

Preparation of Technology Education Teacher in Lithuania, Finland and Great Britain

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Abstract: Under conditions of rapid technological, information, economic, cultural and social changes in the 21st century, there emerges a problem of identifying what kind of teachers should be trained for future generations, what curricular of the study subjects of Technology/Home Economics /Design and Technologies should be implemented in schools of general education to enhance school students' motivation to learn and to obtain generic and technological competences. In various countries different traditions of training teachers of Technologies/Home Economics/Design and Technologies have been established following the traditions and needs of every country. Employing the methods of analysis and meta-analysis of scientific resources and documents, the article focuses on pedagogical study programmes of Technologies/Home Economics /Design and Technologies as well as on similarities and differences in their curricular. Seeking to employ the good experience in teacher training accumulated in foreign countries, the aims and learning outcomes of the study programmes implemented in Lithuania, Finland and Great Britain are analysed, the volumes of the study subjects of Nutrition, Textile, Constructive Materials, Electronics, Design; the study subjects of Pedagogy and Psychology; Research Activities and Graduation Paper Preparation; Sustainable Development and Consumption Culture are compared.

Keywords: technologies, home economics, design and technologies, study programme, university education.

Introduction

Under conditions of rapid technological, information, economic, cultural and social changes in the 21st century, technological education that embraces preparation of an individual for life in a constantly changing environment has acquired an increasing significance. Possibilities of solving social, economic and ecological problems, perspectives of development of future technologies as well as successful adaptation opportunities in the labour market, skills to live in the family and society are developed through technological education of young people in the European countries. Technological competency is significant not only seeking a successful foothold in the labour market but also in other areas of human life, which embrace a wide range of activities from daily routine to making decisions important to the individual's personal life, the quality of environment and the society (Švietimo kokybė, 2013; Pendergast, McGregor, 2012).

Technological competency is developed following not only European strategical progress and educational documents but also those of Lithuania, Great Britain and Finland. The Europe 2020 Strategy (Europe 2020..., 2012) provides for a progressive, sustainable and integrated growth of European countries. The global development until 2020 should embrace ten main trends that initiate changes in the society and in education. According to D. Pendergast, S.L.T. McGregor, K. Turkki (2012), these trends include ageing, globalisation, technological development, welfare, individualisation, commerce, health and environment, haste, Internet system and urbanisation. Technological education, responding to the priorities of smart society enlisted in the Europe 2020 Strategy (Europe 2020..., 2012) and the Lithuanian Progress Strategy "Lithuania 2030" (Lietuvos pažangos..., 2012), should focus on the promotion of lifelong learning, enhancement of public spirit and collaboration, creation, dissemination and employment of creativity, entrepreneurship and leadership, knowledge, promotion of health and protection of natural environment. The Strategic Programme of the Finnish Government envisages that by 2025 the country will have become an inventive, responsible and safe country, where each resident will feel important, and confidence will serve as foundation of society (Finland, a land..., 2015).

Under conditions of continuous change, technological education may be determined as a combination of human development, social responsibility, healthy lifestyle, sustainable resource use and cultural variety, which intensively encourages achievements in various achievements. Technological education may be used as a means of training efficient technology specialists (Pendergast, McGregor, 2012). The future of technologies is closely related to the future of society and the world. To retain the importance of technologies in the future, it is suggested concentrating on attractiveness, creation of sustainable

society that grounds its activities on protecting the environment for future generations, ensuring economic safety, peace and justice (McGregor, 2015).

The aim of the article is to compare the teacher training study programmes of Technologies/Home Economics/Design and Technologies in Lithuania, Finland and Great Britain and to find out similarities and differences in their curriculars.

Methodology

Following the data obtained from the analysis of strategical documents, scientific sources, general curricular of general schools and study programmes, the article analysis the content of study programmes of Technologies, Home Economics, Design and Technologies. The study programme of Technology Teacher Education implemented in Lithuanian University of Educational Sciences, the study programme training teachers of Home Economics in the University of Helsinki in Finland and the study programme that trains teachers of Design and Technologies in the University of Brighton in the United Kingdom (UK) were selected for the analysis because the official websites of the aforementioned higher education institutions present the most comprehensive descriptions of the study programmes. Seeking to more comprehensively analyse the content of the teaching practice in the study programme of Home Economics, the study programme of Home Economics implemented in the University of Eastern Finland was additionally chosen, which is similar to the one realised in the University of Helsinki.

Results and discussion

The aims of the study programmes

The traditions of teacher education in Lithuania, Finland and Great Britain are different. The training of teachers of Technologies/Home Economics/Design and Technologies is organised according to the programmes where of content embraces teaching/learning of nutrition, textile, constructive materials, electronics and design. A teacher of Technologies/Home Economics, who is able to carry out high quality work in general education schools, is prepared during 4-year Bachelor study programmes in Lithuania and Finland. Individuals with higher educational background may obtain the qualification of design and technology teacher in Great Britain having completed a 2-year pedagogical study programme of Design and Technologies.

A competent teacher is an individual, who is able to comprehensively implement the goals set for education of a specific subject in his/her country, which meet the national conceptions of technologies, design and technologies or home economics. The Lithuanian Progress Strategy "Lithuania 2030" (Lietuvos pažangos..., 2012) which addresses the priorities outlined in the Europe 2020 Strategy (The Europe's Economic..., 2010) aims to encourage essential social changes, to establish conditions for building up of a responsible, creative and open personality. The Strategy prioritises the following goals: smart society, smart economy and smart management. One of the priorities of smart society is Lithuania, where everybody is able to learn, create and conduct research and to act in a targeted way. Currently, the most considerable attention in Lithuania is allocated to education of a competent technology teacher, who satisfies the needs of society (The Self-Assessment..., 2013).

In Finland a specialist in Home Economics is a leader, who follows the principles of sustainability, responsible consumption and transfer of constant social innovations (Turkki, 2008). S.L.T. McGregor (2015) presents a holistic attitude towards home economics in the process of education. The two areas, where home economics is able to initiate and implement certain changes, are health and sustainability. Various measures have to be applied seeking to improve the health of consumers, families and communities, to ensure social, economic and ecological sustainability. A similar conception and goals are highlighted in the National Curriculum of Home Economics in Basic Education (Health Education..., 2004). The National Curricular of Home Economics for 7th – 9th Forms comply with the goal of home economics to develop communication abilities, adoption of information and skills of practical work, which are necessary in everyday life, and to teach to apply them in daily situations. The task assigned to teachers of Home Economics is to supervise school learners assuming responsibility for own health, relations with other people, finances striving for convenience and safety in the approximate environment (Health Education..., 2004; Pendergast, McGregor, 2012; Autio, Soobik, 2015).

In Great Britain a teacher is characterised as honest and responsible, well-aware of the taught study subject and regularly updating own subject-related knowledge and skills, able to establish positive professional relations and in cooperation with parents to take care of school learners' interests and satisfaction of their needs (Teachers' Standards, 2011).

Enhancement of sustainable development and consumer culture skills is provided for in training of technology and home economics teachers and future design and technology teachers study the aforementioned aspects integrated into other study subjects. In the study process Technologies and Home Economics teachers address global problems, whereof understanding and evaluation skills contribute to solving such problems (Pendergast, McGregor, 2012).

The goals of the analysed study programmes are in line with the goals of general education curricular. The general education curricular of Technologies, Home Economics, Design and Technologies state that it is necessary to educate a learner, who perceives constant changes in technologies and is able to adapt under conditions of such changes, possesses an established system of values and acts in accordance with it ensuring welfare of an individual and society. The goals of the general curricular of the three countries have a common feature that preparation for family life, ability to take care of household environment and family well-being, development of responsible consumer skills are based on practical activities, collaboration and solving of daily life environment-related problems. The general curricular of Design and Technologies are similar in the following: analysis of information and analogues and their application conducting projecting and production activities, development of learners' critical thinking analysing and evaluating creative ideas and products. The general curricular of Home Economics have close links with general curricular of Technologies as both programmes aim to educate an individual, who is interested in ethnic culture, national crafts, spread of business and traditions in the multicultural environment.

The main modules of the study subject of the study programmes

The content of the study programmes of Technologies, Home Economics, Design and Technologies consist of 5 modules that embrace subject-related knowledge and skills: nutrition, textile, constructive materials, electronics and design. The structure of the study programmes is closely associated with the content of general curricular and not all the 5 modules are taught in all the analysed study programmes (Figure 1).

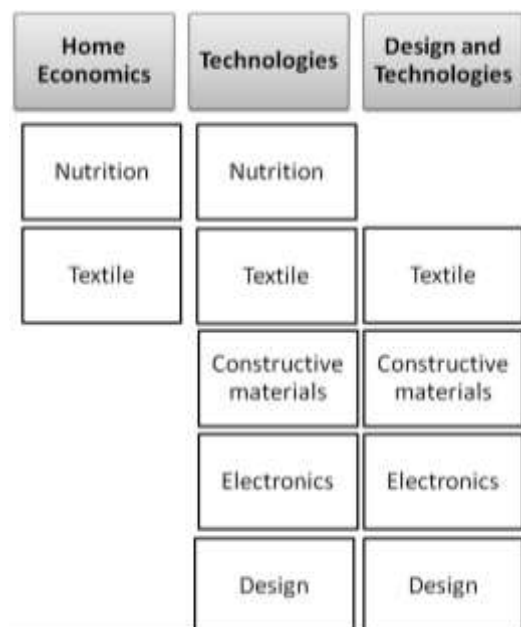


Figure1. The main modules of the study subject of the study programmes.

The study programme of Home Economics implemented in Finland allocates the most considerable attention to teaching/learning nutrition. The content of the study programme embraces teaching of nutrition and choice of food, local and international food cultures, consumer development and education, family and environmental protection education. Students learn the following subjects: The Main Skills of Food

Preparation, Food Quality and Safety, Phenomenon of Food Preparation and its Application, Finish Food Culture, Basics of Nutrition, Nutritional Science, Food Choice and Eating Habits, Nutrition at School, Teaching Nutrition and Food Culture for Advanced (Home economics..., 2016). Similar study subjects are learnt by prospective Technologies teachers in Lithuania. Students study Nutrition, Physiology and Hygiene, Food Technologies and their Didactics, National Food Cultures, Basics of World Food Cultures (The Self-Assessment..., 2013). The study programme of Design and Technologies does not include teaching/learning of nutrition because the study programme focuses on teaching/learning of design, electronics, constructive materials and textile (Design and Technology, 2016).

The comparison of the content of the three study programmes reveals that the most considerable volume of textile study subjects is observed in the study programme of Technology Education. Students learn the following study subjects: Ethnic Culture, Textile Technologies, Technologies of Interior Sewing Works, Technologies of Simple Construction Clothing, Technologies of Bottom and Top Clothing (The Self-Assessment..., 2013). The study programme of Design and Technologies does not highlight separate study subjects but it indicates that a student enrolled in the university has a choice of elective course of textile (Design and Technology, 2016). The study subjects are not separately assigned to textile learning and studies of traditional textile technologies in the study programme of Home Economics but students learn textile services (Home economics..., 2016).

The studies of constructive materials are foreseen in the study programmes of Design and Technologies as well as Technology Education, whereas home economics teachers do not study constructive materials at all. The students of Technology Education learn the study subject of Constructive Materials for three semesters and they are also provided with a choice of eco-creation and metal plastics (The Self-Assessment..., 2013). Prospective teachers, learning in the study programme of Design and Technologies, have the opportunity to choose a certain area of constructive materials but before making such a choice they have to gain experience in working with the main constructive materials (plastic and wood), to master technologies of hot and cold metalworking in furnace, soldering in fireplaces and enamelling in furnaces. Having acquired the basics of constructive materials, a student penetrates into one area and teaches one chosen aspect of constructive materials in the school (Design and Technology, 2016).

The study subjects of Electronics are most comprehensively penetrated into by future teachers of Design and Technologies. Electronics is taught/ learnt together with the study subjects of Communicative Technologies. Students of Design and Technologies are able to choose an area of electronic and communicative systems, which includes not only work with various computer-aided design programmes but also that with equipment for robot management. The study programme of Design and Technologies provides for the necessity of a student to learn to work with production software (Design and Technology, 2016). The students of the study programme of Technology Education learn the study subjects of Electronics (applied electronics and robotics) that are close to those of Design and Technologies (The Self-Assessment..., 2013). The studies in Home Economics do not include Electronics-related study subjects.

The study subjects of Design are most comprehensively studied by future teachers of Design and Technologies because the analysis of design topics and practical skill development are integrated into the majority of study subjects. The subject-related studies embrace the Design and Technology competences acquired by students earlier as well as design and technology skills, knowledge and understanding developed during their studies in the context of secondary education (Design and Technology, 2016). The fundamentals of design in the study programme of Technology Education are obtained in the study subjects of Design History, History of Applied Arts, Design and Arts Technologies, a number of design aspects are integrated into the study subjects of Textile, Nutrition, Electronics, Constructive Materials (The Self-Assessment..., 2013). The analysis of the study programme that trains teachers of Home Economics reveals that separate study subjects of basics of design are not taught and the possible integration of design into other study subjects is not observed.

Preparation for teaching work

Considerable attention is allocated to the study subjects of Pedagogy and Psychology. The studies consist of theoretical studies at University and the teaching practice at school. Students of Technology Education learn the following study subjects: General and Developmental Psychology, Pedagogy, Philosophy of Education, Educational and Special Psychology, Systems of Education and Special

Pedagogy and History of Lithuanian State and Culture (The Self-Assessment..., 2013). The themes of pedagogical and psychological that are close to teaching activity are distinguished in the study programme of Home Economics, which include the following study subjects: Development and Learning Psychology, Teaching Skills and Basics of Learning, Trends in Teaching and Learning, Community Interaction, Evaluation of Learning, Elective Study Subject on Education, Social Challenges in Teacher's Work, Skills of Teaching and Learning (Home economics..., 2016). The study subjects are not enlisted in the study programme of Design and Technologies but the topics of studies are determined: a number of study subjects assigned to a group of educational studies, which facilitate student's comprehensive understanding of the process of teaching/learning, to understand and critically evaluate individual differences of the participants in the process of education (Design and..., 2016). Training teachers of technologies in Lithuania "The Description of the Group of Study Fields of Education Studies" (Švietimo ir ugdymo..., 2015) prepared by the Minister of Education of Science is followed. It provides for the Final Work of Pedagogical Studies that integrates theory and practice and completes the pedagogical studies in the study programme. Consolidation of pedagogical knowledge and skills of students in design and technologies and home economics is not finalised with writing a graduation paper or with another form of assessment.

The training of future teachers of Technologies is based on students' practical teaching activity at school. The responsibly planned content of the teaching practice enables students to learn to combine theoretical and practical knowledge and to apply it in the process of teaching. During the teaching practice students get opportunities to identify own attitudes, beliefs and values. The students start developing skills that are significant working with learners of various learning needs. According to the recommendations of European Agency for Development in Special Needs Education (Mokytojų rengimas..., 2011), seeking quality preparation of students for work following the principles of inclusive education, it is necessary to create conditions for university teachers, school practice supervisors to professionally develop in the area.

A student studying in Finland should learn not only topics related to the study subject he or she majors in but also those of other study subjects of general education as well as interdisciplinary themes. More comprehensive studies allow developing professional competencies, which are necessary working in general education school and teaching any study subject, including Home Economics. Pedagogical studies focus on didactic studies of educational science, which embrace the teaching practice in general education institutions. According to P. Sahlberg (2012), approximately one third of the volume of studies is assigned to the teaching practice at school. Students are entitled to the basic, advanced and final practices in the analysed study programme. During their practice students observe the work of experienced teachers (the basic practice), conduct their practice under supervision of the mentor (the advanced practice) and independently deliver lessons to school students from different age groups (the final practice). The Finnish Ministry of Education and Culture (Government Decree..., 2004) emphasises that the teaching practice is conducted in general education school governed by the university or in any other educational institutions assigned by the university. The training of subject teacher embraces the studies of a specific study subject that are made up of the basic, interim and advanced studies.

During their studies future teachers of Design and Technologies complete their teaching practice to obtain experience in working with different children: learners from various environments or of different age and experience. The practice aims not only to enable students to obtain knowledge of training and upbringing but also to facilitate building up of an attitude towards teaching, school organisation and management (Initial Teacher..., 2012). The Bachelor full-time and part-time study programmes focus on pedagogical studies rather on the studies of separate study subjects. Bachelor programme students spend half of their study time in the institutions of teaching practice. The rest of the time is allotted to learning the specifics of the major subject and the study subjects of pedagogy, psychology and educational science. During their teaching practice students work under supervision of the mentor or independently complete assignments (deliver lessons, communicate with school learners and learn "to manage" the class). J. MacBeath (2012) states that the teaching practice should be evaluated in collaboration of a student, the mentor and a responsible higher education teacher. Such evaluation allows to envisage opportunities for improvement and to plan further teaching activities of a student.

All the study programmes state that they aim at education and development of a student, who answers the needs of general education schools, and the purpose of the teaching practice is to facilitate acquisition of professional competences and experience that are necessary for practical teaching. The analysis of

the study programmes revealed that different proportions of teaching practices prevail in them: the teaching practice is the longest in the study programme of Design and Technologies (approximately half of the duration of studies is allocated to the teaching practice), about 30 % of the volume is assigned to the teaching practice in the study programme of Home Economics and 13 % - in the study programme of Technology Education. The structures of teaching practice are analogous in all the three countries: the observational and assisting practice, the practice under supervision of mentor and the independent teaching practice. The observational practice is integrated into the practice of teacher assistant in the study programme of Technology Education. The teaching practice in the study programme of Home Economics consists of introduction to teaching practice and the main practice. In each country the structure of the practice and assignments are similar: during their teaching practice they fill in their achievement portfolio, reflect and analyse own activities and complete assignments appointed by their universities.

Development of research competency

A teacher, who possesses basics (knowledge, skills) of scientific research and is able to choose methods and apply them while teaching/learning, is trained in higher education institutions. The research-based teaching aims to develop students' research competency, which could be applied teaching or making decisions. According to the researchers (Evagorou, Dillon, 2015; Tryggvason, 2009), teachers have to be aware of the latest research and methods to conduct it, therefore it is important to train teachers, who are able to ground own pedagogical solutions on practical research-based arguments. Learning only to repeat teaching, evaluation and other methods learnt from colleagues not only prevents students from critical thinking about pedagogical processes but also does not develop professionals in them. According to the insights of G. Hilton (2012), a teacher has to constantly evaluate own activity and improve because school learners do not need a teacher, who is not able to learn lifelong. Pedagogy cannot be based solely on experience and routine.

Students acquire the theoretical fundamentals and practical skills of research activities studying in the study programmes of Technology Education and Home Economics. Future Technology teachers learn Methods of Research Paper Writing and Diagnostics, Statistical Analysis in Educational Science, Analysis of Educational Research Data (The Self-Assessment..., 2013). Students of Home Economics penetrate into the study subjects of Criteria of Educational Research, Methods of Education Research and Research Methods (Home economics..., 2016). On the basis of the study subject titles, it can be assumed that both study programmes focus on basics of educational research embracing research methods and criteria as well as data analysis. The research conducted by P. Sahlberg (2012) revealed that research-based teaching is broadly applied in Finland. It aims to form teachers' pedagogical thinking, ability to reason own choices and become an integral part of scientific educational community. The study programme of Design and Technologies does not provide for separate study subjects for development of student's research competency (Design and..., 2016). Following "Teachers' Standards" (Teachers' Standards, 2011), it can be presumed that it is not necessary to assign separate study subjects for development of research abilities as the Standards do not envisage the ability of a teacher to analyse scientific literature, to identify the research problem, to organise the research and to interpret results. In Lithuania a teacher of Technologies has to acquire research competency because Article 44.3 of "The Description of the Group of Study Fields of Education (V-1264)" (Švietimo ir ugdymo..., 2015) issued by the Ministry of Education and Science states that a teacher "... is able to find and analyse scientific and information sources on education and training, to envisage the research problem in sources and (or) educational practice, to make a targeted choice research strategies and research methods, to collect and process research data, to analyse research results and formulate conclusions...".

After completion of the study programme, students have to write and defend the Bachelor thesis. Teachers of Technologies and Home Economics finalise their studies with the graduation paper (The Self-Assessment..., 2013; Home economics..., 2016), the study programme of Design and Technologies does not provide for a separate graduation work, the studies focus on quality implementation of pedagogical study subjects, including the teaching practice (Design and..., 2016).

Conclusions

Teachers, who meet the needs of general education schools, are trained in the study programmes of different duration in the countries with different experience accumulated in training of technology teachers: teachers of Technologies and Home Economics are trained in four years in Lithuania and Finland, while teachers of Design and Technologies study for two years in Great Britain.

The general education curricular of Technologies, Home Economics, Design and Technologies emphasise the necessity to develop school students' social skills, which facilitate successful organisation of their personal life and adaptation in the society developing in the state of constant change. The general curricular of Technologies and Design and Technologies are oriented to implementation of designing and production activities and development of critical thinking of school students, whereas general curricular of Home Economics are closely linked to general curricular of Technologies since both curricular target at development of an individual, who is interested in ethnic cultural traditions and their spread in the multicultural environment.

All the study programmes require a future teacher of Technologies/Home Economics/Design and Technologies to study textile-related study subjects, teachers of technologies and home economics penetrate into nutrition aspects, teachers of technologies and design and technologies analyse constructive materials, electronics and design. The study areas defined in the study programmes comply with school students' learning areas provided for in general curricular.

The research abilities of future teachers and their importance in practical teaching activity are particularly emphasised in Lithuania and Finland, while the teacher's ability to conduct research is not foreseen in Great Britain.

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