

CITIZENSHIP EDUCATION IN THE MATHEMATICS CURRICULUM

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Abstract: An essential feature of the 21st century is the rapid globalization processes of the society. They exercise a vital impact on building education curriculum and their implementation. School leavers must perceive the world in unity and entirety, they must be able to analyse not only separate phenomena and processes, but also in their interrelation and entirety. The accumulation of information in the society causes also changes in the content and structure of school curriculum. Citizenship education is a significant constituent part of the curriculum of school subject. Citizenship education include the nature and practices of participation in democracy, the duties, responsibilities and right of individuals as citizens; and the value to individuals and society of community activity. Preparing students for citizenship involves developing relevant knowledge and understanding as well as encouraging the formation of positive attitudes toward being a citizen. Mathematics curriculum should provide pupils with the basic skills and knowledge that will help them to make a worthwhile contribution to society and its positive development. The article reflects the mathematics curriculum theoretical analysis carried out by using criteria: citizenship knowledge, citizenship skills, citizenship values and attitudes. Selected criteria are characterized by the citizenship education in mathematics curriculum.

Keywords: curriculum, mathematics, citizenship education.

Introduction

Rapid globalization processes are going on in our contemporary society, which essentially influence not only the volume of knowledge, ways of its acquisition, but also each person's feeling of belonging. It is important not to lose one's civic consciousness. That is the reason why citizenship education is becoming more and more important in our contemporary society. It occupies an essential place in one's lifelong education. The prominent Latvian pedagogue J.Greste (Greste, 1923) once said that life is a continuous movement. We develop in quite different conditions than our fathers and forefathers. The results are different, too. But the uniting tie is the consciousness of belonging to one's state, to a definite part of the society, one's relations to the state, the existing social norms, laws, etc. It can be promoted in different ways – by introducing new school subjects, by applying integrative approach to working out differing subject curriculum and by including thematic issues of citizenship education in them. As a result of targeted educational process, there develops an attitude of civic significance and finds its realization in life. It is an essentially significant attitude of a citizen of the state towards the duties and rights determined by the state. Many educational means serve this aim – the content of learning, the teaching /learning methods and education/self-education methods, educational materials, curriculum.

In Latvia the aim of education is defined in the education conception of Latvia (1995). It says that the aim of education in Latvia is to give each person an opportunity to develop into an intellectually and physically developed, free, responsible, creative personality of culture. In order to be really free and responsible, creative, one has to comprehend the mechanisms of the activities of the society and the regularities of the development of relations. In other words, each person needs citizenship education. Paragraph 2 of the Education Law determines that depending on the age and the needs of the learner each person is guaranteed: 1) to acquire knowledge and skills in the spheres of humanitarian, social, natural and technical sciences; 2) to acquire knowledge, skills and experience of attitudes, in order to participate in the life of the society and the state; 3) the moral, aesthetic, intellectual and physical development, thus favoring the development of erudite, skilful and well-bread personalities. (Izglītības likums, 1998)

J.Goodlad marks that schools are significant establishments of the state, the direct task of which is to inculcate the culture of democracy in the young people. (Goodlad, 1990). Citizenship education is

considered to be the basic task of education. However, the ways of including it in the curriculum differ from country to country and in the degrees of education, as it has been stated in the research of European Council of 2005 "Citizenship education in schools of Europe." (Eurydice, 2005)

The latest investigations in Europe, as K.L. Hahn acknowledges, show interest in the evaluation of the curriculum in the implementation of citizenship education, in the development of the learner's personality in a multicultural society. Many researchers centre their attention on the development of co-partnership relations, demonstration of one's position, the development of competence. (Hahn, 2010)

Methodology

Therefore there was carried out research, analyzing mathematics curriculum, stating whether at all or in what way there are included issues of citizenship education.

Notion of citizenship education

Citizenship education is closely connected with citizenship upbringing. Citizenship upbringing is a purposeful process, in which under the guidance of the teacher, develops and finds its realization a personally significant and for the citizen of the state essential attitude to the duties and rights determined by the laws of the corresponding state.

Citizenship education in its essence is comprehension of one's rights and duties, the relations between the individual and the collective, the interaction of the state power and the citizens. It is knowledge of how the state functions and how each of us can participate in the improvement of the life quality of one's own and one's peers. (Izglītības attīstības centrs, 2008). Citizenship education is also explained as education, the aim of which is to give knowledge, skills and habits, as well as experience, needed for man's integration in civil society and life, successful and of full value. (Pilsoniskās sabiedrības stiprināšanas programma 2008 – 2012, 2008).

Citizenship education is not only passing on the values and attitudes of the society but also their transformation, alteration corresponding to the political and ideological aims. (Sandström Kjellin & Stier, 2008). Whereas J. A. Students has said that school gives not only knowledge, but teaches one to get accustomed to the laws of society, discipline, which are very much needed in one's later life. (Students, 1998). Citizenship education helps each learner comprehend one's duties and rights in society, to evaluate critically the phenomena and the processes going on, to express and defend one's point of view. J. Delors admits that citizenship education is a complicated enough process, which refers to both the comprehension of the development of values and learning of how to participate in the social life of society. He also draws attention to making use of lifelong education in order to develop an active civil society, in which everyone does one's duties and treats the others with solidarity. (Delors, 2001).

Citizenship education can be viewed from three aspects,

Firstly, it is knowledge about society.

Secondly, it is skills to develop relations with other people, to develop a safe and supporting environment, to observe the existing regulations and norms.

Thirdly, one's attitude to one's duties and rights.

I.Irbite draws the conclusion on the basis of the investigation of the Commission of strategic analysis of the President of Latvia State that there are at least three different ways of realizing citizenship education of full value at school:

- direct teaching/learning process during lessons,
- out-of-class activities, among them the activities and processes within the frame of different projects,
- common civic culture of the school (Irbīte, 2008).

The borders among these possibilities are not strictly divided. In the direct teaching/learning process the component of citizenship education is present in almost all subjects, both as content dimension in such subjects as politics and rights, social sciences, history, literature, biology, geography, and also subjects for paving the way to communication and mutual attitude between teachers and learners. In the common culture of the school it is the practice of decision making and solution of conflicts, a reciprocal communication style and intensity of the administration, the learner, the teacher, the parents and wider society, the values and priorities of the school community.

Exists a challenge that could contribute to a more holistic understanding of how to achieve citizenship in modern-day Europe:

- diversity – of living in increasingly socially and culturally diverse communities and societies;
- location – of the nation state no longer being the “traditional location“ of citizenship and the possibility of other locations within and across countries, including notions of “European“, “international“, “transnational“ or “cosmopolitan“ citizenship;
- social rights – of changes in the social dimension of citizenship brought about by the impact of an increasingly global economy;
- participation – of engagement and participation in democratic society at local, national and international levels (Kerr, 2003; Jenson, Phillips, 1996).

Citizenship education in mathematics curriculum

Mathematics curriculum in its essence is planning of the teaching/learning process and the content of learning. That is why the aims of the curricula are closely connected with the values of the society. The aims of the curricula of today in Latvia envisage the development of the learners’ responsible attitude to the surrounding world, the development of a personality of culture, motivation to lifelong education, etc. (Andersone, 2007)

Mathematics is one of the subjects, which promotes the learners’ independent and critically analytical thinking, develops one’s skills of substantiating one’s standpoint. The aim of mathematics curriculum in the basic education is to develop the learners’ comprehension of mathematical methods and to develop their skills in order to apply them in the cognition of the world, in other school subjects and in their manifold activities. Whereas in general secondary education the aim of the mathematics curriculum is to improve the skills of applying mathematical methods in the cognition of the world and in their manifold activities when deepening their comprehension of the role of mathematical models in the description of the processes in nature and the society and when developing their mathematical reasoning skills. (VISC, 2011). The various activities mentioned before in both the aims contain also components of citizenship education. The schoolchildren learn to use their knowledge and mathematical models in their everyday activities, thus realizing their civic duties and rights.

Learning mathematics helps the learners comprehend and solve in their life activities issues of rather great significance in different contexts of national economy and social life: in building, economics, trade, transport, tourism, etc. In mathematics the learners investigate, ask questions, express presumptions, check them, clarify different questions, for example, the growth of the population, the distribution of limited resources, ecology, environment protection, health, risks and probabilities, etc. In this way the integration of mathematics and citizenship education expresses itself.

Results and discussion

The mathematics learning programs of forms 1 to 6 of basic education include three content blocks:

- composition of mathematical sets;
- application of mathematics in the analysis of the processes of nature and society;
- structuring mathematical models and investigation with the help of methods typical of mathematics.

Whereas the mathematics learning programs of forms 7 to 9 of basic education and in forms 10 to 12 of general secondary education include three content blocks:

- mathematical models;
- research activities;

- the aspects of mathematics of the interaction of man, the society and the environment.

The planned results of the last content blocks also include the development of skills referring to citizenship education.

There were chosen three components with corresponding indicators as criteria in the analysis of mathematics curriculum civic knowledge, skills, civic values and attitudes. (Table 1) (Andersone, Helmane, 2012)

Table 1

Citizenship education criteria and indicators for mathematics curriculum

Criteria	Indicator	Mathematics curriculum for each class												
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	
Citizenship knowledge	theory of human rights and democracy													
	political and social, civic institutions													
	cultural and historical diversity													
Citizenship skills	involved in the life of the school and local community													
	contribute to a safe environment	x	x	x	x	x	x	x	x	x	x	x	x	x
	opportunity to experiment practically with democratic principles	x	x	x	x	x	x	x	x	x	x	x	x	x
Citizenship values and attitudes	developing values consistent with a pluralist society													
	learning self-respect and respect for others	x	x	x	x	x	x	x	x	x	x	x	x	x
	developing capacity to engage with each other	x	x	x	x	x	x	x	x	x	x	x	x	x

x yes
 partly/sometimes
 no

In the development of the civic skills “contribute to a safe environment” and “opportunity to experiment practically with democratic principles” are included in all the curriculums of forms 2 to 12. They find their expression as the application of the knowledge of mathematics, application of models in the solution of practical tasks pertaining environment, economics, studies of practical solutions of the tasks in the form of group work and individual work.

The development of the civic attitude “learning self-respect and respect for others” and “developing capacity to engage with each other” are also included in the mathematics curriculum of all the forms

from 1 to 12. They find their expression in group work, in working out projects, presentation of the results, search of different solutions, etc.

Whereas the civic skill “involved in the life of the school and the local community” are included in the mathematics curriculum of forms 1 to 12, partly their acquisition is also envisaged in the mathematics curriculum of forms 2 to 8, but it cannot be identified in the mathematics curriculum of form 1. There is a logical explanation of it, because it is the period when more attention is paid to the acquisition of the initial mathematical skills and computing. However, taking into consideration that the child’s adaptation process in form 1 takes place, it is necessary to make use of all the possibilities to facilitate this process and make it more natural. The content for learning is flexible enough for the teachers to use it purposefully with the aim of active involvement of the learners in the school life. It is one of the possibilities of improving the curriculum of mathematics.

Mathematics curriculum do not contain wide civic knowledge. It is determined by the specificity of the subject. However, mathematics curriculum of forms 3 to 5 and the curriculum of form 12 contain partially civic knowledge of “the theory of human rights and democracy”. Whereas the curriculum of form 6 and the curriculum of forms 9 to 12 contain civic knowledge of “cultural and historical diversity”. Knowledge about human rights and democracy is included, for example, in the curriculum of form 4 – “comprehend the necessity of the evaluation of criticism concerning one’s own and other people’s conduct”, but in form 12 - “carry out full research work and evaluate one’s own skills”. Whereas knowledge about cultural and historical diversity is envisaged, for example, in form 9 - “evaluate the importance of geometry in the development of society and science”, but in form 6 – “comprehend the national composition of the population of Latvia”, in form 11 – “discern that combinatory methods are used in different branches and spheres (in games, coding, completing, geometry, biology, etc.). The acquisition of civic knowledge in mathematics curriculum should be envisaged on a wider scale and in greater number of forms. The content of learning mathematics is appropriate enough.

Conclusions

- Mathematics curriculum comprises the planning of the learning content of mathematics and the results to be achieved. They include not only knowledge and skills in mathematics, but also the knowledge and skills, which each member of the society needs when realizing his civil rights and duties, when demonstrating his civic stand.
- Taking into consideration the specific character of the subject, mathematics curriculum comprises on a wide scale the civic skills of taking care of a safe environment, observing practically the principles of democracy; not to such an extent but quite enough the curriculum envisages skills of participation in the development of the life of the school and the society. However, it is necessary to improve the mathematics curriculum in form 1, by including in it the development of the children’s participation in the life of the school, because the potential of the content of mathematics has not been fully made use of.
- In the mathematics curriculum great stress is put on the development of “the skills of cooperation” and the development of “respect for others”. It is an important contribution to citizenship education. Only by learning together, working together and respecting one another there can develop a really civic and multicultural society.
- Although the content of learning does not directly comprise civic knowledge, it is partially included there. For example, knowledge of civic rights and democracy in the curriculum of mathematics for forms 3, 4, 5, and 12.

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