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Renewal Plan and Reform State Educational Programme in Relation to the Perspective of Technical Education in Primary Schools in Slovakia

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Abstract

The study is based on selected parts of the Renewal Plan – Component 7: Education for the 21st Century, outlining the main aims and objectives of curriculum reform for primary and secondary education in Slovakia. The reform is set to be fully implemented from 2026. In relation to the aims and objectives of the curriculum reform, the study presents analytical conclusions regarding possible problem areas related to technical education in primary schools.

Keywords: technical education, primary school, curriculum reform, problematic areas

Introduction

Education and upbringing in primary schools (ZŠ) in Slovakia have undergone various transformative and reformative changes since 1989. The changes that gradually occurred had both positive and negative results and impacts. Concerning technical education in ZŠ, it can be noted that changes of a rather negative nature prevailed, such as a reduction in the number of teaching hours for technical subjects within the weekly time allocation.

The consequences and effects of these changes have undoubtedly manifested in the ongoing societal devaluation of the position of the subject providing technical education in ZŠ, as well as in deepening students' disinterest in science, technology, and the pursuit of technically-oriented study programs in secondary vocational schools. We consider this a key reason for the long-term shortage of a broad spectrum of qualified professionals in the field of technology and services within the Slovak Republic. The intention of this study is to confront selected objectives in the initial stage of the ongoing curriculum reform outlined in the Renewal Plan with expected changes related to technical education in ZŠ in Slovakia.

Component 7 Education for the 21st Century

The document *Component 7 Education* is focused on primary and secondary education. Its main goal is to provide students with education adapted to the needs of contemporary society. The general aim of the component is to increase the literacy and skills of students necessary for life in a global and low-carbon digital economy and society (critical thinking, digital, and soft skills) (Government, 2021).

In various parts, the document provides broader information and main activities in the areas of curriculum reform for the years 2021–2026 and their main objectives. In the following, we will present only a brief selection of areas that the reform touches upon and express opinions regarding technical education in Slovakia.

Area of Digital Infrastructure and Expansion of Primary School Capacities

The prerequisite for the development of students' literacy and skills is accessible school infrastructure. It is necessary to build digital infrastructure and expand the capacities of primary schools in districts that do not have optimal access to education (double-shift operation of schools).

Planned Investment 1: Digital infrastructure in schools will support the construction of digital infrastructure and will indirectly strengthen the digital literacy and skills of students. The total investment in the digitization of schools will amount to 187.2 million euros.

Planned Investment 2: Building school infrastructure aims to expand the capacities of primary schools in districts that do not have optimal access to education (double-shift operation of schools). Emphasis will be placed on schools with a high number of children from socially disadvantaged backgrounds.

For the construction of school libraries in 211 schools with more than 15 students from socially disadvantaged backgrounds, 15.6 million euros will be needed. The construction of school infrastructure will require investments totaling 123.3 million euros, of which 102 million euros will be for expanding school capacities and 15.6 million euros for building school libraries.

In the area of digital infrastructure, it can be expected that the planned provision of ICT resources and improved internet networks, as in other subjects, will contribute to an increase in the quality of digital literacy among students.

We consider the planned expansion of primary school capacities to eliminate double-shift teaching as beneficial. Given the specific focus and needs of technical education, financial resources allocated to the construction and expansion of school libraries, as an additional source of information for technical education, are expected to have desirable effects only to a limited extent.

If the educational area of "Human and the World of Work" is to achieve its set goals and educational outcomes, financial resources should be planned within the Recovery Plan and other reform materials to ensure the spatial and equipment requirements specified by standards for the outdated material and technical equipment of schools for technical education. *However, these resources are not found in the Recovery Plan and other documents*.

The Area of Expansion of Primary School Capacities

Within the school reform, activities are mainly focused on expanding the capacities of primary schools in districts that do not have optimal access to education (double-shift operation of schools). Emphasis will be placed on schools with a high number of children from socially disadvantaged backgrounds. Another activity is the construction and expansion of school libraries.

From the analysis of the documents *Renewal Plan – Component 7* and *Feasibility Studies for Generalizable Typical Solutions of Primary Schools* (Ministry, 2022), it follows that within reform activities (e.g., construction of new primary schools and school libraries), *there is no consideration at all for the construction and completion of school specialized workshops for technical education (school workshops), including their material-technical equipment and completion!*

As is generally known, the goals and intentions of technical education in primary schools have not been fulfilled to the desired extent in the previous period. This raises the question: *What was the reason for this state of affairs?* The main reason can unequivocally be attributed to the unsystematic approach of state authorities, school founders, and in some cases, the management of primary schools towards creating the necessary spatial, material-technical, and personnel provisions for technical education in primary schools.

There are several published works on this reason, which, based on survey results and research, repeatedly confirm that:

1. From 1989, many primary schools in Slovakia saw the elimination or relocation of school workshops to other (often inadequate) spaces, and these workshop spaces were used for other educational purposes (e.g., language and computer classrooms).

2. Outdated material-technical equipment for implementing technical education was completely destroyed (not replaced) or persists until now in several cases. It was only through the understanding of some primary school managements, municipal mayors, and teachers who obtained financial resources from various projects, and especially the implementation of the National Project "Workshops," that conditions for technical education were innovated in almost a fifth of primary schools in Slovakia. 3. Personnel provisions for technical education in primary schools in the previous period and currently can be considered alarming because up to 53.3% of teachers teaching the subject of technology teach it non-professionally (without the required qualification). (MŠ VVaŠ SR, 2014). It is common in schools for technology classes to be used to supplement the commitments of those teachers who have a different subject composition in their qualifications.

The reform material "Foundations of Changes in Educational Areas..." states

The educational area of Human and the World of Work directs:

- to support students' ability to use innovative thinking, knowledge in the field of science and technology, and manual skills in the realization of their own designs,

- to develop students' ability to use and handle technical tools and devices, as well as scientific data, to achieve goals or make decisions, express opinions based on evidence, etc. (ŠPÚ1, 2021)

If the educational area of Human and the World of Work is to be directed towards the mentioned goals, then to achieve the desired effect of reform changes, it is necessary to simultaneously ensure targeted financial support for schools to equip their material-technical background (MTZ) for technical education. Innovations and enhancement of MTZ in schools should become common-place and should involve the provision of:

1. Basic and diverse technical materials (semi-finished products) necessary for students to understand the types, properties, and practical uses of materials, fostering technical creative thinking, drawing conclusions based on evidence, and implementing interesting and motivationally effective experimental and research activities.

2. Basic and additional content and objectives of technical education suitable for the interior equipment of school workshop classrooms (e.g., work tables, planers, shelves, etc.), modern tools, instruments, selected small machining tools for machining technical materials. Without these resources, it is not possible for students to adequately acquire manual skills, understand the essence and significance of various material processing technologies, and apply them in the realization of their own creative ideas within the framework of constructive creative thinking and product creation. Students would be unable to identify, propose, and implement technically appropriate and feasible solutions, as well as analyze related effects and dangers. Without real practical activities involving the mentioned equipment, students cannot explore various professions and cannot objectively and self-critically decide on their future professional direction.

3. Basic and adequate additional technical equipment with devices, apparatus, and technical building blocks that enable the realization of educational content requiring students to understand the principles of their operation and master the basic principles of occupational safety and health when using them (e.g., selected household devices and equipment – electrical, mechanical, gas, air conditioning...; residential installations – electrical strong and weak current, gas, plumbing, telecommunications, etc.). Without this equipment, which is currently lacking in the vast majority of schools, it is not possible to develop students' abilities to use and handle technical devices, understand their function, significance, and environmental implications, analyze necessary data, compare them, and make conclusions or decisions.

4. Basic equipment with ICT tools (interactive board, internet, necessary number of computers, etc.), without which it is very difficult to develop digital literacy and quickly convey the "just necessary" information from selected areas of technology to students amidst a vast amount of information.

Based on the above, it is proposed that as part of the reform changes, normative space and MTZ for technical education for the school and the student be additionally included in the reform materials for the educational area of Human and the World of Work. If the intentions, goals, and content of technical education are changing and innovating, the normative that must be fulfilled in schools within a specified time frame must logically change accordingly (from the perspective of state authorities). However, fulfilling this requirement cannot be left solely to the schools. In this regard, reform changes must be financially supported and ensured by the state, even if it is done later. Otherwise, the entire reform effort, its results, and teaching within the educational area of Human and the World of Work will be carried out at a theoretical level, and the intended reform goals in that area (including the Profile of a Primary School Graduate) will not achieve the desired results.

Area of curricular and textbook reform

The curricular reform will create new educational content organized into three multi-year cycles. Instead of transmitting ready-made information, teaching will create situations where students can interpret information in confrontation with real experience. There will be a need to create space for commenting on current topics, discussion, and actively involving students in the learning process. Rather than detailing the curriculum within narrowly defined subjects, the content of education will be conceived in broader educational units (e.g., man and nature, man and society). The reform systematically integrates crosscutting themes such as financial literacy, global health (e.g., epidemics), climate change and warming, economic crises, and gender equality.

The new curriculum will also require the provision of new textbooks. As part of the reform, support for the digitization of textbooks will be created to strengthen interactive elements in teaching, facilitate distance learning if necessary, and allow their use by students with health disadvantages. Digital learning materials will also reduce printing costs and support digital and green transformation.

The curricular reform will require costs of EUR 99.7 million. Of this, EUR 41.9 million will go towards creating and implementing a new curriculum (including the creation of supporting digital tools), EUR 44.5 million for the systematic provision of new textbooks, and EUR 13.4 million for the expansion of electronic testing and ensuring online maturity.

In the field of curricular and textbook reform, new goals and new content for technical education in primary schools have been set through the State Educational Program (ŠVP) and educational standards. The educational area of Human and the World of Work is characterized in the new ŠVP as follows. The three basic components of the area are Technology, Entrepreneurship and Initiative, and Career Education (Figure 1). All three components are interconnected so that emphasis is placed on the development of technical, creative, and critical thinking in the educational area. Emphasis is placed on developing technical and professional literacy in students. The concept of technical literacy refers to the ability of students to use, control, evaluate, and understand technology. The content of the educational area of Human and the World of Work is linked to solving practical problems, which

MAN AND THE WORLD OF WORK		
TECHNOLOGY	BUSINESS AND INITIATIVE	CAREER EDUCATION
Materials. technology. crafts. energy. sustainability	Economic principles. financial literacy. problem identification and problem solving	<u>Vocations</u> and professions, planning life goals, flexibility

Figure 1. Components and Content of the Educational Area "Man and the World of Work" Source: Author.

The processes are connected to planning, active experimentation, and learning from acquired experiences. Students should be able to navigate the world of technology, understand trends in technological development, the implications of scientific progress, and the impact of human activity on the world. Emphasis is placed on creative and innovative use of technological tools to achieve goals or draw conclusions based on evidence.

Skills in this educational area also include critical awareness and support for environmental safety, such as waste minimization and proper waste management. It focuses on the development of general user skills, modern technological thinking, shaping attitudes, and values needed in the world of work. Students learn to combine thinking with manual activities and understand the relevance of what they study in school to their later productive age. Attention is focused on students' ability to understand that their work creates values useful for others in society, and they can turn their ideas into real actions. They are capable of initiative, taking responsibility, accepting risks, and achieving set goals. Initiative and perseverance are also abilities that enable students to collaborate with others to plan and manage projects with cultural, social, or commercial value. Career education significantly contributes to the development of students' ability to plan significant life steps in their professional and personal lives, set alternative life goals, find effective ways to achieve them, and constructively deal with potential failure. The development of these goals is closely related to the personal development of the student, the development of social and communication skills, the ability to learn, and the planning of their own career. (Ministry, 2023)

The National Curriculum sets educational standards for the educational area of Human and the World of Work separately for the 1st to 3rd cycles of education (years 1 to 3, 4 to 5, and 6 to 9 of primary school) and separately within each cycle for the individual components of Technology, Entrepreneurship and Initiative, and Career Education in three parts: performance standard, content standard, and activities.

The division of standards is clear and orientationally satisfying. In line with Hašková and Lukáčová (2022), we note that the goals and contents of education in the Technology component mostly mirror the goals and contents defined by the educational standard so far. A new aspect of the National Curriculum is that, compared to the educational standard of the previous technical subject, which partly included goals and contents related to entrepreneurship and initiative and to a large extent also career education, the National Curriculum sets a new separate educational standard for both the Entrepreneurship and Initiative (E&I) and Career Education (CE) components.

In our opinion, this fact may evoke two approaches among technology teachers in planning and modeling technology teaching:

Approach 1: Technology teachers develop a thematic educational plan (TEP) for the selected grade by planning the teaching of thematic units and topics of the Technology component within 33 teaching hours for the entire school year. They appropriately incorporate performance requirements (goals) and content from the educational standards of the E&I and CE components into individual topics. This adjusts and supplements the existing system of technology teaching, and if technology teaching is provided by multiple teachers in different grades and cycles, teachers will have to coordinate the structure of TEP to ensure that the goals and contents set for the entire cycle are fully met and implemented. In this case, technology teachers can continue to use the technology

textbooks they have been using, but they will have to develop the prescribed curriculum (contents) for the E&I and CE components.

Approach 2: Technology teachers approach the development of TEP by first dividing it into three parts based on the total number of teaching hours in the school year (a total of 33 hours) and allocate 11 hours for each of the standards T - E&I - CE in line with educational standards. This means that thematic units, topics, goals, and contents of the Technology component are planned and taught within 11 teaching hours in the school year, and the same is planned for the E&I and CE components. We note that fulfilling the requirements of the performance and content standards and implementing the prescribed activities for the Technology component within 11 teaching hours in the school year is practically unattainable in school practice.

The indicated approach 2 represents a high level of risk to the teaching of technology and does not ensure that the goals and intentions of the educational areas of Human and the World of Work are fully met and of the required quality in accordance with the reform requirements. *This model does not ensure that all three components are interconnected so that emphasis* is placed on the development of technical, creative, and critical thinking, as well as the development of technical and professional literacy in students. We mentioned this possible approach because its real-world use exists in school practice. However, we do not wish for this to happen.

In this case, technology teachers can continue to use technology textbooks only within the framework of teaching the Technology component. The content for the components E&I and CE will have to be developed until new textbooks are issued for all components of the educational areas of Human and the World of Work.

As mentioned earlier, we have already stated that the division of standards is clear and orientationally satisfactory. From our point of view, the authors should have developed educational standards for individual educational cycles within the educational areas of Human and the World of Work in a conceptually integrated manner, i.e., for each cycle, develop a single separate (gradually related) educational standard combining the target and content requirements of all three components (Technology – Entrepreneurship and Initiative – Career Education). In this case, there would be a clearer and more specific connection of the target and content requirements of all three components requirements of all three components within the thematic units of the entire educational areas of Human and the World of Work. Teachers would thus significantly reduce the burden they would have to bear during the study and analysis of 3 standards for 3 components in each education cycle. Teachers will be forced to conduct a deep analysis and comparison of all standards, incorporate the results of the analysis didactically into new TEPs, develop new teaching methodologies, etc., including incorporating additional requirements rela-

ted to the development of digital and global skills, inclusive education, green transformation, cross-cutting themes, and more.

We find it gratifying and consider it a positive fact that in the new National Curriculum and in the new educational standards of the educational area of Human and the World of Work, there is no longer the educational focus of Household Economics (ED). In our published studies, we have repeatedly pointed out that the inclusion of ED teaching in the teaching of the subject of Technology was non-systematic; ED teaching disrupted the teaching of technology, and schools included ED teaching to varying degrees and according to their possibilities, primarily because ED teaching in schools had to be implemented. Textbooks for ED teaching did not exist, and ED teaching was provided by teachers with almost 100% lack of expertise. With this, our long-term effort has been fulfilled.

Area of preparation and development of teachers for new content and forms of teaching

The reform will strengthen the quality of pedagogical and professional staff's skills and motivate them for lifelong professional development. Emphasis will also be placed on inclusive education and the acquisition of digital skills. It includes a change in teacher preparation so that they can apply the changes from Reform 1 in their daily practice.

The main goal of the reform is to improve the quality of pedagogical and professional staff's skills and motivate them for lifelong professional development. The reform will impact: a) the preparation of future teachers and b) the motivation of teachers in practice for further education.

The reform aims to support teachers in adequately addressing three challenges:

- implementation of the curriculum reform into daily practice,

- increased use of digital technologies in teaching,

 consideration of individual needs of each child in the teaching process, especially in a multilingual environment or with children from socially disadvantaged backgrounds.

Pedagogical faculties and other faculties preparing teachers and teacher education will undergo transformation with the following goals:

1. Preparedness of teachers to implement the new curriculum. Study programs will be designed to align with the structure of the new curriculum organized into cycles: a) programs for the first and second educational cycles, b) for the second and third educational cycles, c) for the third educational cycle and high schools. Study programs preparing teachers for primary schools (second and third cycles) will, in addition to traditional preparation for teaching two freely combinable subjects, also provide integrated programs for teaching broader educational areas (natural sciences, social sciences, health, and physical education), adapting the qualifications of graduates to the needs of primary school practice and the intention of the curriculum reform.

2. Strengthening direct collaboration between pedagogical faculties and other faculties preparing teachers with schools and school practice, and their interaction in supporting the professional education of teachers (counseling, practical training).

3. Faculties will be more actively involved in the ongoing education of teachers. By not favoring only courses provided by the Ministry of Education, Science, Research and Sport, teachers will be motivated to choose further education according to their needs.

4. Emphasis will be placed on inclusion and digital skills in study programs.

5. Integration of digital teaching methods and innovations in digital education into all programs.

The reform also aims to motivate pedagogical and professional staff for lifelong professional development:

1. Introducing a financial contribution tied to priorities in the field of state policies (e.g., changes in the content and forms of education, support for inclusive education, digitization of education).

2. Legislative changes will adjust the competencies and scope of providers of certifications, functional, and qualification education in the education sector.

3. Qualification standards for the preparatory education of teachers will change in line with the implementation of the new curriculum.

4. A new model of accreditation of educational programs for professional development will be established, including the assessment of their quality.

The transformation of pedagogical faculties and other faculties preparing teachers will take place through the following steps:

1. A grant program for universities will be established to transform study programs preparing future teachers. This program will support the development of new teacher education programs. Funding will also be provided for changes in programs that promote inclusive education, education for students with different native languages, and the development of digital competencies among teacher education students. Grants will prioritize strengthening gender equality.

2. Legislative frameworks will be changed to allow for the implementation of modifications in teacher education in line with the new curriculum and requirements for professional study programs. Teacher certification and specifications of teacher professional study programs in the law on higher education will be redefined. Corresponding adjustments to standards for accrediting teacher education programs will be made.

3. The description of the teaching and pedagogical sciences study program will be adjusted to ensure that practical teaching constitutes at least 20% of the study time or 20% of the European Credit Transfer and Accumulation System (ECTS credits).

4. Study programs will be introduced to profile teachers in integrated educational areas for the second and third cycles of basic education. A higher education program for early and pre-primary education (from 0 years to compulsory pre-primary education) will also be included.

The professional development of teachers will be supported through the following measures:

1. A new funding model for individual professional development will be introduced. The use of funds will be tied to the content of education, including mandatory professional activities (e.g., selected priority topics: inclusion, digitalization, curriculum changes) and optional professional activities (e.g., certification, completion of programs addressing individual learning needs).

2. Teachers will order educational services from providers with precisely defined professional competencies (universities, organizations under the Ministry of Education, Science, Research, and Sport of the Slovak Republic, and non-public providers), creating a competitive environment and pressure on the quality of educational services. Education involving priority topics (curriculum reform, digitalisation, inclusion) will remain in the competence of the organisations of the Ministry of Education and Science of the Slovak Republic. All available training will be published in a central catalogue.

3. The Ministry of Education, Science, Research, and Sport of the Slovak Republic will guarantee, through organizations guiding teacher professional development, a new system of quality control for providing professional education. This includes standardization of professional competencies of pedagogical and expert staff, transparent accreditation rules for providers (programs) of professional development, and evaluation of needs and feedback on the quality of educational services through a public online portal.

The reform of teacher preparation and development will require costs amounting to 50.4 million euros. A grant program for universities preparing elementary school teachers, totaling 2.6 million euros, will be used to create new teacher programs.

Further education for teachers in connection with the new curriculum and key topics (digitalization, inclusion) will be ensured through newly introduced contributions to the professional development of elementary, secondary, and high school teachers, totaling 47.8 million euros.

In the area of teacher preparation and development for new content and teaching methods, the Recovery Plan states the following: The reform will strengthen the quality of pedagogical and professional staff's skills and motivate them for lifelong professional development. Emphasis will also be placed on inclusive education and the acquisition of digital skills. Part of this is a change in teacher preparation to enable them to apply the changes from Reform 1 in their daily practice. The main goal of the reform is to improve the quality of pedagogical and professional staff's skills and motivate them for lifelong professional development.

From several activities aimed at ensuring the achievement of the reform goals in this area, we select:

1. Changes in the preparation of future teachers.

2. Motivation of practicing teachers for further education.

3. Introduction of study programs profiling teachers in integrated educational areas for the second and third cycles of basic education.

4. Provision of integrated programs for teaching broader educational areas,

5. Adjustment of graduates' qualifications to the needs of elementary school practice and the intentions of the curriculum reform.

6. Redefinition of teacher accreditation and specification of teacher professional study programs in the Higher Education Act. Corresponding adjustments to the standards for the accreditation of teacher study programs will be made.

7. Emphasis on inclusion and digital skills in study programs.

8. Inclusion of digital teaching methods and innovations in digital education in all programs.

9. Introduction of a new system (control) for the quality of provided professional education.

10. Standardization of professional competencies of pedagogical and professional staff, etc.

These significant changes apply to a large extent to all faculties. The implementation of these changes will require not only sufficient time but also a high level of expertise from the creators of study programs. It also necessitates the reorganization, supplementation, and possibly integration of the qualifications of higher education educators regarding the structure of future study programs. The practical realization of these changes will demand a substantial amount of financial resources. The digital infrastructure of faculties is mostly outdated, and rapid obsolescence is a concern. There's a need for potential expansion and equipping of specialized classrooms with tools enabling inclusive education in line with new target requirements.

The text expresses concern that the recovery plan document did not allocate any financial resources for these significant changes in selected higher education institutions. This is viewed as a serious deficiency in the planning of reform changes and their implementation in school practice, which could significantly affect the overall effectiveness of the school reform.

In addition to the above, we note that in the last statistical report of the State School Inspectorate in 2014, the rate of non-professionalism in teaching the subject of technology in primary schools in the Slovak Republic was 53.3% (Ministry, 2014). It is likely that this state of affairs persists even today. Unless this problem is also addressed by the state authorities and reform materials, the positive effects and benefits of the reform are uncertain.

Conclusion

After 1989, there were several changes in technical education in Slovakia that influenced the teaching of technology either partially positively or, more significantly, negatively during different periods. The latest positive development is considered to be the period from 2015 when members of the then Subject Commission for the educational area "Human and the World of Work", in collaboration with the School Educational Program Department in Bratislava and the Ministry of Education, managed to stabilize the subject of technology in the Framework Curriculum for Primary Schools as a compulsory subject with a time allocation of 1 lesson per week in grades 5 to 9. The updated Educational Standard for Technology also gained validity.

The introduction of the "Economics of the Household" into the technology subject was deemed inappropriate and unsystematic by the Ministry of Education. Another significant step intended by the members of Human and the World of Work was to make maximum efforts to ensure technical education in all primary schools in Slovakia, especially in terms of their spatial and material-technical equipment. However, this fundamental goal was interrupted by the dissolution of the former subject commissions and the establishment of new reform teams. As work on the planned school reform is intensively ongoing, and the implementation of the reform in practice is becoming a reality starting from the school year 2023/2024, the authors of the reform are wished success in creating dignified (better than before) conditions for the upliftment and implementation of technical education in primary schools in Slovakia.

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