QUALITY ASSURANCE IN SECONDARY EDUCATION: EVIDENCE FROM SUSTAINABLY HIGH-PERFORMING PISA SYSTEMS AND IMPLICATIONS FOR INSTRUCTIONAL QUALITY

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Abstract: *Quality assurance (QA) has emerged as a central instrument of contemporary educational governance, reflecting a global shift toward the principles of New Public Management (NPM). This study examines how sustainably high-performing systems, as evidenced by Programme for International Student Assessment (PISA) data, operationalize quality through evaluation, benchmarking, and performance monitoring. Drawing on the Dynamic Model of Educational Effectiveness (DMEE) and High Reliability Organization (HRO) principles, the research investigates the relationship between governance mechanisms and instructional quality dimensions, including teacher support, disciplinary climate, and cognitive activation. Findings from diverse systems—such as Japan's centralized standards, Finland's trust-based autonomy, and the United States' standards-based certification—reveal that while governance models vary, they consistently prioritize the reduction of instructional variability to enhance student achievement and equity. This paper concludes that effective QA mechanisms are critical drivers of school effectiveness, providing a framework where high-quality instruction can flourish regardless of students' socioeconomic backgrounds.*

INTRODUCTION

In contemporary education, quality assurance (QA) is no longer merely an administrative task; it has become a central instrument through which governments regulate, monitor, and improve secondary education. This transition marks a departure from traditional "loosely coupled" educational systems—characterized by uncoordinated activities and perfunctory evaluations—toward models that impose more rigorous policy strictures to ensure student success (Kilicoglu et al, 2021; Cowan, 2001). Within modern public-sector governance, quality is increasingly defined and measured through evaluation, benchmarking, and performance monitoring (Schneider, 2017; Datahan, 2020). This systematic approach aims to transform schools from

compliance-driven bureaucracies into world-class organizations capable of providing "the best in the world" education.

The shift toward QA reflects broader trends associated with New Public Management (NPM), where accountability, transparency, and measurable outcomes are emphasized across all public institutions (Gruening, 2001). NPM proponents argue that government services should function like efficient business enterprises, utilizing private-sector techniques such as output controls, performance-based assessments, and competition (Dan & Pollit, 2015; Christensen & Laegreid, 2022). In education, this has manifested as outcomes-based accountability and school choice reforms, which seek to "tightly couple" instructional goals with funding and performance rewards (Fusarelli & Johnson, 2004). While controversial, studies suggest that school governance—grounded in transparency and fairness—remains the strongest predictor of overall school effectiveness (Gann, 2015; Meric & O'z, 2025) .

At the heart of the QA movement is the drive to enhance instructional quality, a crucial determinant of students' academic performance across subjects. Data from a decade of PISA cycles indicate that specific dimensions of instruction, such as teacher support, disciplinary climate, and cognitive activation, are consistent predictors of student achievement (Konold et al, 2018; Baumert et al, 2010). High-performing systems are defined by their "relentless focus" on these variables, working to reduce the variability of instruction every child receives. This is particularly vital for equity; evidence shows that while high-quality instruction benefits all, it consistently promotes better outcomes for students from low socioeconomic (SES) backgrounds.

Global Models and High Reliability Education systems worldwide have adopted diverse QA models to reach these goals. Japan utilizes highly centralized standards and the "lesson study" model to foster a collective learning culture. Finland relies on a guidance-oriented approach rooted in professional trust and research-based teacher education. Meanwhile, the United States employs a multi-actor system involving standards (InTASC), advanced certification (NBPTS), and accreditation (CAEP). Despite these different paths, many high-performing systems are beginning to emulate High Reliability Organizations (HROs)—entities like air traffic control or nuclear power plants that operate under high-risk conditions with zero tolerance for failure. By applying HRO principles such as preoccupation with failure and sensitivity to operations, these systems aim to ensure that student learning is a fail-safe outcome rather than a fortuitous event.

This research explores the intersection of governance, quality assurance, and instructional practice within sustainably high-performing PISA systems.

By examining the impact of different governance mechanisms on student outcomes, this paper seeks to provide insights into how systems can balance centralized procedural control with the situational improvisation necessary for teachers to meet the diverse needs of their students.

Literature Review

Quality assurance (QA) in secondary education is characterized by a dual function: it serves both regulatory and developmental purposes (Doherty, 2012; Guttance, 2020). Regulatory functions prioritize compliance with legal obligations, curriculum requirements, and established standards. Conversely, developmental functions focus on enhancing instructional quality through continuous improvement cycles, professional learning, and feedback mechanisms (Bush-Mecenas, 2022). A persistent tension exists between accountability-oriented QA, which emphasizes inspection and performance indicators, and improvement-oriented systems, which are grounded in professional trust, school autonomy, and capacity building. Accountability-driven models often rely on standardized assessments that may inadvertently narrow pedagogical practices toward easily measurable outcomes (Gogoj, 2024). In contrast, developmental systems integrate evaluation with collaborative reflection and teacher learning to strengthen instruction. International evidence suggests that the most sustainable educational improvements occur when QA systems successfully balance both paradigms.

The shift toward more rigorous QA mechanisms reflects the influence of New Public Management (NPM), which seeks to apply private-sector techniques—such as output controls and performance-based assessments—to public institutions (Gruening, 2001). This movement attempts to "tightly couple" educational policy with administrative actions and teaching practices, replacing the traditional "loosely coupled" model where classroom instruction was rarely evaluated in more than a perfunctory manner. High-performing systems are increasingly viewed through the lens of High Reliability Organizations (HROs), which operate under high-stakes conditions with a "preoccupation with failure" and a relentless focus on reducing variability in the quality of instruction every child receives (Wood, 2022).

Instructional quality is a primary determinant of academic success, particularly in subjects like mathematics. Dimensions of quality such as teacher support, disciplinary climate, and cognitive activation have been shown to positively predict student achievement across multiple PISA cycles (Liu et al, 2024). These dimensions are critical for equity, as high-quality instruction can mitigate the negative impact of low socioeconomic status (SES) on performance. However, some instructional strategies, such as student-

oriented instruction or excessive classroom management, have occasionally shown negative correlations with achievement if not paired with adequate cognitive support.

Methodology

To derive robust international lessons, this study focuses on five education systems that have demonstrated sustained high performance across multiple PISA cycles (2006–2022): Finland, Singapore, Estonia, Canada, and Germany. Sustained performance is utilized as an indicator of systemic stability and institutionalized quality practices. These systems were selected not only for their consistently above-average performance in reading, mathematics, and science but also for their diverse governance traditions:

- Finland: Represents Nordic trust-based systems with high teacher autonomy.
- Singapore: Features a centralized, high-accountability model.
- Estonia: Illustrates a successful post-transition reform system.
- Canada and Germany: Represent federal decentralized systems where quality is managed across multi-level state or provincial actors.

The analysis is grounded in the Dynamic Model of Educational Effectiveness (DMEE), which explores the interplay between instructional quality, school-level policy, and student characteristics like SES (Armstrong, 2022). This study examines how different governance mechanisms operationalize quality through evaluation, benchmarking, and performance monitoring. By utilizing trend data, the research identifies common structural features that underlie sustained performance despite varying cultural and institutional contexts. The methodology also incorporates HRO principles to evaluate how these systems balance centralized procedural control with the flexibility for situational improvisation necessary for teachers to address diverse student needs.

Results and Discussion

The findings reveal that high-performing systems achieve success through different configurations of the accountability-improvement balance. Finland achieves high reliability through research-based teacher education and a culture of professional trust, where quality assurance is guidance-oriented rather than inspection-heavy. In contrast, Germany utilizes a cyclical quality management approach (Plan-Do-Check-Act) supported by independent quality agencies and national standards to ensure continuous improvement. Despite these different starting points, both systems prioritize instructional quality as the central lever for effectiveness.

Common Structural Features of High Performance Despite diverse governance traditions, several common features emerge among these sustainably high-performing systems:

- Relentless Focus on Instruction: All five systems prioritize the reduction of instructional variability.

- Mediating SES Impacts: Effective QA mechanisms in these countries function to decouple student background from achievement by ensuring that low-SES students receive high-quality teacher support and a conducive disciplinary climate.

- Professional Learning Communities: Practice-oriented professional development, such as Japan's "lesson study" or collaborative teacher networks in the West, is institutionalized to ensure that theoretical knowledge is translated into effective classroom practice.

Sustainable improvement in these systems is driven by their ability to function as "mindful" organizations. By establishing non-negotiable goals for achievement while allowing for defined autonomy, these systems ensure that the "best in the world" practices are delivered with remarkable reliability. The results suggest that the "harmful equation"—where disadvantaged students receive lower-quality instruction—is most effectively broken in systems that combine rigorous performance monitoring with deep investments in teacher pedagogical content knowledge and supportive school climates.

Moreover, the link between High Reliability Organization (HRO) principles and high-performing PISA systems lies in a shared commitment to achieving "fail-safe" student outcomes through a relentless focus on instructional quality and the reduction of performance variability. While HROs traditionally operate in high-risk industries like nuclear power or air traffic control, their core tenets are increasingly used to explain why certain education systems consistently excel on international assessments. The following points detail the specific links between HRO principles and the characteristics of high-performing systems:

A. Preoccupation with Failure and Student Success

HROs are defined by an unwavering attention to "weak signals" of potential failure. In high-performing PISA systems, this translates to:

- Early Intervention: Systems like Finland and Singapore emphasize responding to early signs of student failure. Rather than accepting a certain "failure rate," these systems view individual student failure as a catastrophic systemic error rather than a fault of the child.

- High Stakes for Failure: There is a growing realization that in a 21st-century economy, educational failure is catastrophic for both the individual and society, mirroring the "zero-tolerance" for accidents in traditional HROs.

B. Sensitivity to Operations and the "Front Line"

Sensitivity to operations involves a primary focus on the "front line" where the real work happens.

- Focus on Instruction: High-performing systems share a "relentless focus" on ensuring high instructional quality across every classroom. This is achieved by staying close to the "technical core" of teaching and learning.

- Professional Learning Communities (PLCs): These systems use PLCs and collaborative models (like Japan's "lesson study") to maintain situational awareness of classroom dynamics and provide real-time support to teachers.

C. Defined Autonomy and Deference to Expertise

HROs shift decision-making authority to those with the most relevant expertise during times of peak activity.

- Defined Autonomy: High-performing systems balance centralized procedural control (non-negotiable goals for achievement) with situational improvisation. For instance, Finland provides teachers with high levels of professional autonomy because they are viewed as the primary experts in student learning.

- Constrained Improvisation: While teachers have the freedom to adapt, this "improvisation" is collective and accountable, occurring within a framework of shared organizational values and research-based practices.

D. Reluctance to Simplify and Data-Rich Environments

HROs avoid oversimplifying complex problems.

- Deep Analysis of Achievement Gaps: High-performing systems use sophisticated data tracking to understand how variables like Socio-Economic Status (SES) interact with instructional quality. They look beyond simple standardized test scores to examine root causes of performance variability.

- Reducing Variability: The goal is to reduce the "egg carton" effect—where instruction varies wildly from one classroom to the next—by establishing Standard Operating Procedures (SOPs) for effective research-based instruction while remaining skeptical of "one-size-fits-all" solutions.

E. Commitment to Resilience and Continuous Improvement

Resilience in HROs involves the capacity to detect, contain, and bounce back from errors.

- Quality Assurance (QA) Cycles: Systems like Germany utilize a cyclical Plan-Do-Check-Act (PDCA) approach to TPD (Teacher Professional

Development), ensuring that evaluation findings are constantly fed back into system-wide improvements.

-Support for Teachers: High-performing systems invest heavily in teacher content knowledge and pedagogical skills so educators can effectively scaffold instruction for low-SES students and recover when initial instructional strategies fail.

Thus, high-performing PISA systems function as mindful organizations that use quality assurance mechanisms to institutionalize HRO principles, ensuring that high-quality instruction is a predictable outcome for all students regardless of their background

CONCLUSION

A decade of PISA data confirms that teacher support and a positive disciplinary climate are the most consistent drivers of student achievement and equity. Effective governance, characterized by transparency and fairness, remains the strongest predictor of overall school effectiveness. By integrating High Reliability Organization (HRO) principles, education systems can transition from inconsistent bureaucracies into "mindful" organizations that ensure "fail-safe" learning outcomes for all students. Ultimately, sustainable improvement requires balancing centralized standards with defined autonomy to reduce instructional variability and reliably deliver a "best in the world" education.

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