

DEVELOPMENT OF TECHNOLOGICAL EDUCATION IN LITHUANIA

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The article deals with the changes in technological education in Lithuania i. e. a transition from the craft-based technological education to the project-based education of technologies when the students' skills related with projects, information search, collection and analysis, knowledge of materials, etc. are developed, and a concept of technologies is expanded. Applying a method of literature analysis, the features of technological education as well as expression of didactic components of technological education in the activities of the educational process participants at different historical time periods are analysed. As the political environment of education in Lithuania was changing, teaching of household works (technical works) was transforming into technological education. The goal was to develop a coherent conception of technological education, from domestic consumption to the knowledge of not complicated technologies. An opportunity to reveal and develop the multidimensionality of technologies as an educational subject occurred. The main components of technological education are technological changes, consumer education, quality of life, computer literacy, design, and vocational guidance. A close relationship among these components demonstrates multidisciplinary of technological education. Technological education, as a part of holistic education, is holistically qualitative as much as interrelations among technological education components are perceived. Technological education is integral, open for cooperation, individualization and differentiation of the curriculum by applying a project method of education. As the students select one of the six modules in the area of technologies in the secondary education school, a technological competence is developed i. e. moral values and technological skills are cherished. In order to verify and evaluate the student's achievements aimed at the competence in the area of technologies, in 2009 the examination of technologies was introduced in Lithuania. The examination is carried out by applying a project-based work method, and the process consists of three parts: preparation of description of the final examination work, creation of the product of the final examination work and presentation of the final examination work.

Keywords: technological education, a subject of technologies, an examination of technologies, a general education school.

Historically, the concept of technological education, its features, content and the use of the term has been changing due to different factors: technical progress, the changes in the curriculum of general education, educational reforms, approaches, political and economic situation of the country.

The concept of technological education involves a combination of two terms: “technologies” and “education”, which outlines a certain field of education. Currently, technological education is defined as a pedagogical system whose didactic components are the goals of technological education, the content of technological education, forms of technological education, methods and techniques as well as teaching and learning aids of technologies with which the teacher helps the learners to acquire technological and general competencies significant for the society and the individual. Thus, it is aimed at further development of technologies and better quality of human life.

The term “technology” is related to the Greek word “*technē*” which has a number of meanings: to weave, to connect, to bind or denotes all kinds of human activities and is usually translated as art, craft, skill, ability, trick. The term “*technē*” is referred to in connection with the concept “*epistēmē*”, which means science (knowledge), and the word “*poiēsis*”, which means creativity, writing poetry and excellence (Lietuviškoji tarybinė..., 1983).

A general concept of technologies is formed in the system “the man - creating environment -scientific cognition”.

Lithuanian scientists V. Ruzgas (1928), B. Cesnaite (1992), A. Grabauskiene (1988), A. Grabauskiene, J. Paulionyte J. and A. Sapranaviciene (1998), J. Galkauskas (2000, 2001, 2009), A. Ramanauskaite (2002), P. Urbietis (2000, 2005), Z. Zebrauskiene (1999), R. Daciulyte (2003), L. Statauskiene (2003, 2005), B. Zygaitiene (2001, 2005), B. Zygaitiene and V. R. Zuokiene (2010) researched work education, early stages of technological education, revealed the problems related with teaching through practical training at different historical stages. Z. Sedereviciute (2005) summarized foreign experience in teaching technologies.

A modern concept of technologies is multidimensional. It reveals the nature of technological development from classical to modern technologies, and it is outlined by specific components of human activities, such as mastery, success of technical fulfilment, cooperation and a human role in performing work procedures (Statauskiene, 2009). The status of technological education has particularly increased since the introduction of a maturity examination of technologies; therefore, currently it is very relevant to research the changes of technological education.

The Object of the Research - technological education. *The Goal of the Research* - to study the change of technological education in Lithuania. *Research Method* – the methods of scientific literature and educational documents analysis, systematization, synthesis, generalization, and comparison (Kardelis, 2007).

Changes of Technological Education in Lithuania over Different Periods

There is little knowledge on the ancient Lithuanian education. This knowledge is obtained from folk creation, rich archaeological material as well as the written sources of the early feudal period reflecting daily activities and customs of the ancient Lithuanians and their lifestyle (Zilionis, 2003).

Ancient Lithuanians were concerned about physical and mental, moral and work as well as aesthetic education of young people. Transmission of customs and following traditions strengthened the base of ethical traditions of the nation, developed human honour, duty, responsibility and humane interrelationships (Zilionis, 2003). In the XIII–XVth centuries representatives of the society emphasized the cognition of craft by relating it to art (Strazdiene, 2006; Zilionis, 2003).

In the early feudal period, work education was related with intellectual education: young people tried to get accustomed to taking part in the family, social, economic and cultural life. Economic and social differentiation of people enhanced the need for broader training and education of young people (Zilionis, 2003).

During a subsequent period, the problems of teaching works in general education schools of Lithuania were solved by taking into consideration the advanced ideas of foreign and local teachers and the school was following a general direction i. e. to provide students with the basic work knowledge, abilities and skills (Galkauskas, 2009).

In the XIXth century there were several types of primary schools, and in some of them teaching was based on practical activities. At the end of the XIXth century, agriculture, drawing and music, medicine and various crafts schools were founded (Augustinavicius, 2002). In the second half of the XIXth century and at the beginning of the XXth century, Lithuanian educators promoted education, learning different works and crafts. At the beginning of the XXth century, famous philosophers and teachers of that time associated personality development with creative work, and Vydunas, a well-known philosopher, proposed to prepare children for serious work at “homes of work”, which should be established in every village where a school is located (Strazdiene, 2006:5-12). In 1920 in high schools (colleges) handicrafts were introduced for girls only. From 1923 to 1935, girls studied this subject longer than boys (Strazdiene, 2006; Urbietis, 2005).

In later years (around 1950) all education in Lithuania was impacted by the instructions of the Soviet Union. This was conditionally called the first period. On that basis different theories of teaching works were developed and implemented. The period from 1950 to 1955 may be considered as the second period. During the unification of curricula, handworks as a subject in the primary school of Lithuania was refused. After 1955, when the school started polytechnic training, more attention was given to work. The content of the works and home economics subjects from that period until now is analyzed in separate sections of the textbook (Galkauskas, 2000).

In the middle of the XXth century teaching works was not included in the curriculum of the secondary school; however, organization of different extracurricular work education activities (circles) started. From the school year 1954/1955 teaching crafts for students in grades 1-4 was begun, from 1955/1956 practical work for the students in grades 5-6 was introduced and later for the students in grade 7 (1956/1957). Extracurricular work education expanded. In Lithuania there were 1930 technical circles attended by more than 38 000 young technicians. Nearly one-third of all technical circles were “Diligent Hands” circles (Siriakoviene, 2005). From 1952, consistent politechnization of the general education school was taking place. Special attention was paid to the studies of the technical basics, especially emphasizing the importance of the knowledge application in agriculture and industry (Urbietis, 2005).

From 1959 teaching works had to be the basis for the initial manufacturing-technological preparedness for learning manufacturing, whose final goal was granting qualification of a lower level worker during

the period of studies in the general education school. In 1977 general vocational training of students was introduced. Almost for thirty years (1959-1989) it was attempted to relate general education with teaching manufacturing and vocational training (Urbietis, 2005).

The period of restoration of independence (1990-2003) was distinguished for the start of the creation of own national culture, which reflected in the curricula as well (Urbietis, 2005).

After over twenty years from the start of the Lithuanian educational reform (in 1988) and also from the beginning of transformation of technological education, it was important to highlight the trends of changes in technological education. During that period the general education school in Lithuania experienced the periods of creation, growth, breaks and restoration. The school structure, curricula, and the process of teaching organization were changing. The subjects were updated, developed and assigned still another educational function. Technological education experienced such a change as well. This subject was changing not only its name (works/ teaching works/ home economics/ technologies), but also its goals and functions (Statauskiene, 2009).

In the general curriculum framework for primary and basic education, technological education is perceived as unity of creative and manufacturing process. The basic school aims at developing a technologically literate, curious, thinking, creative, proactive and responsible personality. Technological education is an integral part of holistic education which allows students to become technologically literate and to be able to constantly acquire new knowledge and develop technical skills, to understand, to use and to evaluate the ongoing developments of technologies in the creative (practical) process forming a positive attitude towards the transformation of technologies in the context of the past, present and future. Applying active teaching and learning methods, modern technologies of work, information submission, processing, materials cognition and taking into consideration the students' needs and abilities, conditions for all the students (not grouping them by gender) to study various technologies are created (Pradinio ir pagrindinio..., 2008).

Therefore, technological literacy as the ability to understand, to use, to evaluate and to manage technologies and a positive attitude towards the constant technological development are important for modern society.

A. Ramanauskaite (2002) indicates the changed long-term goals of technological education, moving from teaching technical works towards technological education. These long-term goals of technological education strictly focus on the improvement of quality of life under the conditions of developing technologies for the individual and the society as:

- a user of everyday technologies,
- a future employee using technologies at work depending on the functions performed,
- a human resource for future innovations and development of new technologies (Ramanauskaite, 2002).

Proponents of the holistic concept put particular emphasis on the dependence of a part of characteristics on the unity to which it belongs, and interrelationships between them help to understand these parts. Perception of the unity helps to understand holistic quality (Kiliuviene, 2006).

All these statements enable to decide that one of the objectives of technological education is to educate a conscious consumer. Consumer education is important for enhancing the ability of children and young people to act in the society under current conditions, it encourages a rational

choice and constructive use of their acquired knowledge and skills (Framework..., 1999).

The Didactic Components of Technological Education

The didactic components of technological education in the socio-cultural context of Lithuania at certain historical time periods were treated variously, and they were expressed differently in the activities of participants (Table 1).

Table 1. *The expression of didactic components of technological education in the activities of the educational process participants at different historical time periods in Lithuania (Statauskiene, 2009).*

F e a t u r e s o f t e c h n o l o g i c a l e d u c a t i o n	Activities of the educational process participants at different historical time periods		
	1918 - 1960	1961 - 1993	Since 1994
Goals	It is encouraged to develop physical and intellectual powers of the child through his need for self-expression, developing and preserving the national cultural heritage. A social significance is attached - the use of technological artefacts.	It is encouraged to develop working skills and the understanding of the work culture in order to form the basics for manufacturing activity. A social significance is attached - manufacturing activity skills required for further occupation, life and household.	The conditions for the acquisition of the basics of technological literacy are created. A social significance is attached - the ability of an individual to live and create in the modern society.
Content	Handworks: "works", paper and cardboard handicrafts, clay moulding, paper cutting crafts, wood carving - for junior students only; "handicrafts": knitting, weaving, embroidery, cooking, nutrition, domestic, household works - for girls only.	"Works": wood, metal and specialized works, and from 1987 - plastic works, cookery, nutrition - for boys. "Household works" (from 1961), "Domestic works" (from 1981): textile works (sewing, knitting, weaving, embroidery), cookery, nutrition - for girls only. Domestic works, household works, electronics, basics of engineering exploration, community beneficial work - for the students of both sexes, differentiated according to the stereotypical activities of "man" and "woman".	A single structure of the curriculum is adopted, and the learners are not divided into separate work groups, it is applied for girls and boys. "Works and Home Economics" (from 1994): household and economics, nutrition, textile and knitwear, technical works. "Technologies" (since 2001): construction materials, textiles, cookery, electronics, design.
Principles, methods,	A teaching process is organized following enculturation traditions, the learners are taught by a personal example and the existing examples of folk art are used. A teacher is a conveyor of experience.	Teaching is arranged following the principles of organization of manufacturing activity by conveying the experience of product manufacturing. A teacher - head, foreman.	Teaching is arranged according to the principles of project-based activities, the learners are taught to design, produce and evaluate. A teacher is a creator of conditions for self-education.

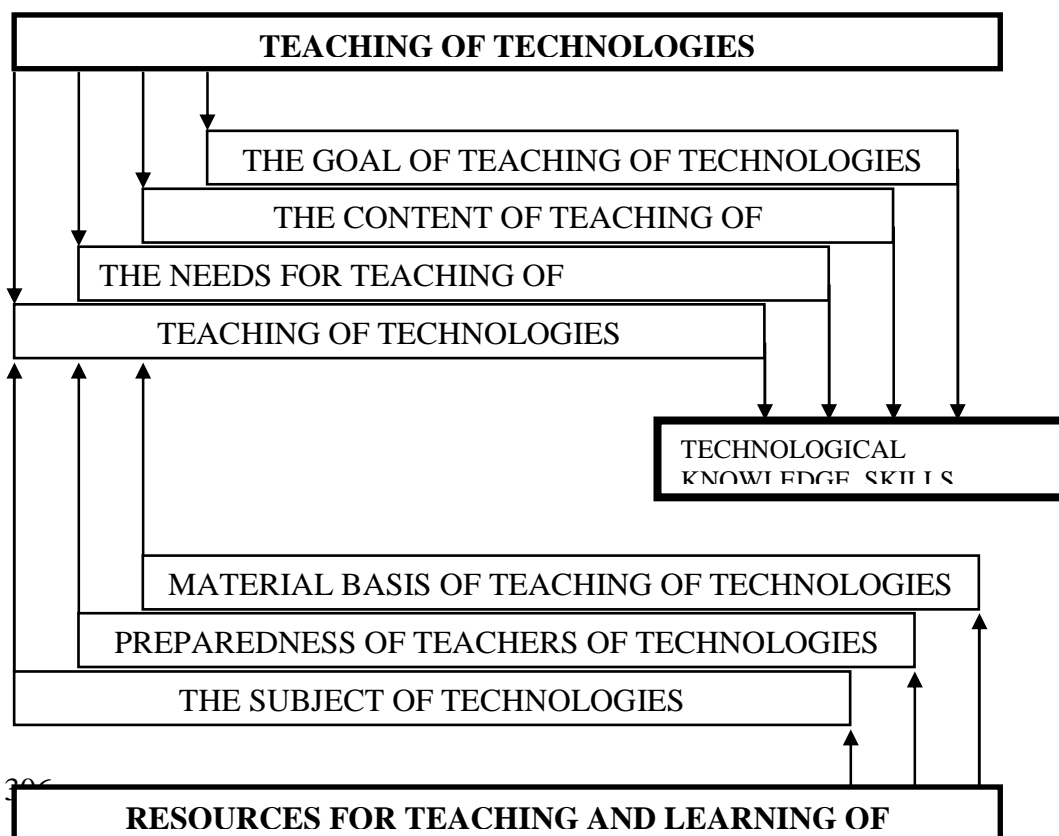
Currently Relevant Issues of Technological Education

At present, in Lithuania the curriculum is updated following these trends: to focus the curriculum on the development of general competences, especially creativity, and the key subject competences (Pradinio ir pagrindinio..., 2008). Currently, in the context of national and global educational values there is a need to change and develop the teaching process in order to make it more efficient, more interesting for the child, to model the teaching process in a new direction focusing on the creative activities of the child and the development of general skills for activities (Strazdiene, 2006:5-12). Such type of technological education enhances the students' independence, teaches them to solve the problems themselves, which is one of the key preconditions for development of creativity. General technological skills (no matter what the object of technological education is, e. g.: nutrition, textile, construction materials, electronics, etc.) are developed in four areas of activities: design; information collection and its use; cognition of materials; technological processes, presentation and evaluation of their results. The provision is followed that every student of the basic school, regardless of gender, shall have a possibility to get acquainted with different types of technologies (Bendrosios programos..., 2003).

However, supplementary education has not been forgotten, and it is understood as the development of aesthetic, moral, working, and cognitive capabilities. Extracurricular activities is an available way to educate a positive attitude of the growing generation to work, to expand their knowledge of different crafts (Siriaikoviene, 2005).

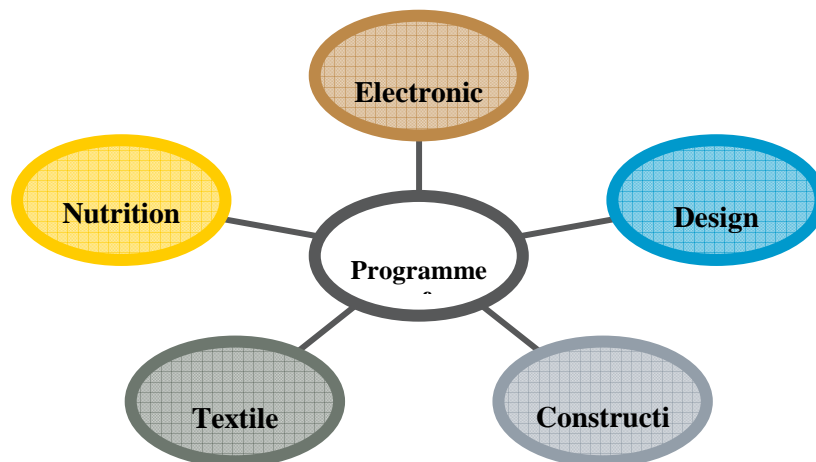
Basically new social, pedagogical and subject requirements for the teacher's profession are set forth in the State Education Strategy Guidelines for 2003 – 2012. Practical possibilities of technological education implementation and the impact of human and material resources of teaching of technologies on the teaching of technologies organization are presented in Figure 1.

Figure 1. *Practical possibilities of technological education implementation in the lesson of technologies* (Statauskiene, 2009)



Recently, in general education schools of Lithuania technological education involves the programmes of the following subjects: nutrition, textile, construction materials, electronics, product design and technologies (Fig. 2).

Figure 2. *Technological education programmes in a general education school*

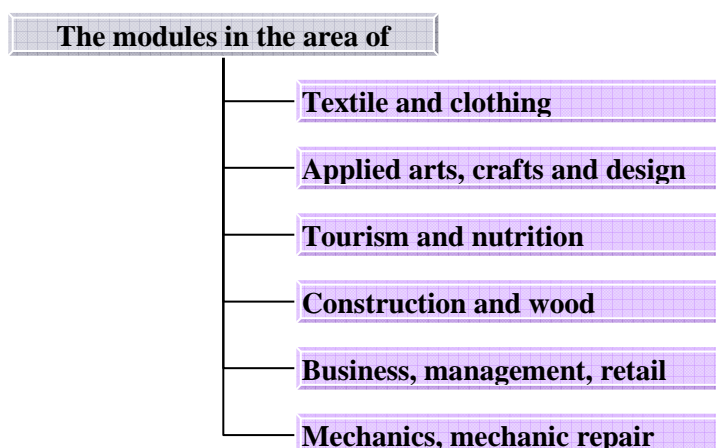


Project activities are particularly important in the process of technological education as they help to develop the areas of students' knowledge, understanding, skills, attitudes and values. They are perceived as a set of the search for ideas (research), designing, manufacturing and evaluation activities performed during the lesson of technologies. The work is organized so that the students themselves could make decisions and participate in all fields of technological activities.

The main components of technological education are technological changes, education of culture of consumption and eco-culture, quality of life, computer literacy, design, business technologies, vocational guidance.

In General Curriculum Framework for Secondary Education: Technology Education (Vidurinio..., 2011) the goal of technological education is defined as follows: "to create preconditions for the students to develop a technological competence i. e. to cherish moral values and technological skills necessary for each individual in the constantly changing socio-cultural environment, to develop positive approaches to the permanent change of advanced technologies". Implementation of this goal is achieved when the students choose one of the modules in the area of technologies (Fig. 3).

Figure 3. *The modules in the area of technologies in the programme of secondary education*



The status of technological education has particularly increased since 2009 after having introduced a maturity examination of technologies (Technologijų..., 2009). The goal of the examination is to verify and evaluate the student's achievement aimed at the competence in the area of technologies. Organization and evaluation of the examination of technologies is conceptually different from other maturity examinations. In the examination process, which lasts for more than two months, a project-based work method is applied, and the process itself consists of three parts: preparation of description of the final examination work (a planning part), creation of the product of the final examination work (a process part) and presentation of the final examination work.

In 2010, more than 4 000 school-leavers took the examination of technologies, and in 2011 already over 7 000 students decided to take this examination (although it is not compulsory), which demonstrates its popularity. The students learning under the chosen technologies programme of a general education school or a vocational training programme could take a maturity examination of technologies.

Conclusions

As the political environment of education in Lithuania was changing, teaching of household works (technical works) was transforming into technological education. The goal was to develop a coherent conception of technological education, from domestic consumption to the knowledge of not complicated technologies. An opportunity to reveal and develop the multidimensionality of technologies as an educational subject occurred.

The main components of technological education are technological changes, consumer education, quality of life, computer literacy, design, and vocational guidance. A close relationship among these components demonstrates multidisciplinary of technological education. Technological education, as a part of holistic education, is holistically qualitative as much as interrelations among technological education components are perceived.

Technological education is integral, open for cooperation, individualization and differentiation of the curriculum by applying a project method of education.

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