European Proceedings of
Social and Behavioural Sciences
EpSBS

www.europeanproceedings.com
e-ISSN: 2357-1330

DOI: 10.15405/epsbs.2021.04.33

CDSES 2020

IV International Scientific Conference "Competitiveness and the development of socio-economic systems" dedicated to the memory of Alexander Tatarkin

DIGITAL SKILLS OF ECONOMIC STUDENTS IN RUSSIA

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Abstract

A modern educated specialist has an automated workstation, which implies that he knows advanced information technologies and the ability to use information systems. These tools are designed to generate information based on which a specialist makes a production decision, including managerial decisions. The summarizing above indicates the importance of the formation of modern digital competencies among university graduates. The purpose of this study is to study the level of digital skills among students of economic direction in dynamics - after studying computer science at school and after studying the disciplines of an information course at the university. According to the Federal State Educational Standard, subject competencies formed by Computer science have a fairly general sound and cover a wide range of skills. Therefore, for the study, information search skills, organization, assessment, and communication network skills were selected. Second-year students of the Chelyabinsk State University, who were trained in Computer science at the university, were selected as the audience. The study used testing, task execution, statistical data processing, and analysis. The results showed that the level of digital skills is quite different. Some of the skills are well mastered at school, for the formation of most of the other skills, it is necessary to identify the reasons for their insufficient development, and their elimination requires the inclusion of particular tasks in the course of Computer science that contribute to the development of digital skills.

Keywords: Computer science, digital skills, digitalization of education, economic education

https://doi.org/10.15405/epsbs.2021.04.33
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Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

1. Introduction

The global digitalization of the economy, which is currently being carried out in the country, raised the issue of training personnel with the necessary competencies to effectively use modern digital technologies to work in a modern digital environment with data encoded in a binary system, with devices of various types of communication. When training specialists, it is essential to teach them one or another digital technology and change thinking, communication with each other, and the external environment.

IBM Institute for Business Value prepared the executive report «Facing the storm. Navigating the global skills crisis» (2016). The experts talk about changing skills: “As industries are redefined, so too are the types of skills they require. <…> This evolution results in sustained economic malaise or economic prosperity" (p. 17). Today many researchers offer their research results in one aspect or another. Van Laar et al. (2019) examined “the level of 21st-century digital skills among knowledge workers, and the determinants contributing to the level of these skills” (p. 93). Ananiadou and Claro (2009) published an article «21st-Century skills and competences for new millennium learners in OECD countries» where they «proposes a new three-dimensional framework, consisting of the dimensions of information, communication and ethics and social impact” (p. 4). Starčič and Lebeničnik (2020) dream that “Higher education graduates need 21st-century skills, both learning skills and competences for working with technology” (p. 55). McKay and Mohamad (2018) dedicated their research to the necessary digital skills when working with big data. Soomro et al. (2020) investigated the «digital divide» among higher education faculty and analyzed physical access, motivation, skills, and actual digital technologies usage.

He and Zhu (2017) believe «Digital competence is of growing importance for our current information society, and also it plays an essential role in the process of digital informal learning». In this regard, when preparing future specialists at a university, a clear understanding of the sets of digital skills for certain specialties formed within educational programs' framework is required (Hatlevik and Hatlevik, 2018). «Scholars and policy-makers see educators as central to preparing students to gain the required 21st-century skills for the work environment» (Gretter & Yadav, 2016, p. 510). Higher requirements are imposed on university teachers who train graduates ready for socialization in modern society, both for a narrow-profile specialist and a new person's teacher.

2. Problem Statement

Not all students can master the entire wealth of activities offered by ICT when mastering university programs. Moreover, for future professional activities, a student needs to master at least a certain digital skills group at a university. Therefore, it is necessary to determine the minimum of skills and their degree in the university for certain specialties.

3. Research Questions

The study took place in the following sequence:

1. Identifying the range of skills.

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2. Intensity of mastering individual digital skills with the identification of a measure of satisfactory mastering of a minimum of digital skills.

3. Analysis to identify gaps and reasons for not mastering digital skills. Methodological suggestions to eliminate deficiencies.

Research methods.

1. Analysis of literary sources;

2. Empirical study of the level of digital skills in the students.

3.1. Digital skills

The most common terms in the literature digital literacy, digital skills (Fraillon et al., 2014); Internet skills (van Deursen & van Dijk, 2009), digital competences.

Digital skills are sometimes identified with Internet skills.

Burin et al. (2018) studied both directions:

Digital skills include the basic and advanced operation, knowledge, and strategic use, of computers and digital devices in general, including offline (e.g. using a word processor, a spreadsheet, presentation software, or coding). Internet skills refer to operational skills specific to the web, and its core would reside in navigation, integration and assessment of multiple sources, evaluation of content and sources, and communication.

Many researchers use the final report of the DIGCOMP (Digital Competence) study to determine digital competences as the “confident, critical and creative use of ICT to achieve goals related to work, employability, learning, leisure, inclusion and/or participation in society” (Ferrari, 2013, p. 2).

Wild and Schulze Heuling (2020) were guided by this document and studied the following five competences in the context of digitization: (1) information and data literacy (2) communication and collaboration, (3) digital content-creation, (4) safety, and (5) problem solving.

Ilomäki et al. (2016) «found that digital competence consists of a variety of skills and competences, and its scope is wide, as is its background: from media studies and computer science to library and literacy studies» (p. 655).

In January 2018, the Digital Education Action Plan (DEAP) entered into force. The European Commission has focused on such aspects of digital competence as problem solving and cooperation in the digital environment.

The strategy for the development of the information society in the Russian Federation includes development of technologies for collecting and analyzing data, exchanging them, managing production processes based on the introduction of cognitive technologies.

We will focus on digital skills for finding, evaluating and managing digital information for research. A graduate in the process of studying at a university must master the basics of information management and evaluation, that is

…to manage their documents, files, emails, and other forms of digital information as part of their work activities. They need the skills to save files in the right place, to be consistent in the naming of digital files, and to organize digital files via hierarchical folder structures. Information evaluation skills

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include judging the usefulness, relevance, and reliability of the retrieved digital information» (Van Laar et al., 2019, p. 94).

3.2. Digital competencies of the Federal State Educational Standard

In the process of studying the discipline "Computer science", students of economic specialties master the competencies according to the Federal State Educational Standard, including:

- the main tasks of professional activity;

-informational and bibliographic culture;

-Information Technology;

- Information security requirements.

Future customs specialists should be prepared to solve the following professional tasks:

- management of the activities of customs authorities;

- ensuring compliance with customs regulation and control;

-analysis and maintenance of customs statistics of foreign trade;

-analysis and maintenance of special customs statistics, as well as consulting participants in foreign economic activities;

- identification and suppression of administrative offenses and crimes in the field of customs, etc. (Federal State Educational Standard for Higher Education, 2015, p. 12,13).

The solution of these problems at the modern level requires knowledge of the skills of working with information, with the basic methods of working with information in applied circulation programs, skills in interacting with IS, with tools of applied software, tools for storing and transferring information.

Thus, we have identified a group of basic digital skills necessary for working with information to future specialists in the field of economics: search, assessment and management of digital information.

4. Purpose of the Study

This section is devoted to the empirical identification of the minimum mastering by students of digital skills in searching, assessing and managing digital information before and after studying the discipline "Computer science". The sub-objectives of the research are:

1.Comparison of distributions of mastering digital skills before and after studying a discipline in order to identify the effectiveness of training at a university;

2.Identification of factors influencing the results of educational activities.

5. Research Methods

Experimental work was carried out at the Chelyabinsk State University. The research tool was a questionnaire constructed by us, which includes questions on searching, storing, evaluating the necessary information, as well as questions that reveal the skills of working with large amounts of information. The basis for designing questions and answers is a two-tier approach to the knowledge and skills learned (yes, no; always, never). Participation was anonymous, which allowed the responses to be considered genuine. Questions from the first group are aimed at studying the development of issues of information retrieval

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and storage. Questions from the second group are aimed at studying the actions of students related to the assessment of information. The questions are related to the assessment of students' work with large amounts of information, and are also aimed at identifying factors that affect the outcome of mastering digital skills. This organization of the questionnaire helps to conduct a comparative analysis of the results of the questionnaire by groups of questions.

6. Findings

The survey involved 98 students studying customs. The results of the survey presented in Table 1 before and after studying the discipline "Computer science".

Table 1. Distribution of students' answers to questions before and after studying the discipline "Computer science"

The first group of the questions				
Questions	Before studying the discipline, %		After studying the discipline, %	
	Yes	No	Yes	No
I am familiar with the list of file parameters, and I always pay attention to the file parameters	41	50	67	32
My information is organized in a hierarchical folder structure	34	25	83	17
My file names are "transparent" and understandable	68	25	83	17
I know how to tell a trusted site from an unreliable site	43	17	69	30
I know which sites to look for up-to-date information	45	15	92	8
I easily find the information I need, analyze large amounts of data	44	29	91	9
The second group of the questions				
The found information seems to you unreliable, incomplete, irrelevant. Your actions				
	Before studying the discipline, %		After studying the discipline, %	
I will not complete the task	12		3	

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I will ask for help from a teacher, friend	46	45
I will achieve results myself using my information skills	22	51

When working with large amounts of information, I feel

	Before studying the discipline, %	After studying the discipline, %
Confident and comfortable	33	55
Large amounts of information scare me	20	37
I prefer not to touch such work	7	6

Below is our analysis of the results obtained by groups of questions. It should be noted that the students had some skills in working with digital information before studying the discipline. The discrepancy between the total result up to 100% is explained by the fact that some of the students did not mark either “yes” or “no” in their answers. However, on all the proposed questions, not even half of the positive answers (“yes”, “always”) were recorded. After mastering the discipline "Computer science ", the situation has changed. Let's take a closer look at comparing the results.

Mastering the search and storage of information. If, when searching for information before studying the discipline, less than half of the students were interested in file parameters, then after mastering the course, 67% of students became interested. However, quite a few students are still not interested in this issue.

If, before mastering the discipline, almost a third of students did not have the skills to store files in the right place, organize a hierarchical structure of folders, assign “transparent” names to folders, then after mastering the discipline, 83% of all students have mastered this skill.

Evaluation of information by students. Students assess the reliability and relevance of the information. However, after mastering the discipline, the assessment indicators increased, students became especially attentive to these qualities of information if it was necessary to analyze large amounts of information (92% versus 69%). If the information seemed unreliable, incomplete, irrelevant, then the students' actions before and after studying the discipline changed little. A large proportion of students both counted on help and continue to count. However, it should be noted that the share of students counting on themselves has increased significantly (from 22% to 51%). The share of students who do not want to complete the task with such information has slightly decreased.

Assessment of students' work with large amounts of information. Large volumes of information that appear when completing the assignment require increased attention of students. A large amount of information determines the increased complexity of the task, and its successful completion, as a rule, requires the involvement of a set of knowledge and skills, as well as a higher mental stress. Therefore, it

is not surprising that almost half of the students experience discomfort when completing such tasks, and some students do not want to complete them at all.

There is reason to believe that large amounts of information that complicate the task affect the result of students' educational activities. In order to test the last hypothesis, we conducted a conversation with students who have mastered the course "Computer science". 72 students took part in the conversation. During the conversation, students were asked questions: 1) the importance of developing digital skills; 2) attitudes towards complex tasks requiring the use of large amounts of information and many skills. Almost all students understand the importance of developing digital skills, and most students are willing to experience difficulties in developing such skills, not realizing that the complexity of the assignment is a kind of difficulty. Only a few students (7%) expressed a positive attitude towards difficult tasks, rightly considering them developmental, as well as tasks, the implementation of which is based on a set of skills. To eliminate this discrepancy, it is possible to recommend the leading teacher of the "Computer science" course to implement the principle of teaching at a high level of difficulty, observing the measure of difficulty.

7. Conclusion

Based on the study of literary sources, a group of basic digital skills necessary for working with information for future specialists in economics was determined: search, assessment and management of digital information. Skills can be formed in the process of mastering information disciplines at a university.

An empirical study of the level of formation of a group of necessary digital skills in a university showed that students already had some skills in working with digital information before studying the discipline "Computer science". A comparative analysis of the distributions of mastering digital skills in the main group before and after studying the discipline showed that the above discipline is an effective means of developing students' digital skills.

Difficulties in mastering digital skills among students related to the performance of tasks requiring the use of large amounts of information and the use of a set of skills and complex tasks were revealed. The course instructor is advised to refer to the principle of teaching at a high level of difficulty while observing the measure of difficulty, with a gradual increase in the amount of information.

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