

The Impact of International Measures, such as PISA, on National Education Policy: Focus on the German Secondary Education System

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Abstract: *The Programme for International Student Assessment (PISA) has become one of the most influential international comparative measures of educational quality, profoundly impacting national education policies worldwide. Germany's experience is a seminal case. The so-called "PISA shock," triggered by the country's unexpectedly poor performance in the 2000 survey, led to a fundamental overhaul of its secondary education system. This paper examines the subsequent PISA-driven policy shifts in Germany, analyzing the systemic move towards curricular reform, standardization, accountability, and targeted equity measures. The analysis reveals a dual-edged impact: while reforms demonstrably raised standards and improved average student outcomes, they also introduced significant challenges related to narrowed curricula, the pressures of high-stakes testing, and persistent socio-economic inequities. This study concludes that the influence of international benchmarks like PISA is potent but complex, requiring policymakers to strategically balance external performance pressures with a holistic and equitable vision for education.*

Keywords: *PISA, Educational Policy Impact, German Secondary Education, Curriculum and Governance Reform, Educational Equity*

1. Introduction

The Programme for International Student Assessment (PISA), initiated by the Organisation for Economic Co-operation and Development (OECD), was conceived as a triennial survey to measure the knowledge and application skills of 15-year-old students (OECD, 2006)[1]. Unlike traditional assessments tied to specific curricula, PISA is designed to evaluate how well students can apply their learning in reading, mathematics, and science to solve real-world problems. This emphasis on competency and application makes PISA uniquely powerful as a comparative tool (Turner & Adams, 2007)[2]. Its high-profile international rankings have turned it into a critical lever for policy influence. Santos and Centeno (2023)[3] argue that PISA results now function not merely as a snapshot of student performance but as drivers of policy learning, imitation, and direct reform in participating nations.

The impact of these international comparisons has been starkly evident in Germany. The release of the 2000 PISA report acted as a political and societal catalyst, precipitating what became known as the "PISA shock" (Davoli & Entorf, 2018)[4]. This paper investigates the multifaceted impact of this shock on German secondary education policy. It examines how Germany's historically federal and stratified education system responded with profound changes to its governance structures, curricular frameworks, and approaches to educational equity. By critically analyzing the implementation and consequences of these reforms, this study aims to illuminate the complex interplay between international benchmarking and domestic educational policymaking.

2. The PISA Shock and The German Educational Context

2.1 Overview of PISA

PISA is a triennial, international survey developed by the OECD to provide standardized, comparable data on the knowledge and applied skills of 15-year-old students across member and partner countries (OECD, 2006)[1]. Its unique focus is not on testing curricular knowledge but on assessing how well students can apply their learning in reading, mathematics, and science to solve real-world problems, emphasizing the ability to "extrapolate from what they know and apply their knowledge in novel settings"

(Turner & Adams, 2007)[2]. This competency-based approach, with its highly publicized country rankings, offers a powerful comparative snapshot of education system effectiveness and serves as a crucial reference point for global policymakers. The public release of country league tables, combined with extensive analysis on equity and effective practices, creates a powerful “name and shame” dynamic. Furthermore, PISA consciously designs its assessment around competencies vital for the modern workforce and global citizenship, thereby linking its metrics directly to contemporary economic and social policy concerns (OECD, 2018)[5]. This approach encourages policymakers to view PISA performance as a proxy for future national competitiveness. Importantly, PISA employs a two-dimensional evaluation framework, simultaneously assessing a country’s average score and the level of equity in its education system (OECD, 2018)[5]. This dual focus aims to ensure that high performance is not simply the result of concentrating resources on elite students, and that equity is measured as a component of quality. The influence of this framing is clear, as the PISA results often highlight the relationship between socio-economic background and student achievement, directly spotlighting areas of systemic inequality.

2.2 The German Education System Prior to PISA

Prior to the first PISA assessment, Germany’s education system was a deeply embedded exemplar of a state-supervised, three-tiered tracking model (Entorf & Davoli, 2019)[6]. Students were typically assigned to one of three distinct tracks as early as age ten:

- **Gymnasium:** The academically oriented university-preparatory track, intended for top-performing students.
- **Realschule:** An intermediate track preparing students for technical and commercial careers.
- **Hauptschule:** A basic vocational track for students who were assumed to be less academically inclined.

This early, rigid segregation was justified as a means of providing differentiated education aligned with students’ perceived abilities and vocational futures. However, substantial criticism from scholars argued that it functioned primarily as a mechanism of social reproduction (Boockmann & Nielen, 2016)[7]. Entorf and Davoli (2019)[6] indicated that students from disadvantaged socio-economic backgrounds and those with a migration history were overwhelmingly directed to the Hauptschule, which often had fewer resources and lower academic expectations, severely limiting their future life chances. The system was defended on grounds of tradition and local (Länder) control, but it faced mounting evidence of promoting inequity.

2.3 The PISA Shock

The publication of Germany’s PISA 2000 results was not just a statistical disappointment; it was a cultural and political earthquake. Germany ranked below the OECD average, placing 20th in mathematics, 21st in reading, and performing inadequately in science (OECD, 2006)[1]. The poor average ranking was, however, overshadowed by a more damning revelation: Germany exhibited one of the strongest correlations between a student’s socio-economic background and their academic achievement among all surveyed nations (Davoli & Entorf, 2018)[4]. This finding directly challenged the core principles of fairness and opportunity that underpinned the national self-image. The resultant media uproar, public debate, and intense political pressure created what Davoli and Entorf (2018)[4] describe as an unprecedented and “indispensable” political mandate for sweeping reform. The “PISA shock” transformed education from a technocratic domain into a matter of urgent national concern, forcing a fundamental re-examination of policies and assumptions that had remained largely unquestioned for decades.

3. PISA-Driven Reforms in German Secondary Education Policy

In response to the deficits exposed by PISA, Germany’s federal government and its 16 Länder initiated a series of interconnected reforms. These reforms collectively represented a pivot away from a decentralized, input-focused system toward a more centralized, outcome-oriented, and equity-conscious model.

3.1 Curricular Reforms: A Revised Secondary School Curriculum

The poor PISA performance prompted a rigorous national re-evaluation of the secondary school curriculum. The observed skill deficits led to significant revisions that shifted focus toward developing core competencies directly relevant to PISA domains. These included a stronger emphasis on cultivating critical thinking, problem-solving abilities, and digital literacy (Niemann, Martens, & Teltemann, 2017)[8]. A notable change was the integration of a more interdisciplinary approach, such as combining arts and humanities elements into STEM (Science, Technology, Engineering, and Mathematics) subjects to foster a more holistic and engaging learning experience (Cantley, 2019)[9]. Project-based learning gained prominence as a pedagogical tool, aiming to enhance students' practical application of theoretical concepts and deepen understanding.

The early and rigid tracking system also became a central target for reform. The traditional model of separation into academic or vocational pathways after primary school was identified as a significant factor in inequality. Reforms aimed to make tracking more permeable and, in many regions, increased the years of common, comprehensive schooling. This was intended to provide more time for student development before decisive choices were made (Gomolla, 2021)[10]. This structural change was coupled with targeted financial investments and resource allocation to schools in socio-economically disadvantaged neighborhoods to support these efforts. Additionally, there was a heightened policy focus on supporting students with immigrant backgrounds, including expanding and improving language and integration courses, aligning with PISA's clear correlation between language proficiency and academic success (Niemann et al., 2017[8]; Odendahl, 2017[11]).

3.2 Shifts in Educational Governance: Standardization and Accountability

The PISA shock fundamentally altered the governance of Germany's historically decentralized education system, instigating a move towards greater centralization through national standards and a culture of accountability (Niemann et al., 2017)[8]. Traditionally, educational sovereignty (Kulturhoheit) resided with the 16 federal states (Länder). However, in a rare collaborative effort, the Länder and the federal government established the Kultusministerkonferenz (KMK) to develop a comprehensive, binding framework of national educational standards (Bildungsstandards). The primary goal was to systematically address the performance gaps identified by PISA and ensure a more uniform and high-quality educational experience for all students, regardless of their region (Niemann et al., 2017)[8].

Alongside these standards, a robust accountability system was implemented. This framework required regular, nationwide assessments to monitor student performance against the established benchmarks. Furthermore, many states introduced external school evaluations and quality inspections, often conducted by institutions like the German Institute for International Educational Research (DIPF) (Niemann et al., 2017)[8]. Teacher performance also came under greater scrutiny, with more frequent evaluations linking professional development and career advancement to demonstrable improvements in student learning outcomes (Furnham & Cheng, 2024)[12].

3.3 Equity Measures: Targeted Support for Disadvantaged Students

In direct response to the glaring socio-economic achievement gaps highlighted by PISA, Germany intensified its efforts to support students from disadvantaged backgrounds. A key step, as noted by Entorf and Davoli (2019)[6], was establishing and expanding extensive support systems aimed at leveling the playing field.

Academic interventions included broadened access to tutoring, mentoring programs, and free after-school homework assistance to help bridge learning gaps (Odendahl, 2017)[11]. Beyond academics, support systems were expanded to address non-academic barriers. Schools with a high proportion of at-risk students saw greater integration of social workers and counselors to tackle psycho-social issues like low self-esteem, family problems, and absenteeism, which often hinder academic performance (Niemann et al., 2017)[8]. A significant policy shift was the massive expansion of all-day schools (Ganztagsschulen), offering structured educational and extracurricular activities beyond the traditional half-day schedule. This benefited students whose families could not afford private afternoon care or enrichment activities (Boockmann & Nielen, 2016[7]; Odendahl, 2017[11]). Simultaneously, vocational education and training (VET) programs were reformed and strengthened. These programs were redesigned to offer credible, high-quality alternative pathways to employment, simultaneously serving individual student needs and the broader labor market demands of the German economy (Ringarp,

2016)[13].

4. Analysis of Reforms and Their Impact

The German experience demonstrates the powerful but paradoxical impact of international benchmarks. The PISA shock effectively broke political and administrative inertia, driving reforms that have produced clear, evidence-based improvements but also generated significant negative side effects.

4.1 Positive Outcomes

Empirical analysis indicates that the post-PISA reforms led to tangible benefits for the German education system.

- **Improved Performance:** The standardization of curricula and introduction of consistent quality standards across federal states helped mitigate prior regional disparities. Germany's performance in subsequent PISA cycles showed a marked and sustained improvement, moving the country from a below-average to an above-average performer internationally (Abdullah et al., 2018[14]; Niemann et al., 2017)[8].
- **Competency Alignment:** The shift toward PISA-inspired, competency-based education has been credited with better preparing students for the demands of higher education and a modern knowledge economy (Rautalin, Alasuutari, & Vento, 2019[15]; Furnham & Cheng, 2024[12]). This is a global trend, as PISA itself is evolving to focus more on "scientific ability" and applied problem-solving in future frameworks like PISA 2025.
- **Progress on Equity:** The strategic investments in disadvantaged schools and targeted support programs contributed to a measurable reduction in achievement gaps for some cohorts, such as those receiving intensive language support (OECD, 2018[5]; Rautalin et al., 2019[15]).

Germany's trajectory from "shock" to "improver" has been widely cited as a success story of data-driven policy reform (Santos & Centeno, 2023)[3]. Recent Chinese PISA results also underscore how PISA can validate reform efforts focused on "quality and fairness." For example, data shows that certain high-performing Chinese regions achieve a combination of high quality and high equity, a "dual high" profile, in line with the ideal PISA framework.

4.2 Critiques and Challenges

Despite this progress, PISA-driven reforms have attracted persistent and serious criticism, raising questions about the long-term consequences of "governing by numbers."

- **Curriculum Narrowing:** A core criticism is the narrowing of the educational focus. Daniel (2024)[16] and others argue that the intense policy weight given to the core PISA-tested domains (reading, math, and science) risks marginalizing other essential elements of a complete education, such as the arts, social studies, and physical education. This may inadvertently impoverish the curriculum in favor of measurable outcomes (Daniel, 2024)[16].
- **'Teaching to the Test' and High-Stakes Pressure:** The accountability system's reliance on standardized testing is argued to foster an environment of high-stakes pressure that encourages "teaching to the test." This pedagogical strategy can undermine intellectual curiosity and the joy of learning, reducing education to rote performance, while placing excessive stress on both students and teachers (Daniel, 2024)[16]. Research on technology use in schools also highlights the counterproductive effects of over-emphasis on quantitative metrics; for instance, PISA 2022 found that excessive use of digital devices for learning can actually decrease performance, suggesting a similar law of diminishing returns and unintended consequences can apply to high-stakes assessment pressures.
- **Persistent and Systemic Inequity:** Perhaps the most significant and sobering challenge is that underlying inequities have proven difficult to eradicate. While targeted measures have helped, significant performance gaps linked to socio-economic status, migration background, and regional location stubbornly persist (Furnham & Cheng, 2024)[12]. This reflects a global issue identified in PISA data: raising average scores and addressing systemic inequality are distinct challenges, and the latter often requires far deeper societal and structural interventions.

- Marginalization Risk: Some scholars warn that the uniform pressure to raise standardized scores may inadvertently further marginalize students who, due to systemic barriers, struggle to meet the new benchmarks, thus creating a new form of exclusion within a system designed to be more inclusive (Furnham & Cheng, 2024)[12].

5. Conclusion

The impact of PISA on German secondary education policy is a paradigmatic illustration of the profound and complex influence wielded by international large-scale assessments. The “PISA shock” served as an undeniable and essential catalyst, breaking through decades of complacency and driving a nationwide transformation focused on raising standards, ensuring accountability, and promoting equity.

Germany’s story is, however, a cautionary tale as much as a success story. It reveals the inherent tensions within modern educational governance: between centralized standards and local autonomy; between the need for accountable measurement and the dangers of a high-stakes testing culture; and between the push for excellence on global metrics and the deep-seated challenge of ensuring genuine, transformative equity.

Therefore, the primary lesson for Germany, and for all nations influenced by global benchmarks like PISA, is the critical need for strategic balance. Policymakers must learn to harness the diagnostic power of comparative assessments to expose weaknesses and challenge complacency, without becoming passive consumers of their implicit values or simplistic rankings. The ultimate goal for any nation should remain a commitment to a holistic, equitable, and humanistic education—an objective that cannot be fully captured or guaranteed by a single quantitative index, no matter how influential it may be. This requires a sophisticated policy approach that views PISA not as an all-encompassing yardstick, but as one important instrument within a broader toolkit of educational evaluation and reform.

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