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Quality Assurance for STEM Education:
School Inspection Practices and Implementation Challenges in Cambodia

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Abstract

Educational quality assurance is essential for strengthening institutional conditions that support effective teaching and learning, including STEM education. However, the effectiveness of school inspection depends not only on compliance with evaluation procedures but also on school leaders' capacity to implement recommendations for institutional improvement. This study examines school inspection practices, principals' engagement with inspection recommendations, and implementation challenges in lower secondary schools in Cambodia. Employing quantitative data collected from 38 teachers. Teachers' ratings indicated favorable perceptions of principals' inspection-related practices before (M = 4.16, SD = 0.70), during (M = 4.05, SD = 0.74), and after inspections (M = 3.91, SD = 0.82). Perceived engagement with inspection recommendations was also positive (M = 4.01, SD = 0.78). Nevertheless, implementation was constrained by limited financial and human resources, delayed inspection reports, insufficient communication of findings, limited community involvement, and infrequent follow-up inspections. The findings highlight a distinction between positive engagement with quality assurance procedures and the institutional capacity to translate inspection feedback into sustained improvement. For STEM education, this distinction underscores the importance of examining whether school quality assurance systems provide the organizational and instructional conditions necessary to support effective teaching and learning. The study contributes context-sensitive evidence to international discussions on educational quality assurance while identifying implementation conditions that warrant further investigation in STEM-specific settings.

Keywords: STEM education; Educational quality assurance; School inspection practices; School leadership; Institutional capacity; Educational improvement

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INTRODUCTION

Education is conceptualized as a holistic process dedicated to training and developing the physical, mental, intellectual, and moral capabilities of learners. Through diverse educational activities, students acquire essential knowledge, practical skills, competencies, and core ethical values that enable them to transform into well-rounded, responsible citizens who contribute outer value to themselves, their families, local communities, the nation, and the global society (ASEAN, 2025; Delors et al., 1996; Hare, 2006; Pellanda, 2024; UNESCO, 2015). Guided by this vision, the Ministry of Education, Youth and Sports (MoEYS, 2019a) committed to a shared international policy framework during the World Education Forum in Incheon, Republic of Korea, on May 21, 2015. This policy prioritizes sustainable educational systems, ensuring equitable, inclusive, and high-quality education while expanding lifelong learning opportunities for all stakeholders. This vision was further strengthened under the Five-Pronged Strategy for Growth, Jobs, Equity, Efficiency, and Sustainability, Phase 1 of the 7th Mandate of the Royal Government of Cambodia, where human capital development was officially identified as an absolute top priority for national development (RGC, 2023).

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To successfully implement these important national goals, the Ministry of Education, Youth and Sports has developed and implemented 1 key education policy: "Ensure that all Cambodians receive quality, equitable and inclusive education, full of knowledge, skills, discipline, ethics and good behavior, as well as good health, physical fitness and lifelong learning" (MoEYS, 2024). Crucially, academic scholars and policy architects emphasize that quality assurance is fundamentally anchored in school inspections (MoEYS, 2026). Based on MoEYS (2024), improving educational quality across Cambodia necessitates robust inspection regimes designed to bolster school-level efficiency and operational standards. Under the Education, Youth, and Sports Sector Reform Strategy, five strategic educational pillars were established to serve as the structural foundation leading towards 2030:

Pillar 1: Implementation of the Teacher Policy Action Plan
Pillar 2: Review of curriculum, textbooks, and the development of the learning environment
Pillar 3: Implementation of inspection work
Pillar 4: Strengthening of academic assessments, including examinations and national, regional, and international assessments.
Pillar 5: Higher education reform

The Education Quality Inspection Department (EQID) is tasked with executing the third pillar of this reform strategy, focusing primarily on the coordination and implementation of thematic and periodic (systematic) school inspections. While MoEYS has developed and distributed highly standardized tools for conducting these periodic evaluations, severe research gaps remain concerning the micro-level dynamics of these inspections. Specifically, there is little clarity regarding the precise relational dynamics between school principals and education inspectors before, during, and after inspections. Furthermore, it remains highly uncertain whether school principals actively utilize these inspection reports to enact school improvement. Although inspectors spend two weeks evaluating provincial schools and compiling detailed periodic inspection reports containing recommendations to address institutional shortcomings (EQID, 2021b), academic literature has yet to determine whether school principals genuinely accept, reject, or fail to implement these recommendations. To address these knowledge gaps, this study investigates school inspection practices, school leaders' engagement with inspection recommendations, and the institutional challenges affecting quality assurance in Cambodian lower secondary schools. Although the study does not directly assess STEM-specific teaching or learning outcomes, its findings are relevant to understanding the institutional conditions through which school quality assurance may support effective STEM education, particularly in resource-constrained settings.

From an educational improvement perspective, school inspection can be understood as a feedback mechanism connecting external evaluation with internal institutional development. Its potential contribution to STEM education lies in identifying and addressing organizational conditions that influence instructional quality, including teacher availability, learning resources, curriculum implementation, and school leadership. However, inspection recommendations do not automatically produce educational improvement. Their effectiveness depends on whether schools possess the administrative capacity, resources, and collaborative structures necessary to translate evaluative feedback into sustained action. This distinction provides the conceptual foundation for examining school inspection practices and implementation challenges in the Cambodian context.

This study examines school inspection as a mechanism of educational quality assurance, with particular attention to its institutional relevance for supporting STEM education. Specifically, the study aims to eexamine school principals' inspection-related practices before, during, and after regular school inspections, as perceived by teachers and described by school stakeholders. Additionally, this study tries to investigate school principals' engagement with inspection recommendations and their perceived implementation within school improvement processes and identify institutional and contextual challenges that may constrain the

implementation of inspection recommendations and discuss their implications for quality assurance in STEM education.

Research Questions

The study addresses the following research questions:

1. How are school principals' practices perceived and described across the pre-inspection, during-inspection, and post-inspection phases?
2. How do school principals engage with inspection recommendations within school improvement processes?
3. What institutional and contextual challenges affect the implementation of school inspection recommendations, and what implications do these challenges have for educational quality assurance relevant to STEM education?

This study contributes to educational quality assurance research by examining how school inspection practices and implementation challenges interact within a resource-constrained education system. It provides empirical evidence to inform the Education Quality Inspection Department and the National Institute of Education (NIE) in Cambodia, particularly in strengthening inspector capacity, improving feedback communication, and promoting more collaborative and effective school improvement practices. For the international STEM education community, the study offers an institutional perspective on how school inspection and the capacity to implement its recommendations may influence the conditions supporting effective teaching and learning, although STEM-specific outcomes were not directly measured. The research focuses on regularly inspected lower secondary schools in Stung Sen Town, Kampong Thom Province, encompassing all four eligible institutions (Prak Sbove, Kampong Kroboa, Preytahou, and Kampong Rotes Secondary Schools) that underwent at least one systematic inspection during the 2018–2019, 2019–2020, and 2020–2021 academic years.

LITERATURE REVIEW

Understanding school inspection as a mechanism of educational quality assurance requires consideration of school leadership, stakeholder participation, institutional capacity, and the use of evaluation feedback for school improvement. These dimensions are particularly relevant to educational systems in which resource constraints may limit schools' ability to implement inspection recommendations. This review examines the relationships among leadership practices, stakeholder engagement, school inspection, and institutional improvement within Cambodia's educational policy context. It also considers their implications for the organizational conditions supporting STEM education, while recognizing that STEM-specific instructional outcomes are beyond the empirical scope of this study.

School Leadership and Engagement with Quality Assurance

School leadership plays an important role in connecting external quality assurance requirements with internal school improvement practices. Principals are responsible not only for preparing institutional documentation and facilitating inspections but also for communicating evaluation findings, coordinating teachers, and supporting the implementation of recommended improvements. From an organizational perspective, leaders' engagement with inspection processes can be examined through observable practices, including preparation, participation, communication, and follow-up activities. These practices should be distinguished from psychological attitudes, which cannot be directly inferred from teachers' observations alone. The relationship between leadership engagement and institutional improvement is not necessarily direct.

Although school principals may demonstrate positive engagement with external evaluations, the implementation of inspection recommendations can be constrained by limited resources, administrative workloads, delayed feedback, and insufficient institutional support. Research on school inspection and feedback utilization therefore provides a useful basis for distinguishing leaders' receptiveness to evaluation from schools' practical capacity to act on its findings (Behnke & Steins, 2017; Gustafsson et al., 2015; Quesel et al., 2021). This distinction is central to understanding why favorable inspection-related practices may coexist with persistent implementation challenges.

Stakeholder Participation and Institutional Improvement

The operational efficiency of any public reform framework relies heavily on active stakeholder engagement (Rahmani, 2026). In policy administration, participation is defined as the capacity of stakeholders to actively influence policies and legal regulations, set institutional priorities, shape strategic plans and development designs, make key decisions, and directly affect the outcomes of specific administrative actions (Arnstein, 1969; Braun & Busuioc, 2020; Reed, 2008). Generically, participation denotes the active and physical involvement of an individual in a designated task, collaborative activity, or structured group process.

Within educational psychology and pedagogy, stakeholder and student participation is recognized as an absolute prerequisite for fostering school engagement, qualitative learning, and academic achievement (Fredricks, Blumenfeld et al., 2004; Atik & Çelik, 2021). This aligns with the international framework established by UNESCO (2005), which defines participation as the deliberate act of taking part in an activity or event, particularly in a manner that directly contributes to the shared goals of a group or educational community (Ngoc & Thi, 2025; Yasmin et al., 2026). Within the school environment, pedagogical scholars categorize participation into four distinct, overlapping behavioral types:

1. Verbal participation, which involves answering or asking questions and actively contributing to administrative or instructional discussions.
2. Collaborative participation, which entails engaging in group work, peer teaching, and collaborative school-level planning.
3. Behavioral participation, demonstrated through regular attendance, timely completion of administrative tasks, and showing sustained effort in daily tasks.
4. Decision-making participation, which centers on giving constructive feedback, shaping school-level classroom norms, and establishing operating guidelines.

Within school quality assurance, stakeholder participation becomes meaningful when teachers, school leaders, and community members can contribute to interpreting inspection findings, identifying improvement priorities, and implementing agreed actions. Participation therefore extends beyond attendance or formal compliance to include communication, collaboration, and shared responsibility for institutional improvement. These processes may be particularly important for STEM education, where the availability of qualified teachers, instructional resources, and appropriate learning environments depends partly on coordinated school-level decisions. Nevertheless, the effectiveness of such participation must be assessed through evidence of implementation rather than assumed from positive perceptions alone.

School Inspection, Feedback Utilization, and Quality Assurance

To ensure that educational standards are consistently maintained, modern education systems rely on rigorous evaluation mechanisms. Internationally, inspection is defined as the process of assessing the performance of schools, teachers, and educational systems to ensure strict compliance with established standards and to support continuous institutional improvement (OECD, 2023). In the educational context, inspection refers to a highly methodical, standardized procedure designed to evaluate the caliber, relevance, and efficacy of classroom instruction, student learning, and school administrative leadership.

These systematic evaluations are conducted to ensure that educational institutions satisfy national benchmarks while simultaneously encouraging organic school-level improvements by establishing clear lines of accountability, monitoring systems, and objective feedback loops. In Cambodia's historic educational policy, school inspection is officially defined as the process of monitoring, verifying, and evaluating an individual or organization to assess the performance of their assigned duties and responsibilities (Ehren et al., 2016; Mam et al., 2019; MoEYS, 2024). Under Cambodia's current education sector reforms, the Ministry of Education, Youth and Sports has implemented a new systematic inspection system (NIE, 2017). This modern quality assurance framework is structurally bifurcated into: Internal inspections: School-level self-evaluations carried out by school principals, teachers, and students. This internal work focuses on local quality assurance at the school or district level, utilizing internal, local resources to drive self-improvement. External inspections: Short-term evaluations conducted by independent officials from outside the school's immediate environment.

External inspections are further divided into inspections, which are carried out directly by the central Department of Education Quality Inspection (EQID) to evaluate specific curriculum or policy priorities. Regular school inspections, which are implemented at the capital-provincial level by trained inspectors under the Provincial Departments of Education and the National Institute of Education.

According to national training frameworks, these regular periodic inspections serve two core purposes: first, to actively help schools improve by providing constructive feedback, clinical guidance, and professional advice to enhance the quality of teaching and management; and second, to compile formal evaluation reports to inform MoEYS, parent-teacher associations, and local communities about the school's actual level of achievement (NIE, 2017).

The contribution of school inspection to educational improvement depends on the extent to which evaluation findings are translated into institutional action. Inspection feedback may identify weaknesses in instructional practices, resource allocation, curriculum implementation, and school management, but identifying these weaknesses does not guarantee that corrective measures will follow. Feedback utilization requires timely communication of findings, clear improvement priorities, institutional commitment, and sufficient implementation capacity. This distinction between receiving inspection feedback and acting upon it provides an analytical basis for examining the challenges encountered by Cambodian lower secondary schools (Ehren et al., 2016; Ólafsdóttir et al., 2022; Quintelier et al., 2020).

To ensure the validity of these evaluations, inspectors utilize the "information triangle" (or the three-cornered method) to triangulate data. This method relies on three core techniques: interviews with diverse school actors, including administrators, teachers, and community members; observations of classroom teaching practices, student behaviors, and school facilities. Document reviews of administrative, pedagogical, and financial records, such as lesson plans, attendance books, student score lists, and school development plans.

Secondary Education and School Administration in Cambodia

To understand the context in which school inspections are implemented, it is necessary to examine the legal and structural frameworks of Cambodia's school system. According to the Law on Education (MoEYS, 2007), Chapter 4, Article 17, general education states that secondary education—or the second stage of general knowledge education—spans from grade 7 through grade 12. Secondary education is legally divided into two distinct chronological stages:

- Stage 1 (Primary Secondary Education / Lower Secondary): Spanning from grade 7 to grade 9.
- Stage 2 (Secondary Education / Upper Secondary): Covering grades 10 through 12.

The legal and social mandate of secondary education is to train a complete, well-rounded personality in learners by expanding their academic knowledge, practical skills, vocational training, and moral education. This comprehensive curriculum is designed to contribute directly to economic and national development, qualify

students for higher education or professional vocational training, and empower them to actively participate in civic life. At the primary and secondary level, students are required to study a standardized curriculum of ten core subjects. To manage this complex curriculum, instruction is delivered by specialized basic-level teachers—identified as primary or secondary teachers, under the direct administrative leadership of the school principal.

Within this institutional structure, quality assurance has potential implications for STEM education because science, technology, engineering-related learning, and mathematics require appropriate instructional resources, qualified teachers, curriculum coordination, and supportive learning environments. School inspections may contribute indirectly by identifying organizational weaknesses that affect these conditions and by providing recommendations for improvement. However, the relationship between inspection practices and STEM learning effectiveness should be treated as a proposition for further investigation rather than an established outcome of the present study. Quality in education focuses on two main categories, including student achievement and research output (Mittal et al., 2018). External Quality Assurance improves teaching quality, ensuring research impact; however, EQA remains concerned about the cost of service (Harvey, 2006). Currently, modern STEM education requires internal and external inspection of the use of laboratories, classrooms, and libraries. Consequently, Quality Assurance indicates public support, professional curiosity, and training (WHO Working Group. (1989). Therefore, educational institutions require internal and external inspection to improve the quality of education.

RESEARCH METHOD

This study employed a quantitative research design to examine school inspection practices, engagement with inspection recommendations, and implementation challenges in Cambodian lower secondary schools. Quantitative survey data were used to describe teachers' perceptions of principals' inspection-related practices. The combination of these sources enabled the study to examine both perceived administrative practices and the institutional conditions affecting school inspection and improvement.

Research Design

The study's structural design is split into two concurrent components: Quantitative Track: This track utilizes structured, closed-ended survey questionnaires completed by secondary school teachers. This track systematically measures and statistically analyzes teachers' observations of their principals' leadership practices across three chronological inspection phases.

Sampling Design and Target Population

The target population is restricted to lower secondary schools in Stung Sen Town, Kampong Thom Province. While the municipality contains six secondary schools, the sampling frame targets institutions that underwent at least one formal, systematic periodic inspection over three consecutive academic years (2018–2019, 2019–2020, and 2020–2021).

All four lower secondary schools that met the inspection eligibility criteria within the defined local sampling frame were included: Prak Sbove, Kampong Kroboa, Preytahou, and Kampong Rotes. This constituted complete coverage of eligible schools within the study area, rather than a census of all secondary schools in the municipality. The final research sample contains 43 participants: 2 education inspectors, 3 active school principals, and 38 secondary school teachers who observed the inspection process. Although four schools were included, interviews were conducted with three school principals because one principal asked to withdraw from participating in this study regarding his personal issues. The quantitative findings represent the perceptions of the 38 participating teachers and should not be interpreted as direct measurements of all principals' attitudes. These specific administrative inspection dates for the four selected secondary schools ranged from June 2018

to April 2020, representing the comprehensive quality assurance landscape within the target region during this active three-year time frame.

Research Instruments

The research instruments were developed with reference to the Ministry of Education, Youth and Sports guidelines for regular school inspections. The teacher questionnaire was designed to capture perceptions of principals' practices across inspection phases, engagement with inspection recommendations, and implementation-related challenges. Semi-structured interviews with inspectors, principals, and teachers were used to explore the contextual experiences underlying these perceptions. Quantitative Questionnaires: Completed by the 38 teachers, utilizing a five-point Likert scale (1: Strongly Disagree, 2: Disagree, 3: Somewhat Agree, 4: Agree, 5: Strongly Agree) to rate administrative behaviors.

To evaluate the internal consistency of the research instrument, Cronbach's alpha coefficient was computed for each subscale across both groups: school principals(n=3) and teachers(n=38). As presented in the table, the reliabilities coefficients across section A, B, and C range from .715 to .900 for principals and from .721. to .856 for teachers. Because all values exceed the conventional threshold of .70, the survey instrument demonstrates strong internal consistency and reliability, confirming that the questionnaire items are methodologically sound for measuring perceptions and challenges regarding the school inspection process.

Table1: Reliability analysis of survey instrument by section

Section A	**Reliability Statistics of action before inspection**			
Quality assurance by school principal in the inspection process	Principals (n=3)		Teacher (n=38)	
	Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items
	.900	16	.840	16
	Reliability Statistics of action during inspection			
	Principals (n=3)		Teacher (n=38)	
	Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items
	.778	16	.84	16
	Reliability Statistics of action after inspection			
	Principals (n=3)		Teacher (n=38)	
	Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items
	.762	8	.84	16
Section B	Principals (n=3)		Teacher (n=38)	
Engagement with inspection recommendations and school Improvement	Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items
	.885	7		7
Section C	Challenges during inspection			
Challenges in implementing inspection recommendations	Principals (n=3)		Cronbach's Alpha	
	Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items
	.894	9	.856	9
	Challenges to implement the inspection report			
	Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items
	.715	10	.721	10

ANALYSIS DESIGN

Quantitative Statistical Analysis

Quantitative questionnaire responses were analyzed descriptively using frequencies, percentages, means, and standard deviations. Mean scores were interpreted according to the predefined five-point response categories. Because the study employed a small, locally defined sample and did not report inferential statistical testing, differences between inspection phases were interpreted descriptively rather than as statistically significant changes. Percentage (%): Measures proportional response distribution across categories: $\% = \left(\frac{f}{N}\right) \ X\ 100$, where is category frequency; N = 3 for principals and N = 38 for teachers. Arithmetic Mean ($\bar{X}$): Determines average central tendency: $\overline{X} = \frac{\Sigma X}{N}$, where ΣX is the score sum. Standard Deviation (SD): Calculates score variability relative to the mean: $SD = \sqrt{\frac{\sum(X-\overline{X})^2}{N}}$. Computed mean scores are interpreted using standardized academic thresholds defined by Sözen & Güven (2019): 1.00–1.80 (Strongly Disagree/Very Weak), 1.81–2.60 (Disagree/Weak), 2.61–3.40 (Neutral/Average), 3.41–4.20 (Agree/Good), and 4.21–5.00 (Strongly Agree/Very Good).

FINDING AND DISCUSSION

The findings are organized around three research questions addressing school inspection practices, engagement with inspection recommendations, and implementation challenges. Quantitative results describe teachers' perceptions of principals' inspection-related practices using means and standard deviations. Together, these findings inform an analysis of the relationship between school quality assurance procedures and schools' capacity to implement improvement recommendations.

Teachers' Perceptions of Principals' Inspection-Related Practices (Research Question 1)

Teachers reported favorable perceptions of principals' inspection-related practices across the three inspection phases, with an overall mean of 4.04 (SD = 0.74). The highest means were recorded for pre-inspection practices (M = 4.16, SD = 0.70), followed by practices during inspection (M = 4.05, SD = 0.74) and after inspection (M = 3.91, SD = 0.82). Although the descriptive means were progressively lower across these phases, the results should not be interpreted as evidence of statistically significant changes in principals' attitudes. Instead, they suggest differences in how teachers perceived administrative practices associated with preparation, inspection participation, and post-inspection follow-up.

A. Before the Inspection Phase (Mean = 4.16; SD = 0.70)

Before the inspection, teachers reported the highest ratings for principals' preparation-related practices, particularly administrative coordination, school organization, and documentation readiness. Providing Information: Principals actively communicated with staff and students regarding the impending evaluation (Mean = 4.11; SD = 0.69). School Organization and Related Documents: Preparatory document compilation and environmental cleaning scored extremely high (Mean = 4.29; SD = 0.69). The highest-rated quantitative indicator was the principal's order to ensure 100% teacher presence on inspection days (Mean = 4.79; SD = 0.41). Enforcement of Discipline: Enforcing student and teacher discipline achieved the highest sub-section score (Mean = 4.38; SD = 0.67), focusing on punctual attendance and bell-ringing schedules. Preparation of the Principal: General readiness was rated as positive (Mean = 3.85; SD = 0.77), although principals experienced notable anxiety (Mean = 3.58; SD = 0.89). These findings suggest that inspection preparation was associated with visible administrative coordination and compliance-oriented practices. However, high ratings for documentation and attendance preparation should not be equated with evidence of sustained instructional improvement. As highlighted by Goor, Schwenn et al. (1997), effective educational leaders must act as role

models, demonstrate strong communication, build trust, and maintain proactive preparedness to ensure school quality (Ehren et al., 2023; Gaertner, 2014; Skedsmo, 2020).

B. During the Inspection Phase (Mean = 4.05; SD = 0.74)

During the on-site inspection, teachers generally perceived principals' practices as supportive of information sharing, staff coordination, and participation in evaluation activities. Information Provision and Participation: Principals effectively facilitated external data gathering (Mean = 4.00; SD = 0.72). Encouraging Teachers: Principals strongly motivated teachers in teaching and learning (Mean = 4.09; SD = 0.84), specifically encouraging classroom environmental improvements (Mean = 4.42; SD = 0.72). However, promoting Information and Communication Technology (ICT) usage in classrooms scored the lowest (Mean = 3.47; SD = 1.03). Teachers' Perceptions: Teachers perceived their principals' behavior on inspection days as highly positive and collaborative (Mean = 4.05; SD = 0.67). The reported practices suggest an emphasis on administrative cooperation during external evaluation. Nevertheless, the relatively lower rating for promoting classroom ICT use (M = 3.47, SD = 1.03) points to a potentially important area for institutional improvement. Although ICT use is not equivalent to STEM education quality, this finding raises questions about schools' capacity to support technology-enabled teaching and learning. Further STEM-specific evidence would be needed to determine whether this constraint affects STEM instructional practices. According to EQID (2021b), maintaining an open, supportive, and collaborative stance during evaluations is essential to validating quality assurance outcomes and driving local school development (Om, 2025; World Bank, 2023).

C. After the Inspection Phase (Mean = 3.91; SD = 0.82)

Post-inspection practices received the lowest mean rating among the three phases (M = 3.91, SD = 0.82), although the score remained within the study's predefined "Agree" category. Education Inspector Recommendations: Principals expressed high satisfaction and positive attitudes toward adopting the constructive feedback provided by inspectors (Mean = 4.10; SD = 0.72). Periodic Inspection Reports: Disseminating results through structured meetings was rated lower (Mean = 3.72; SD = 0.91), and teachers reported a lack of deep awareness regarding the final inspection results (Mean = 3.55; SD = 0.92). The comparatively lower ratings for disseminating inspection results and teachers' awareness of inspection findings suggest potential weaknesses in post-inspection communication. These findings are consistent with the broader concern that favorable engagement during an inspection does not necessarily ensure effective feedback dissemination or subsequent institutional improvement. Timely communication and shared understanding of recommendations are therefore important conditions for translating external evaluation into school-level action. Nevertheless, Behnke and Steins (2017) assert that the positive reception of feedback by a majority of administrators serves as a fundamental first step toward implementing organizational adjustments (Ehren et al., 2023; Ólafsdóttir, 2022; Quesel, 2021; Quintelier, 2020).

Table 2**:** Teachers' Ratings of Principals' Practices Across School Inspection Phases

Section	Sub-section	Mean	SD	Indicator level
Before inspection	Providing information about school inspections	4.11	0.69	agree
	School organization and related documents	4.29	0.69	strongly
	Enforcement of discipline during school hours by the principal	4.38	0.67	strongly
	Preparation of the principal	3.85	0.77	agree
	Total	4.16	0.70	agree
During inspection	School information provision to education inspectors and participation	4.00	0.72	agree
	Principals' motivation for teachers to teach and learn	4.09	0.84	agree

Section	Sub-section	Mean	SD	Indicator level
	Teachers' perceptions of principals' behavior	4.05	0.67	agree
	Total	4.05	0.74	agree
After inspection	Education Inspector Recommendations	4.10	0.72	agree
	Periodic Inspection Reports	3.72	0.91	agree
	Total	3.91	0.82	agree
	A total of 3 sections	4.04	0.74	agree

The overall composite score across all three sections (M=4.04; SD=0.74) is reported to evaluate the school inspection cycle as a unified continuous process rather than disconnected events. By synthesizing the three sequential phases before, during, and after inspection, this aggregate metric demonstrates that participants maintained a consistently positive assessment "Agree") across the entire quality assurance cycle framework.

Engagement with Inspection Recommendations and School Improvement (Research Question 2)

Teachers generally perceived principals' engagement with inspection recommendations favorably (M = 4.01, SD = 0.78). The highest-rated practices included encouraging school-wide collaboration (M = 4.26, SD = 0.64), assigning responsibilities to teachers (M = 4.21, SD = 0.78), and reviewing classroom curriculum implementation (M = 4.21, SD = 0.62). However, incorporating inspection recommendations into formal School Development Plans received a lower rating (M = 3.63, SD = 0.75). Interview accounts described efforts to address teacher absenteeism and support students experiencing learning difficulties, alongside limited follow-up from inspectors. These findings suggest a distinction between perceived engagement with recommendations and their systematic integration into school improvement planning. From a quality assurance perspective, this distinction is important because inspection effectiveness depends not only on receiving and acknowledging recommendations but also on establishing institutional processes for implementing and monitoring improvement actions. The findings are relevant to STEM education insofar as school development planning may influence instructional resources, curriculum coordination, and teacher support; however, the study did not directly examine the implementation of STEM-specific recommendations.

Table 3**:** Teachers' Ratings of Principals' Engagement with School Inspection Recommendations

No.	Description	Mean	SD	Indicator Level
1	The principal integrated the recommendations from the inspection report into the School Development Plan (SDP).	3.63	0.75	Agree
2	The principal established clear organizational structures and assigned roles and responsibilities to teachers with official documentation.	4.21	0.78	Strongly Agree
3	The principal reviewed teachers' classroom curriculum implementation.	4.21	0.62	Strongly Agree
4	The principal conducted instructional improvement meetings with teachers after receiving the inspection report.	3.82	1.01	Agree
5	The principal encouraged teachers to employ innovative teaching methodologies and motivate students to continuously enhance student learning outcomes.	4.16	0.79	Agree
6	The principal collaborated with teachers to address priority shortcomings in the school based on the inspection report.	3.79	0.84	Agree
7	The principal fostered strong collaboration among teachers across all grade levels within the school.	4.26	0.64	Strongly Agree
	Total	**4.01**	**0.78**	**Agree**

Institutional and Contextual Challenges in Implementing Inspection Recommendations (Research Question 3)

Teachers' ratings indicated substantial agreement with statements describing institutional and contextual challenges associated with school inspections and the implementation of recommendations (M = 3.96, SD = 0.76). Challenges related to inspection procedures received a mean rating of 3.94 (SD = 0.75), while challenges associated with implementing recommendations received a mean rating of 3.97 (SD = 0.77). Among the reported concerns, the absence of deputy principals received a particularly high rating (M = 4.39, SD = 0.79), followed by limited financial resources for school development (M = 4.16, SD = 0.68), insufficient community and parental engagement (M = 4.08, SD = 0.54), and shortages of subject teachers (M = 4.00, SD = 0.74). Delayed inspection reports (M = 3.76, SD = 0.68) and difficulties interpreting administrative guidelines (M = 3.84, SD = 0.75) were also identified. Interview accounts further described limited opportunities for follow-up inspection and difficulties sustaining improvement efforts. Taken together, these findings suggest that institutional capacity may constrain the translation of inspection recommendations into school improvement, even when school leaders are perceived as receptive to external evaluation. For STEM education, shortages of subject teachers, limited instructional resources, and weak follow-up mechanisms represent potentially relevant institutional conditions, although their direct effects on STEM teaching and learning were not assessed in this study.

Table 4: Principal Ratings of Institutional and Contextual Challenges in School Inspection and Recommendation Implementation

No.	Description	Mean	S.D.	Interpretation
A	**Challenges in the Inspection Process (Principals' Perspective)**			
1	The school principal did not receive prior notice regarding the school inspection.	3.84	0.79	Agree
2	The school principal did not prepare relevant documents, school data, statistics, etc., prior to the inspection.	3.97	0.85	Agree
3	The school principal did not clearly understand the objectives of the inspection.	4.03	0.79	Agree
4	The school lacks a deputy principal to assist with the principal's workload.	4.39	0.79	Strongly Agree
5	The school principal did not provide comprehensive information to the inspection team.	3.89	0.65	Agree
6	The school principal has limited understanding of regulatory legal frameworks and guidelines from the Ministry of Education (e.g., Education Law, Teacher Policy, Core Curriculum, Detailed Curriculum).	3.84	0.75	Agree
7	The school principal had difficulty understanding the interview questions asked by the education inspection team.	3.89	0.73	Agree
8	The school principal lacked sufficient supporting evidence related to the interview questions.	3.87	0.70	Agree
9	The school principal did not receive the inspection report two weeks after the inspection was completed.	3.76	0.68	Agree
	Total	3.94	0.75	Agree
B	**Challenges in Implementing Recommendations from the Inspection Report (Principals' Perspective)**			
1	The inspection report is delayed and issues are not resolved in a timely manner.	3.76	0.85	Agree
2	The school principal lacks sufficient time to implement inspection recommendations (handling dual roles as both administrator and teacher).	4.08	0.85	Agree
3	The school principal has limited experience serving as school management.	3.79	0.99	Agree
4	The inspection cycle is too long, taking 3 to 5 years before visiting the school again.	4.03	0.79	Agree
5	The school lacks financial resources for school development.	4.16	0.68	Agree
6	The school faces a shortage of subject teachers.	4.00	0.74	Agree
7	Students do not pay attention to their studies and have high absence rates.	3.92	0.71	Agree

No.	Description	Mean	S.D.	Interpretation
8	Parents and guardians are indifferent and do not cooperate with school activities.	4.08	0.54	Agree
9	The School Management Committee has low participation in internal and external school activities.	3.97	0.82	Agree
10	The school lacks support from the community and philanthropists for school development.	3.95	0.73	Agree
	Total	3.97	0.77	Agree

Section	Sub-section	Mean	SD	Indicator level
A	Challenges in the inspection process	3.94	0.75	agree
B	Challenges in implementing recommendations in inspection reports	3.97	0.77	agree
	Total	3.96	0.76	agree

Implications for Quality Assurance and STEM Education

Across the three research questions, the findings point to an important distinction between engagement with school inspection and the institutional capacity to implement its recommendations. Teachers generally perceived principals' inspection-related practices positively, particularly during preparation and on-site evaluation. However, comparatively lower ratings for post-inspection communication and the integration of recommendations into School Development Plans suggest that translating external evaluation into sustained improvement may be more challenging than participating in the inspection itself. This distinction contributes to understanding school quality assurance as a process that extends beyond procedural compliance to include feedback utilization, institutional coordination, and implementation capacity. In relation to STEM education, these findings offer a context-sensitive perspective on the organizational conditions that may support effective instruction, including subject-teacher availability, instructional resources, curriculum coordination, and leadership support. The study does not establish a direct relationship between inspection practices and STEM learning outcomes; rather, it identifies institutional conditions and implementation challenges that can inform future STEM-specific quality assurance research. Consequently, the proposed interpretation may offer a basis for comparative inquiry across resource-constrained education systems, subject to further empirical validation.

CONCLUSION

This quantitative methods study concludes that lower secondary school principals in Stung Sen Town maintain a highly positive and receptive attitude toward the regular school inspection process and its structural recommendations. Across the chronological evaluation phases, administrative attitudes remained consistently favorable, though a gradual downward trend was observed from the highly proactive preparation phase (Mean = 4.16) to the active on-site inspection (Mean = 4.05) and the final post-inspection evaluation phase (Mean = 3.91). Furthermore, school principals demonstrated a strong professional willingness to accept and implement the constructive recommendations outlined in the final inspection reports (Mean = 4.01) to drive local school development. However, a significant gap persists between the administrators' positive intentions and their actual operational capacity. The practical implementation of these quality assurance recommendations is severely hindered by deep-seated systemic and contextual challenges (Mean = 3.96), including severe financial deficits, acute shortages of deputy principals and subject teachers, delayed feedback loops, minimal community involvement, and an excessively long inspection cycle exceeding five years. To optimize the impact of Cambodia's quality assurance framework, MoEYS must bridge this developmental gap by providing targeted

financial resources, reinforcing school-level administrative personnel, and establishing timely, supportive inspectorial cycles across all educational institutions in Cambodia.

LIMITATION & FURTHER RESEARCH

This study is limited to four lower secondary schools in Stung Sen Town, Kampong Thom Province, which restricts the generalizability of its findings to broader regional or national contexts. To expand upon this research, future studies should consider the following avenues: first, expand the geographical scope and sample size across the entire Kampong Thom Province to include diverse stakeholders like students and community members; second, investigate classroom teachers' attitudes towards periodic inspections; third, explore active community and parental engagement within quality assurance frameworks; and finally, analyze the actual post-inspection implementation status of recommendations, identifying key challenges and sustainable administrative solutions.

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