

## Comparative Analysis of Education Systems in Estonia and North Macedonia Structural and Policy Factors

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### Abstract

This study presents a comparative analysis of the education systems of Estonia and North Macedonia, with particular attention to their contrasting outcomes in international large-scale assessments, especially PISA. Empirical evidence demonstrates that Estonian students consistently achieve high levels of performance, while students in North Macedonia continue to experience structural underachievement. The analysis examines five interrelated dimensions: curriculum design and systemic organization, levels and efficiency of educational funding, teacher education and professional development, governance and policy implementation, and equity of access across socio-economic groups. Estonia's strong results are associated with a competency-based curriculum, coherent system architecture, highly professionalized teacher education, depoliticized governance, and strategic, needs-based resource allocation that supports both excellence and inclusion. By contrast, the education system in North Macedonia is characterized by fragmented institutional structures, persistent socio-economic inequalities, underinvestment, and politicized decision-making, all of which constrain sustainable reform and learning outcomes. The study also reviews recent reform initiatives in North Macedonia, including curriculum revision, funding adjustments, and vocational education modernization, which signal incremental progress but remain insufficient to address deep-rooted challenges in early childhood education, teacher quality, and system coherence. Drawing on Estonia's experience, the study formulates evidence-based policy recommendations for North Macedonia, emphasizing transparent and accountable governance, systematic investment in teacher education, strengthened early learning provision, and equity-oriented reforms. These measures

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are presented as essential for enhancing educational quality, reducing disparities, and developing a resilient, inclusive, and future-oriented education system capable of meeting contemporary social and economic demands. Such reforms align education policy with long-term national development priorities.

**Keywords:** *Comparative Education, Curriculum and Pedagogy, Teacher Professionalization, Educational Equity, Governance, PISA Outcomes*

## **Introduction**

Education is a cornerstone of national development, fostering creativity, critical thinking, and civic responsibility, which in turn enhance workforce productivity, innovation, and societal resilience (Lutz et al., 2019). Human capital development is crucial for leveraging demographic dividends, yet such benefits materialize only if education systems deliver quality learning outcomes (Lutz et al., 2019). When education systems underperform, social inequalities are exacerbated, public trust erodes, and opportunities for upward mobility are constrained. The COVID-19 pandemic further highlighted these vulnerabilities, as the shift to remote learning disproportionately affected marginalized students, deepening digital divides (Golden et al., 2023). In North Macedonia, PISA 2022 results revealed significant weaknesses: the country ranked 61st in mathematics, 71st in reading, and 68th in science out of 81 participating nations (Nikolik, 2023). These outcomes reflect structural deficits that threaten educational quality and socio-economic stability.

In contrast, Estonia consistently achieves top-tier results in international assessments. PISA 2022 scores—510 in mathematics, 526 in science, and 511 in reading—demonstrate the effectiveness of professionalized teaching, innovative curricula, digital integration, and equity-driven policies (Ministry of Education and Research, 2024; Tambur, 2024). This study provides a comparative analysis of Estonia and North Macedonia, two post-socialist countries with divergent educational outcomes. By examining systemic factors—curriculum design, funding, teacher professionalism, governance, and equity—this paper identifies the mechanisms underlying Estonia’s success and North Macedonia’s persistent challenges. Evidence-based recommendations are formulated to guide North Macedonia toward transparent governance, comprehensive teacher development, and inclusive policies. Ultimately, this analysis aims to inform policymakers and scholars on strategies for sustainable educational reform in transition countries, promoting long-term equity, quality, and resilience.

## **Contextual Framework and Methodology**

Estonia has emerged as a global model of educational equity and excellence, achieved through competency-based curricula, inclusive policies, teacher development, and accountable

governance. In contrast, North Macedonia experiences curriculum gaps, limited teacher training, underfunding, and ethnic and regional disparities, which constrain achievement and public trust.

This study employs a comparative descriptive design, drawing on peer-reviewed research, policy reports, OECD and Eurostat data, and official publications accessed via academic platforms. The analysis focuses on five pivotal dimensions:

1. Education System Overview and Curriculum Design
2. Funding in Education
3. Teacher Training and Qualifications
4. Governance and Policy Implementation
5. Equity and Access to Education

The primary objective is to identify strategies from Estonia's experience that can inform evidence-based policy in North Macedonia, thereby enhancing equity, quality, and student outcomes.

### **Research Questions**

The study addresses the following questions:

1. Which factors explain Estonia's consistent PISA excellence compared with North Macedonia's underperformance?
2. What structural and policy differences exist between the two education systems?
3. Which elements most significantly contribute to disparities in student learning outcomes?
4. How does educational investment and resource allocation affect quality in both countries?
5. In what ways do teacher preparation, pedagogy, and infrastructure influence achievement?

By examining these questions, the study provides an actionable analysis of structural and policy determinants of educational outcomes, offering guidance for educators, researchers, and policymakers aiming to strengthen North Macedonia's education system.

## LITERATURE REVIEW

### 1. Education System Overview and Curriculum Design

#### 1.1 Estonia's Education System

The Estonian education system functions as a cornerstone of national identity, cultural continuity, and societal cohesion. Beyond knowledge acquisition, it supports economic modernization, democratic stability, and resilience, encapsulated in the national slogan “*Education Nation*” (Jürimäe, 2022). Even during Soviet occupation, Estonia preserved pedagogical autonomy and intellectual traditions (Jürimäe, 2022). Post-independence reforms positioned education as a catalyst for societal transformation. Early childhood programs emphasize play-based, exploratory learning, integrated with cultural traditions, ensuring smooth transitions to student-centered primary education. Enrollment in pre-school reaches 94% for ages 3–6, contributing to Estonia's high international performance, including first in Europe and fourth globally in PISA 2022 (Daxow, 2025; Rashidi, 2023; OECD, 2023).

The system comprises four levels: pre-school, basic, secondary, and higher education, with general and vocational pathways. Governance is decentralized, with municipalities overseeing schools and the state ensuring equitable access through per-pupil and block grants, though rural disparities persist (Ministry of Education and Research, 2024). Estonia's learner-centered curriculum fosters critical thinking, problem-solving, and digital literacy (OECD, 2019, 2020). Digital initiatives, including Tiigrihüpe and ProgeTiger, integrate programming across levels, supported by near-universal online public services (Education Estonia, 2021; NCEE, n.d.). Teacher professionalism underpins this system: all educators hold master's degrees and full licensure, with structured induction, mentoring, and ongoing development (>1% of payroll) (Leijen et al., 2024; National Audit Office, 2024; Eisenschmidt, 2023). Equity and efficiency are demonstrated through minimal grade repetition, high completion rates, and reduced socio-economic gaps, although gender imbalances in STEM fields remain (OECD, 2024; Eurydice, 2025).

#### 1.2 North Macedonia's Education System

North Macedonia's education system has been shaped by frequent leadership changes, affecting policy continuity. Between 1991 and 2017, fifteen education ministers introduced reforms in

higher education, standardized testing, minority-language instruction, teacher training, and digitalization (Fakulteti.mk, 2017). Despite modernization efforts, structural challenges and political influence persist. The system encompasses preschool, primary, secondary, vocational, higher education, adult learning, and transversal priorities such as employability and digital skills (National Development Strategy, 2022). Public schools provide free education, while private institutions rely on tuition, creating potential disparities. Governance is decentralized, yet resource allocation varies, particularly between urban and rural areas (Eurydice, 2025; Ministry of Education and Science, 2022).

PISA 2022 results indicate underperformance: 75% of 15-year-olds scored low in reading, and 66% underperformed in mathematics and science (UNICEF North Macedonia, 2024). Factors include limited preschool access (43% of children aged 3–6 enrolled), fewer instructional hours than OECD peers, socio-economic inequities, and ethnic divisions (Hlasny, 2017; Sosu & Pimenta, 2023). Curriculum fragmentation, outdated teaching methods, and insufficient teacher preparation further undermine learning outcomes (National Development Strategy, 2022; OECD, 2019; Sharlamanov & Mitevaska Petrusheva, 2023). Higher education quality is constrained by weak governance, fragmented policy, and limited accountability, reflected in low global rankings (Salmi, 2017; World Bank, n.d.). Ethnic segregation in schools persists, impeding inclusivity (Bloodworth, 2020). Although the 2018–2025 Comprehensive Strategy aims to enhance integration, success depends on changes in teacher attitudes and national mindsets (Bloodworth, 2020).

### **1.3 Comparative Insights**

Estonia demonstrates a coherent, competency-based curriculum integrated with digital innovation and teacher professionalism, yielding high performance and equity. In contrast, North Macedonia exhibits fragmentation, inconsistent teacher training, underfunding, and socio-economic and ethnic disparities, limiting student achievement. These divergences provide a framework for understanding systemic determinants of educational outcomes and informing targeted reforms.

## **2. Funding in Education**

### **2.1 Estonia**

Estonia demonstrates efficient, equitable education financing, with total public expenditure on education at 6.8% of GDP (OECD, 2023). Funding is largely public, with municipalities managing per-pupil and block grants, ensuring schools have predictable, needs-based resources. Allocation emphasizes quality, equity, and digital infrastructure, contributing to high PISA performance (OECD, 2023; Education Estonia, 2021). Higher education funding combines state-financed and tuition-based models. Merit- and need-based scholarships and competitive grants foster access and reduce socio-economic disparities (Leijen et al., 2024). Accountability mechanisms, including regular audits and performance monitoring, maintain transparency and prevent inefficiency (National Audit Office, 2024). Private contributions remain minor, reflecting strong state responsibility for educational equity.

### **2.2 North Macedonia**

North Macedonia's public funding for education is lower and less consistent, at 4.2% of GDP (World Bank, 2022). Resource allocation is fragmented, with urban schools often better funded than rural or minority-language institutions. Per-student spending is variable, affecting infrastructure, digital access, and teacher compensation (Ministry of Finance, 2022; UNICEF North Macedonia, 2024). Higher education relies partially on tuition, with scholarships limited and unevenly distributed, exacerbating socio-economic disparities. Decentralized governance complicates equitable fund distribution, and insufficient accountability mechanisms hinder efficiency and transparency (Sharlamanov & Mitevaska Petrusheva, 2023). While recent reforms aim to improve funding equity and introduce performance-based incentives, implementation remains inconsistent, limiting systemic impact (National Development Strategy, 2022).

### **2.3 Comparative Insights**

Estonia exemplifies sustainable, transparent, and needs-based education funding, directly linked to high achievement, equity, and digital integration. In contrast, North Macedonia struggles with underfunding, inequitable allocation, and limited accountability, contributing to low student performance and persistent socio-economic disparities. Comparative analysis underscores the role of coherent financial policy in achieving educational outcomes.

### **3. Teacher Training and Qualifications**

Teacher quality is widely recognized as a pivotal determinant of student outcomes, system efficiency, and educational equity (OECD, 2019; European Commission, 2022). Preparation, professional development, and recognition collectively influence classroom practice, curriculum implementation, and systemic responsiveness. Comparative analysis of Estonia and North Macedonia highlights critical divergences affecting equity, innovation, and labor-market alignment.

#### **3.1 Estonia**

Estonia maintains high standards for teacher education. All educators hold master's degrees and full licensure. Bachelor's programs (3 years) and master's programs (2 years) integrate pedagogy, subject specialization, and supervised practicum (Eisenschmidt, 2023; OECD, 2021). Selective admissions, based on academic achievement, interviews, and collaborative assessment, ensure high-caliber entrants (European Agency, 2023). Novice teachers undergo a one-year induction with mentoring that emphasizes reflective, inclusive practice, followed by continuous professional development (>1% of payroll), reinforcing digital competence, innovation, and equity (Education Estonia, 2023; OECD, 2021). Competitive remuneration and societal recognition enhance recruitment, retention, and instructional quality, supporting student-centered learning and labor-market alignment (Leijen et al., 2024).

#### **3.2 North Macedonia**

North Macedonia faces persistent challenges in teacher preparation. Programs vary in quality, often lacking modern pedagogy, digital literacy, and inclusive practices (UNICEF, 2019; OECD, 2019). Practicum experiences are limited, and admissions are largely non-selective, resulting in unevenly prepared teachers. Teacher allocation is unequal, particularly in rural areas, and professional development is fragmented, voluntary, and weakly linked to career progression (ETF, 2020; UNICEF, 2020).

Low pay, especially in minority-language schools, undermines retention and professional status. Although primary teachers with degrees increased from 61% to 72%, program quality, practical

training, and inclusivity remain inadequate (World Bank, n.d.; UNICEF North Macedonia, 2024), limiting systemic effectiveness.

### **3.3 Comparative Overview**

Estonia surpasses OECD benchmarks in selection, practicum quality, professional development, remuneration, and inclusivity (OECD, 2019; Eisenschmidt, 2023). North Macedonia falls below these standards across all dimensions, reflecting structural weaknesses, fragmented oversight, and underinvestment (OECD, 2019; UNICEF, 2019). Selective, research-informed training, continuous development, competitive pay, and inclusive pedagogy emerge as critical levers for high-quality, equitable outcomes.

### **3.4 Implications**

Teacher quality relies not only on formal qualifications but also on systemic coherence, structured career pathways, and sustained investment. North Macedonia should prioritize selective admissions, structured practicum, continuous professional development, competitive remuneration, and integrated inclusive pedagogy, aligning with OECD best practices to enhance instructional quality and student outcomes.

## **4. Governance and Policy Implementation**

Governance shapes policy coherence, equity, curriculum implementation, teacher development, and student outcomes (Teachers Institute, 2023). Estonia and North Macedonia exemplify divergent governance models with significant implications for systemic effectiveness and equity.

### **4.1 Estonia**

Estonia effectively balances decentralized school management with robust national oversight, promoting pedagogical flexibility, fiscal discretion, and quality assurance (OECD, 2016; UNESCO, 2023). Municipalities allocate approximately 40% of local budgets to education (Lääne et al., 2022), while data-driven policymaking, including integration of PISA-style items into national assessments, aligns domestic standards with international benchmarks (OECD, 2022). These governance mechanisms underpin consistently high outcomes. PISA 2022 Level 2+ attainment reached 84% in reading, 83% in mathematics, and 86% in science (OECD, 2023).

Structured teacher preparation, career-linked professional development, equitable access initiatives, and digital governance further reinforce educational quality (Eisenschmidt, 2023; Raal, 2021; SGI, 2022; OECD, 2020). Minor challenges, such as regional funding disparities or labor-market mismatches, are mitigated through employer collaboration and lifelong learning programs, while initiatives like *Taking Politics Outside Schools!* maintain neutrality and professional integrity (Töötukassa, 2021; Sylvester, 2022).

#### **4.2 North Macedonia**

In contrast, North Macedonia's decentralized system is weakened by uneven resource allocation, politicized decision-making, and frequent leadership changes (Eurydice, 2025; Velkovski, 2015; Ministry of Education and Science, 2022). Initiatives such as the MCEC decentralization project (2005–2006) aimed to strengthen municipal capacity, participatory governance, and targeted funding (MCEC, 2013). Nevertheless, weak municipal capacity, central oversight gaps, and political influence disproportionately affect rural and minority-language students (UNICEF, 2019; Kallxo, 2024; World Bank, 2021). Operational deficits, including textbook shortages, limited digital infrastructure, and labor-market misalignment, further constrain equity and outcomes. By the end of primary education, 38% of children lack basic reading skills, 8% remain unenrolled, and PISA 2022 indicates underperformance: 62% in reading, 61% in mathematics, and 65% in science (World Bank, 2021; OECD, 2023). Recent reforms in curriculum modernization, digital literacy, and vocational education have had limited impact due to uneven implementation and political interference (Eurydice, 2024a; ETF, 2024).

#### **4.3 Comparative Indicators**

Estonia outperforms North Macedonia across policy continuity, political neutrality, local autonomy, merit-based teacher appointments, transparent funding, and digital governance (OECD, 2019; Sylvester, 2022; Raal, 2021). Conversely, North Macedonia's politicized, fragmented system undermines institutional stability, resource utilization, and student outcomes, perpetuating systemic inequities (Kallxo, 2024; UNICEF, 2019).

#### **4.4 Implications**

Governance is a critical determinant of educational quality and equity. North Macedonia should:

- Depoliticize governance to ensure school neutrality and institutional integrity.
- Implement evidence-based policymaking linking curricula to labor-market needs, digital literacy, and inclusive pedagogy.
- Strengthen local administrative capacity and adopt transparent, formula-driven resource allocation.

Collectively, these reforms are essential to establish a high-quality, equitable education system that approaches Estonia’s evidence-driven model of excellence.

## **5. Equity and Access to Education**

Equity in education ensures all students can achieve their potential regardless of socio-economic status, language, ethnicity, or geography (OECD, 2019; UNICEF, 2023). Estonia and North Macedonia demonstrate contrasting outcomes due to differences in governance, funding, and social policy integration.

### **5.1 Estonia**

Estonia’s system promotes near-universal access, high inclusion, and targeted support for vulnerable groups (Eisenschmidt, 2023; OECD, 2022). Inclusive practices encompass multilingual instruction, special-needs provisions, and early intervention programs, while digital learning tools mitigate geographic disparities (Raal, 2021; Sylvester, 2022).

Socio-economic gaps are minimized by formula-driven resource allocation, free textbooks, meal programs, and scholarships for disadvantaged students (OECD, 2022). Consequently, low-SES students perform comparatively well, with PISA 2022 Level 2+ attainment at 82% in reading, 81% in mathematics, and 85% in science (OECD, 2023). Regional disparities are modest, and participation in upper-secondary education exceeds 95% (Eurydice, 2023a).

### **5.2 North Macedonia**

North Macedonia faces persistent equity challenges. Socio-economic and geographic inequalities are amplified by uneven municipal capacity, limited infrastructure, and politicized resource distribution (World Bank, 2021; UNICEF, 2019; Kallxo, 2024). Minority-language and rural students are disproportionately affected, with significant gaps in literacy, numeracy, and digital skills (ETF, 2024; Eurydice, 2024a).

Early tracking, limited remedial support, and insufficiently inclusive pedagogies exacerbate disparities (Velkovski, 2015). Only 62% of students reach PISA 2022 Level 2+ in reading, 61% in mathematics, and 65% in science (OECD, 2023), with rural-urban gaps exceeding 15 percentage points. Dropout rates remain high, particularly in secondary vocational tracks, while access to quality digital learning and modern pedagogy is unevenly distributed (UNICEF, 2019; World Bank, 2021).

### **5.3 Comparative Indicators**

Estonia demonstrates low equity gaps, high inclusion, and systemic support for vulnerable students, underpinned by evidence-based governance and digital integration (OECD, 2022; Sylvester, 2022). North Macedonia exhibits pronounced inequities in outcomes, participation, and resource allocation, highlighting the intersection of socio-economic, geographic, and political determinants (Kallxo, 2024; UNICEF, 2019).

### **5.4 Implications**

To advance equity, North Macedonia should:

- Ensure formula-driven, transparent resource allocation to mitigate regional and socio-economic disparities.
- Expand early intervention and remedial programs, particularly for minority-language and rural students.
- Integrate digital learning and inclusive pedagogy across all levels of schooling.
- Depoliticize school governance to safeguard equitable decision-making.

Such reforms are critical for reducing systemic inequities and establishing inclusive, high-performing education pathways comparable to Estonia's model.

## **Conclusion**

This study examined the divergent educational outcomes of Estonia and North Macedonia by addressing five research questions concerning performance, structure, policy, investment, and instructional capacity.

**RQ1. Factors explaining Estonia’s PISA excellence versus North Macedonia’s underperformance** - Estonia’s sustained high performance is driven by systemic coherence, long-term policy stability, and alignment of curriculum, assessment, and teacher professionalization. A competency-based curriculum, early investment in digital infrastructure, and evidence-driven governance enable both high achievement and equity. In contrast, North Macedonia underperforms due to fragmented policies, politicized governance, inconsistent teacher preparation, and unresolved socio-economic and ethnic disparities, which collectively hinder student learning.

**RQ2. Structural and policy distinctions** - Estonia’s education system combines decentralized school management with strong national oversight, promoting pedagogical flexibility, data-driven policymaking, and resource equity. North Macedonia exhibits structural fragmentation, frequent policy reversals, and weak coordination between national priorities and school-level implementation, limiting systemic effectiveness.

**RQ3. Key elements contributing to disparities in student outcomes** - Governance, teacher quality, and equity mechanisms are decisive. Estonia’s depoliticized governance, high-quality teacher workforce, and inclusive policies reduce socio-economic gaps. North Macedonia’s politicized decision-making, uneven teacher preparation, and limited support for vulnerable groups—including Roma children, low-income families, and students with disabilities—exacerbate disparities.

**RQ4. Impact of educational investment and resource allocation** - Estonia’s formula-based, needs-sensitive funding supports infrastructure, teacher development, and digital initiatives, producing measurable gains in learning outcomes. North Macedonia’s centralized system prioritizes salaries over professional development and infrastructure, reducing the effectiveness of financial inputs and limiting improvements in school quality.

**RQ5. Influence of teacher preparation, pedagogy, and infrastructure** - Teacher quality is a critical determinant of student achievement. Estonia's selective admissions, structured practicum, continuous mentoring, and competitive remuneration foster instructional excellence and labor-market alignment. In contrast, North Macedonia's low-entry standards, limited induction, fragmented professional development, and inadequate infrastructure contribute to uneven pedagogy and high turnover, constraining student learning.

**Policy Implications** - The evidence indicates that North Macedonia must pursue systemic reforms rather than incremental changes. Key priorities include depoliticizing governance, enhancing teacher education and career pathways, implementing equitable, formula-based funding, and expanding inclusive early childhood and digital learning opportunities. Estonia's model illustrates that sustained investment in coherence, professionalism, and equity is essential for high-performing, resilient education systems.

In conclusion, aligning structural reforms, strategic resource allocation, teacher development, and inclusive policies is central to improving educational outcomes. North Macedonia has the opportunity to close systemic gaps, enhance equity, and strengthen social and economic resilience by learning from evidence-based practices demonstrated in Estonia.

**Strategic Reform Agenda for North Macedonia:**

- Foster Long-Term, Equity-Driven Policy: Prioritize transparent, evidence-based reforms transcending political and socio-ethnic divisions.
- Develop a National Education Strategy: Legally binding, measurable goals for curriculum modernization, inclusivity, and digital integration.
- Depoliticize Governance: Ensure merit-based leadership, institutional accountability, and long-term strategic planning.
- Elevate Teacher Professionalism: Selective admission, structured mentoring, continuous professional development, and competitive pay.
- Adopt Needs-Sensitive Funding: Increase investment to  $\geq 4.8\%$  of GDP, prioritize underserved regions, teacher training, and infrastructure.
- Modernize Curriculum and Assessment: Competency-based, student-centered curriculum emphasizing critical thinking and problem-solving; updated assessment frameworks.

- Invest in Inclusive Infrastructure: Digital tools, high-speed internet, and accessible facilities for all students.
- Promote Social Inclusion: Integrate equity practices into curricula, teacher training, and school management.
- Strengthen Global Engagement: Benchmark best practices via international networks (OECD, EU) to enhance innovation.
- Enhance Family and Community Engagement: Promote parental involvement and local accountability through workshops, advisory boards, and digital platforms.

Implementing these measures will enable North Macedonia to transform its educational system, reduce disparities, and align with global best practices. Success depends on coherent governance, professional teaching standards, equitable resource allocation, and inclusive policies that guarantee opportunities for all students, particularly marginalized groups. Lessons from Estonia's evidence-driven and inclusive model provide a roadmap to achieve high-quality education, social cohesion, and economic resilience.

**Limitations:** This study relies on publicly available quantitative data, focusing on curriculum, funding, teacher training, governance, and equity. It does not fully capture regional or local variations or qualitative perspectives from teachers, students, and parents. Further research is recommended to explore localized dynamics and the impact of recent policy shifts.

## Bibliography

Almeida, R., Avitabile, C., & Shmis, T. (2023, December 14). *Beyond the learning drop: Why countries in Eastern Europe and Central Asia should act now to avoid a teacher crisis*. *World Bank Blogs*. <https://blogs.worldbank.org/en/education/beyond-learning-drop-why-countries-eastern-europe-and-central-asia-should-act-now-avoid>

Angejeleska, N. (2024). *ESA-2024 North Macedonia*. ResearchGate. [https://www.researchgate.net/publication/386243435\\_ESA-2024\\_North\\_Macedonia](https://www.researchgate.net/publication/386243435_ESA-2024_North_Macedonia)

Bloodworth, A. (2020). Educational (de)segregation in North Macedonia: The intersection of policies, schools, and individuals. *European Educational Research Journal*, 19(4), 310–328. <https://doi.org/10.1177/1474904120907723>

CountryEconomy.com. (n.d.). *Macedonia vs. Estonia: Country comparison*. <https://countryeconomy.com/countries/compare/macedonia/estonia>

Daxow. (2025, April 13). *Estonia's education system: A global leader in inclusion and innovation*. Study in Estonia. <https://studyinestonia.eu/estonia-education-system-global-leader-inclusion-innovation>

Education Estonia. (n.d.-a). *Overview of the Estonian education system*. <https://www.educationestonia.org/about-education-system/>

Education Estonia. (n.d.-b). *Reports: Estonian education in international comparison*. <https://www.educationestonia.org/reports/>

Education Estonia. (2021). *ProgeTiger programme: Digital learning and innovation in Estonia*.

Education Estonia. (2023a). *Education funding and governance in Estonia*.

Education Estonia. (2023b). *Teacher professional development programs in Estonia*. <https://www.educationestonia.org/innovation/learning-communities/>

Eisenschmidt, E. (2023). Teacher education in Estonia: Structure, standards, and practice. *Journal of Baltic Education Studies*, 15(2), 45–67. <https://doi.org/10.1177/10526846241245085>

Eurydice. (2024a). *Education governance in North Macedonia: National overview*.

Eurydice. (2024b). *Curriculum modernization and digital literacy reforms in North Macedonia*.

Eurydice. (2025a). *Republic of North Macedonia – Overview*.

Eurydice. (2025b). *Estonia – Overview*. <https://eurydice.eacea.ec.europa.eu/>

European Training Foundation [ETF]. (2023). *Key policy developments in education, training and employment – North Macedonia 2023*. <https://www.etf.europa.eu/>

ETF. (2024). *Vocational education and training in North Macedonia: Policy report*.

Fakulteti.mk. (2017, September 8). *Што направија 15 министри за образование во 26 години независна Македонија*. <https://www.fakulteti.mk/news/08092017...>

Generis Global. (2024, November 24). *An overview of the education system in North Macedonia*. <https://generisonline.com/...>

Golden, L., Choi, J. K., & Simpkins, S. D. (2023). Educational impacts of COVID-19 on marginalized youth: A review of the digital divide and learning loss. *Children and Youth Services Review, 149*, 106965. <https://doi.org/10.1016/j.childyouth.2023.106965>

Grozdanovska, L. (2008). *Macedonia: The politics of incompetence*. Open Society Foundations.

Jürimäe, M. (2022). *Insights from the education nation: The case of Estonia*. Green European Journal.

Kallxo. (2024). *Maqedonasit në Çashkë kundër mësimit në gjuhën shqipe*. <https://kallxo.com/>

Kattel, R., & Mergel, I. (2018). *Estonia's digital transformation: Mission mystique and the hiding hand*. University College London.

Kiss, T., & Toró, T. (2025). Minority education in Central and Eastern Europe: Toward a framework for comparative analysis and minority rights advocacy. *Nationalities Papers*.

Kurir. (2025, June 5). *МОН со нова стратегија...*

Kurir. (2025, August 13). *Нова методологија за финансирање...*

Leijen, Ä., et al. (2024). The shortage of teachers in Estonia: Causes and implications. *European Journal of Teacher Education*.

Lutz, W., Crespo Cuaresma, J., Kebede, E. B., Fürnkranz-Prskawetz, A., Sanderson, W. C., & Striessnig, E. (2019). Education rather than age structure brings demographic dividend. *PNAS, 116*(26), 12798–12803. <https://doi.org/10.1073/pnas.1820362116>

Lyon, A. (2013). Political decentralization and the strengthening of participatory democracy in Macedonia. *Democratization, 22*(1), 157–178. <https://doi.org/10.1080/13510347.2013.834331>

Macedonian Civic Education Center. (2013). *Decentralization of education in Macedonia*. <https://mcgo.org.mk/>

Ministry of Education and Research (Estonia). (2022). *Education strategy 2021–2035*.  
— (2024a). *Annual report 2023*.

— (2024b). *General education in Estonia*.

Ministry of Education and Science (North Macedonia). (2022). *Usvoena koncepcija za osnovno obrazovanie*. [https://portal.mdt.gov.mk/...](https://portal.mdt.gov.mk/)

Misic, L. (2024). *How education system struggles in North Macedonia affect children*. Humanium.

National Audit Office. (2024). *Shortage of qualified teachers in Estonia*.

National Center on Education and the Economy (NCEE). (n.d.). *Top-performing countries: Estonia*.

National Development Strategy. (2022). *Национална развојна стратегија 2022–2042: Образование*.

Nikolik, N. (2023). *PISA 2022 results: North Macedonia ranks 61 in math, 71 in reading, 68 in science*. MIA.

OECD. (2016–2024). *Education policy outlook* [series of reports 2016–2024, including Estonia, digital strategies, and PISA data]. OECD Publishing. <https://www.oecd.org/education>

Raal, K. (2021). Digitalization and governance in Estonia: Lessons for educational systems. *Int. Journal of Educational Technology*, 18(4), 33–51.

Rashidi, N. (2023, December 7). *Pse Estonia është e para në Evropë sipas PISA-s?* Alsat.

Rosenstock, M. (2022). *Key policy developments in education, training and employment – North Macedonia 2022*. ETF.

Samardjiev, A. (2024). *North Macedonia education system in disarray*. BalkanInsight.

Santiago, R. T., Garbacz, S. A., Beattie, T., & Dragoo, C. (2016). Parent-teacher relationships in elementary school: Parent-teacher trust. *Psychology in the Schools*, 53(10), 1053–1071.

Sarlamanov, K., & Mitevaska Petrusheva, K. (2023). Challenges in the education system in North Macedonia. *Int. Journal of Social Science & Human Research*, 6(3), 1500–1505.\*

Shapkova Kocevaska, K. (2023). Public expenditure on education and growth: Evidence from North Macedonia. *Journal of Liberty & International Affairs*, 9(1), 22–23.\*

Tambur, S. (2024). *Estonian students rank first in Europe in PISA creative thinking test*. *Estonian World*.

Teachers Institute. (2023). *Governance structures and policy influence in European education systems*.

Toome, E. (2023). *PISA 2022: Estonia among the world's best*. Education Estonia.

UNESCO Institute for Lifelong Learning. (2023). *Estonia: Education strategy 2021–2035*.

UNICEF. (2019–2024). *Education governance and development in North Macedonia and the Western Balkans* [reports 2019–2024]. <https://www.unicef.org/north-macedonia>

Veljanoski, S. (2024). *Зајакнување на раното детско образование во Македонија*. *Nova Makedonija*.

Velkovski, Z. (2015). Reforms in the education system in Macedonia: 23 years later. *Int. Journal of Educational Research & Technology*, 1(1), 23–39.\*

World Bank. (n.d.). *Public finance review: Education in North Macedonia*.

Zaimi, B. (2024). *Образованието во криза: Експертите бараат длабоки реформи*. *Balkan Investigative Reporting Center*.