

## New Trends In Informatics Study Programmes

Eugenijus Valavičius <sup>a</sup>, Violeta Jadzgevičienė  
Vilnius Business College, Kalvariju str. 125, Vilnius, Lithuania

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**Abstract.** Objectives of study program *Media and computer games* are presented and discussed. Online questionnaire was sent to social partners which use media technologies or create computer games. Created primary version of objectives was verified by a survey of relevance.

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### Introduction

The demand for Informatics specialists in Europe is questioned last decade at academic and industry level. The European Commission announced the Digital Agenda for Europe two years ago in conjunction with the Europe 2020 Strategy. Digital Agenda is based on 7 pillars: a vibrant digital single market, interoperability and standards, trust and security, fast and ultra-fast internet access, research and innovations, enhancing digital literacy, skills and inclusion, ICT-enabled benefits for EU society.

Over the past 15 years, half of European productivity growth was driven by information and communication technologies, and it is likely that this trend will continue. Almost 40% of productivity and 25% of GDP are related to ICT. According to the Department of Statistics of Lithuania the number of employees in ICT services increased by near 30% during the last five years. Results of study of "Infobalt" confirm that the demand for ICT specialists will grow - by 2016 there will be a need for 21 000 professionals [3].

Lithuania's progress strategy "Lithuania 2030" states that changes must occur in these key areas: smart society, smart economy, smart management. One of the major initiatives of changes in the smart economy is the development of modern information technology and digital infrastructure. The program of development of Lithuanian Information Society for 2011÷2019 has three priorities:

- i) the improvement of ICT skills for Lithuanian population;
- ii) the development of e-content and e-services, the promotion to use;
- iii) the development of ICT infrastructure.

The rapidly expanding fields of application of ICT have an impact on growth in demand for ICT professionals. Such

a specialist should be able to handle digital content of ever increasing quality (especially audio and video) and to present it to consumers in understandable way.

### 1. New study programmes in Informatics

The growth of internet speed and the spread of digital contents encourage the development of more beautiful services based on multimedia. According to European Commission now about two-thirds of mobile data traffic consists of audio-visual content. A significant proportion of the ICT market takes computer games market. A study of European Parliament was initiated in 2009.

One of its finding states that computer games are not harmful to children - on the contrary, playing is healthy. Video games can stimulate developing of strategic thinking, creativity, cooperation and innovative thinking. The study also says that the skills acquired in early age by playing games will remain with us until the end of life.

Of course the researches warn children not to play games intended of adult. Violence and other similar forms of games can have exactly the opposite effect on a child's development. The study also recommends the use of games in schools for learning purposes. There is a public school *Quest to Learn* in the USA which uses computer games not as supplementary but as a main learning tool. Primary school pupils can play computer games such as *Little Big Planet* and *Civilization* as well as the role play and card games.

Situated in Manhattan, school hopes to educate the great mathematicians, inventors, historians, writers and evolutionary biologists. There is also claimed that the school will ensure that their original teaching method will help to achieve great results and adds that it complies with all New York State Education Standards.

<sup>a</sup>Corresponding author, email: [eugvalav@gmail.com](mailto:eugvalav@gmail.com)

One of the studies of Ireland Limerick University states that the gaming industry worldwide has surpassed the film industry. Computer game development is an innovative and promising business viewing from a creative and technological perspective. It provides career opportunities for energetic and creative IT students.

Modern students form the generation which was growing in interactive media world from a young age. They have a different way of thinking and operating culture. Taking into account these social and psychological changes in society, educational institutions began to develop new curricula, to introduce new innovative teaching methods in the education process.

There are some similar study programs of technologies in Lithuanian universities and colleges: *Multimedia technologies* in Kaunas Technological University, *Multimedia and computer-aided design* in Vilnius Gediminas Technical University, *Technology of e-publishing* in Alytus College, *Multimedia technology* in Kaunas College. Also there is one similar study programme of informatics: *Applied programming and Multimedia* in College of Social sciences. Vilnius Business college expects to attract students with a new-enough area of computer games which is not taught in other colleges. Also the study programme will introduce to students programming for mobiles and smart devices, programmes for robots will be created during training practices. According to the annotations of AIKOS system there are only two analogous university degree programs in Lithuania: Kaunas University of Technology and Vilnius Gediminas Technical University.

## 2. Objectives of Vilnius Business college's study program *Media and computer games*

The primary version of objectives and competences for the new study program was created in a small workgroup with participation of social partners of the college (Užupis Creative Cluster, Akira Mobile) who have an experience in media and gaming programming. Vilnius Business College has been educating specialists of informatics (Programming, Internet technologies) for a long time so a new study program was created in the same area of studies.

Created primary version of objectives was verified by a survey of relevance. Online questionnaire was prepared in Lithuanian and English. Invitations to answer questions were sent to college's social partners and other companies with priority to companies which use media technologies or create computer games. 28 companies answered questionnaire including 7 foreign partners and IT companies. Some companies sent short comments or advice (Table 1).

66% of respondents are directors of companies or departments, about half of respondents have 10 or more years of work experience. Respondents consider as most important knowledge and skills of computer-aided design, graphics and visualization of information, games programming with Java

and specialized tools or libraries (93% answers "Is necessary"), structural and object programming with C, C++ and C#, computer games projecting and creating, collaboration and team work (89% answers "Is necessary"). Two- and three-dimensional graphics, animation, creation of a modern game design using knowledge of human and computer interaction skills were evaluated a little below (above 80% of positive responses).

Respondents considered knowledge of global and local networks, maintenance of computer hardware (93% of answers "Not necessary" or "Has no use"), installing of OS and applications, user consulting as less important (75% "Not necessary" or "Has no use"). Also database knowledge was evaluated as not important (only 54% of answers "Necessary").

Assessments of Lithuanian and foreign partners had a significant difference evaluating knowledge of artificial intelligence and robotics ("Necessary" choose 50% of Lithuanians and 85% correct communication in Lithuanian and foreign language ("Necessary" choose 57% of Lithuanians and 100% of foreign respondents), knowledge of audio and video processing ("Necessary" choose 67% of Lithuanians and 100

Respondents also left separate remarks. They offered to pay more attention to knowledge of algorithms and data structures, computer architecture especially those topics that are related to the operation of computer games: memory allocation, video cards, CPU performance. Also the need of mathematical knowledge (linear algebra and geometry, logic, numerical methods), responsibility, ability to reach the goal and to work in team was emphasized. Foreign partners offered to give an additional focus on web technologies (HTML5, PHP, etc.).

Based on these results number of credits for computer networks, operating systems was reduced, separate notices were transferred to teachers who create programs for mathematics, computer architecture, data structures and algorithms, project management subjects. More subjects will use project work as a form of assessment.

After survey and analysis the following goals were set for study program:

- a) to use and supervise software and hardware, to apply cloud services;
- b) to develop, test and debug applications, databases, using modern programming tools and techniques;
- c) to create, test and debug applications and databases using modern programming languages and technologies;
- d) to apply internet technologies to develop and provide online services and entertainment;
- e) to develop and integrate media products for a wide range of information environments (smart devices, etc.);
- f) to design and develop interactive games for computers and smart devices;
- g) to work in a team, to assess a value of knowledge and communication between people, nature and technology, to have a professional responsibility.

Table 1. Assessment of knowledge and skills of study program (in %).

1 - necessary; 2 - not necessary; 3 - has no use (I don't know)

N	Knowledge and skills	1	2	3
1.	To apply information technologies (computer, mobile, NFC, GIS, etc.) in solving practical tasks.	71	21	7
2.	To exploit the IT hardware, to install and configure operating systems, application software, to consult customers.	25	61	14
3.	To design, implement and exploit the local computer network, to use the global network services.	7	68	25
4.	To understand the rules of data structures creation and storage and to create new data structures. To analyze and create information-processing algorithms.	68	29	4
5.	To develop, to test and to debug programs using principles of structured and object-oriented programming (C, C++, C #).	89	7	4
6.	To have an understanding of artificial intelligence technology, basics of robotics.	61	36	4
7.	To understand the principles of database creation and management, to create and exploit the databases (mySQL).	54	39	7
8.	To know the World Wide Web technologies (HTML, XML, CSS) and possibilities of their application. To analyze and develop the content management systems.	64	29	7
9.	To create static and dynamic elements of the websites, to apply dynamic principles of the website design (Adobe Photo Shop, Adobe Illustrator, Adobe Flash). To design and program the sub-systems websites' security (PHP, etc.).	61	29	11
10.	To have a general theoretical framework of computer design, on which media technologies are based. To apply the principles of computer graphics and information visualization for effective creation of multimedia systems.	93	4	4
11.	To use audio and video processing technologies.	75	25	0
12.	To combine technologies of 2D and 3D graphics and animation for multimedia systems creation.	86	14	0
13.	To know classification of games, design principles and creation techniques.	89	4	7
14.	To program interactive games using effective tools and libraries (Java).	93	4	4
15.	To create a modern game design using knowledge of human and computer interaction.	86	11	4
16.	To be able to analyze problems arising for the users, to help solve them, to understand the responsibility for the taken decisions.	75	21	4
17.	To comply with the principles of cooperation and ethical standards, teamwork and project work.	89	7	4
18.	To communicate correctly in Lithuanian and foreign language.	68	29	4

## Conclusion

The rapid expansion of ICT application areas requires specialists who are able to handle the digital content of constantly increasing quality (especially audio and video) and to make it understandable to consumers. A new study program was designed taking into account the social and psychologi-

cal changes in thinking and performance culture, Lithuanian and foreign partners' experience. Objectives of study program were focused on video and audio technologies as well as conventional programming for computers and smart devices, all this combined with approved Regulation of Informatics field of study.

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