

Teacher's ICT Competence in Home Economics and Technologies Lessons

Lasma Dauvarte Mg.paed.

Faculty of Information Technology, Latvia University of Agriculture, Latvia

lasma.dauvarte@llu.lv

Abstract: The article summarizes the research data on the elementary school Home Economics and Technologies teachers' necessary ICT competences. Development of the educators' ICT skills and competences contributes to the free use of technology in different educational situations, stimulates the emergence of new teaching methods and the use of e-learning environment. **The aim** of the study is to investigate and determine what ICT competences are required for comprehensive school subject Home Economics and Technologies teachers. The study was conducted at Latvia University of Agriculture (LLU) in the Institute of Education and Home Economics (IMI) and in 9 urban and rural schools of Latvia, interviewing the subject Home Economics and Technologies teachers in schools and lecturers at LLU. The teachers' ICT competences expert assessment was made. This work theoretically describes the teachers' ICT competence in Home Economics and Technologies lessons. The teachers' ICT competence in Home Economics and Technologies lessons is described with the following skills: the ability to use IT facilities, to integrate knowledge, using IT to enrich the knowledge for new learning situation modeling; the ability to use test developing programs in e-environment. As the teacher at the same time has to know the use of computer and to be able to optimize the learning process in his/her subject, he/she needs both computer literacy and pedagogical proficiency, being competent in all Home Economics and Technologies topics. The teachers should be internally motivated and capable of acquiring knowledge continuously, which ensures systematic improvement of the necessary competences, therefore, guaranteeing the improvement of the teaching quality at school.

Keywords: teacher ICT competence, Home Economics and Technologies, school education.

Introduction

Information and communication technology (ICT) is rapidly developing nowadays, as many people are interested in everything modern and new. The importance of new knowledge and skills for our everyday life is continuously growing, so new information technologies have to be learned not only by students, but also by teachers. At present, information technology learning environment is used by all subject teachers, thus, a modern learning process is realized. In this context, the teacher should be able to keep up with the times; it is desirable to be an initiator.

Information and communication technologies is a dynamic field, in which the existing knowledge has to be regularly improved in accordance with the latest tendencies, and the tutors who are able to use it will feel support in their teaching process.

Simultaneously with the specific competences' and qualifications' accumulation, which determines a person's ability to enter the labor market and to build a successful professional career, education is also the developmental process of human talent, emotional and social intelligence, and personality. Therefore, the quality of education, its availability and content at all levels and for all age groups – from pre-school to adult education – is the opportunity for development and the precondition of human capital value rising in Latvia (Latvijas ilgtspējīgas attīstības ..., 2010).

Information technologies are rapidly developing and changing; therefore, it is important to improve one's knowledge and to develop one's own working style. In order to shape an educated and skilled society, in education it is necessary to promote innovation and the development of new qualifications, which focus on specific learning outcomes, as well as to facilitate the development of skills, suitable for the labor market needs. The possibilities of combining the acquisition of interdisciplinary content and specific skills are sought (New Skills for New Jobs: Action Now ..., 2010).

The author connects the topicality of the study with the idea that in order to work in the contemporary educational environment, the modern teacher has to be not only a professional in his/her subject, but also should be competent in information and communication technology field.

The author believes that the development of modern society largely depends on the competence of teachers. The largest educational target group consists of children and young people, and the teacher is the one who forms a new generation. Moving towards an information society, the educator himself/herself should be capable of using the latest information technology to be able to pass these skills to the learners.

The aim of the study is to investigate and determine what ICT competences are necessary for the teachers of the subject Home Economics and Technologies in comprehensive schools.

Teacher's competence

The requirements for education, schools and teachers are becoming more diverse and more complex – it is necessary to follow the rapid development and teaching approaches of different fields of knowledge, to create the conditions and environment for the students to acquire skills, to make students to be ready for a change, for lifelong learning. The competence of the teachers today is considered as a single whole with continuous competences' development and lifelong learning.

In the context of lifelong learning and education sustainable development, for a teacher, further education is the development of his/her professional qualification, necessary in order to maintain the existing and acquire new knowledge, skills and competencies that are currently being emphasized as professional experience and general education components. Lifelong learning is based on the internal need for spiritual development, as well as on the need to get and improve their knowledge and skills, generated by external factors. In modern age of rapid scientific and technological achievements and high technologies, the knowledge and skills acquired in terms of formal education are aging faster.

Lifelong learning with particularly organized formal and informal further education system contributes to full personal development, enabling people to adapt better to the social changes of the new century and, constantly raising their qualifications or even retraining, to maintain a high level of competitiveness in the labor market; promotes responsibility and participation of municipalities and employers in ensuring the access to education; provides the offer of professional primary and further education programs, considering the territorial structure of employed and socially not adapted population target groups, and, as a result, leads to reduced territorial socio-economic differences between the regions, as well as decreased migration of economically active population and rural youth; the population will have the access to vocational education based on the requirements of the labor market, as close as possible to their living (working) place (Izglītības attīstības pamatnostādnes 2007.-2013.gadam, 2006). The scientist J. Habermas formulated a new approach for understanding competence (Tiļļa, 2005): competence as the human ability to use the acquired in the activities, and to enhance it; as the unification of person's skills and attitudes, associated with the individual's abilities learn, communicate and collaborate; competence as the individual's quality level that conveys proficiency and operational responsibility.

The scientist A.Rauhvargers (2004) recommends the use of the following definition – competence is the combination of knowledge, skills and attitudes that makes one qualified for completing the tasks of a certain type or level.

The European Council has identified five groups of competences, which were included in the competences that should be developed by schools:

- political and social competences, such as taking responsibility, participation in group discussions, non-violent conflict resolving;
- competences that are related to living in a multicultural society, such as the acceptance of differences, respect for other people, readiness to live together with other cultures, languages and religions;
- spoken and written communication competences;
- information society competences – IT competence, evaluation of information disseminated in mass media;
- lifelong learning competence (Hutmacher, 1996.; 11–12).

Since information technology has entered the schools, Home Economics and Technologies teaching is changing; the lessons are becoming interactive, but not remote. The author believes that contact hours in the learning process are necessary and important, because if the students cannot hear the teacher or cannot see what is demonstrated, communication breaks down. Teaching is an art, and nothing can replace being in close relation to the teacher while learning.

In the European Qualifications Framework (EQF) concept of competence, learning outcomes for each of the EQF levels are presented as the statements of what learner knows, understands and is able to do on completion of acquiring the subject, and are defined as knowledge, skills and competence (Skaidrojums par Eiropas..., 2008):

- knowledge is the result of the assimilation of information, obtained during the learning process. Knowledge is the combination of work or study-related facts, principles, theories and practices. EQF describes knowledge as theoretical and/or factual;
- skills are the ability to apply knowledge and use skills to perform practical and theoretical tasks. EQF describes skills as cognitive (logical, applying intuitive and creative thinking) or practical (involving manual dexterity and using methods, materials, tools and instruments);
- competence is the proven ability to apply knowledge, skills and personal, social, and/or methodological abilities in work or study situations, and in professional and personal development. EQF describes competence in terms of responsibility and autonomy.

Teacher I. Nikišina (Никишина, 2007) believes that the methodological training of teachers should facilitate independent personal and professional development, and be scientifically organized, systematic and purposeful.

The educator's competence consists of professional competence (subject, psychological, pedagogical competence) and socio-cultural competence (social, cultural, self-competence). The teacher should consider the mentioned competences as a means of self-realization, not as an end in itself. For the teacher, professional competence is associated not only with the ability to orientate oneself in the principles, forms and methods of the learning process, but also with the ability to manage the whole educational process and separate subject content. Socio-cultural expertise includes mutual cooperation of students, teachers and other people (Maslo, Tilla, 2002).

Each competence group covers a large variety of individual skills and abilities described in the table (Table 1).

Table 1

Structure of competence (Erpenbeck, Scharnhorst, 2005)

N	Competences	Competence description
1.	Personality competencies	Loyalty, tolerance, ability to take responsibility, ability to take responsibility for surrounding people and their actions, ability to trust and be trustable, self-presentation skills, ability to make decisions, ability to delegate responsibility for finances, etc.
2.	Activity competencies, management competencies	Energy, readiness for challenge, readiness to take risk, mobility, flexibility, ability to manage resources (external, internal), initiative, etc.
3.	Professional competencies	Professional knowledge, professional knowledge in certain areas, comprehensive knowledge on global market trends, ability to plan in team and on your own, professional skill on work in team and on your own, etc.
4.	Social, communication competencies	Communication skills, ability to argue, reasoning skills, presentation skills, skill to cooperate, ability to get to know people (empathy), ability to speak in front of audience, skill to motivate, skill to adjust, diplomacy, etc.

As mentioned by teacher A. Gulbe (2010), a professional educator is the country's stability, economic development and public welfare cornerstone. The teachers and the education system of Latvia are competitive in Europe and worldwide. The profession of a teacher has a high prestige. It provides satisfaction and allows achieving personal and professional goals.

The growth of the teachers' professional competence, emphasizing the idea that competence is analyzed as a socio-pedagogical problem, is essential for educational process improvement. The concept of competence, its nature, content and formation conditions depend on a number of aspects, including the discussions about the awareness of human life value, about one's professional activity development, about understanding that a person himself/herself should be actively involved in the academic and practical process of professional educating.

The development of the teacher's competence is mainly manifested through his/her growth, choosing the strategy and analyzing one's practice. The educator's competence is divided as follows: personal competence or self-competence (loyalty, responsibility in certain the working situation, the ability to trust and be trusted, the ability to make independent decisions, etc.), the competence of process activities, management (readiness to take risks, mobility, flexibility, ability to manage resources, initiative, etc.), professional competence (professional knowledge of the occupation field, professional abilities, ability to plan work, professional skills for team work, professional ethics, etc.), social, interpersonal competence (communication skills, ability to argue, presentation skills, ability to establish cooperative relationships, ability to motivate, adaptability, etc.). The educator's professional competence problem becomes particularly important because of education humanization. The topicality of researching this problem is also determined by a number of contradictions in the learning process:

- contradiction between the teacher's developmental function and real capabilities, determined by his/her professional skills;
- contradiction between the teacher's tendency to develop professionally and insufficient knowledge of the types of development;
- adult education humanistic approach encourages personal development and aims at developing an individual with the ability of self-realization.

In recent years, the number of computer users has been rapidly growing. Computers are used not only at work, but also during free time. Development of new technologies and services facilitates a wider computerization. As the teacher at the same time has to know the use of computer and to be able to optimize the learning process in his/her subject, he/she needs both computer literacy and pedagogical proficiency (Kļaviņa, 2009). Thus, the teachers should be internally motivated and capable of acquiring knowledge continuously, which ensures systematic improvement of the necessary competences.

Competence should be independently developed; the author agrees with the idea of Maslo (2006) that the ability to develop one's competence depends only on a person – whether he/she wants to learn and develop his/her skills, whether it is interesting, whether he/she feels the necessity and attraction to learning. Thus, the ability to learn can be considered as the main structural component of competence, because competence is obtained through learning.

Materials and methods

In terms of the current study, the teacher's competence and the Home Economics and Technologies teachers' ICT competence is theoretically described. The research is done. The obtained data on Home Economics teachers' ICT competence, their ability to integrate the opportunities provided by ICT in teaching Home Economics and Technologies, which is necessary for ensuring a modern learning process, is summarized and analyzed. It is clarified, which ICT competences are needed for the teachers of the subject Home Economics and Technologies in comprehensive schools.

The study was carried out in Latvia University of Agriculture (LLU) in the Institute of Education and Home Economics (IMI) and ten different regional schools of Latvia were involved: Brocēni Secondary School, Cēsis State Primary School, Jelgava Gymnasium Nr.1, Līvu Primary school, Mārsnēni Primary School, Menģele Primary School, Olaine Secondary School Nr.1, Rāmuļi Primary

School, Strīķi Primary School, Vecsaule Primary School. In expert assessment participated 12 Home Economics and Technologies teachers, aged 29–55, professionals in their field. The survey method used in the research is questionnaire; the essence of it is that the respondent should independently fill in a questionnaire that he has understood (Kristapsone, 2008).

Results and discussion

The teachers' ICT competence in Home Economics and Technologies classes.

Information age is associated with large changes in the teacher's work. The educator cannot avoid thinking about his/her work improvement, about the possibilities provided by the use of ICT in the learning process. His/her approach to this process is evaluated from two aspects (Birziņa, 2007):

- first, the teacher has to understand the sense of using ICT;
- the teacher has to be aware of his/her knowledge and skills required for the job.

Therefore, when using ICT, the teacher should not only to be aware of why and how to use the opportunities offered by the computer, but he/she has to be able to:

- apply technology for more efficient learning process, so that teaching and learning would be better;
- plan the work of individual students, groups and whole class;
- prepare and print the teaching materials, created by himself/herself;
- facilitate the use of ICT opportunities;
- organize the work in his/her subjects and increase his/her specialization, using ICT;
- engage in team learning on-site or distance learning.

Professional competence is one of the types of competences and it is specified according to a particular profession. A number of approaches are used for clarifying competence; T. Hoffman (Briede, Bīmane, 2010; Bīmane, Briede, Pēks, 2012) mentions four of them.

1. The first approach explains competence as "observable achievement or learning process outcomes". Achievements and results have to be measurable. This approach can be called behavioral.
2. The second approach concentrates on the quality and level of competence. T. Hoffman notes that this approach is very suitable for company's work. This approach focuses on determining work efficiency using the competence levels. Company's needs, plans, objectives and tasks determine the required competence levels. The second approach emphasizes the importance of adjusting company's development and the competence level requirements.
3. The main idea of the third approach is the development of personal qualities. Knowledge, skills and attitudes are evaluated. Each individual's contribution to a competent performance is important. The first two approaches mostly focus on the results of measurements. In the third approach, the process, individual's attitude and personality development are also important.
4. The fourth or mixed approach combines three above-mentioned approaches, however, it is the most complex one, and it requires, on the one hand, continuous effective activity, but on the other hand – providing opportunities for personal development.

In recent years, one of the most important issues for contemporary people sounds as follows: whether a school offers to their children the knowledge and skills, necessary for achieving success in the information age? The scientist S.C.Erhman (Erhman, 1996) has formulated three main points of ICT in education:

- improving the efficiency of the learning process;
- raising the quality of education;
- diversification and increase of the access to learning opportunities.

For the educator's ICT skills and competence development, it is needed to promote free use of technologies in different educational situations (Figure 1). ICT opportunities have stimulated the emergence of some new methods, new teaching materials and even new ways of learning, such as learning CDs and DVDs, electronic books, test developing programmes, e-learning and integrated collaboration environment.

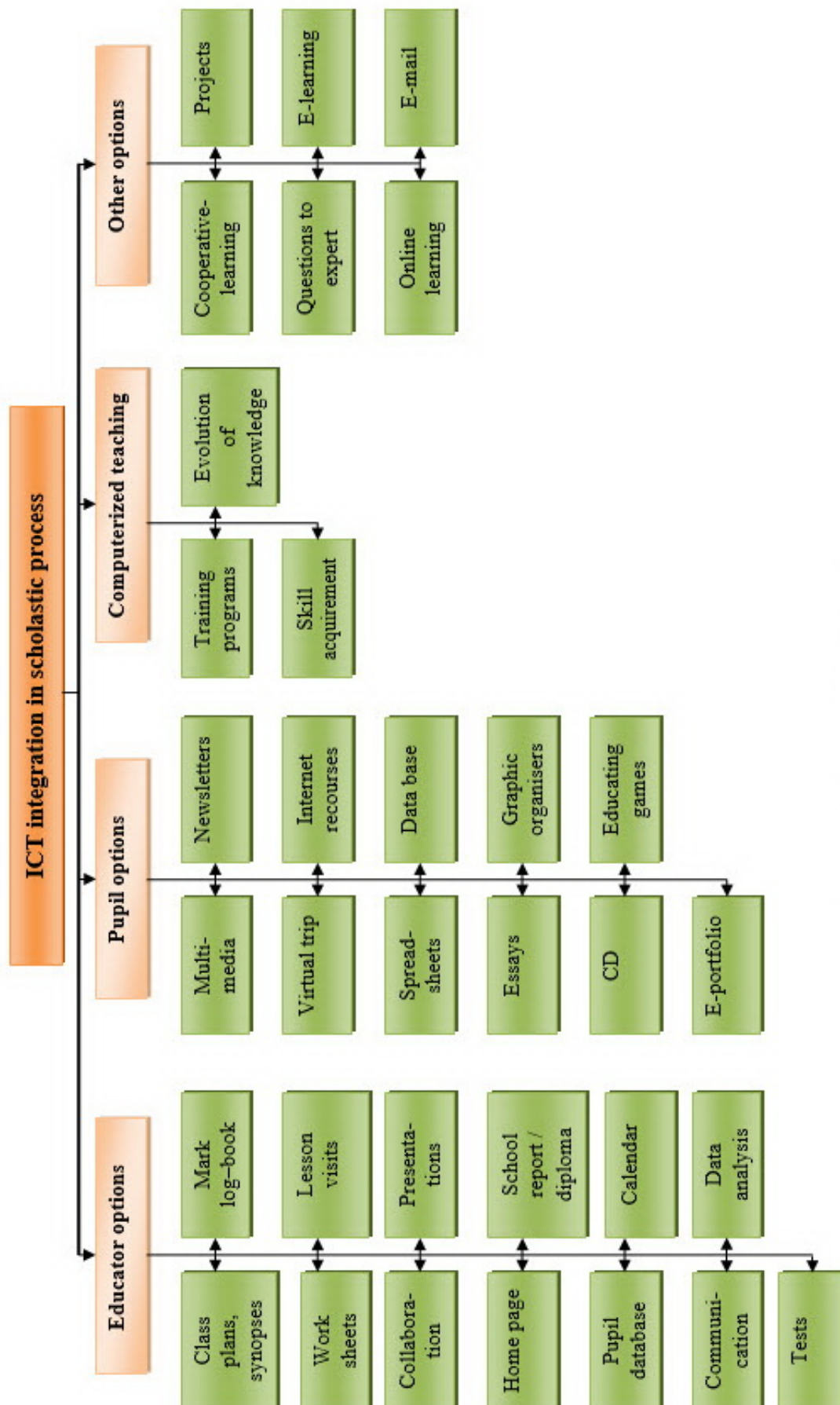


Figure 1. Teachers use of ICT (Birzina, 2007)

Students' needs satisfaction is the basis of the work of any subject's teacher, including Home Economics and Technologies teachers. However, as it is known, the needs develop if there is an interest, if the work is exciting. The teacher has to be able to develop his/her own competence in order to adapt to professional and human requirements that are set for a contemporary educator.

Teacher M.Ignatjeva (2007) has highlighted the educator's skills that are relevant in the information society; the ability to work with information technology has also been mentioned among others:

- ability to cooperate, to work with colleagues;
- ability to work with sources of information, technology and news media;
- ability to use IT facilities, to integrate knowledge, to develop understanding of teaching and learning productivity;
- ability to develop students' skills for working with various sources of information;
- ability to use IT to enrich the knowledge for new learning situation modeling.

Clarifying computer literacy and computer competence requirements, it is also important to know how to identify and evaluate the professional competence in using computer. One solution is to apply European Computer Driving License (Eiropas datorprasmes..., 2014). European Computer Driving License (ECDL) certificate verifies that:

- its owner knows the basic concepts of information technology;
- its owner has the basic skills in using computer hardware and core applications.

Considering on the role of ICT in the learning process, where it functions as a tool and creator of the learning environment, the teacher should have computer literacy knowledge, in order to use ICT both in preparing for lessons, as well as for integrating it in the lessons. These two aspects are related to ICT knowledge and skills acquisition, but being aware of the fact that the integration of ICT requires from the teacher a change in the teaching methods, the third aspect, i.e. the teacher's pedagogical knowledge, is also important. The teacher has to pay attention to these three aspects during further education process, for his/her competence enforcement.

V.Dislere stresses the necessity of using ICT in teaching Home Economics, in order to modernize and expand learning opportunities, e.g. using e-environment options (Dislere, 2012). The following ICT competences are included in professional competences of the Home Economics teacher:

- has to use pedagogical technical elements;
- has to know the history of Home Economics education;
- has to be competent in the use of ICT;
- has to be competent in all topics of the subject:
 - cooking, sewed clothing manufacturing, material handling (including textile works), composition, woodworking and metalworking, electrical appliance and motor vehicle operation,
 - technical graphics;
 - consumer education: housing, food, clothing, safety, family finance, advertising, shopping art.
 - using modern household equipment and technologies;
 - arranging training workshops and organizing work appropriate to standards;
 - integrating the issues of learning the management of household, consumer science, mutual relationships in household, nutrition, clothing in Home Economics and Household subjects.

Home Economics and Technologies teacher may use ICT competence when teaching a variety of topics:

- specialized software WinKnit or Aran Paint can be used for developing knitting schemes;
- the programme PrimaVision Knit can create one's virtual knitted handicraft visualization;
- construction of main patterns for women's garment for upper or whole body can be done in the programme EBA, Pattren CAD or Grafis;
- embroidery schemes can be made in the programme Stitch Art Easy or Adobe Photo Shop;
- DB Weave, WeavePoint or BeadsWicker could be used for developing weaving products' schemes;
- the programme Astron Design can be used for furnishing virtual space;

- family budget planning can be made in the programmes Money Controller, SEB Budget Planner or CRPC Budget Calculator;
- crochet charts can be made in the programme MyCroche (Vronska, 2012).

The teacher plays an important role in the integration of ICT opportunities in the learning process; however, computer usage is not always successful. The authors (Fisher, 1991, Kosmidou-Hardy, 2003, Olgren, 2000) describe learning with computers as physical separation between the teachers and the students. The author of the article agrees with these authors that in computer-organized learning process one faces both positive and negative effects, and using any new technology is associated with learning “dehumanization”, students’ isolation, information overload. Therefore, it is important to balance the time to be used for working with computer programmes and time to be used for creating practical products manually.

Research results

When, many years ago, the author of the present work attended Home Economics classes in comprehensive school, she could only dream that teaching today’s students will require specific competences for ensuring a modern learning process. In terms of the study, the author wishes to know, what is topical for a modern educator who is a professional in one’s subject, and the respondents’ assessment of the author’s computer using skills. The survey consists of open-ended questions, in order to collect, evaluate the objective facts and to publish those for teaching quality improvement.

Results of the survey are obtained from respondents' answers to thirteen questions, of which:

- eight closed questions;
- four semi-closed questions;
- one open question.

Table 2

Survey expert assessment of the author’s teacher ICT competence

The value of Kendall’s W^a coefficient 0,177 $\neq 0$ (<i>Chi - Square</i>) $\chi_r^2 - 12,359$ Kendall’s (<i>Asymp. Sig.</i>) p – value 0,577					
	1	2	3	4	5
How pleased are you with test creation tool for the educator needs?					
Ability to set password	-	-	-	1	4
Execution time limitation	-	-	-	1	4
The ability to use additional features for each question	-	-	-	-	5
View of correct answers	-	-	-	1	4
Evolution compilation	-	-	-	-	5
Evaluate use of test:					
Question adequacy on specific topic	-	-	-	1	4
Understanding of question	-	-	1	1	3
Are you pleased with use of imagery:					
Quantity	-	-	-	1	4
Quality	-	-	-	1	4
How would you rate the overall of test in subject “Home Economics and Technologies”					
Your total evaluation on test	-	-	-	-	5
Master students ICT competence?					
Is able to work with applications	-	-	-	-	5
Is able to work with graphic applications	-	-	-	-	5
Is able to work with multimedia technique	-	-	-	-	5
Is able to use E- environment tools	-	-	-	-	5
Is able to make verification tests in E- environment	-	-	-	-	5

The survey open type question for Home Economics and Technologies teachers is: What problems have you faced in the organization of the learning process, using ICT in Home Economics and Technologies subject? The quotes from the teachers' responses are as follows:

1. Too little time available for the subject (only 1 hour a week).
2. The lack of hardware.
3. Low level of ICT skills.
4. Equipment does not correspond to modern requirements.
5. Low level of foreign language knowledge.
6. Expert assessment value analysis.

Kendall's W test p-value of 0.177 indicates that the expert evaluation is not unanimous (Table 2). The author's ICT competence was evaluated with the highest rating by all experts. However, test imagery quantity and quality, view of correct answers, execution time limitation and ability to set passwords created by the author, was evaluated with 4 points by one expert. Understanding the test question was evaluated as "completely satisfactory" by 3 experts, as "satisfactory" by 1 expert and as "almost satisfactory" by 1 expert. The average rates of test development tools for the subject are presented below (Figure 2).

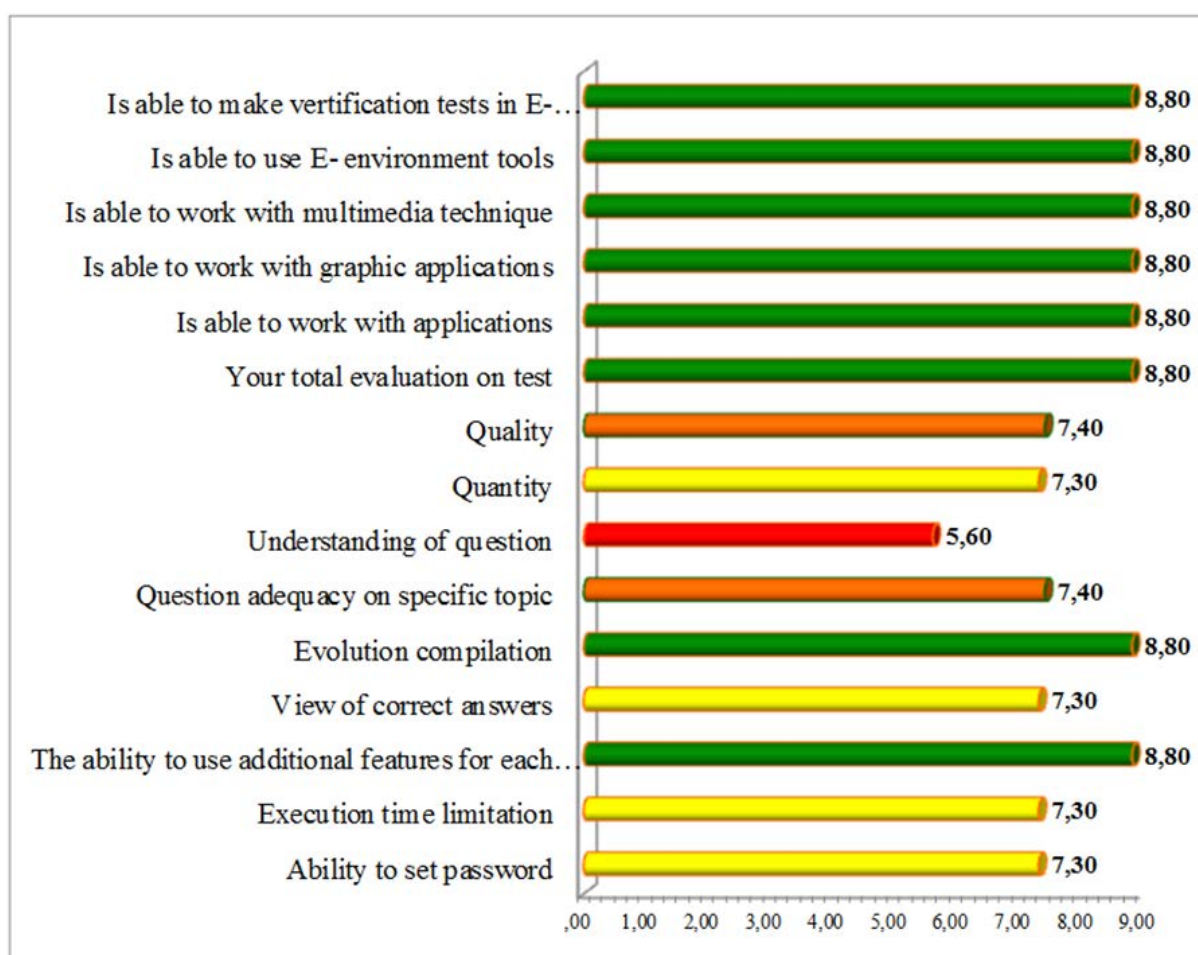


Figure 2. Survey expert assessment of the author' educator ICT competence.

The use of technology provides a variety of new benefits, such as using computer as a source of information and communication, personal opportunities' expansion, gaining new knowledge and skills, as well as broadening experience, considering the use of ICT as getting certain independence.

In collaboration with the school teachers, the author of the present works has heard positive feedback about further education, expressed during the interview on education. The summarized results of the teachers' answers to the question: "Do you want to enhance your existing ICT competence?" show

that one respondent does not want it, one respondent has not thought about it, while 10 respondents are fully convinced of the need of their ICT competence improvement.

Contemporary Home Economics and Technologies teacher has to be ICT competent, as computer skills corresponding to ECDL requirements should be mastered by every school leaver – for elementary school in a narrowed way, but for the rest of graduates – in full. ICT for concrete specialties should be acquired in the educational institution, where one acquires the profession itself – at the university, college or vocational training schools.

Conclusions

- The teacher's competence is characterized by such components as competitiveness in the labor market; inborn abilities; the ability to manage the learning process; proficiency; the ability to organize oneself for further education; learning ability, the ability to use experience. The educator should also have specific competences in working with the younger generation. While using ICT in Home Economics and Technologies classes, computer technology can be used both as a means of learning, when learning "with computer", and as learning environment – learning "from computer", thus improving learning, productivity and performance. In present century (Information and Knowledge century), the requirements actualize the need for self – education, self – development that would provide better job opportunities and higher life quality, as well as the need for a personal challenge – to realize one's potential, to develop oneself in a personally meaningful way.
- The teacher's abilities which are relevant in information society:
 - ability to cooperate, to work with colleagues;
 - ability to work with sources of information, technology and news media;
 - ability to use IT facilities, to integrate knowledge, to develop understanding of teaching and learning productivity;
 - ability to develop students' skills for working with various sources of information;
 - ability to use IT to enrich the knowledge for new learning situation modeling.

As the teacher at the same time has to know the use of computer and to be able to optimize the learning process in his/her subject, he/she needs both computer literacy and pedagogical proficiency. Thus, the teachers should be internally motivated and capable of acquiring knowledge continuously, which ensures systematic improvement of the necessary competences.

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Further suggestions:

- Continuous professional development for teachers; it is preferable to confirm their ICT competence with ECDL certificate.
- The key to success for any teacher including Home Economics and Technologies teacher is holding a dialogue with the students, which is the basis of successful cooperation.
- Young ICT competent teachers should support the transfer of computer skills to the older colleagues taking into account that their experience in the new technologies field is smaller.

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