Croatia

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Introduction

Overview of Education System

The education system in the Republic of Croatia is centralized in most areas, and power lies with the Ministry of Science and Education (MSE). However, cities have rights and duties of the founders of primary schools, and counties oversee high schools.[a] Both have an important role in allocating funds and cooperating with schools on staffing matters. At International Standard Classification of Education (ISCED) Level 0, there are nurseries for children under age 3, followed by kindergarten and preschool programs. In 2014, it became obligatory for all children to attend a preschool program for a duration of 150-200 hours in the year prior to starting elementary school. On average, involvement in preschool programs is much lower than the overall European Union (EU) average (95 percent in 2016, according to Eurostat) due to uneven availability and attendance of these programs throughout the country (from almost 90 percent of children in Zagreb to 19 percent of children in one county in Eastern Croatia). At the age of 6 or 7, children start attending primary education, which lasts eight years (ISCED 1 and 2). Primary schools are compulsory in Croatia, and the student-teacher ratio in primary education is 14 to 1.[1] Secondary education has two main streams that represent ISCED Level 3: general education gymnasiums (four-year programs) and vocational education (high schools with three- to five-year programs). After secondary education, all gymnasium students are obliged to pass the State Matura exams; for vocational students, these exams are voluntary but needed when a vocational education student wants to enroll in a higher education institution. At the tertiary level (ISCED 5 through 8), Croatia, along with 48 European countries, implemented the Bologna Process, a set of changes that reformed higher education across Europe. Since 2005, the following innovations were introduced with the purpose of joining the European Education Area: three educational levels in tertiary education, new academic titles (aligned with the qualification frames[b]), and European Credit Transfer System (ECTS) points. All of these adjustments in higher education were complete by 2010.

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[a] Units of local government are municipalities (hrv. "općine") and cities, and units of regional government are counties (hrv. "županije"). In total, there are 576 units of local and regional government comprising 428 municipalities, 127 cities, and 21 counties. (Note: Zagreb is both the capital city and a county.)

[b] The European Qualification Framework (EQF) is available at https://europass.cedefop.europa.eu/europass-support-centre/other-questions/what-european-qualification-framework-eqf; the Croatian Qualification Framework (CROQF) is available at https://www.azvo.hr/en/enic-naric-office/the-croatian-qualifications-framework-croqf.

In summary, the education system in the Republic of Croatia comprises the following education cycles:

- Preschool education and childcare for children ages 6 months to 6 years, delivered through educational, health and social care programs[2]
- Primary education (Grades 1 to 8), which is compulsory for all students ages 6 to 15
- Secondary education (Grades 1 to 4) in gymnasiums (general or specialized), vocational or trade schools, and art schools (music, dance, visual arts, etc.)[3]
- Higher education comprises university and professional studies offered at universities or polytechnics and schools of professional higher education

The official language in education institutions is Croatian. In certain areas of Croatia, where ethnic minorities comprise a majority of the population, the minority language is recognized as a second official language. In Croatia, the languages of instruction may be categorized into two groups: so-called territorial or minority languages, and nonterritorial languages (in accordance with the European Charter on Regional or Minority Languages).[4] Members of the recognized national minorities are guaranteed the right to education and can exercise this constitutional right to education in their native language and letter[5] via three basic models:

- In Model A schools, all the classes are conducted in the minority language, and study of the Croatian language is compulsory for the same number of hours as for the minority language
- In Model B schools, classes are conducted in two languages, with science subjects taught only in Croatian and social science subjects taught in the minority language
- In Model C schools, all classes are conducted in Croatian, and an additional two to five hours are dedicated to fostering the language and culture of the national minority

National minorities that exercise these rights and employ the aforementioned models in schools are Czech, Hungarian, Italian, and Serbian national minorities (usually for Models A and B), and Albanian, Austrian, Czech, Hungarian, Italian, Macedonian, Polish, Serbian, Russian, Rusyn, Slovak, Slovene, Ukrainian, and Jewish national minorities (for Model C). Most schools (97 percent) instruct students in Croatian, and only students in Model A and B schools and classes are learning science, technology, engineering, and mathematics (STEM) subjects in the minority language.

Use and Impact of TIMSS

The *National Curriculum Framework* (2010)[6] presents a starting point for systemic changes in preschool, primary, and secondary education in Croatia. Comprehensive reform of the structure and content of the curriculum for the primary and lower secondary education restarted with the adoption of the Strategy for Education, Science, and Technology[7] in 2014. In 2015, an expert working group, aided by a wide range of stakeholders, began work on general curricular reform drawing information from, among other sources, the results of international large scale studies.

The original plan was to introduce new curricula on an experimental basis in the 2016–2017 school year, but it was somewhat slowed due to a period of instability in national politics. Nevertheless, processes restarted, and new curricula were put into place in early 2019, beginning experimentally in the 2019–2020 school year.

For the first time, indications are strong that TIMSS results have had a direct impact on education reform and will consequentially influence teaching practices in primary education in Croatia. After the TIMSS 2015 results and the secondary analysis that followed, published findings resulted in some changes to the mathematics, physics, chemistry, biology, and Nature and Society curricula. A number of experts were involved in both secondary analyses of the TIMSS 2015 data and production of the new curricula, and their experience serves as an excellent example of the direct impact of TIMSS 2015 on national policies. Physics in primary and general secondary (gymnasium) education has been affected by some of these impacts. While building a new curriculum for physics, TIMSS 2015 results in science were taken into consideration in relation to two findings. First, students were fairly familiar with some content, such as hydrostatic pressure or buoyancy, that was not included at all in the physics curricula. Second, they were familiar with content that was being taught in higher grades—for example, recognizing materials that conduct electricity or understanding magnetism. Students' familiarity may originate from real-life experiences and other sources of learning outside the formal curriculum (advanced project groups; home resources, such as scientific magazines or watching specialized TV content; or simply playing with their parents or peers). Therefore, the physics curriculum introduced some new education outcomes. Some outcomes were named more precisely; some have been upgraded to higher levels, such as understanding or connecting concepts; and some—for example, astronomy concepts, such as lunar changes or starlight, that were present sparsely or not at all—are planned to be introduced in earlier grades.

Around the same time (2015 to 2018), the Education and Teacher Training Agency, as the authority in charge of continuous professional development of teachers in Croatia, had organized series of expert trainings with the main theme being TIMSS results. The goal was to introduce this research to wider audience of teachers, to present Croatian results in TIMSS (2011 and 2015) on the international level, to address some national specificities, and to study available TIMSS items. The focus was on teachers of lower grades (Grades 1 to 4) that participated in TIMSS 2015 and, in general, on mathematics teachers. TIMSS results were an excellent basis for discussion on learning and teaching challenges in the line of new approaches to developing students' competencies, contrary to more traditional ways of reproducing theoretical knowledge. This change of paradigm was also a topic of numerous STEM seminars and workshops for lower grades of primary education.[c]

[c] Students assessed in TIMSS 2019 were still learning according to the 2006 syllabus, and new curricula will be obligatory in the 2020–2021 school year, according to the MSE's Decisions in Power. New curricula are introduced gradually. Therefore, fourth grade primary school students will be actively included for the first time in the reform in the 2022–2023 school year.

The Mathematics Curriculum in Primary and Lower Secondary Grades

In 2005, the MSE began to implement the first major school reform project, known as the Croatian National Education Standard (*Hrvatski nacionalni obrazovni standard*). The Syllabus for Primary School (*Nastavni plan i program za osnovnu školu*)[8] was designed and implemented in 2006. It contains the educational work plan for subjects for Grades 1 to 8 and was effective at the time of all TIMSS surveys of fourth grade students conducted in Croatia (2011, 2015, and 2019). The document was not a curriculum per se, but more of a catalog of education goals presented separately for each subject, grade, and teaching unit.

Exhibit 1 lists competencies students should achieve by the end of fourth grade, according to the syllabus.

Exhibit 1: Expected Mathematics Competencies by the End of Fourth Grade

Domain	Content Area	Competencies
Numbers	Whole numbers	Add, subtract, and compare whole numbers up to 1 million; demonstrate knowledge of place values; find values on a number line; add and subtract using a number line; differentiate between natural and ordinal numbers; estimate and round two-digit numbers to the nearest tenth; recognize multiples and factors of numbers; learn the multiplication table up to 10 × 10; multiply a two-digit number by 100; divide multiples of 100 by 100; multiply a two-digit number by a number with more than two digits; divide a number of three or more digits by a two-digit number; perform operations with and without brackets; perform money calculations (in *kuna* and *lipa*); know units for measuring liquid (deciliter and liter) and convert between them; know units for measuring mass (gram, dekagram, and kilogram) and convert between them; and learn basic algebraic terms and that letters represent numbers in algebraic equations
	Fractions and decimals	Use words to express fractions (e.g., one-third of an apple, or 5 is half of 10) and divide with a remainder
	Number sentences with whole numbers	Solve word problems and simple equations
	Patterns and relationships	Find the missing term in a sequence
Geometric Shapes and Measures	Points, lines, and angles	Differentiate among and draw flat, curved, and broken lines; draw and label lengths, and mark terminal points of lines; draw horizontal and vertical lines; draw straight lines that intersect and determine their point of intersection; differentiate between points that belong to a line and points that do not; recognize and draw right, acute, and obtuse angles; use informal coordinate systems (square grids) to locate points on a plane; draw circles with a compass
	Two- and three-dimensional shapes	Identify two-dimensional geometric shapes (circle, triangle, rectangle, and square); identify three-dimensional geometric shapes (sphere, cylinder, cube, parallelepiped, and pyramid); draw and identify triangles according to shape (scalene, isosceles, and equilateral); draw right triangles; measure the perimeter of a triangle; measure the perimeter and area of rectangles and squares; know units of area (cm^2, dm^2, and m^2); use a square grid to measure area; estimate area and volume; calculate the volume of cubes and parallelepipeds; and know units of volume (cm^3 and dm^3)
	Data display	Read, interpret, organize, and represent data in simple tables, compare information from bar graphs, and draw conclusions from data

Exhibit 2 lists the competencies students should achieve by the end of eighth grade, according to the syllabus.

Exhibit 2: Expected Mathematics Competencies by the End of Eighth Grade

Domain	Content Area	Competencies
Numbers	Whole numbers	Compare, round, add, subtract, multiply, and divide whole numbers; find numbers on a number line; determine the absolute value of a whole number; write, read, compare, add, subtract, and multiply natural numbers larger than 1 million; divide by two-digit numbers; use the commutative, associative, and distributive properties of multiplication; know the properties of divisibility; determine common multiples; use pocket calculators; and find square roots using a calculator
	Fractions and decimals	Find fractions, decimals, and rational numbers on a number line; compare, add, subtract, multiply, and divide fractions; write equivalent fractions; convert fractions to mixed numbers; understand decimal places; compare, round, add, subtract, multiply, and divide decimals; convert decimal numbers to decimal fractions and vice versa; and write rational numbers as fractions and decimal numbers and compare them
	Integers	Differentiate between positive and negative integers; find integers on a number line; compare, add, subtract, multiply, and divide integers; and determine the absolute value of an integer
	Ratio, proportion, and percent	Recognize proportional quantities and apply ratios and proportionality in simple everyday situations; present proportionality graphically; calculate percentages; and determine interest
Algebra		Solve simple mathematical formulas and expressions containing one variable; solve simple linear equations and simple two-variable systems of two linear equations, and use substitution to verify the accuracy of solutions; substitute numerical values for variables in formulas and calculate the value of remaining variables; present simple numerical relationships (e.g., linear, pure quadratic, and square root) using appropriate vocabulary, associated value tables, equations, and graphics; convert simple word problems into algebraic notation (e.g., numerical sentences, linear equations, and systems of two linear equations), plan and execute solutions, and understand their significance; solve equations graphically and algebraically; graph linear functions; calculate with exponents; and perform calculations using scientific notation
Geometry		Measure and draw angles; construct angles using the properties of angle bisectors; identify, create, compare, and classify two- and three-dimensional geometric shapes, and recognize and describe their geometrical properties, including translation, axis symmetry, central symmetry, and rotation; recognize congruence, similarity, and symmetry in two- and three-dimensional forms; apply Thales' theorem for right angles inscribed in circles; apply the Pythagorean theorem as it relates to the measurable features of squares, rectangles, equilateral triangles, isosceles triangles, rhombuses, and trapezoids; use the Cartesian coordinate system and read the coordinates of points in the system; determine perpendicular lines and planes; and apply formulas to determine length, area, surface area, perimeter, and volume
Data and Probability		Collect, classify, and interpret data using tables, frequency diagrams, bar graphs, and pie charts; determine the number of possible and favorable outcomes in simple situations; apply the terminology of probability; draw frequency and relative frequency histograms and find the arithmetic mean, median, quartiles, mode, range, and interquartile range of a series of numerical data; and calculate the probabilities of random events and explain them as relative frequencies

The Science Curriculum in Primary and Lower Secondary Grades

The Syllabus for Primary School[9] contains the educational work plan for science topics, combined until Grade 4 and within separate subjects for Grades 5 to 8. Science is taught mostly as Nature and Society until Grade 4, followed by separate and more distinguished subjects of biology, chemistry, geography, and physics in Grades 5 to 8.

According to the syllabus and its areas, by the end of fourth grade, students should meet the following objectives in the following areas:

- Characteristics and Life Processes of Living Things: Differentiate between the living and the nonliving world and recognize the correlation between them; recognize parts of the body and understand that the human body is an organism; recognize changes that occur in the body during puberty; describe the main parts of plants and understand their main functions; understand the importance of plants for life; differentiate animal species according to their diet; explain mutual dependencies between plants and animals; recognize plants and animals that live in grasslands and understand their mutual relationship; know the most common forest animals; recognize the interdependence of plants and animals in the forest; understand the significance of water for humans, plants, and animals; and recognize the most common plants and animals in fresh water and in and near the sea
- Life Cycles, Reproduction, and Heredity: Name members of a family and differentiate between members of the nuclear and extended family; differentiate between ancestors and descendants; and become familiar with the life cycles of living things
- Interaction with the Environment: Differentiate among the seasons and recognize their main features; describe seasonal changes and link them with changes in the lives of plants, animals, and people; and understand the interrelationship of professions, institutions, plants, and animals in Croatia
- Ecosystems: Recognize that plants need sunlight and food; identify simple food chains; recognize human impact on the environment; learn how to separate waste into appropriate containers; understand the correlation between people's activities and pollution; understand man's role in water conservation and consumption; and understand the importance of protecting the air and sea from pollution
- Human Health: Understand the importance of personal hygiene, a healthy diet, and health maintenance; become acquainted with health care facilities and staff; describe how one can maintain health by adhering to basic hygienic, dietary, and physical habits; understand how infectious diseases are transmitted; and recognize maltreatment and ask for help
- Classification and Properties of Matter: Describe physical states and properties of water by conducting simple experiments; describe characteristic differences in shape and volume of each state of matter, and understand that state changes can occur by heating or cooling; identify observable changes in materials caused by heating, cooling, and freezing;

give examples of materials that dissolve in water and those that do not; and identify properties of air by conducting experiments, and determine the composition of air

- Energy: Identify sources of energy (e.g., the Sun, electricity, water, wind) and describe practical uses of energy; identify common light sources (the Sun); and describe the concepts of rainbow and shadow
- Earth's Structure, Physical Characteristics, and Resources: Recognize features of the landscape in Croatia (lowland, hill, mountain, and coastland); describe elements of the natural environment in students' local town or village regions; understand the correlation between climate and living things; name the most common types of wind; understand the importance of air for life; identify evidence that air contains water; differentiate among types of soil; differentiate among types of forest; differentiate among types of water; identify the role of land in the economy and explain the economic importance of different regions; and recognize the importance of using Earth's resources responsibly
- Earth's Processes, Cycles, and History: Describe the movement of water on Earth's surface; understand the water cycle; observe changes in nature caused by the seasons; and understand basic terms associated with fossils
- Earth in the Solar System: Understand the relationship between the Sun and life on Earth; describe the Solar System as a group of planets, including Earth, each revolving around the Sun; identify the Sun as a source of heat and light; and relate daily patterns observed on Earth to Earth's rotation on its axis (e.g., day and night, appearance of shadows)

By the end of eighth grade, according to the syllabus and its areas, students should be able to achieve the following objectives in the following areas:

- Biology: Describe types of living things and classify organisms on the basis of major taxonomic groups and their characteristics; describe the structure and functions of plants and animals; describe organs in the human body, their functions, and the most common disorders associated with organ systems; describe how the nervous system and hormones control processes in the human body; compare structures and functions of human organs and body systems with those of other animals; describe the main parts and life cycles of cells and the role of metabolic processes in cells; differentiate between unicellular and multicellular organisms, and understand the processes of cell division and photosynthesis; describe the life cycles of plants and animals; differentiate between asexual and sexual reproduction; recognize the importance and hereditary role of genes; recognize the evolutionary development of living things and explain the process of emergence of new species; describe the adaptation of living things to specific types of habitat and explain how changes in the environment can affect them; describe the importance of fossils; describe the interdependence and adaptation of living things in ecosystems and how changes in nature and human activity affect ecosystems, anticipating possible consequences at the local and global levels; describe food chains and explain the relationship among producers, consumers, and decomposers; describe causes of common

diseases, addictions, and other factors that jeopardize human health and life; understand immunity; and explain the principles and importance of health protection

- Chemistry: Examine and explain physical properties of substances using experimentation (density, thermal and electrical conductivity, magnetic properties, solubility, boiling point, and melting point); differentiate between chemical and physical changes; explain chemical changes; describe how chemical reactions may be used as a source of energy; differentiate between metals, nonmetals, and chemical compounds; recognize properties of acids and bases; differentiate between pure substances and mixtures; recognize homogeneous and heterogeneous mixtures and understand methods for separating mixtures; describe the structure of atoms and molecules; describe factors that affect the process of dissolving or making solutions; recognize the physical properties of water and air; and recognize uses of oxygen
- Physics: Describe transitions that occur between states of matter through heating and cooling; describe various forms of energy and energy transformations; relate temperature changes to changes in volume; describe examples of heat transfer; identify basic properties of light; recognize characteristics of sound; construct and draw direct current circuits and explain the role of each part of the circuit; differentiate between conductors and insulators; understand applications of the magnetic effect of electric currents and uses of electromagnets; describe motion; describe types of force and apply knowledge of forces to examples from everyday life; compare the density of substances; explore and apply levers; and explain pressure in terms of force and area
- Geography: Identify renewable and nonrenewable energy sources and discuss their efficiency and environmental impact; describe methods of waste management; identify causes of pollution; explain how common methods of agriculture and land use can affect land resources; describe the importance of water conservation; describe the Solar System; describe Earth's motion around the Sun and its effects; recognize features of the structure of Earth; describe earthquakes and volcanoes; describe uses of minerals and rocks; differentiate among types of soil; recognize characteristics of and the importance of water on Earth and the water cycle; describe Earth's atmosphere; and describe changes in climate and weather patterns

Professional Development Requirements and Programs

The main provider of continuous teacher education is the Education and Teacher Training Agency (ETTA). This agency is responsible for professional development of teachers through organizing education seminars at national, regional, and local levels, as well as providing professional assistance and guidelines, developing teaching resources and materials, and other activities. Teachers and other education staff are required to take part in professional development at the national and county level several times per school year. ETTA is funded by state budgets and provides regular seminars and workshops with topics that are subject specific but also offer general interest themes, such as educational methodology, didactics, pedagogy, counseling, administration, policy, and other areas

teachers show interest in. Teachers are obliged to pursue continuous professional development through programs provided by ETTA that were approved by the Ministry of Education. A variety of seminars and courses are available also from other providers, such as nonprofit organizations or other educational institutions. Costs incurred by teachers' continuing professional development are co-funded by the state and local government bodies as part of states' investments in education. Employers, (i.e., heads of schools) can also secure additional sources of funding (such as from renting school facilities, for example) that they allocate to teacher training and other professional development opportunities. Another state agency in education, the Agency for Mobility and EU Programmes, is dedicated to promoting and implementing exchange programs for teachers and similar models of acquiring additional knowledge and qualifications within the EU-funded platforms.

Monitoring Student Progress in Mathematics and Science

Student achievement is monitored and evaluated throughout the school year. The MSE prescribes a standardized framework of monitoring and evaluation to measure students' progress in all areas prescribed by the national curriculum (and in the prior period, 2006 to 2019, prescribed by the syllabus). The Regulatory Act on the Methods, Procedures, and Elements of Evaluation of Students in Primary and Secondary Schools[10] provides general guidelines on the use of unified grades and suggested evaluation criteria.

The frequency of written and oral tests, as well as the evaluation of homework, mostly depends upon individual teachers. Teachers evaluate students by grading their achievement numerically and their behavior descriptively. School grades comprise numerical marks and accompanying descriptors on a scale of 1 to 5 (1 being insufficient and 5 being excellent). The descriptive grades for student conduct are summarized as "exemplary," "good," or "bad." In the first four years of primary school, grades are numerical, accompanied by a clear, written explanation.

According to the 2006 syllabus, the general goal of teaching mathematics is acquiring basic mathematical knowledge necessary for understanding concepts and principles in Nature and Society, and acquiring basic mathematical literacy and the ability to solve mathematical problems. Around one-quarter to one-third of all lessons on ISCED 1 were dedicated to teaching Mathematics.

The goal of teaching Nature and Society is for students to become aware of complexity, diversity, and interconnectedness of all factors operating in humans' natural and social environment, to develop a relationship toward humans and events that is tolerant, that openly accepts different attitudes and opinions, and that encourages curiosity for discovering new concepts in natural and societal community. Around one-sixth to one-fifth of all lessons on ISCED 1 were dedicated to teaching Nature and Society.

For both areas of assessment, achieving the targeted goals of teaching and learning happens in multiple ways. Besides direct summative evaluation visible in form of school grades, some external processes are in place for overall quality assurance of evaluation processes. Student knowledge competitions at the school, regional, and national levels in specific subjects are an additional way

to recognize students' accomplishments. Advisers from ETTA regularly visit school teaching staff, as well as homeroom teachers (Grades 1 to 4), for consultations to assess their work, locate and assist in resolving any issues, and/or compliment teachers who are doing exemplary work in their classrooms. Also, the Primary and Secondary School Education Act foresees a self-evaluation process in which schools monitor and improve the quality of their work on their own, including evaluation and improvement of curriculum implementation.

Providing standardized self-evaluation materials in pre-tertiary education is one of the tasks of the National Centre for External Evaluation of Education (NCEEE). At the primary education level, there are no real high-stakes exams, but there are occasional national exams in chosen subjects (usually in Grade 8) to generally assess achievement in a target area. Some national examinations have been conducted by the NCEEE since its establishment in 2006, in rather irregular cycles, serving more as a diagnostics tool. International assessments were introduced in 2006, including the first cycle of the Program for International Student Assessment (PISA) in Croatia. In 2011, IEA studies were also introduced, in the form of combined Progress in International Reading Literacy Study (PIRLS) and TIMSS assessments (in Grade 4). Since then, these assessments have represented independent and international approaches to deepening the understanding of students' achievements and attitudes in primary education.

At the secondary education level, high-stakes State Matura exams are managed and organized by the NCEEE. These examinations are administered in the same way and at the same time for all students, thus making comparative results possible at the national level. Students who have attended gymnasium are obliged to take these exams to finish their secondary education. Students finishing their last year of vocational and/or art programs take State Matura exams only if they are planning to enroll in higher education institutions. The Croatian State Matura comprises of compulsory and optional exams. Compulsory subjects are mathematics, Croatian language, and foreign language. Compulsory exams have two levels: higher/extended (A) and lower/basic (B). Students can choose between the basic and extended level exams, and this decision is mostly affected by the requirements of the higher education institution in which they plan to enroll. All other STEM subject exams are voluntary; physics, biology, chemistry, and informatics and they usually have a large number of attendees.

NCEEE is responsible for external evaluation within Croatian primary and secondary education, as well as conducting examinations based on national standards and implementation of international studies. Besides delivering reports to the ministry of education and other interested public entities, the NCEEE usually delivers these results to schools and assists in their self-evaluation processes. Aforementioned modes of evaluations are all used to monitor students' progress in mathematics and science, ISCED 1 to 3.

Special Initiatives in Mathematics and Science Education

In primary and secondary education, there are noncompulsory subjects, modules, and other educational programs; supplementary classes; additional or remedial instruction; school, class, and group projects; excursions; trips; and extracurricular and extramural activities, some of which focus on mathematics and/or science. The purpose of these nonobligatory activities is to enable students to develop their knowledge and abilities in areas of special interest. In all schools, high-achieving students and/or low-achieving students have specific extracurricular programs organized for them. Remedial instruction is provided for low-achieving students in specific subjects, while additional instruction is provided for motivated high-achieving students. According to the *National Curriculum Framework* (2010), extracurricular activities involve mathematics and science contents, among other subject areas, in ways that enable students to learn through personal experience about a range of topics (e.g., man and plants or animals, chemistry experimentation, chemistry and the environment, everyday chemistry, meteorology, the causes and effects of natural disasters, cartography, genetics, astronomy, etc.). In recent years, examples of such projects are initiatives in robotics and programming for students of all ages. Also, many Croatian primary schools have locally recognized accomplishments in ecology—for example, growing their own gardens and organizing activities that involve all students and different contact with the local community.

At the moment, curriculum reform is being implemented in the Croatian education system (ISCED 0 to 3) that is a comprehensive modernization of teaching and learning practices refocusing on students and facilitating the development of their competencies. Cross-curricular topics based on the lifelong learning framework are being also reintroduced and woven into all subjects, among them, Health and Sustainable Development. Another important cross-curricular competence is Informational and Communications Technology (ICT). ICT is the backbone of all described processes and the area in which schools and teachers require the most substantial investments (in terms of means, equipment, and teacher training). Until recently, computers were rarely used outside lessons in informatics (which was an optional subject), and the same applied to instructions in mathematics and science subjects. The State Pedagogical Standards[11] stipulated the minimum of infrastructural and material conditions for primary schools, but it often varied from school to school and from county to county; the gap is now being leveled nationally. On the wave of the current national reform, schools are constantly getting better and better equipped, both through central MSE procurement and individual purchases, and the various modes of the use of evolving ICT are slowly finding their way into teaching practices.

New curricula were introduced in a limited number of schools on an experimental basis in the 2018–2019 school year, and then overall implementation followed in the 2019–2020 school year. Without a doubt, some of the changes in STEM curricula were developed with TIMSS experiences and national results in mind.

Suggested Readings

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