Ana Vivdici (Țîbuleac), PhD Student
Tiraspol State University

GLOBAL TRENDS AND LOCAL CHALLENGES IN CURRICULUM FRAMEWORK TIMETABLE DEVELOPMENT FROM THE PERSPECTIVE OF KEY COMPETENCES (COMPARATIVE ANALYSIS)

Context

All over the world, countries are making diverse decisions regarding the time for instruction and which school subjects must be mandatory and which optional. These choices and preferences are reflected in terms of rules and/or regional regulations on what subject to be studied and what is more important at what age and for how long.

Almost all OECD countries have statutory or regulatory requirements related to hours of instruction. These are most often stipulated as the minimum number of instruction time that must be provided by a school, similarly to the Republic of Moldova, are based on the shared understanding of the authorities that sufficient time is required for better learning outcomes.

Resources correlation with students' needs and optimal use of time are essential for educational policies. The amount of time these resources are made available to students is an important factor in determining how funds are allocated for education. There is a growing awareness of the importance of time spent outside the classroom during the school day in other activities for compulsory instruction, including breaks and recesses.

In addition to formal instruction time, students may participate in extra-curricular activities before and/or after lessons or during school holidays, but these activities (as well as examination periods) are outside of the scope of this article. The way in which OECD countries allocate time for instruction and the subjects that constitute the core curriculum for OECD countries and the Republic of Moldova, including reporting them to PISA results, is the main subject of this article.

What are the characteristics of the Curriculum Framework Timetable (CFT) in the Republic of Moldova?

The Curriculum Framework Timetable is the most rigid document of national curricular policies that has undergone the least changes over time, regardless of the number of curricular reforms and interventions in those education systems, like Moldova, in which this document exists and its elaboration, approval, is the responsibility of the ministry. According to the researcher's understanding [2, p. 236–237], one of the few researchers who investigated this concept in the Romanian space and was taken-over by Moldovan researchers, National Curriculum Framework authors [7, p. 104] for implementation in curricular educational policies in the Republic of Moldova [7, p. 54], the CFT is an official document for global design of training content, which establishes, according to value/pedagogical criteria adapted to the policy level of education:

a) the general pedagogical objectives valid at the level of the entire education system;
b) specific pedagogical objectives valid on education levels and cycles;
c) the maximum number of hours reserved for formal/school instruction within each level of education;
d) the educational subjects studied on levels, school cycles;
e) the succession of educational subjects by school years;
f) the number of hours per week reserved for each educational subject in the context of the school year structure;
g) achievable non-formal education offers in the context of the student's real learning time.

One of the most prolific Romanian researchers specifies the CFT as a global curricular project that must be conceived as a unit (for grades I–XII) [3, p. 748], not as a plot (on disparate levels and levels of schooling, artificially cut) as it is at the moment. According to the author [2, p. 236–237], curriculum must be built

at the level of the general connections necessary between: a) the finalities of the education system (the ideal of education and strategic goals) which set the main medium and long term directions; b) the finalities of the educational process: the general objective valid at all levels, schooling levels and school cycles; specific objectives on schooling levels, school cycles and curricular areas; c) educational subjects, built mono-disciplinary, intra-disciplinary, inter-disciplinary, multi-disciplinary, trans-disciplinary, distributed longitudinally (grades I–XII) and horizontally (disciplinary relations, intra-disciplinary, inter-disciplinary, multi-disciplinary, trans-disciplinary – possible and necessary within the same level of education or the same level of education), with optional and optional compulsory status, with openings to non-formal (in the perspective of lifelong learning); d) the number of hours annually, by semester; e) forms of organizing formally recommended training (frontal, mixed activities, laboratory activities, classroom activities, etc.) and non-formal (individual study, documentation activities, individual and group consultations, didactic excursions, etc.); forms of evaluation: oral, written, practical; internal, external, current, semesterly, annually, at the end of the cycle, stage, level of education [3, p. 749].

Both authors [3, p. 749] and [4, p. 104] identify the CFT as a global curricular project that represents a fundamental curricular document dependent on the aims of the system and the education process, but which determines the development of curricula and textbooks; which is not happening at the moment, changes in curricula and textbooks are made without touching the CFT. The quality of school curricula and textbooks depends on the quality of the CFT, which in turn depends on the purposes of the system, the educational process and its organizational structure on schooling levels and cycles and on curricular areas [3, p. 749].

The design of the Curriculum Framework Timetable in the perspective of the curriculum paradigm is an innovative pedagogical approach socially engaged in the medium and long term, as a result of the consequences determined, objectively, in the cumulative process of elaboration of the curriculum and textbooks. This approach implies the recognition, observance and full pedagogical capitalization of the following principles:

1) The principle of the global approach of the CFT, depending on the general objectives of the curriculum;
2) The principle of selecting school subjects/subjects related materially to the specific objectives established on schooling levels and cycles of education;

3) The principle of concentrating the curriculum at the level of the "common core" (common curriculum/core curriculum), pedagogically fixed in the general education;
4) The principle of balanced distribution and integration of school subjects/ subjects on "curricular areas", determined on pedagogical criteria, argued epistemologically and psychologically;
5) The principle of interdependence of school subjects/subjects at the level of intra-disciplinarity, inter-disciplinarity, multi-disciplinarity/ pluri-disciplinarity, trans-disciplinarity;
6) The principle of optimizing the relations between the basic school subjects/subjects-profile, respectively between the compulsory-optional school subjects/subjects depending on the specifics of each school stage and the psychological age of the students;
7) The principle of opening the curriculum at the level of lifelong education for the optimal capitalization, in time and pedagogical space, of all contents and general forms of education [2] and (National Curriculum Reference Framework, 2019).

The same meaning taken from Cristea [2] is introduced by the author Guțu [4] in the document of curricular educational policies (Reference Framework of the National Curriculum, 2019) which is the key document for elaboration of National Curriculum for each school subject, Curriculum and textbooks. In the opinion of the author Guțu [2] the Curriculum Framework Timetable is seen as an official document of education policy that reflects the content design criteria defined in the general objectives of the instruction process. It capitalizes on the organizational structure of the education system that sets the limits for the achievement of the "common core of general culture" and the possible openings on the vertical of schooling levels and on the horizontal of the school calendar and schedule. The "common trunk of general knowledge" is studied at the level of OECD countries compared to the Republic of Moldova in this article to elucidate trends and how time is allocated for instruction and how much of this formal instruction time is allocated to the development of key competencies.

The analyses carried out at UNESCO level, since 1960-1970, delimit three coordinates of interdisciplinary planning of the instruction content: vertical – horizontal - transversal [1, p. 211–216]. The coordinate of vertical organization of the Curriculum Framework Timetable that promotes the intra-disciplinary design of the training content eliminates the tendency to fragment a field of study in several school subjects, ensuring their integration at the level of a single

higher school discipline (in primary education: writing, reading, composition – the Romanian language; in high school education: Logic, Ethics, Epistemology, History of philosophy – General Philosophy). The horizontal organization of the curriculum promotes the inter-disciplinary design of the content of the instruction aimed at integrating the concepts and principles studied in several scientific fields (natural sciences, social sciences, aesthetic education, etc.) in complex school subjects (Physics-Chemistry Biochemistry, History-Geography, Psycho-Pedagogy, etc.) or the application of mathematical or computer language in different fields of knowledge and activity (see the subjects or training modules resulting in this context). The transversal organization of the curriculum promotes the perspective of multi-disciplinary design of the training content that allows the approach of complex problems, existing at the level of nature or society, problems included under the generic "new education" (ecological, democratic, demographic education, etc.) or within global issues (water, air, climate, pollution, population, health, democracy, human rights, etc.). These problems require the integration of concepts, principles, laws that act in different particular sciences. Their collaboration, inter-penetration, interaction and even their effective coordination is achievable, methodologically at the level of new educational subjects with superior informative-formative resources.

How can Moldovan Educational Curriculum Framework Timetable be operationalized?

The operationalization of the Curriculum Framework Timetable implies the capitalization of the three axes of organizing the previously analysed instruction. This involves making managerial decisions, adaptable in different pedagogical and social contexts:

a) stabilization of the common trunk of general knowledge/basic formation of the student's personality, valid on the vertical of the education system;
b) ensuring the optimal pedagogical relations between the general knowledge – profile – specialized/professional, vertically and horizontally of the system;
c) decentralization of curricular programmes by integrating the offers of non-formal instruction in the structure of the curriculum, achievable in the perspective of permanent education and self-education;
d) elaboration of the principles of the school schedule – at the level of education policy – in terms of optimizing the ratio between the official

time invested in formal school instruction and the real time necessary for the student for efficient school and extracurricular learning.

Objective factors, influencing the current structure of the Curriculum Framework Timetable for the Republic of Moldova (that comprehends the list of compulsory study subjects), and subjective factors such as the allocation of random hours per specific skills development to different subjects of study and the allocation of a random number of hours per sub-competence development from one compulsory school subject to another conditions an unbalanced distribution of the number of hours per subjects and the non-flexibility of the Curriculum Framework Timetable. With a Curriculum Framework Timetable consisting of 100% compulsory subjects and only 4-5 % hours allocated to a compulsory subject, but elective by students as Options, from the list of subjects recommended by the ministry, we are talking about a non-flexibility of the CFT. Schools that have more autonomy in defining and developing curricula and assessment tend to perform better at PISA than education systems that do not guarantee such autonomy, regardless of the country's public income per capita [10].

How is time allocated per compulsory study subject in OECD countries compared to Moldova and what impact does it have on PISA results?

On average, in OECD countries and economies, reading, writing and literature, mathematics and arts constitute 52% of the instruction time required for students in primary schools [9], compared with 70% in Moldova for grade 1 and 65% grades 2–4 (Framework Plan, 2018–2019) in the 2018–2019 reference school year (similar to the 2018 reference year for the data used in the article for OECD countries) identical also in 2019–2020 (Curriculum Framework Timetable 2019-2020), including 2014-2015 (Curriculum Framework Timetable, 2014–2015), on average for primary classes constituting 67.5%, instruction in reading, writing and literature, second language study and other languages, including mathematics, represent about 42% of the compulsory instruction time for high school students compared to about 50% on average for lower secondary grades V–IX in Moldova, constant since 2014. There is a higher share of hours allocated to the above-mentioned compulsory study subjects in the Republic of Moldova compared to OECD countries (primary classes – 52% OECD countries

compared to 67.5% on average in the Republic of Moldova and gymnasium – 42% OECD countries compared to 50% on average for the Republic of Moldova).

Although there is a higher placement in the Republic of Moldova in the CFT of the higher number of hours (constant from 2014–2020) for the study of compulsory subjects, this is not justified by better result indicators compared to OECD countries such as would be the results of the PISA test. For example, the Republic of Moldova ranked at PISA 2015 on the 50th place (PISA 2015 Results) and PISA 2018 on the 51st place (PISA 2018 Results), below the average of OECD countries with an average accumulated score of 424 students for Reading, compared to the OECD average of 487 and 421 in Mathematics compared to the OECD average of 489 and a number of 45.8% of students who do not reach basic reading skills [5, p. 177] and 420 average score accumulated by students compared to the OECD average 490 points in Mathematics in 2015 with a slight improvement since 2009. At PISA 2009+, Moldova scored 397 average points, OECD countries 496 [6, p. 177].

About 20% of students in OECD countries do not reach the basic level of reading proficiency. This proportion has remained stable since 2009. The Republic of Moldova scores an approximately double percentage of students (45.8%) who do not reach the basic level of reading competence in PISA 2015 [6, p. 175]. At PISA 2018, in Moldova, 57% of students reached at least level 2 in reading (OECD average: 77%), which means that 43% fail to reach at least level 2 of basic reading competence. About 1% of Moldovan students were the best in reading, which means that they reached level 5 or 6 in the PISA 2018 reading test (OECD average: 9%) [15]. About 50% of Moldovan students have reached level 2 or higher in Mathematics (OECD average: 76%). In Moldova, 2% of students have reached level 5 or higher in Mathematics (OECD average: 11%).

If we report these results in Reading (with only 57% students who have reached at least level 2 in Reading) with the number of hours allocated for the study of this subject (with approximately 57% more hours per week in primary school and 15% more in high school for the study of the Romanian language and literature) in relation to Mathematics (50 % students who have reached at least level 2 in Mathematics), these data would partially justify the better results in Reading by the increased share of classes for the study of the Romanian language and literature (OECD reading, writing and literature) in relation to Mathematics, but not the lower results of the OECD average for these subjects/PISA assessment areas.

What is the proportion of compulsory curriculum allocated to instruction per school subjects in OECD countries and the Republic of Moldova?

The proportion of the compulsory curriculum for primary school students dedicated to reading, writing and literature ranges from 18% in Portugal to 38% in France (OECD, 2019) and about 34 % in Moldova (Curriculum Framework Timetable, 2018-2019); for students of secondary school, it ranges from 9% in Ireland (for English, one of the two national languages) from 25% in Greece (33% in Italy, including social studies) and approximately 19% in Moldova (Curriculum Framework Timetable, 2018–2019). The proportion of the compulsory curriculum dedicated to mathematics at the primary level varies from 12% in Denmark to 27% in Mexico and 18% in Moldova; at secondary level, it ranges from about 11% in Hungary, Ireland and Korea to 16% in Chile, Latvia and the Russian Federation (and 20% in Italy, including natural sciences) (OECD 2019), compared to 14 % in Moldova.

With the exception of a few countries where the compulsory curriculum is mostly devoted to flexible subjects, in OECD countries and economies, an average of 1% or less of compulsory instruction time for primary and lower secondary school pupils is dedicated as well as for subjects with a flexible program. An average of 5% of the compulsory instruction time at both primary and secondary level is 4% dedicated to flexible subjects chosen by schools (OECD 2019), identical to the time allocated for the compulsory study of an optional subject by the choice of students for (1 hour per week) both primary and lower secondary level in Moldova. In a quarter of OECD countries with available data, the allocation of instruction time for all classes is flexible (i.e. instruction time for a particular subject is defined for a certain number of classes or even for all compulsory education, without specifying the time to be assigned to each class).

On average, in OECD countries, primary school pupils spend 52% of their time in three subjects: reading, writing and literature (25%); mathematics (17%); and arts (10%), compared to 60% of instruction time in Moldova: (33%) for reading, writing and literature, mathematics (18%) and arts (9%) (Curriculum Framework Timetable, 2018–2019, p .16). Together with physical education and health (9%), natural sciences (7%) and social studies (6%), these six fields of study are part of the main curriculum in all OECD countries where instruction time is specified, compared with an equal distribution between (4%) physical education, (4%) natural sciences and (4%) moral-spiritual education, other social studies besides

sciences being absent from the framework plan for primary education in the Republic of Moldova.

Second and other languages, religion, ethics and moral education, information and communication technologies (ICT), technology, practical and vocational skills, and other subjects make up the rest of the non-flexible compulsory curriculum at primary level, accounting for about 19% of compulsory instruction time on average in all OECD countries, compared to about 22% in the Republic of Moldova. It appears at primary level a preponderance of instruction time of 33% assigned to reading, writing and literature in Moldova (OECD: 25%) and equal distribution between physical education and natural sciences and moral and spiritual education, all making it allocated 4 % of instruction time required, social science being absent from the Curriculum Framework Timetable for primary education in Moldova. Physical education and health are the areas in the Republic of Moldova with less instruction time allocated – only (4%) compared to the double time allocated in the OECD country (OECD average: 9%).

It would be necessary to examine the causes and reasons for discriminatory allocation of instruction time for subjects that promote health education in the early education of healthy behaviour in a developing country with a low level of healthy behaviour among young people and increased annual percentage of infectious diseases (350 young people aged 15–17 out of 100,000 suffered from sexually transmitted diseases in 2018, compared to 372 in 2017, 21 cases of abortion for girls aged 15–19 years out of 1,000 in 2018, and the number of young people aged 15–34 infected with human immunodeficiency syndrome (HIV) was 318 persons, which is 5.6% more than in 2014. For the age group of 15–24 years a share of 22.6% is registered [19]. These sociological data should serve as an argument in favour of this segment of education to be a priority for a healthy young person fit for optimal integration into society and his well-being.

At the secondary level, on average, in OECD countries and economies, approximately 42% of the compulsory curriculum is composed of three subjects: reading, writing and literature (15%); second and other languages (15%); and mathematics (13%) compared to Moldova 47 %: reading, writing and literature (19 %); second and other languages (14 %); and mathematics (14 %). On average, an additional percentage (12%) of the compulsory program is dedicated to natural sciences, (11%) social studies, (8%) physical education and health and (7%) arts compared to Moldova (12%) natural sciences, (12%) social studies, (7%) physical education and health and (3%) arts.

These seven areas of study form a major part of the curriculum for this level of education in all OECD countries where instruction time is specified. Religion, ethics and moral education; IT; technology; practical and vocational skills; and other subjects constitute the rest (approximately 12%) of the compulsory and non-flexible curriculum for students at this level of education, compared to 24% in the Republic of Moldova. These data indicate a considerable proportion of the non-flexible/non-variable curriculum in the Republic of Moldova, about 97% and only 3% is the flexible/variable part of the compulsory curriculum in primary and secondary education with only 1 hour per week allocated to studying an optional subject of student's choice from the list recommended by the ministry. This non-variable distribution of subjects in more than 97 % has remained constant for more than 10 years, while the national curriculum and textbooks have undergone many paradigm shifts, at least once every 5-6 years, including from the National Curriculum focused on objectives in 2000 and 2006 to the National Curriculum based on competencies in 2010 and recently revised version of the National Curriculum in 2018.

What are global trends in curriculum development by subject and level of education in OECD countries and the Republic of Moldova?

In Table 1 we observe the representation of the countries and the share allocated to the subjects in the compulsory curriculum per subject at an interval of 11 years for primary education. For 2019 the data from 2018 are used, while for 2009 the data from 2007 for public educational institutions. Generally, it certifies minor variations and the allocated weight per subject between 2019 and 2009. On average for the EU variation is max 3%, OECD average variation is max 2%.

We can observe some trends for primary education:

- **The trend of allocating an increased share of time per study of Reading, Writing and Literature to** a group of countries: Russian Federation (+ 9%); Mexico (+ 5%); Turkey (+ 11%); France (+ 7%); Austria (+ 14%); Luxembourg (+ 4%); Sweden (+ 5%); Germany (+ 6%); Hungary (+ 4%); Japan (+ 5%); Australia (+ 11%); Slovenia (+ 4%); Denmark (+ 5%); Chile (+ 6%); Iceland (+ 4%); Ireland (+ 9%);
- **The share of hours allocated to the study of foreign languages decreases**: France (-4%); Turkey (-4%); Austria (-6%); Luxembourg (-6%); Czech Republic (-4%); Sweden (-5%); Germany (-5%); Hungary (-7%); Portugal (-8%);

- **Minor changes in general:** Norway (max 2%); Estonia (max 2%); Slovenia (max 4%); Israel (max 4%); Finland (3%);
- **Increase/decrease the share allocated to the flexible curriculum:** Czech Republic (+ 12%); Greece (+ 6%); Hungary (+ 10%); Spain (+ 11%); Denmark (+ 8%); Portugal (+54%), Russian Federation (-6%); Turkey (-11%); Australia (-29%); Israel (-4%); Korea (13%); Chile (9%); Iceland (6%); Ireland (-8%);
- **The share allocated to mathematics increases:** Turkey (+ 4%); Sweden (+ 5%); Australia (+ 8%); Ireland (+ 5%); Portugal (+ 6%);
- **The flexible curriculum has no weight in the curriculum (0%):** France, Mexico, Turkey, Austria, Luxembourg, Slovenia, Korea, Ireland;

If we report these trends to the Republic of Moldova, then in the same time we could see the lack of any changes, the Curriculum Framework Timetable that establishes the list of compulsory subjects/compulsory curriculum and the number of hours allocated to each subject remaining intact, without any change.

Table 1. Instruction time per subject in primary education (2009–2019)

	Reading, writing and literature	Reading, writing and literature	Mathematics	Mathematics	Natural sciences	Natural sciences	Second and other languages	Second and other languages	Other compulsory curriculum	Other compulsory curriculum	Compulsory flexible curriculum	Compulsory flexible curriculum
	2019	2009	2019	2009	2019	2009	2019	2009	2019	2009	2019	2009
France	38	31	21	18	7	5	6	10	28	36	0	0
Russian Federation	36	27	16	16	8	7	6	9	25	26	9	15
Mexico	35	30	27	25	13	15	0	0	25	30	0	0
Turkey	30	19	17	13	5	12	5	9	43	36	0	11
Moldova*	34	34	18	18	3	3	7	7	33	33	5	5
Austria	30	24	17	16	13	10	2	8	38	42	0	0
Luxembourg	29	25	19	18	7	6	15	21	30	30	0	0
Czech Republic	28	26	17	19	10	11	8	12	24	30	14	2
Sweden	27	22	19	14	8	12	7	12	33	34	6	6
Greece	27	29	14	14	12	11	10	10	31	36	6	0
Germany	26	20	21	18	4	6	5	10	43	44	1	2
Norway	26	25	17	16	7	7	7	7	43	45	1	0
Hungary	25	29	16	17	4	6	2	9	43	39	10	0
EU23 average	25	25	17	16	7	8	8	8	43	40	5	3

OECD average	25	23	17	16	7	8	7	9	42	40	6	4
Japan	24	19	16	15	7	9	2	0	44	49	7	8
Australia	24	13	17	9	6	3	0	1	24	16	29	58
Finland	23	21	15	18	10	10	8	9	34	36	9	6
Spain	23	22	18	17	7	9	11	13	22	30	20	9
Estonia	23	21	15	15	7	7	10	12	34	33	12	12
Slovenia	22	18	17	16	8	10	8	11	45	45	0	0
Israel	22	19	18	18	8	9	9	11	38	35	4	8
Korea	21	19	14	13	9	10	6	5	50	40	0	13
Denmark	21	26	12	17	5	8	6	9	48	40	8	0
Chile	21	15	17	15	9	14	3	2	38	33	12	21
Iceland	20	16	16	15	8	8	6	4	45	46	5	11
Ireland	20	29	17	12	4	4	14	14	45	33	0	8
Portugal	18	15	18	12	14	9	3	11	3	50	57	3

Source: Author's integration of data based on original *Table D1. 3b. Instruction time per subject in primary education (2019) Education at a Glance 2019; Table D1. 2a Instruction Time per subject as a percentage of total compulsory instruction time for 9-11-year-olds (2007) Education at a Glance 2009*

Note a: Data are included as a percentage of total compulsory instruction time, in public institutions for 2009(data for 2007) and 2019;

Note b: Slovak Republic, Lithuania, Canada, Costa Rica, Latvia, Poland, French Comm. (Belgium), Italy, Flemish Comm. (Belgium), England (UK), and the Netherlands are not included, because of no data available for 2009;

Note c: * For Moldova are included author's calculations based on Education Curriculum Framework Timetable available on https://mecc.gov.md/sites/default/files/plan-cadru_2018-19_c_plasat_pe_site-ul_mecc.pdf and from 2009, and from 2009 (2007) data not available online;

Note d: For Moldova Reading, Writing and Literature (the Romanian Language and Literature), Second and other Languages (Russian, English/ French and other foreign languages), other Compulsory Curriculum (Arts, Music, Handicraft, Physical education, Personal Development, History, Moral and Spiritual Education,), Flexible Curriculum (Options);

Note e: Highlighted in green are those countries that represent the highest value per indicator.

If we perform a data analysis for 2019 (2018) and 2009 (2007) for secondary education, we would notice some similarities with primary education in terms of trends. In Table 2 we observe the representation of the countries and the share allocated to the subjects in the compulsory curriculum at an interval of 11 years for secondary education. For 2019 the data from 2018 are used, and for 2009 the data from 2007 for public educational institutions. There are minor variations, in general, between 2019 and 2009 in the share allocated per subject. On average, the variations in the period 2009-2019 for the EU were 2%, the OECD average variation of max 2%.

Following the analysis of evolving data by subject and country, we can see the following trends for secondary education:

- **Reading, Writing and Literature focus remains almost constant:** France (+1%); Mexico (constant); Turkey (-1%); Austria (constant); Czech Republic (constant); Germany (-1%); Japan (+1%); Australia (+2%); Finland (-1%); Spain (+1%); Slovenia (constant); Israel (constant); Korea (constant); Denmark (-2%); Iceland (constant);
- **Increase of the share of foreign languages in the curriculum**: France (+ 7%); Luxembourg (5); Czech Republic (+ 5%); Sweden (+ 7%); Japan (+ 3%); Israel (+ 6%);
- **Increase / decrease of the share of flexible curriculum:** Turkey (+ 12%); Czech Republic (+ 3%); Greece (+ 3%); Germany (+ 3%); Norway (+ 12%); Hungary (+ 10%); Finland (+ 5%); Spain (10%); Denmark (+ 5%); Iceland (+ 5%); Ireland (+ 57%); Portugal (+ 62%); France (-7%); Russian Federation (-8%); Japan (12%); Slovenia (3%); Israel (9%); Korea (13%);
- **Increases/decreases the weight allocated to sciences by max. 9%:** Luxembourg (+ 3%); Greece (+ 3%); Japan (-3%); Australia (+ 3%); Israel (+ 4%); Korea (+ 9%); Russian Federation (-7%); Turkey (3%); Czech Republic (-3%); Hungary (7%);
- **Minor changes in general:** Mexico (constant); Austria (max 1%); Germany (max 3%); Slovenia (max 3%);

Table 2. Instruction time per subject in general lower secondary education (2009–2019)

	Reading, writing and literature	Reading, writing and literature	Mathematics	Mathematics	Natural sciences	Natural sciences	Second and other languages	Second and other languages	Other compulsory curriculum	Other compulsory curriculum	Compulsory flexible curriculum	Compulsory flexible curriculum
	2019	2009	2019	2009	2019	2009	2019	2009	2019	2009	2019	2009
Greece	25	12	12	11	13	10	12	12	35	55	3	0
Russian Federation	22	15	16	14	17	24	10	9	28	23	7	15
Luxembourg	19	22	13	15	8	5	25	20	35	38	0	0
Moldova*	19	19	14	14	14	14	14	14	35	35	4	4
Denmark	18	20	13	13	13	14	16	18	35	35	5	0
France	17	16	14	15	12	13	19	12	38	37	0	7
Spain	17	16	13	11	11	11	11	10	25	39	23	13
Turkey	16	17	14	13	11	14	10	12	33	40	16	4
Norway	15	18	12	13	9	10	8	15	41	41	15	3
Spain	17	16	13	11	11	11	11	10	25	39	23	13
Chile	16	13	16	13	11	11	8	7	35	40	14	16
EU23/19 average	15	16	13	13	12	12	15	13	39	40	6	6
OECD average	15	16	13	13	12	12	15	13	36	38	9	8
Israel	14	14	14	14	13	9	21	15	38	39	0	9
Iceland	14	14	14	14	8	8	19	17	25	32	20	15
Mexico	14	14	14	14	17	17	9	9	46	46	0	0
Austria	13	13	13	14	12	13	12	12	49	48	1	0

Germany	13	14	13	13	11	10	17	17	40	43	6	3
Hungary	13	17	11	12	11	18	10	12	45	41	10	0
Korea	13	13	11	11	20	11	10	10	41	37	5	18
Portugal	13	11	13	11	incl. in flexible	12	incl. in flexible	15	10	49	64	2
Slovenia	13	13	13	13	17	15	11	11	39	38	7	10
Australia	12	10	12	9	11	8	incl. in flexible	4	25	28	40	41
Finland	12	13	13	13	16	17	13	14	36	38	10	5
Czech Republic	12	12	12	13	17	20	15	10	29	33	15	12
Sweden	12	22	12	14	11	12	19	12	41	34	5	6
Japan	12	11	12	10	12	9	13	10	46	47	5	13
Ireland	9	28	11	13	incl. in flexible	8	6	7	14	41	60	3

Source: Author's integration of data based on original *Table D1. 3b. Instruction time per subject in general lower secondary education as a percentage of total compulsory instruction time (2019) Education at a Glance 2019; Table D1. 2b Instruction time per subject as a percentage of total compulsory instruction time for 12-14-year-olds (2007) Education at a Glance 2009*

Note a: Data are included as a percentage of total compulsory instruction time, in public institutions for 2009 (data for 2007) and 2019;

Note b: Slovak Republic, Lithuania, Canada, Costa Rica, Latvia, Poland, French Comm. (Belgium), Estonia, Flemish Comm. (Belgium), England (UK), and the Netherlands are not included, because of no data available for 2009 or non-comparable data (Italy);

Note c.: For Moldova are included author's calculations based on Education Curriculum Framework Timetable available on https://mecc.gov.md/sites/default/files/plan-cadru_2018-19_c_plasat_pe_site-ul_mecc.pdf and from 2009, and from 2009 (2007) data not available online;

Note d: For Moldova Reading, Writing and Literature (the Romanian Language and Literature), Mathematics (Mathematics), Natural Sciences (Biology, Physics and Chemistry), Second and other Languages (Russian, English/ French and other foreign languages), other Compulsory Curriculum (Computer Science, Civics, Arts, Music, Handicraft, Education for Society, Personal Development, History, Geography, Physical Education), Flexible Curriculum (Options);

Note e: Highlighted in green are those countries that represent the highest value per indicator.

If we report these trends to the Republic of Moldova, we could observe the lack of any changes for lower secondary education, similar to primary, the Curriculum Framework Timetable that establishes the list of compulsory subjects/compulsory curriculum and the number of hours allocated to each subject remaining intact, without any change. The rigidity of the Curriculum Framework Timetable for the Republic of Moldova is also explained by the directly proportional interdependence of the number of hours allocated per week per study of school subjects and the salary of the teacher who teaches this subject. Changes in the distribution of the number of hours would directly affect financially a large group of teachers who are mostly involved in teaching the subjects in the core curriculum. The list of compulsory study of subjects is directly related to the specialties of the initial and continuous training of teachers which is carried out according to the name of the school subjects (Chemistry - chemistry teacher, Physics - physics teacher, etc.).

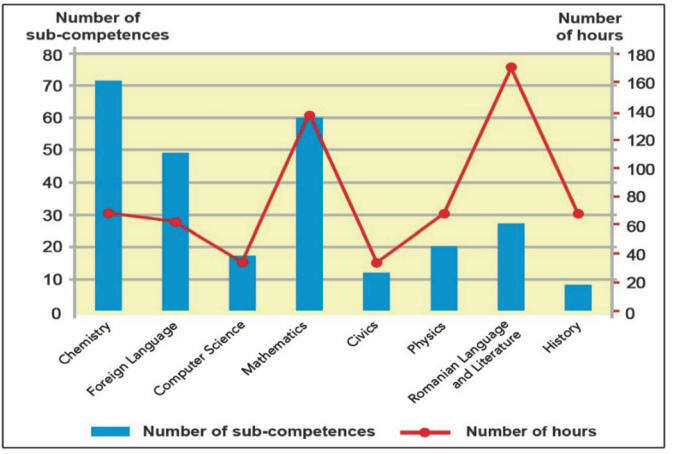
The tradition of functioning of the current structure of the Curriculum Framework Timetable – unchanged, the same school subjects and mostly all nation-wide compulsory curriculum, same training specialties in higher education institutions for both initial and continuing training – does not include the development of general, key competencies, but specific competences related to specific subjects, as well as the National Curriculum is written for each school subject. Resistance of teaching staff from the system, fear of change, additional costs for introducing a change in the scheme of distribution/allocation of study hours, close connection with the amount of teacher salary and lack of openness to introduce an integrated approach from the perspective of key competences and not from the perspective of specific competences development, all of the listed factors condition random changes on some curricular products (National Curriculum and textbooks) and not (Curriculum Framework Timetable) that would involve an integrated, simultaneous, holistic transformation of what, how, when and where the student learns.

The reform of the curriculum and the updating of the textbooks was done at an interval of 20 years without revising the number of hours and the compulsory subjects of study in the structure of the Curriculum Framework Timetable. The non-essential changes constituted the introduction/exclusion of an optional subject or the renaming of a compulsory subject (3%) without essentially changing and revising from the perspective of key competences the list of compulsory subjects, the number of hours allocated per subject and skills development, with their introduction in the European educational space and in the Education Code of the Republic of Moldova of 2014 [8].

How is the distribution of instruction time for the specific skills and sub-competences development in Moldova?

If we make an analysis of the number of specific competencies, sub-competences and curricular contents, they vary from one subject to another, without having any tangent with the number of hours allocated to instruction by subjects. Gremalschi [5] performs an analysis of the distribution of skills by subjects and finds the following: in the case of lower secondary education, 9th grade, the curriculum in the Romanian language and literature states 15 specific skills and 27 sub-competences; the curriculum in Mathematics – 9 specific competencies and 60 sub-competences; Foreign language curriculum – 8 specific competencies and 49 sub-competences; the curriculum in Computer Science – 10 specific competencies and 17 sub-competences. These figures indicate a random distribution of specific competences and sub-competences per subject of study as well as an unbalanced proportion of sub-competences/units of competence deriving from the specific competences of a subject (Mathematics – 9 competences/60 sub-competences derived from them, compared to Computer Science – 10 specific skills and 17 sub-skills; see Figure 1).

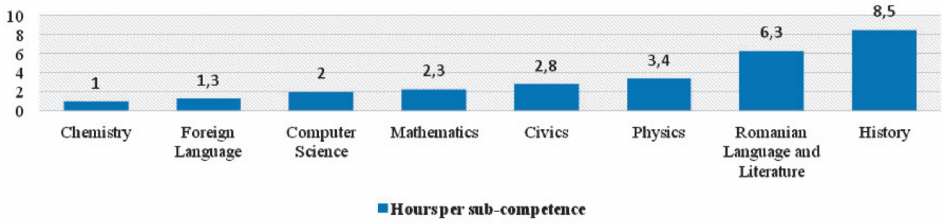
Figure 1. Number of sub-competences and hours allocated per school subject (National Curriculum for lower secondary education, 2010 edition)



Source: Gremalschi A. (2015) Formarea competenţelor-cheie în învăţământul general. Provocări şi constrângeri. Studiu de politici educaţionale, p. 31.

Respectively, if we report the proportion of time allocated to the development of a competence in Chemistry – for 70 sub-competences - 30 hours, compared to the Romanian language and literature – 27 sub-competences and more than 170 hours allocated in total for their study in high school. If we follow the distribution of time in hours allocated for the development of a sub-competence per subject, in the analysis made by the author [5] (See Figure 2), we notice a surprising disproportion from one subject to another (for Chemistry – 1 hour of study per development of a sub-competence, while for History – 8.5 hours allocated for the development of a sub-competence!).

Figure 2. Average number of hours allocated for developing a sub-competence per subject (National Curriculum for lower-secondary education, 2010 edition)



Source: Gremalschi A. (2015) Formarea competenţelor-cheie în învăţământul general: Provocări şi constrângeri: Studiu de politici educaţionale, p. 32.

Possible causes of these significant gaps could be:

- lack of a uniform approach in defining competencies and sub-competences, the degree of complexity and the degree of their detail varying from one school subject to another;
- the allocation of classes for each school subject based on other criteria than their complexity, for example, based on the public perception of the "importance" of a certain school subject [5].

We emphasize the fact that, in most cases, the subjects that are characterized by a lower average number of hours are from the curricular area Mathematics and Sciences: Chemistry – 1.0 hours, Computer Science – 2.0 hours, Mathematics – 2.3 hours and Physics – 3.4 hours. The subjects with a comparatively large number of hours per competence are attested in the case of the humanities: the Romanian language and literature – 6.3 hours; History – 8.5 hours. An exception to this trend is the Foreign Language – 1.3 hours and Civic Education – 2.8 hours.

From the analysis of the disciplinary curriculum according to the criterion "the average number of hours allocated in the framework plan for the formation and development of a sub-competence" derives the following recommendations:

1) in the process of curricular design, in the formulation of competencies an identical degree of complexity will be ensured;
2) the composition and the degree of complexity of the skills to be acquired must correspond to their relevance for the future educational path and the age peculiarities of the students;
3) the time allocated for the formation and development of each competence must be established according to its complexity, excluding the intervention of subjective factors [5].

Based on the analysis of the above factors and data, it would be necessary to rethink the Curriculum Framework Timetable from the perspective of key competencies development and redistributing the number of hours per subject of study, which is currently random and not directly proportional to the complexity of developing a specific competence from one school subject to another. Moreover, the structure of the Curriculum Framework Timetable components requires an in-depth analysis of the number of school subjects in the variable and invariable core from the perspective of key competences development.

The taxonomy of key competencies proposed in the Education Code of the Republic of Moldova (Education Code, art. 11, paragraph 2) is presented in Table 3.

Table 3. The taxonomy of key competencies proposed in the Education Code of the Republic of Moldova

Education Code	**European key competences** (Key competences for Lifelong Learning Brochure, 2019)
a) Communication in Romanian;	Literacy competence / Multilingual competence
b) Communication in mother tongue;	
c) Communication in foreign languages;	
d) Competence in Mathematics, Science and Technology;	Mathematical competence and competence in science, technology and engineering
e) Digital competence;	Digital competence

	European key competences
f) Learning to learn;	Personal, social and learning to learn competence
g) Social and civic competence;	Citizenship competence
h) Entrepreneurship and initiative;	Entrepreneurship competence
i) Cultural awareness and expression competence	Cultural awareness and expression competence

Source: Education Code, art. 11, paragraph 2.

There are few differences in the list of key competences compared to the European set of key competences, mostly they are related to the competence structure, but no new competences in Moldovan version, except for languages specified (communication in mother tongue, Romanian and foreign languages). In order to apply correctly and effectively this taxonomy, some conceptual and terminological as well as methodological clarifications are required regarding the formation of key competences, in particular the four competences that are not equivalent to a concrete school subject title.

These nine competencies can be represented in several hypostases: the field of competence, key skills and transversal skills.

1) Of these nine key competencies, five competencies (marked in green in the table above) are correlated with a dominant school subject in the formation of that competency. The other four competencies are not equivalent to any specific school subject. These competencies have a rather transversal status.
2) It is important to establish very clearly the dominant formative valences of the school subject for the formation of one or some competences. For example, the subject "Music Education" does not have the formative valences for the competence in "Mathematics", and "Romanian Language and Literature", on the contrary, formatively influences "Mathematics" through the communication competence [7].

At the moment, the Education Framework Plan of the Republic of Moldova does not reflect in any way the integration of the 4 key competences with transversal status established in the Education Code. It is built from the perspective of specific competencies development related to the existing compulsory subjects.

Conclusion

A curricular reform is always preceded by an update of the distribution of the number of hours for different school subjects, which establishes the minimum number of hours to be taught. This update for the Republic of Moldova has not been made in the last 10-15 years. At the moment, the Education Framework Plan of the Republic of Moldova is mono-disciplinary structured and does not reflect in any way the integration of the 4 key competences with transversal status established in the Education Code. It is built from the perspective of specific competencies development related to the compulsory subjects.

According to the researcher [3] the curriculum is a global curricular project that must be designed unitary (for grades I–XII), not parcel wise (on disparate levels and steps, artificially cut) as it is at the moment. Moreover, the structure of the curriculum components requires an in-depth analysis of the weight and curricular contents associated with the school subjects in the variable and invariable core from the perspective of key competencies with transversal status development.

Decentralization of curricula by integrating non-formal training in the structure of the curriculum, achievable in the perspective of lifelong learning and self-education would make teaching-learning-assessment more flexible, or the students of education systems in which schools have more autonomy over curricular content and assessment tend to make better progress in learning and assessment [10].

Abstract: The purpose of the article is to analyse from a diachronic perspective and reflect how time is allocated for the study of compulsory and optional subjects in OECD (the Organization for Economic Co-operation and Development) countries and Moldova, the share allocated to subjects in the compulsory curriculum in primary and lower secondary education/gymnasium in relation to PISA results in OECD countries and the Republic of Moldova.

In this article, the author identifies global and local trends in the distribution of hours per subject of study in time and demonstrates the rigidity and few transformations that Curriculum Framework Timetable went through/ weight allocated to the study of different compulsory subjects in the core curriculum for primary and lower general secondary education.

The article describes the principles and characteristics of the Curriculum Framework Timetable from the perspective of researchers and educational policy

documents as found in the context of the education system in the Republic of Moldova. Its Curriculum Framework Timetable has undergone the least transformations in relation to the curricular reform produced in general education in the Republic of Moldova and methodological documents (textbooks).

The author highlights local challenges in the actual structure and educational system context and makes recommendations for reviewing the current structure of the Educational Curriculum Framework Timetable from the perspective of key competences development stipulated in Education Code of Republic of Moldova [8].

Keywords: curriculum, competencies, sub-competencies, Curriculum Framework Timetable, PISA, OECD countries

References

1. D' Hainaut, L., *Programe de învățământ pentru educația permanentă*, Editura Didactică și Pedagogică, Bucharest 1981.
2. Cristea, S., *Dicționar de termeni pedagogici*, Editura Didactică şi Pedagogică R.-A., Bucharest 1998.
3. Cristea, S., *Dicționar enciclopedic de pedagogie*, Editura Didactica, Bucharest 2015.
4. Guţu, V., *Curriculum educațional. Cercetare. Dezvoltare. Optimizare*, Moldova State University, CEP of MSU, Chișinău 2014.
5. Gremalschi, A., *Formarea competențelor-cheie în învățământul general. Provocări și constrângeri. Studiu de politici educaționale,* Institute of Public Policies, Lexon-Prim, Chișinău 2014. http://ipp.md/old/public/files/Proiecte/Studiu_Formarea_Competentelor-Cheie.pdf [accessed: 02.07.2020]
6. Terzi-Barbăroșie D., Vivdici A., Bezede R., *Modernizarea învățământului general în Republica Moldova. Studii de politici educaționale elaborate în baza rezultatelor PISA 2015*, Lexon-Prim, Chișinău 2018 (http://educatia.md/doc_studii/StudiuPISA_20180504.pdf, [accessed: 05.06.2020].
7. Guţu, V., Bucun N., Ghicov A., Achiri I., Gremalschi A., Velișco N., Goraș M., Gaiciuc V., Ceapă V., Cotovițcaia D., Marț V., Ghenciu N., Gînu D., Eftodi A., *Cadrul de referință a Curriculumului Național, 2019* approved by Order No. 432 from 29.05. 2017 https://mecc.gov.md/sites/default/files/cadrul_de_referinta_final_rom_tipar.pdf, [accessed: 03.06.2020]
8. *Codul educației al Republicii Moldova,* no. 152 of 17.07.2014 https://mecc.gov.md/ro/content/codul-educatiei-0, [accessed: 08.07.2020].
9. Education at a Glance 2019. OECD Indicators, OECD Publishing, Paris 2019 https://doi.org/10.1787/f8d7880d-en, [accessed:13.07.2020]
10. *PISA 2009 Results. What Makes a School Successful? Resources, Policies and Practices (Volume IV),* OECD 2010 http://dx.doi.org/10.1787/9789264091559-en, [accessed: 13.07.2020]

11. *Education at a Glance 2009. OECD Indicators*,OECD Publishing,OECD, Paris 2009. https://doi.org/10.1787/eag-2009-en, [accessed:13.07.2020].
12. *Key competences for Lifelong Learning Brochure*, 2019 https://op.europa.eu/en/publication-detail/-/publication/297a33c8-a1f3-11e9-9d01-01aa75ed71a1/language-en, [accessed:30.07.2020].
13. Avvisati F., Echazarra A., Givord P. and Schwabe M. *"Moldova – Country Note – PISA 2018 Results"*, 2019 Directorate for Education and Skill https://www.oecd.org/pisa/publications/PISA2018_CN_MDA.pdf, [accessed: 04.08.2020].
14. Schleicher A. *PISA 2015 Results in Focus, OECD PISA 2015 Database* https://www.oecd.org/pisa/pisa-2015-results-in-focus.pdf, [accessed on 20.07.2020].
15. *PISA 2018 Results, PISA 2018 OECD Database* https://www.oecd.org/pisa/PISA-results_ENGLISH.png, [accessed on 25.07.2020].
16. *Planul-cadru de învățământ pentru învățământul primar, gimnazial și liceal, anul de studii 2018-2019, Ministerul Educației Culturii și Cercetării al Republicii Moldova*, order no. 397 of 29.03.2018 https://mecc.gov.md/sites/default/files/plan-cadru_2018--19_c_ plasat_pe_site-ul_mecc.pdf. [accessed on 10.07.2020].
17. *Planul-cadru de învățământ pentru învățământul primar, gimnazial și liceal, anul de studii 2019-2020, Ministerul Educației Culturii și Cercetării al Republicii Moldova*, order no. 321 of 29.03.2019, https://mecc.gov.md/sites/default/files/ ordin_nr._321_ din_29.03.19_si_plan_cadru_invatamint_general.pdf, [accessed on 20.07.2020].
18. *Planul-cadru de învățământ pentru învățământul primar, gimnazial și liceal, anul de studii 2014-2015, Ministerul Educației al Republicii Moldova,* order no. 370 of 06.05 2014 https://mecc.gov.md/sites/default/files/document/attachments/plan_cadru_2014-2015_.pdf, [accessed on 08.07.2020].
19. *Statistica: Tinerii în Republica Moldova în anul 2018,* https://statistica.gov.md/newsview.php?l=ro&idc=168&id=6431, [accessed on 01.08.2020] .