there were no statistically significant differences in perceived effectiveness between teachers who received feedback sessions and those who did not across any of the four dimensions ($p > .05$ for all cases). Specifically, the differences in PCK (U = 6.00, p = .271), Laboratory Management (U = 10.00, p = .712), Psychological Environment (U = 10.50, p = .781), and Professional Development (U = 10.00, p = .711) did not reach statistical significance. While these

p-values suggest that the presence of feedback does not create a statistically measurable difference in this specific group, this result is primarily data-constrained due to the extremely small sample size of the "No Feedback" group ($N = 2$).

However, looking past the sample size constraint, this statistical non-significance provides a profound insight into the qualitative nature of school-based dialogues. It demonstrates that the mere administrative act of holding a post-observation meeting yields no automatic advantage in how teachers perceive the value of instructional support. This aligns with the observations of Podador (2025), who argues that the qualitative value of a feedback session as a developmental dialogue is far more critical than its mere presence or absence in a structural sense.

In this specific context, the lack of a statistical divide strongly indicates that the feedback currently being delivered is generic and pedagogical rather than diagnostic or science-focused. For a science educator, a post-observation conference that ignores laboratory dynamics, complex safety protocols, or specialized conceptual delivery provides very little practical utility. Therefore, this finding serves as empirical justification that the structural occurrence of feedback remains an empty administrative exercise unless the content of that dialogue is technically enriched by subject-matter expertise.

Subject-Matter Congruence between Teachers and Supervisors

A critical factor influencing the effectiveness of instructional supervision, particularly in a technical field like science, is the subject-matter expertise of the supervisor. Table 5 presents a cross-tabulation of the teaching subjects of the respondents against the subject expertise of their internal supervisors.

The data reveal a significant "Expertise Gap" within the sample schools. While all respondents are science teachers, only 21.4% are supervised by individuals with a background in science. Conversely, a vast majority (78.6%) of science teachers are supervised by heads or coordinators from other disciplines, such as arts, commerce, or humanities.

According to Avwiri and Okey (2022), effective science supervision requires a "Scientific Supervision Model" where the supervisor can provide technical guidance on laboratory safety, chemical handling, and inquiry-based practicals. This overwhelming 78.6% structural mismatch acts as the root institutional cause behind the low laboratory management scores identified in this study. When nearly four out of five internal supervisors are trained in humanities or commerce, they are

fundamentally unequipped to critique complex specialized spaces, chemical hygiene, volatile resource management, or the nuances of scientific inquiry.

Consequently, the lack of subject-matter congruence forces the internal supervision process to inevitably shift away from technical oversight toward generic administrative compliance. Generalist administrators are structurally restricted to evaluating specialist science teachers on superficial, outward traits, such as attendance records, or lesson plan templates, while completely bypassing the core competencies of practical science instruction. This qualitative gap explains why teachers perceive the psychological environment to be highly effective, as trust and rapport are general leadership traits, while simultaneously finding technical laboratory support significantly lacking. Ultimately, this mismatch highlights a systemic vulnerability in the school-based monitoring framework that requires a deliberate policy shift toward subject-specific peer or divisional oversight.

Table 5

Subject-Matter Congruence between Teachers and Supervisors

Teaching Subject		Supervisors Subject	
		Science	Other Subject
Teaching subject	Science	21.4%	78.6%

Relationship Between Dimensions of Internal Supervision

To examine the relationship between the four dimensions of internal supervision, a Pearson Correlation analysis was conducted. The results, as displayed in Table 6, reveal several statistically significant and strong positive relationships among the variables.

The most significant finding is the very strong positive correlation between Instructional Support and Professional Development (r = .820, p < .001). This suggests that when supervisors effectively support a teacher's PCK, it directly and powerfully enhances the teacher's overall professional growth. Similarly, Laboratory Management shows a strong correlation with Professional Development (r = .814, p < .001), indicating that technical support in the lab is nearly as influential to a science teacher's growth as general pedagogical support.

Furthermore, Psychological Environment maintains a significant positive relationship with all other dimensions, most notably with Professional Development (r = .757, p < .001). This reinforces the earlier finding that a high-trust, low-anxiety environment is a prerequisite for effective instructional enhancement. Interestingly,

while Laboratory Management and Psychological Environment are positively related (r = .516), this was the only relationship that failed to reach statistical significance at the .05 level (p = .059).

This statistical breakdown highlights a clear operational division between emotional trust and technical capability. It proves that professional rapport and a friendly school environment do not automatically translate into safer laboratories or better-managed scientific environments. While a supportive atmosphere is critical for general teacher receptivity, it cannot compensate for a supervisor's lack of technical literacy. A science teacher may highly respect and trust an internal supervisor, but that trust does not bridge the expertise gap required for laboratory oversight. Consequently, this statistical independence underscores that subject-matter congruence is a non-negotiable requirement for technical instructional supervision that cannot be bypassed by simply maintaining a warm or collaborative school environment.

Table 6

Relationship Between Dimensions of Internal Supervision

		PCK	LM	PE	PD
PCK	Pearson Correlation	1			
	Sig. (2-tailed)				
LM	Pearson Correlation	.621	1		
	Sig. (2-tailed)	.018			
PE	Pearson Correlation	.658	.516	1	
	Sig. (2-tailed)	.011	.059		
PD	Pearson Correlation	.820	.814	.757	1
	Sig. (2-tailed)	.000	.000	.002	

Note. LM = Laboratory management, PE = Psychological Environment, and PD = Professional Development

Limitation of the Study

The study area was restricted to a single educational division, and the target population was small (N = 14). While census sampling was utilized to ensure complete representation within this division, the small size necessitated treating this as a pilot study. Consequently, the findings regarding supervisory effectiveness and subject-matter mismatch are context-specific and cannot be generalized to the national level. It is therefore recommended that future research be conducted on a larger scale, covering a more extensive geographic area and a more diverse population of science teachers to validate these results.

Conclusion and Implications

This study concludes that internal supervision within the target division is structurally consistent but technically constrained by a significant subject-expertise gap. Based on the analysis of the four research objectives, the following conclusions are drawn.

Firstly, science teachers perceive internal supervision to be effective in providing general instructional support and monitoring PCK, with a mean score of 3.57. While this indicates a positive perception, it suggests that the pedagogical support provided is perceived as slightly less effective than the broader professional development initiatives, likely due to the general nature of supervision.

Secondly, the study identifies a critical technical gap. Laboratory Management and Safety Protocols received the lowest rating of all dimensions (M = 3.09). This moderate effectiveness is directly linked to the "Expertise Gap", where 78.6% of science teachers are supervised by individuals from non-science backgrounds. Consequently, specialized technical guidance essential for science education is frequently overlooked.

Thirdly, the Psychological Environment emerged as the strongest dimension of the supervisory process (M = 4.14). Despite the lack of subject-specific expertise, a high level of professional trust exists between teachers and supervisors. This ensures that teachers remain highly receptive to feedback. While 85.7% of teachers receive formal feedback, the Mann-Whitney U test confirmed that this alone does not create a statistically significant difference in perceived effectiveness (p = .059), indicating that the quality and relevance of the feedback are more critical than its mere occurrence.

Finally, internal supervision was found to be most effective in driving Continuous Professional Development and Instructional Enhancement, which earned a high mean score of 3.91. The very strong positive correlation (r = .820, p < .001) between PCK support and professional growth further highlights that when supervisors focus on pedagogical enhancement, it directly fosters a commitment to professional excellence

Implications of the Study

The findings of this research have important implications for educational policy and school leadership within the Sri Lankan school system:

Policy Implications

School management should prioritize subject-matter congruence when appointing Subject Coordinators and Sectional Heads. Seniority alone is an insufficient criterion for supervising technical subjects like science. Also, there is an urgent need for professional development programs specifically for internal supervisors that focus on "Scientific Supervision Models", including laboratory safety oversight and the management of inquiry-based practical.

Practical Implications for School Leaders

Given that 78.6% of supervisors are not science experts, schools should implement Peer-Supervision models where science teachers from the same school or different schools support their colleagues, even if they do not hold a formal administrative rank. Further, school leaders should ensure that the "observation" phase of supervision explicitly includes laboratory sessions, rather than just classroom-based theory lessons, to address the current weakness in laboratory management support.

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