

NOVELTIES IN TEACHER EDUCATION IN LATVIA

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***Abstract:** The educational system in Latvia has been constantly changing in recent decades. In October 2016 started project "Skola 2030" ("School 2030"), supported by ESF. The aim of this project is to create a new competences based standards and curricula in all subjects started from preschool (kindergarten) up to high school (12th Grade including). A new curriculum also demands new approach in teachers' education. Therefore, the Ministry of Education and Science of Latvia in 2017 decided to develop a new teacher education system. In 2018/19 was realized a project for development of study programs in teachers' education of various subjects. The main novation is that starting from 2022 in Latvia teachers' education could be realized according the same study programs in every university where teacher education will be offered, all previous study programs for teacher education should be closed or reorganized.*

In the paper will be discussed the new school mathematics standard and curriculum and new study programs for teacher education in Latvia.

***Keywords:** Education of teachers, Teachers of mathematics, Mathematics school curricula*

INTRODUCTION

Education system in Latvia

In Figure 1 considered whole education system in Latvia.

Pre-school education is available from the age of 1.5 years, but it is mandatory to participate in pre-primary education programmes for five- and six-year-old children. Pre-school education is considered a comprehensive first stage of general education and all children must complete it by the time they are 7 years old.

9-year single structure **basic education** (*primary and lower secondary education according to the International Standard Classification of Education (ISCED)*) is compulsory for all children from the age of 7 and is generally completed till the age of 16.

There are two types of programmes at the **secondary education** level: *academic secondary education* programmes and *vocational secondary education and training* programmes. The main task of academic secondary education programmes is to prepare for further studies at university, while the vocational secondary programmes are more aimed at acquiring a vocational qualification, i.e. for entering the labour market and/or continuing education.

A Certificate of secondary general education (atestāts) or Diploma of vocational secondary education (diploms) is required to continue education at the level of **higher education**. The 3-4-year bachelor's degree programme is considered a complete academic qualification. A master's degree is awarded after the second stage of academic education and requires at least 5 years total of university studies.

A master's degree or the equivalent degree is required for admission to **doctoral studies** (Ph.D.). Doctoral studies last 3-4 years full-time. They include advanced studies of the subject in

a relevant study programme and scientific research towards doctoral thesis. (Ministry of Education and Science, 2019)

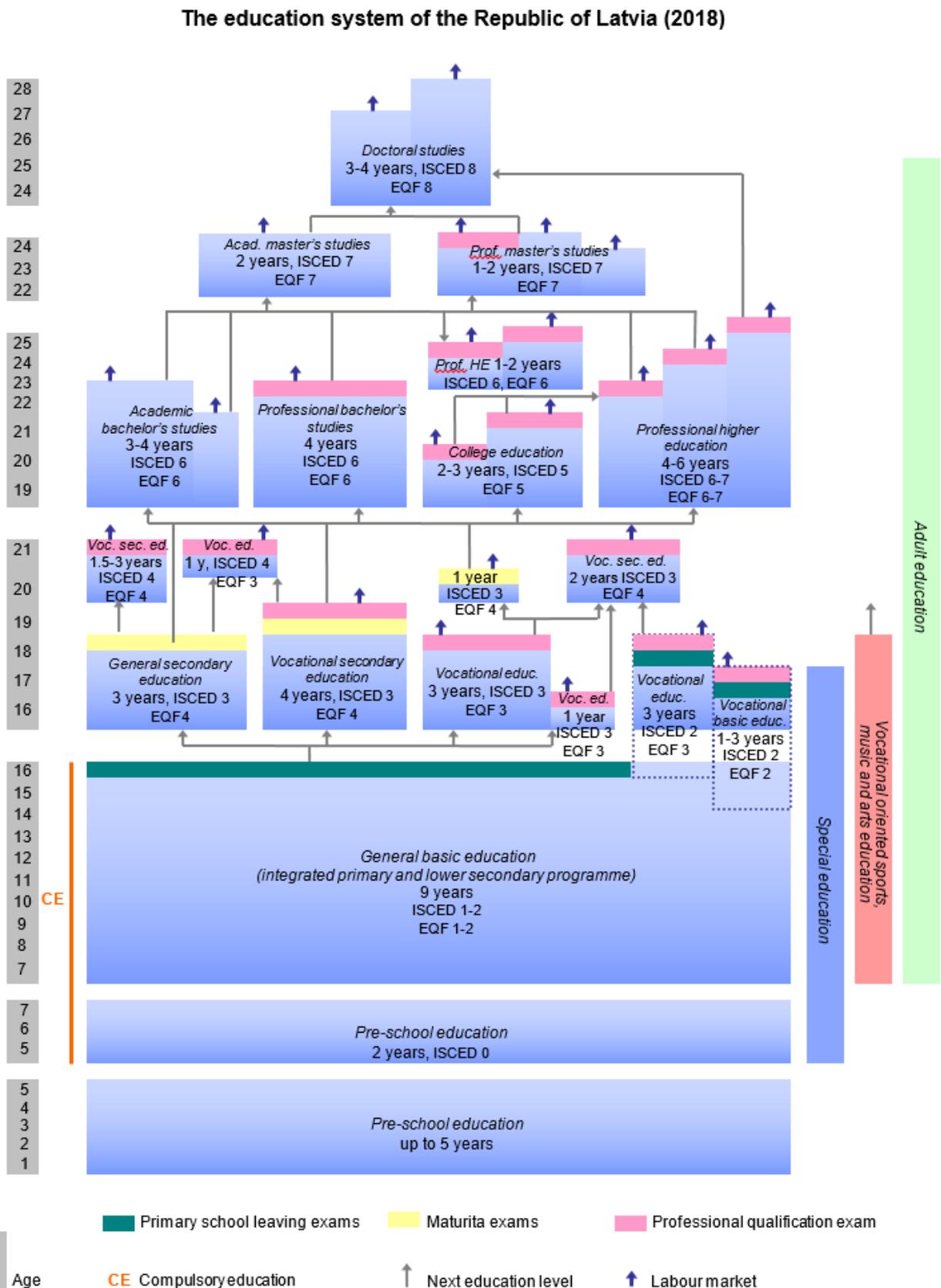


Fig. 6. Education system in Latvia

EXPOSITION

Mathematics Curriculum

The National Basic Education Standard determines the objectives and tasks, compulsory curriculum and the principles and procedures for assessment of basic education. The aim of basic education is to provide opportunities for acquiring the basic knowledge and skills required for community and personal life, to lay the foundation for continuing education, to promote the learner's harmonious development and to foster a responsible attitude toward one's self, family, society, the environment and the state.

The current school system, as evidenced by "crisis rhetoric", does not satisfy society. Therefore, action is needed. But there is a paradox – the public does not like school, but in fact do not want to change it (Kestere, 2019).

Action is needed also because our world is changing fast. As it is written in OECD Learning Framework 2030 Position paper (2018):

"We are facing unprecedented challenges – social, economic and environmental – driven by accelerating globalisation and a faster rate of technological developments. At the same time, those forces are providing us with myriad new opportunities for human advancement. The future is uncertain and we cannot predict it; but we need to be open and ready for it. The children entering education in 2018 will be young adults in 2030. Schools can prepare them for jobs that have not yet been created, for technologies that have not yet been invented, to solve problems that have not yet been anticipated. It will be a shared responsibility to seize opportunities and find solutions. To navigate through such uncertainty, students will need to develop curiosity, imagination, resilience and selfregulation; they will need to respect and appreciate the ideas, perspectives and values of others; and they will need to cope with failure and rejection, and to move forward in the face of adversity." (OECD, 2018)

Therefore the National Centre for Education of Republic of Latvia realizes the project "Competency Approach to Learning Content" (Skola 2030). Aims of the project are to develop, approbate, and successively introduce into general education from pre-school to secondary school education in Latvian schools the content and teaching approach, which will provide students with the knowledge, skills and attitudes they need today and in future. Project "Competency Approach to Learning Content" runs from 2016 – 2021.

Now are elaborated and approved by the Cabinet of Ministers new *National Basic Education Standard* (Cabinet of Ministers, 2018) and the *National Standard for General Secondary Education* (Cabinet of Ministers, 2019) and sample curricula in seven fields of study: Languages, Social and civic, Cultural awareness and self-expression in art, Science, Mathematics, Technologies, Health and sport. In Table 1. are considered subjects corresponding to each field (Skola 2030).

Table 1. Study fields and subjects in new Standards for Basic and Secondary Education

Field	Subjects and modules
Languages	Latvian Minority language Foreign language 1, 2
Social and civic	Social sciences History of Latvia and the World
Cultural awareness and self-expression in art	Visual art Music Literature Drama

Science	Physics Chemistry Biology Geography
Mathematics	Mathematics
Technologies	Technologies Engineering Design and technologies Computer science
Health and sport	Sport Interdisciplinary modules: Health, Security etc.

Considering Mathematics curriculum in Basic Education there are no significant changes in content of mathematical concepts to be acquired, but there is more emphasis on proof and justifying skills, self-directed learning, more considering interdisciplinary tasks and applications of knowledge to the real life.

Deeper changes are expected in secondary education. Mathematics curriculum for secondary education is developed in three levels: general level, optimal level and highest level.

Optimal level will be provided mainly for vocational education. For academic secondary education intended optimal and highest level, students will be able to choose on which level to study mathematics.

Curriculum of highest level contains also elements of higher mathematics and calculus:

- Complex numbers
- Limit of number sequence, including definition of number e as $e = \lim_{n \rightarrow \infty} \left(1 + \frac{1}{n}\right)^n$
- Derivative of the function, application of it to study properties of function
- Indefinite integral
- Definite integral, application of it in calculation area, volume of revolution, etc.
- Factorization of polynomials
- Fraction decomposition
- Vectors' scalar product
- Elements of analytic geometry
- etc

New standards will be implemented in schools starting from 1 September 2020 according to the following scheme:

Year 2020/21: Grade 1, 4, 7, 10

Year 2021/22: Grade 1, 2, 4, 5, 7, 8, 10, 11

Year 2022/23: Grade 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

It makes many teachers worried because these topics were excluded from the program more than 20 years ago and they are not sure about their knowledge in these topics.

Mathematics teacher's education in Latvia

As described before changes in the school curricula and approach in teaching and learning demands changes also in teacher's education. Therefore, in 2017 Ministry of Education and Science of Latvia decided to develop a new teachers' education system.

Before mathematics teachers were prepared in the University of Latvia, in Liepaja University and in Daugavpils University, each university realized its own program for teacher's education. But starting 2018 in Latvian universities is realized ESF financed project of Specific Support Objective "To reduce fragmentation of study programs and strengthen resource sharing". In field of education in the project are involved the University of Latvia, Liepaja University, Daugavpils University and Rezekne Academy of Technologies to develop new common study programs for teacher's education. Starting from 2022 in Latvia teachers' education should be realized according the new study programs, all previous study programs for teachers' education should be closed or reorganized.

In the framework of abovementioned project was developed professional bachelor study program "Teacher" with 7 subdirections, one of them also "Mathematics teacher". Length of this study program is 4 years, total 240 ECTS. The program will be organized so that 117 ECTS are common for students of all subdirections:

- General courses (30 ECTS):
 - Basics and regulations of teachers profession,
 - Psychology,
 - Methodology of research in education,
 - Civil protection etc.
 - Praxis at school (30 ECTS)
 - Final exams (18 ECTS)
 - Bachelor thesysis,
 - Qualification exam
 - Theoretical courses (30 ECTS)
 - Pedagogic,
 - Special education,
 - IT in educational process etc.
 - Free choice (9 ECTS)
- Speciality courses for math teachers totally are 123 ECTS:
- Didactics of mathematics (9 ECTS)
 - Practise in school mathematics exercise (15 ECTS)
 - Higher mathematics and its didactics (63 ECTS)
 - Mathematical analysis,
 - Linear algebra and analytical geometry,
 - Differential equations,
 - Theory of probability and Statistics etc.
 - Modern elementary mathematics and Combinatorics (18 ECTS)
 - IT (18 ECTS)
 - Programming,
 - IT,
 - Tools for creating interactive materials

Graduates of the study program acquire the right to teach mathematics in secondary school, and they will have enough knowledge and competences to teach mathematics also on the highest level.

There will be also possibility for students of the study program "Primary school teacher" to acquire 48 ECTS module of mathematics speciality courses to become basic school (up to Grade 9) math teacher.

CONCLUSIONS

- Rapidly changing world demands new skills and competencies, it leads to the necessity change school curricula, moving stress from acquaintance large amount of knowledge to the skills search and critically analyse information, proof and justify your own opinion. Therefore, new school curricula was developed in Latvia within project *School 2030* (Skola 2030).
- Together with new curricula also teaching/ learning methods should be changed. Teacher competence consists of knowledge, skills and beliefs that result in action. Teacher activity influences students' performance. In order for the pupils' learning to result in competence, the teacher should improve skills to conduct appropriate learning, to analyse, to reflect and to cooperate (Namsone etc, 2018). Therefore, new study programs and in-service courses for teachers should be offered to acquire new teaching methods, IT usage competences, cooperation models with pupils. A new professional bachelor study programs for teacher education are developed in Latvia and start run in study year 2020/21.
- New curriculum in mathematics for secondary school on highest level includes elements of calculus, therefore also deep knowledge in subject should be acquired within teacher's study program. However, there is also demand for in-service courses for acting teachers to improve their knowledge and skills in teaching elements of calculus etc. topics on highest level.
- I am satisfied with the ideas contained in the new mathematics school curriculum, but I am concerned that most of the teachers currently employed do not have sufficient knowledge and competences to implement it. I hope that there is a growing generation of young teachers, who can replace them.

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