CZU: 373.016:303.446 **https://doi.org/10.59295/sum9(179)2024_02**

MONITORING SCHOOL CURRICULUM IN DIFFERENT COUNTRIES: A COMPARATIVE STUDY

Carolina ȚURCANU,
Moldova State University

In a constantly changing world, school curricula play a central role in preparing students for life's challenges. In Europe, monitoring and continuous development of school curricula is a priority for improving the quality of education, including through the effective formation of students' competences. Curriculum monitoring and development is an essential process for ensuring the relevance of education. This article examines the most effective methods of monitoring the school curriculum in different countries: Finland, Estonia, Germany, France, Denmark, Singapore, the United States of America, the Republic of Moldova. The examination of problem of monitoring the school curriculum focuses on several dominant aspects: theoretical foundations of school curriculum monitoring (theories and conceptual approaches), practices, experiences and methods of carrying out the process of monitoring the school curriculum; the impact and challenges of curricular monitoring. Some directions of curriculum development are also stipulated as reflections of school curriculum monitoring.

Keywords: *integrated approach, quality in education, school curriculum, curriculum development, curriculum evaluation, curriculum monitoring methods.*

MONITORIZAREA PROGRAMELOR ȘCOLARE ÎN DIFERITE ȚĂRI: STUDIU COMPARATIV

Într-o lume în continuă schimbare, curriculum școlar are un rol central în pregătirea elevilor pentru provocările vieții. În Europa, monitorizarea și dezvoltarea continuă a curriculumului școlar reprezintă o prioritate pentru îmbunătățirea calității educației, inclusiv, prin formarea eficientă a competențelor elevilor. Monitorizarea și dezvoltarea curriculară reprezintă un proces esențial pentru asigurarea relevanței educației. În acest articol se examinează cele mai eficiente metode de monitorizare a curriculumului școlar în diferite țări: Finlanda, Estonia, Germania, Franța, Danemarca, Singapore, Statele Unite ale Americii, Republica Moldova. Examinarea problemei de monitorizare a curriculumului școlar se axează pe câteva aspecte dominante: fundamente teoretice ale monitorizării curriculumului școlar (teorii și abordări conceptuale), parctici, experiențe și metode de realizare a procesului de monitorizare a curriculumului școlar; impactul și provocările monitorizării curriculare. Sunte stipulate și unele direcții de dezvoltare curriculară ca reflecții ale monitorizării curriculumului școlar.

Cuvinte-cheie: *abordare integrată, calitate în educație, curriculum școlar, dezvoltare curriculară, evaluarea curriculumului, metode de monitorizare a curriculumului.*

Introduction

The school curriculum is a fundamental tool in the formation and development of cognitive, social, affective and psychomotor competences, a tool on the basis of which the entire educational process is organized. Over time, its adaptation to the needs of learners and the challenges of contemporary society has become a necessity. European countries approach the issue of developing and monitoring the school curriculum in different ways, integrated into different cultural and socio-economic contexts. Despite the diversity of approaches, there are a number of common factors that influence the efficiency of these processes: the conceptualization of curricular monitoring, the selection and use of educational data, the involvement of different factors, adaptability and the emphasis on the development of general and specific competences.

School Curriculum Monitoring: Concept and General Characteristics

School curriculum monitoring is an important stage regarding the continuous and cyclical development of the written curriculum, the taught-learned-assessed curriculum.

Curriculum monitoring aims to collect information/evidence to describe and formulate concepts about the value and quality of the curricula in function.

School curriculum monitoring involves 1) evaluating curricular products (curriculum, subject curriculum/syllabus, textbook, methodological guide, etc.) before they are implemented and 2) evaluating the teaching-learning-assessment process organized on the basis of these documents.

School curriculum monitoring in function is a process evaluation, which aims to control and improve the quality of curriculum application at the level of educational practice, which identifies barriers, errors or difficulties in applying the written curriculum and as a result, creating the premises for continuous and cyclical development of the school curriculum.

Monitoring the school curriculum in function involves the following aspects [12, p. 42]:

- the correspondence between the written curriculum and the taught/implemented curriculum;
- the extent to which the internal logic of the teaching-learning-assessment process is respected;
- the extent to which the provisions of designed curriculum are valorized on what and how to teach, how to organize learning and assessment;
- the identification of causes that generate barriers/difficulties in the application of written curriculum, as well as ways to correct/improve problematic situations, but also to prevent these situations in the future, providing necessary information to national curriculum designers, but also to decision-makers;
- the identification of impact of the written and taught curriculum on school results; impact assessment assesses whether the level of competence monitoring is in line with school objectives (by education levels, by school years).

In this context, we consider it appropriate to examine different approaches to school curriculum monitoring in different countries, as a source for establishing a school curriculum monitoring system in the Republic of Moldova.

Monitoring School Curriculum in Different Countries: A Comparative Framework

The analysis of specialized literature from different countries on the issue of monitoring the school curriculum allowed us to highlight several approaches both theoretically and praxiologically. It is obvious that all countries (subjects of this study) in their own approaches to monitoring the school curriculum emphasize the establishment and valorization of the theoretical foundations of this process.

Of interest are the approaches to monitoring the school curriculum in **Finland**, which is internationally recognized for its educational performance. As researchers C. Dweck, P. Black and D. Wiliam state, a dominant factor of success is the monitoring of school curriculum, focused on research and continuous feedback. Research-based monitoring is based on the principles of educational research and the use of empirical estimates to guide decisions regarding the continuous development of the school curriculum.

The Finnish concept of monitoring the school curriculum, however, focuses on two dominant theories: *the Formative Assessment Theory and the Self-Determination Theory*.

Formative assessment is essential in the Finnish educational model. According to the works of Black and Wiliam (1998), formative assessment is defined as a continuous process that takes place throughout the entire learning cycle, with the aim of adjusting teaching and learning to meet the needs of students. In Finland, this approach is extended by the direct involvement of teachers in the process of evaluating and adapting curricula based on the results of periodic assessments. Research shows that formative assessment contributes significantly to improving academic performance, as students receive personalized feedback that allows them to adjust their own learning strategies [1].

Within the Finnish educational system, a central role is played by the “self-determination theory”, developed by Deci and Ryan (2000). This emphasizes the importance of autonomy, competence and relatedness in motivating and engaging students in the learning process. In Finland, curricula and assessments are designed to give students high autonomy in the learning process, and feedback is used to support the development of individual competences, promoting high intrinsic motivation [8].

Another concept of school curriculum monitoring is promoted by **Estonia**, based on technology and data. Technology and data-driven monitoring is based on three main pillars: continuous data collection and

analysis, the use of algorithms to personalize learning, and the automation of assessment and feedback processes. These approaches are based on theories from digital education and big data analysis, which allow for more accurate assessment and dynamic adjustment of curricula.

Adaptive learning is an educational approach in which digital technologies are used to adjust educational materials and teaching methods according to the individual needs of students. This theory is supported by the work of Bloom (1984), who emphasizes the importance of adjusting learning methods to allow each student to progress at his or her own pace. In Estonia, digital systems use machine learning algorithms to collect and analyze data on student performance, adjusting curricula and teaching methods to provide a personalized educational experience [2].

Another important theoretical foundation is the digital feedback theory, which suggests that providing immediate and personalized feedback can have a significant impact on the learning process. According to research by Hattie and Timperley (2007), immediate feedback allows students to quickly identify mistakes and adjust their learning strategies, which leads to constant improvement in performance. In Estonia, digital educational platforms allow for continuous monitoring of students' progress and provide real-time feedback, contributing to more efficient and faster learning [13].

Big data analysis in education refers to the use of large data sets collected from various sources to evaluate and optimize educational processes. This data includes information about academic performance, student behavior, and the level of engagement in educational activities. Theoretically, big data analysis allows for more detailed and accurate monitoring of student performance and curriculum effectiveness. Siemens and Long (2011) were among the first to highlight the potential of big data analysis in education, noting that it can revolutionize the way educational decisions are made and how study programs are structured.

An original concept of school curriculum monitoring is promoted in **Germany** – the active participation of educational actors. The active participation of educational actors is based on several educational theories, which emphasize the importance of involving all stakeholders in the educational process. These theories include the collaborative learning, the social capital theory, and the ecological model of education.

The collaborative learning theory, developed by Vygotsky et al. (1978) argues that learning is a social process and collaboration between different people can significantly improve educational outcomes. In Germany, educational actors such as teachers, parents and students are actively involved in the design and evaluation of curricula through consultations, meetings and discussions, which leads to an educational process that is better adapted to local and individual needs [16].

The theory of social capital, formulated by Bourdieu (1986), emphasizes the importance of social networks and the resources they provide in the context of education. In Germany, the active involvement of parents and the community in school life is considered a form of social capital that can improve students' academic performance. Parental participation in school councils or extracurricular activities is essential for strengthening the link between school and community and supporting students' educational development [4].

The ecological model of education, proposed by Bronfenbrenner (1979), emphasizes the interaction between the different factors in the educational environment – from the family and school, to the community and educational policies. The active participation of educational actors in Germany is an example of the application of this model, since the involvement of all stakeholders at local, regional and national levels allows the adaptation of curricula to the specific needs of each region and community, contributing to the development of a more equitable and efficient education [5].

While in Germany the emphasis in the process of monitoring the school curriculum is on the active participation of educational actors, in **France** the emphasis is on the national and international assessments PISA (Program for International Student Assessment) and PIRLS (Progress in International Reading Literacy Study). School curriculum monitoring is always based on different ecological theories and models. Among these, *psychometric* theories and *ecological models of assessment* are the most commonly used to understand the impact of assessments on the education system.

Psychometric theory focuses on the measurement and interpretation of students' cognitive performance through standardized tests. In France, national and international assessments, such as the PISA and PIRLS tests, use advanced psychometric techniques to assess students' competences in areas such as reading,

mathematics and science. *The Rasch Model* and other statistical models are often used to ensure the reliability and validity of test results, contributing to a correct assessment of student competences and monitoring educational progress (Bond & Fox, 2015) [3].

The ecological model of assessment, inspired by Bronfenbrenner (1979), emphasizes the context in which students learn, including the influences of the social, family and school environment. In France, national and international assessments are not limited to measuring cognitive competences, but also analyze factors that influence learning, such as socio-economic status, family environment and school resources. This holistic approach allows for a more comprehensive understanding of educational performance and ways to improve equity and access to education [5].

A scientific approach to monitoring school curriculum is being proposed and implemented in **Singapore**, focusing on using data to relevantly update the educational curriculum.

Singapore is recognized globally for the outstanding performance of its students in international assessments such as PISA and TIMSS (Trends in International Mathematics and Science Study). This success is the result of an integrated education strategy that relies on the accurate use of data to make continuous adjustments to the education system. Data collected through formative and summative assessments, as well as feedback from teachers and students, are used to adjust curricula, teaching methods, and teacher professional development.

The use of data in education is based on several theoretical frameworks, including *the data-driven learning theory, the educational prediction models, and adaptive feedback theory*. These theories provide a deep understanding of how data can be used to improve learning and educational performance.

Data-driven learning theory proposes that data collected systematically from the educational process can be used to optimize individual and group learning. In this framework, teachers and administrators use data to identify students' strengths and weaknesses and to adapt teaching methods to the needs of each student. In Singapore, this theory is applied through *a continuous cycle of assessment, feedback and adjustment*, which allows for rapid and accurate intervention when students are struggling.

Another important theoretical framework is the use of *educational prediction models*. These models use data collected from past assessments and school observations to predict future student performance. In Singapore, predictive models are used to predict student outcomes based on factors such as family background, class attendance, and involvement in extracurricular activities. These models allow for preventive interventions and targeting of resources to students at risk of underperformance.

Adaptive feedback theory focuses on the use of feedback to continuously adjust the teaching and learning process. In Singapore, feedback provided by teachers and formative assessments play a crucial role in guiding curricular and methodological adjustments. Feedback is not only descriptive, but also directional, providing specific solutions to improve student performance. This type of feedback is used both at the individual and systemic levels, contributing to improving the quality of the entire education system [11].

The model from **Canada** is largely similar to the German one – the active participation in curriculum monitoring of educational actors, primarily teachers and the community. The involvement of teachers and the community in monitoring the school curriculum is based on several theoretical frameworks and educational models that emphasize the importance of collaboration and partnerships in improving educational outcomes. These include *the educational collaboration theory*, *the social capital theory*, and *the parental involvement theory*.

The educational collaboration theory emphasizes the importance of collaboration between different educational actors, including teachers, parents, students, and communities. This theory suggests that the active involvement of all stakeholders in the educational process leads to better outcomes for students. Studies have shown that collaboration between teachers and parents can improve students' academic performance and contribute to a more positive and supportive learning environment (Epstein, 2001) [10].

The social capital theory develops the idea that relationships and support networks within the community contribute to students' educational success. According to this theory, community and parent involvement in education creates „social capital” that supports student development. In Canada, engaged communities and collaboration between different stakeholders contribute to a more supportive and integrated educational environment (Coleman, 1988) [7].

The parental involvement theory emphasizes the importance of parental participation in their children's

education. According to this theory, parents who are actively involved in their children's education contribute to improving academic performance and student behavior. In Canada, parents are considered essential partners in education, and their collaboration with schools is encouraged through various programs and initiatives (Hornby & Lafaele, 2011) [14].

The United States of America in designing and implementing the school curriculum monitoring process focuses on the following theories: *the comparative evaluation theory, the benchmarking theory,* and *the continuous improvement theory*.

The comparative evaluation theory emphasizes the importance of comparing educational performance across countries and education systems to identify best practices and understand variability in educational outcomes. This theory is based on the idea that comparative evaluation can provide valuable insights into the effectiveness of education systems and can contribute to the development of strategies for their improvement. International assessments such as PISA and TIMSS are examples of the application of this theory (OECD, 2019) [15].

The benchmarking theory refers to the process of comparing the performance of an education system with international best practices and standards. This process involves detailed analysis of performance and identification of differences between practices and outcomes, with the aim of adopting the most effective strategies for improvement. Benchmarking allows the identification of strengths and weaknesses of the educational system and contributes to the establishment of objectives and standards of excellence (Camp, 1989) [6].

The continuous improvement theory proposes that regular evaluation and feedback are essential for the continuous improvement of the quality of education. According to this theory, international evaluation and benchmarking are tools that facilitate the identification and implementation of changes necessary for the improvement of educational system. In the United States, these practices are integrated into the processes of educational reform to ensure a constant and adaptable development of the system (Deming, 1986) [9].

With reference to **the Republic of Moldova**, it is necessary to state that the monitoring of the school curriculum is mainly limited to national assessments (final exams according to the levels of education – primary, secondary, high school) and international assessments (PISA). At the same time, curriculum assessments are organized at the national level during the periods of curricular reforms, which take place in the Republic of Moldova, as a rule, once every 8-10 years.

In this context, it is worth mentioning that the basis of curricular monitoring are the following theories: *the student-centered education theory, the competence training-centered theory, active learning theory*, etc. We can note that in the Republic of Moldova, at the current stage, efforts are being made to substantiate a concept of continuous and cyclical monitoring of the school curriculum.

Generalization of the theoretical framework of school curriculum monitoring in different countries is presented in Table 1.

Table 1. Theoretical Framework of School Curriculum Monitoring in Different Countries.

No. Crt.	Country	Theory
1.	***Finland***	• *Formative Assessment Theory* • *Self-Determination Theory*
2.	***Estonia***	• *Adaptive Learning Theory* • *Immediate Digital Feedback Theory* • *Big Data Analysis*
3.	***Germany***	• *Collaborative Learning Theory* • *Social Capital Theory* • *Ecological Theory of Education*
4.	***France***	• *Psychometric Theory* • *Ecological Model*
5.	***Singapore***	• *Data-Driven Learning Theory* • *Educational Prediction Theory* • *Adaptive Feedback Theory*

6.	***Canada***	• *Educational Collaboration Theory* • *Social Capital Theory* • *Parental Involvement Theory*
7.	***United States of America***	• *Comparative Evaluation Theory* • *Benchmarking Theory* • *Continuous Improvement Theory*
8.	***Republic of Moldova***	• *Student-Centered Education Theory* • *Competence Training-Centered Theory* • *Active Learning Theory*

Monitoring School Curriculum in Different Countries: Methodological Framework

In all the countries consulted, monitoring the written curriculum, the taught-learned-assessed curriculum is seen as an essential tool in ensuring the continuous development of the school curriculum and, respectively, the quality of education.

In this regard, in ***Finland*** the emphasis is on the use of research and continuous feedback on curriculum development; in ***Estonia*** the emphasis is on the application of technologies and databases (digital educational platforms, digital monitoring and automated feedback); in ***Singapore*** the monitoring is carried out in a real way, focusing on data analysis and personalized interventions; in ***Germany*** and ***Canada*** the curricular monitoring includes models of collaboration between teachers and the community, between teachers and students, between teachers and curriculum designers, etc. The development of educational curriculum in ***the United States of America*** focuses mainly on data from national and international assessments, as well as benchmarking.

Generalized and specific characteristics of educational curriculum monitoring in different countries are presented in Table 2.

Table 2. School Curriculum Monitoring in Different Countries: Generalized Characteristics.

No. Crt.	Country	Characteristics. Findings. Conclusions.
1.	***Finland***	Research-based monitoring and continuous feedback are the pillars of successful education in Finland. This innovative approach improves learning through personalization, the use of empirical evidence, and the development of students' self-assessment skills. By implementing these practices, Finland has demonstrated that education can be flexible, adaptive, and efficient, ensuring the holistic development of students.
2.	***Estonia***	Technology- and data-based monitoring is one of the major innovations in the Estonian education system. This approach allows for continuous and personalized assessment of student performance, while improving curricula and teaching methods. Although there are challenges related to data privacy and teacher training, the benefits of this method – such as increasing academic performance and reducing educational inequalities – are significant.
3.	***Germany***	Active participation of educational actors is a central element of the German education system, contributing to improving the quality of education, increasing motivation and engagement, and reducing educational inequalities. Educational studies and theories show that the involvement of teachers, parents, students and the community in the development and implementation of curricula is essential for creating an educational system adapted to the needs of all stakeholders. This participatory model can serve as an example for other countries that want to improve the efficiency and equity of their educational system.

4.	***France***	National and international assessments play a crucial role in the French educational system, providing valuable data for monitoring and improving the quality of education. These assessments, based on psychometric and ecological theories, allow the measurement of students' cognitive competences and the analysis of contextual factors that influence educational performance. However, assessments must be used with caution to avoid transforming the educational process into a simple quantitative measurement, thus neglecting the qualitative dimensions of learning. International assessments, such as PISA, provide France with a comparative picture of its educational performance and have contributed to the adoption of important reforms. However, the educational inequalities reflected in these assessments highlight the need for more equitable and inclusive education policies.
5.	***Singapore***	The use of data for precise adjustments is one of the main driving forces behind the success of Singapore's education system. By systematically collecting, analyzing, and using data, Singapore has been able to create an adaptive education system that is able to meet the diverse needs of its students. This data-driven approach has not only improved academic performance, but has also ensured greater equity and efficiency in education, setting an example for other countries.
6.	***Canada***	Teacher and community engagement is essential to the success of Canada's education system. Through active collaboration between schools, parents, and the community, Canada has created an educational environment in which all stakeholders contribute to improving student performance and developing an equitable and efficient education system. Collaborative models, parental involvement, and continuing professional development are key components of this integrative approach, which serves as an example for other countries in developing educational practices based on collaboration and community engagement.
7.	***United States of America***	United States of America International assessment and benchmarking are essential tools for improving the United States education system. By using these practices, the United States can compare educational performance with that of other countries, identify best practices, and develop strategies for educational reforms based on data and evidence. The positive impact of these practices on student achievement, educational policies, and ongoing reform underscores the importance of integrating international assessment and benchmarking into the process of improving education.

General Conclusions:

Concepts and models of monitoring the school curriculum vary significantly between countries, but the most relevant approaches and practices share a number of essential characteristics. European education systems offer a variety of effective approaches and methodologies for monitoring the school curriculum, adapted to the specific context of each country. Common factors in these approaches are flexibility, the use of benchmarks and technologies, and a focus on developing competences. By implementing these good practices, the school curriculum can become more relevant, more adaptable and more student-oriented.

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Note: *The paper was carried out within the Subprogram* „*Theory and Methodology of Continuous and Cyclical Monitoring and Development of School Curriculum*”*, cod 01.14.01* Harvard University Press.

Data About Author:
Carolina ȚURCANU, PhD in Law, Associate Researcher, Coordinating Scientific Researcher, Scientific Research Center „Education and Social Policies” & Head, Section Promotion and Protection of Scientific Results, Moldova State University.
E-mail: carolina.turcanu@usm.md
ORCID: 0000-0001-8450-3075

Presented on 01.10.2024