

IEA COMPASS: BRIEFS IN EDUCATION

GLOBAL INSIGHTS, LOCAL IMPACT

Leveraging TIMSS and PIRLS for Education Policy Reform

SUMMARY

This *Compass Brief* synthesizes how education systems leverage TIMSS (Trends in International Mathematics and Science Study) and PIRLS (Progress in International Reading Literacy Study) data to inform national reform efforts, drawing on self-reported insights from over 130 participating education systems.¹ Despite varying contexts, six broad areas of impact consistently emerge: policy development, curriculum reform, educational support programs, monitoring and benchmarking, teacher training, and public engagement. Education systems use the assessments to identify gaps, justify reforms, and stimulate political and public debate. In some cases, the studies also inform the development or revision of national assessments. While some impacts are common to both studies, notable differences appear—for instance, TIMSS more frequently drives curriculum and STEM (science, technology, engineering, and mathematics) reforms, whereas PIRLS often influences public discourse and literacy policy. The findings demonstrate that beyond benchmarking, these assessments function as catalysts for systemic change and educational improvement.

INTRODUCTION

ILSAs (international large-scale assessments), such as TIMSS and PIRLS conducted by IEA (International Association for the Evaluation of Educational Achievement), have become central to the global education landscape (Best et al., 2013; Johansson, 2016; World Bank, 2018). Participation in these studies has grown steadily (Mullis & Martin, 2017; Reynolds et al., 2022; Wagemaker, 2020), signaling their value for national systems seeking robust, comparative data on student outcomes. Beyond test scores, IEA assessments gather contextual information from students, parents, teachers, and principals, creating a rich evidence base that education systems use to benchmark performance and identify strengths and weaknesses. Yet participation comes with costs: managing sampling, translation, test administration, and data reporting requires significant technical and financial investment.

This brief examines why countries repeatedly choose to engage despite these demands. Drawing on national reports from the PIRLS 2021 and TIMSS 2023 Encyclopedias (Reynolds et al., 2022; Reynolds et al., 2024), we investigate how governments have reported that they interpret, disseminate, and use the findings. These accounts reveal how IEA data is used to inform curriculum reforms, accountability systems, professional teacher development, and public debate. By synthesizing these perspectives, the brief highlights the varied, context-dependent ways in which international evidence is mobilized, offering insights into the broader role of ILSAs in shaping educational policy and practice across countries.



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¹ The term “education system” is used here to describe a country or a territory or a certain administrative entity within a country that is participating in TIMSS or PIRLS.

DATA & METHODS

This brief is based on a systematic analysis of national contributions to two recent IEA encyclopedias: the *TIMSS 2023 Encyclopedia* (Reynolds et al., 2024) and the *PIRLS 2021 Encyclopedia* (Reynolds et al., 2022). It draws on written statements from 71 education systems that provided a section on the impact and use of TIMSS data, and 60 education systems that addressed the same topic in relation to PIRLS data. Participants were asked to summarize how results of the studies are used and describe any impacts of the study results on educational policies or reforms. In total, 75 education systems

provided these chapters. The analysis proceeded in several stages: (1) extraction of relevant text from each education system's chapter, (2) qualitative coding of the material to identify concrete examples and recurring themes, (3) development of a categorization framework to capture common types of impact and use, (4) independent application of the framework by both authors to ensure reliability, and (5) an experimental quality-assurance step in which the categories and coding assignments were checked using ChatGPT-4. Full details of the analytic procedures are provided in Appendix B.

RESULTS

The findings presented in this section are based on a systematic qualitative content analysis of national “impact and use” statements published in the TIMSS 2023 and PIRLS 2021 Encyclopedias. Through inductive coding of these national contributions, 17 categories of topics emerged that can be grouped into six cross-cutting core areas of influence (I to VI)

that capture how education systems report using international assessment data (see Table 1). These thematic areas provide an analytic synthesis of reported uses across countries and form the basis for examining both shared patterns and study-specific differences between TIMSS and PIRLS.

Table 1. Overview of core areas of influence and their related categories

Core area of influence	Related categories
I. Policy development and system-level reform	Data source for policymakers and educators (T50/P44) Introduced or evaluated reforms or special support programs (T44/P37) Initiated political discussions on national reforms (T16/P20) Increased or informed funding (T3/P1)
II. Curriculum review and adjustment	Reviewed or revised curriculum (T49/P22) Introduced or evaluated reforms or special support programs (T44/P37)
III. Educational reforms and support programs	Introduced or evaluated reforms or special support programs (T44/P37) Implemented or revised national assessments (T11/P12) TIMSS/PIRLS as role models for national assessments (T4/P5) Introduced or increased STEM activities (T10/P0) Increased investment in technical or scientific equipment (T3/P0)
IV. Monitoring, benchmarking, and accountability	Monitored student progress over time or system monitoring (T21/P28) Comparison with other countries (T20/P18) Within-country comparisons (T6/P2)
V. Teacher training and pedagogical development	Used in teacher training and professionalization (T22/P26) Developed or improved teaching material (T9/P25) Increased or improved digital learning (T4/P2)
VI. Public engagement and research	Data source for researchers (T16/P20) Increase in public awareness of education or students' performance (T9/P22)

- Note: Numbers in brackets indicate the number of education systems that mentioned the specific category for TIMSS (T) and PIRLS (P). Category “Introduced or evaluated reforms or special support programs” is grouped under two core areas because it is related to both.

► From Insight to Impact: How Countries Use TIMSS and PIRLS

Across participating education systems, engagement with TIMSS and PIRLS is consistently described as extending well beyond international benchmarking. Despite substantial contextual diversity, six core areas of use and impact emerged from the qualitative analysis. Together, these thematic areas illustrate how assessment data are mobilized to inform policy decisions, guide instructional improvement, and shape public discourse.

(I) Policy development and system-level reform. TIMSS and PIRLS frequently serve as evidence bases for national education policy and strategic planning. Ministries and policy bodies use results to identify demands for change and diagnose mainly systemic weaknesses, justify reform priorities, and support legislative or regulatory change. The international comparability of the data strengthens their legitimacy in political decision-making and allows policymakers to situate national challenges within a broader global context.

(II) Curriculum review and adjustment. Curriculum reform is one of the most commonly reported areas of impact. Education systems use TIMSS and PIRLS data to identify content areas where students struggle and to revise curricula accordingly. In mathematics and science, this often involves aligning curricula with the TIMSS assessment frameworks, which organize achievement around clearly defined content domains alongside cognitive domains. This structure provides detailed reference points for reviewing curricular content and expectations. In contrast, the PIRLS assessment frameworks (e.g., Mullis & Martin, 2019) focus on reading purposes and comprehension processes rather than subject-specific content. Consequently, PIRLS findings more often inform the development of reading instruction, comprehension strategies, and teaching materials than revisions of curricular content itself.

(III) Educational reforms and support programs. Beyond curriculum, TIMSS and PIRLS frequently catalyze broader reform initiatives, including targeted support programs, national strategies, and changes to teacher education or assessment systems. These reforms are often framed explicitly as responses to international assessment findings and may span multiple years, reflecting the strategic importance attributed to the studies.

(IV) Monitoring, benchmarking, and accountability. Many education systems emphasize the role of TIMSS and PIRLS in monitoring trends over time. The cyclical nature of the assessments allows countries to evaluate the effects of reforms and track long-term progress. International and within-country comparisons support accountability efforts and help identify disparities across regions, schools, or student subgroups.

(V) Teacher training and pedagogical development. Assessment results are widely used to inform professional development. Countries have reported developing teacher guides, training modules, and instructional resources based on released items and analyses of student performance. These materials support methodological improvement and help translate international findings into classroom practice.

(VI) Public engagement and research. Finally, TIMSS and PIRLS often influence public discourse and research activity. Media coverage and public reporting raise awareness of educational performance and stimulate political debate. At the same time, researchers use the datasets for secondary analyses, policy evaluation, and academic research, sometimes supported by dedicated national data centers or partnerships between ministries and universities.

Together, these six thematic areas demonstrate that TIMSS and PIRLS function not only as assessment instruments but also as policy-relevant knowledge infrastructures that connect evidence, reform, and public debate.

► Numbers That Speak: Patterns of Use Across TIMSS and PIRLS

While the six thematic areas appear across both studies, our analyses reveal notable differences in emphasis between TIMSS and PIRLS in the underlying 17 categories. These patterns are based on the proportion of education systems mentioning specific uses in their encyclopedia chapters and should be interpreted as indicators of relative emphasis rather than measures of impact strength.

Across both studies, the most frequently reported use is as a data source for policymakers and educators, cited by around 70 percent of participating systems. Similarly, introducing or evaluating reforms and support programs is reported by more than 60 percent of countries for both TIMSS and PIRLS. This convergence underscores the shared role of international assessments as tools for evidence-informed decision-making across subject domains.

Clear divergences emerge, however, in relation to curriculum reform and public engagement. TIMSS is substantially more likely than PIRLS to be cited as a driver of curriculum revision, particularly in mathematics and science. This pattern likely reflects the structured and domain-specific nature of STEM curricula, which lends itself to direct alignment with TIMSS frameworks. In contrast, PIRLS is more frequently associated with the development of teaching materials and increased public awareness, suggesting that reading literacy outcomes resonate more strongly in public discourse and classroom-level resource development.

Additional differences relate to technology and infrastructure. TIMSS is more often linked to digital learning initiatives, STEM activities, and investments in technical or scientific equipment—patterns that align with its subject focus and the increasing use of computer-based assessment. PIRLS, by comparison, plays a more limited role in these areas.

At the same time, several uses appear at medium frequency across both studies, including teacher professional development, system monitoring, international benchmarking, research use, and initiating political discussions on national reforms. These shared patterns highlight the broad applicability of TIMSS and PIRLS as instruments for system learning, professionalization, and policy alignment, regardless of subject domain.

There are also several categories that were mentioned only rarely across both studies. These include the use of TIMSS or PIRLS to inform funding decisions, serve as a model for national assessments, or support within-country comparisons. STEM initiatives, digital learning, and investments in technical or

scientific equipment were reported only occasionally and almost exclusively in relation to TIMSS, reflecting its mathematics and science focus rather than common patterns of use across participating education systems.

Figure 1. Percentage of education systems reporting specific uses and impacts of TIMSS (n = 71) and PIRLS (n = 60)

	TIMSS education systems (%)	PIRLS education systems (%)
Increased or informed funding	4	2
Increased investments in technical or scientific equipment	4	0
Increased or improved digital learning	6	3
TIMSS/PIRLS as role models for national assessments	6	8
Within-country comparisons	8	3
Developed or improved teaching material	13	37
Increase in public awareness of education or students' performance	13	42
Introduced or increased STEM activities	14	0
Implemented or revised national assessments	15	20
Data source for researchers	23	33
Initiated political discussions on national reforms	23	33
Comparison with other countries	28	30
Monitored student progress over time or system monitoring	30	47
Used in teacher training and professionalization	31	43
Introduced or evaluated reforms or special support programs	62	62
Reviewed or revised curriculum	69	37
Data source for policymakers and educators	70	73

► Why These Findings Matter

Taken together, these findings highlight the multifaceted role of ILSAs in national education systems. TIMSS and PIRLS are not merely sources of comparative performance data; they function as catalysts for reform, professional learning, and public engagement. Their influence depends not only on measured outcomes but also on how results are interpreted, communicated, and embedded within national policy processes.

The observed differences between TIMSS and PIRLS further illustrate how subject focus shapes the translation of international evidence into domestic action. Mathematics and science assessments more readily drive curriculum reform and technological improvements, while reading literacy assessments more often influence teaching materials and public debate. One

possible explanation is the different structures of the assessment frameworks described above. Because the TIMSS frameworks distinguish between detailed content and cognitive domains, they provide more direct reference points for curriculum revision. By contrast, the PIRLS framework emphasizes reading purposes and comprehension processes, making it particularly relevant for instructional practices and teaching materials.

Finally, the consistent use of TIMSS and PIRLS for monitoring and benchmarking over time points to their value as instruments for policy learning across borders. By enabling countries to situate national reforms within an international evidence base, these studies support not only accountability but also collaboration and shared learning in the global education community.

CONCLUSION

The reported use cases of TIMSS and PIRLS illustrate the diverse and context-sensitive ways in which international assessment data are mobilized for educational improvement. While both studies are widely used to guide policymaking, support teacher development, and inform curriculum design, TIMSS tends to exert stronger influence on STEM-related reforms and infrastructure investment, whereas PIRLS more often shapes literacy-focused strategies and public discourse. The convergence of high-impact

categories across both studies—such as data use by policymakers and educational reforms—underscores the central role of international large-scale assessments such as IEA’s TIMSS and PIRLS in driving evidence-informed change. At the same time, the observed variations highlight how subject focus, national priorities, and public visibility shape the translation of international data into domestic action.

CAVEATS IN INTERPRETING REPORTED IMPACTS

Comparisons of the perceived impact of TIMSS and PIRLS across countries are subject to important methodological limitations, as the data are based on self-reported assessments by national authorities that are subjective, context-dependent, vary in level of detail, and lack a common definition of “impact.” Cross-country

comparisons and causal interpretations are problematic, and the data should be read as indicative rather than evaluative. They are most useful as a starting point for further, more context-sensitive qualitative analysis.

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REFERENCES

- Best, M., Knight, P., Lietz, P., Lockwood, C., Nugroho, D., & Tobin, M. (2013). *The impact of national and international assessment programmes on education policy, particularly policies regarding resource allocation and teaching and learning practices in developing countries* (Final report). EPPI-Centre, Social Science Research Unit, Institute of Education, University of London. https://research.acer.edu.au/cgi/viewcontent.cgi?article=1016&context=ar_misc
- Johansson, S. (2016). International large-scale assessments: What uses, what consequences? *Educational Research*, 58(2), 139–148. <https://doi.org/10.1080/00131881.2016.1165559>
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed). Sage Publications.
- Mullis, I. V. S., & Martin, M. O. (Eds.). (2017). *TIMSS 2019 assessment frameworks*. TIMSS & PIRLS International Study Center, Boston College. <http://timssandpirls.bc.edu/timss2019/frameworks/>
- Mullis, I. V. S., & Martin, M. O. (Eds.). (2019). *PIRLS 2021 assessment frameworks*. TIMSS & PIRLS International Study Center, Boston College. <https://timssandpirls.bc.edu/pirls2021/frameworks/>
- Reynolds, K. A., Aldrich, C. E. A., Bookbinder, A., Gallo, A., von Davier, M., & Kennedy, A. (Eds.). (2024). *TIMSS 2023 encyclopedia: Education policy and curriculum in mathematics and science*. TIMSS & PIRLS International Study Center, Boston College. <https://doi.org/10.6017/lse.tpisc.timss.rs5882>
- Reynolds, K. A., Wry, E., Mullis, I. V. S., & von Davier, M. (2022). *PIRLS 2021 encyclopedia: Education policy and curriculum in reading*. TIMSS & PIRLS International Study Center, Boston College. <https://pirls2021.org/encyclopedia>
- Saldaña, J. (2015). *The Coding Manual for Qualitative Researchers* (3rd ed). Sage Publications.
- Wagemaker, H. (Ed.). (2020). *Reliability and validity of international large-scale assessment: Understanding IEA's comparative studies of student achievement*. IEA Research for Education, 10. Springer. <https://doi.org/10.1007/978-3-030-53081-5>
- World Bank. (2018). *World development report 2018: Learning to realize education's promise*. World Bank. <https://doi.org/10.1596/978-1-4648-1096-1>

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