ЕВРОПЕЙСКИ СЪЮЗ
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ИНСТИТУТ ПО ПУБЛИЧНА АДМИНИСТРАЦИЯ

ОПЕРАТИВНА ПРОГРАМА ДОБРО УПРАВЛЕНИЕ

RESEARCH FOR THE LEVEL OF DIGITAL COMPETENCE OF EMPLOYEES IN THE STATE ADMINISTRATION

Project BG05SFOP001-2.017-0001/28.11.2019 "Digital Transformation in Learning - Digital Competence and Learning", funded by Operational Programme "Good Governance", co-financed by the European Union through the European Social Fund.

2019

In the framework of the project "Digital Transformation in Education - Digital Competence and Learning" an IPA team conducted a research on the digital competence of state administration employees. The main objective was to identify the level of digital competence and to develop a training programme for state employees based on the research.

5,770 employees from all administrative structures in the country participated in the survey conducted from 6 to 15 November 2019. For this purpose, a self-assessment questionnaire was developed, including 141 statements grouped into 6 separate modules. The developed questionnaire is based on the European Digital Competence Framework DigiComp 2.1, developed by the Joint Research Centre of the European Commission, which aims to identify and validate the key components of digital competence at European level. The framework includes 5 core areas, each containing several specific competences:

1. **Information and data**

    1.1. View, search and filter information

    1.2. Evaluating information

    1.3. Store and retrieve information

2. **Communication and cooperation**

    2.1. Interaction through technology

    2.2. Information and content sharing

    2.3. Participation in online civil society

    2.4. Collaboration through digital channels

    2.5 Ethical rules

    2.6. Digital identity management

3. **Content creation**

    3.1. Content development

    3.2. Copyrights and licenses

    3.3. Information integration and processing

    3.4. Production of multimedia and creative products. Software development

4. **Safety**

    4.1. Protection of devices

    4.2 Data protection and digital identity

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4.3. Health protection

4.4. Environmental protection

5. **Problem solving**

5.1. Solving technical problems

5.2. Solving practical and theoretical problems through technology

5.3. Propose technological solutions to a problem

5.4. Determine the need to upgrade digital competence

A number of good practices presented in the dedicated DigiComp into action guide published in 2018 were also considered for the purpose of the study. This helped the team in formulating the questions and applying specific examples relevant to each skill. Primarily, the examples used in developing the questions were taken from the Ikanos self-assessment tool developed by the Basque Government. The self-assessment questionnaire is divided into six modules. The first includes demographic questions that were used to describe the sample population. The others reflect the main areas of digital competence - **Information Processing, Communication, Content Creation, Security and Problem Solving.**

The modules contain 141 statements grouped into 24 topics reflecting 24 types of knowledge and skills. The questions in the questionnaire are closed questions only and, depending on the scale on which they are assessed, are divided into three groups:

- The first group includes questions that involve a choice between several predefined answers.

- The second group consists of statements that are scored on a scale from 1 to 10. In forming the results, grouped data from the 10 grading scales applied in the survey were used, as follows: for the low grade (skill) we take the set of items selected by the respondents as 1+2+3, for the high grade 8+9+10, and the intermediate

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answer (medium grade) 4+5+6+7. The goal is easier visualization and clearer highlighting of the aggregations. In the question "To what extent do you know the programmes in each group?" a scale of 1 - 5 was used to group the distributions more compactly and because of the specific programmes and instruments mentioned.

- The third type of questions includes statements for which the participant chooses one of the categories "Yes", "No" or "Undefined". The aim is to achieve a clearer grouping of responses through this type of categorisation.

Statements rated on the slider scale are statements of skill/experience level, while those containing "Yes," "No," or "Undefined" categories are indicators of the presence or absence of specific knowledge (factual statements). Responses do not contain a fully dichotomous option to avoid forcing a categorical response for statements that risk being interpreted ambiguously by respondents. The 'Undecided' category is therefore used to allow for nuance in the assessment.

The order of the topics in the different modules moves from elementary to more complex competences. This is because the self-assessment framework assumes set baselines against which each respondent's answers are weighted in terms of a predefined required level of knowledge/skills. This survey presents the survey data in aggregate form and cannot be used to determine the level of digital knowledge/skills of an individual administrative employee.

Due to the fact that in Bulgaria there is no specific description of the requirements for digital competency in the different professional areas in the administration, the digital competency programme proposed by the team aims to develop the general digital skills of employees in the administration, without taking into account their narrower expert positions.

MODULE 1 "DEMOGRAPHICS"

Four demographic attributes were set out in the study to describe the sample population. The results show that the typical respondent is a woman in an expert position with analytical and/or control functions, aged between 35 and 50, working in central administration structures. (Fig. 1)

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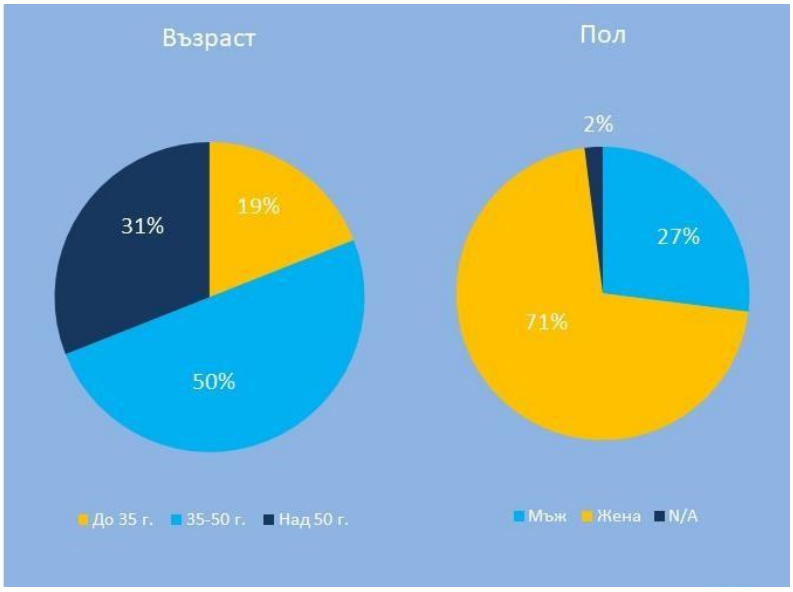

Fig. 1

In terms of age, there is a predominance of responses given by respondents in the age range 35 - 50 years, and in terms of gender, women dominate the distribution, accounting for 70% of respondents. The data presented in the 'State of the Administration Report 2018' on the gender distribution of the staffing levels shows that the ratio of women to men is in line with the gender distribution of the respondents to the survey. The lower limit of the first age category was chosen as 23 years. The reason is that this is the age at which, according to Eurostat, Bulgarians start their first job. The upper limit of the third age category is 66 years.

Fig. 2

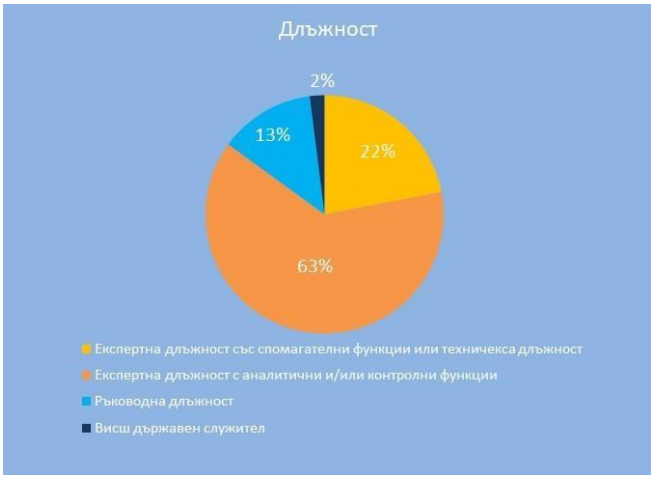

Fig. 3

The distributions show that the population of respondents to the survey has similar characteristics to the general population, except for the indicator of place of work. There is a

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predominance in the share of questionnaires received from employees in the central administration at the expense of employees working in the territorial administration.

MODULE 2 "INFORMATION"

In this field, a total of 27 statements are set in 5 main areas.

What do you do to find and access the information you need?	Low %	Medium %	High %
I can use one search engine	20%	18%	62%
I use different search engines (Google, Bing, DuckGo and others)	23%	23%	54%
I use various specialized search engines (scienceresearch.com, researchgate.com, Microsoft Academic Search, Google Scholar, etc.)	60%	21%	19%
I have my own way of organizing different searches	34%	30%	35%
I have organized the retrieval of information from various information channels (RSS, Twitter, etc.)	63%	21%	16%

In this area it can be seen that a large proportion of respondents do not use different channels to access information, with 81% not using specialised search engines.

How do you filter the results to find the information you are interested in?	Low %	Medium %	High %
Search by keywords and synonyms	6%	17%	77%
I use a combination of different keywords in the same search	9%	20%	71%
I use quotes to search for "exact results"	45%	25%	30%
I know how to reduce search results using plus (+) and minus (-) signs	55%	25%	20%
I know how to use search operators like "Site" for a website or "Filetype" for a file type	59%	22%	19%
I restrict the search by dates	36%	30%	34%
I use the "Advanced Search" field (Advanced search)	32%	27%	42%

The results are mostly high in the keyword search part, but we can see a drop in the level when we talk about more detailed search (advanced search) and the use of different techniques to refine the search.

To save your documents and files:	Low %	Medium %	High %

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I save information on different media: hard drive, CD, USB memory, SD memory card, etc.	11%	18%	71%
I use Cloud services: Google Drive, One drive, Dropbox, iCloud, etc.	49%	22%	29%
I usually make backup copies of the information on my devices (computer, phone, etc.)	32%	28%	40%
I organize information into folders so I can find it more easily	7%	16%	77%
I find and retrieve stored information without any difficulty	12%	24%	64%
I use various technologies to transfer files between devices: USB, Bluetooth, NFC, WiFi, FTP, etc.	22%	22%	55%
I use specialized methods (5S digital) to name and organize my digital documentation	74%	17%	8%
I help other people use different methods to organize and retrieve files	51%	26%	23%

The results show that nearly half of respondents do not use cloud services for file storage, nor do they use external storage. 40% back up the information they store on their devices, and 64% determine that they retrieve already stored information without difficulty.

How do you identify whether the information you find on the Internet is true/authentic?	Low %	Medium %	High %
I know when to be suspicious of information I find	14%	34%	51%
I can determine whether a source of information is reliable	19%	37%	44%
I know how to properly screen out unwanted information (spam)	14%	33%	53%
I am able to compare information from different sites according to their usefulness	13%	31%	56%
I participate in sites that publish information important to me	51%	25%	24%
I follow the online activity of experts and professionals on issues of interest	40%	29%	31%
I teach other people to critically evaluate the information they have access to	49%	29%	22%

More than half of the respondents stated a high level of competence in sifting out true and false information on the Internet, but at the same time, competence in establishing the reliability of an information source was mostly low and medium. Only 14% have difficulty identifying spam.

Do you have knowledge of ICT and how did you acquire it?	% indicated
My level of ICT knowledge is more than basic	95%
I am self-taught (I have used resources available on the Internet)	21%

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The knowledge I have is acquired on the job/work process	**71%**
The knowledge I have acquired is during in-service training	**26%**
The knowledge I have acquired is during extra/additional trainings	**34%**

Can you demonstrate your ICT knowledge?	**% indicated**
I cannot prove my ICT knowledge	**29%**
I can demonstrate my knowledge by taking a practical skills and knowledge test	**55%**
I have internationally recognized certificates, e.g. ECDL, Certiport	**5%**
I have a university degree	**27%**

The last 2 questions of the section rather want to check how the participants have acquired their ICT skills, with 95% of respondents answering that their ICT skills are higher than basic. It is noteworthy that most often, the skills acquired come from employees' on-the-job experience (71%), followed by skills acquired during off-the-job activities (34%), and then skills learned during in-service training (26%).

MODULE 3 "COMMUNICATION"

In the area of communication, a total of 30 statements were asked, subdivided into 5 main questions. In this section, participants are asked to answer 'yes' and 'no' to most statements, with a third, undefined option. The self-assessment here is significantly higher than the previous section.

To connect with other people:	No %	Undefined %	Yes %
I send and receive SMS by mobile phone	23%	13%	64%
I send and receive emails	2%	3%	95%
I use messaging apps Whatsapp, Telegram, Skype, Messenger, MS Link, etc.	12%	8%	80%
I take part in social networks: Facebook, Twitter, Snapchap, LinkedIn, Instagram, etc.	21%	11%	68%
I consult and participate in forums, blogs, wikis, etc.	49%	26%	26%
I use video conferencing applications Facetime, Skype, Webex, etc.	34%	17%	49%
I encourage and teach others to connect through technology	25%	26%	49%

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As expected, self-esteem is high when communicating via emails, mobile phone and social networks.

The survey shows that 80% of employees use online messaging apps. The same figure shows that less than half of employees use video conferencing apps, with only 49% clearly stating that they use this mode of communication. It can be assumed that much of the messaging apps used are so widespread because they are used primarily on a mobile phone and not so much on a coputer.

How do you share information and digital content with others?	No %	Undefined %	Yes %
I use email to share digital content: documents, photos, videos, etc.	5%	5%	89%
I use online tools to share digital content. Drive, Scribd, Slideshare, Instagram, Flickr, Scoop it, We transfer, Tranz.it and others	6%	22%	2%
I participate in social networks and online forums to share information	7%	22%	2%
I use Wikis to share content and access content developed by others	71%	21%	8%
I maintain a blog where I post my own content and receive comments from readers	88%	7%	4%
Through the Internet, I collaborate with others in my educational or professional field (I participate in a learning network of people)	51%	20%	30%
I encourage and teach others to use digital tools/apps to share information and content	8%	27%	34%

Regarding the use of cloud technologies for file sharing, 89% of respondents said they use email to share digital content, making it a key tool not only for communication but also for file sharing.

The survey shows that a large number of participants do not participate in online blogs and forums from which information can be obtained, nor do they use platforms such as Wikis where information can be entered and accessed alongside other users. It is also evident that 88% of government employees do not have a blog or other form of online presence where they post their own content, nor do they participate in an online network of people to share knowledge.

Do you carry out these public activities via the Internet?	No %	Undefined %	Yes %
I consult websites of public and/or civil society organisations through their websites	33%	15%	52%
I use the websites of NGOs and civil society organisations to propose ideas on social or political issues	69%	19%	11%
I report situations and send complaints to relevant institutions via the Internet	54%	19%	27%
I participate in civic consultations and complete online surveys for community or social organizations	49%	21%	30%

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I use online services offered by institutions, banks and businesses using e-identification tools: e-certificate, soft keys, etc.	28%	14%	58%
Helping people around me use technology for citizen engagement	36%	27%	37%

58% of respondents said they use online services offered by institutions using e-identification tools. A large proportion of those who do not participate in civic or non-governmental initiatives on the Internet and do not use the electronic environment to submit complaints to institutions. Only 30% indicate that they participate in civic consultations and fill in online surveys for public or social organisations.

To collaborate with other people:	No %	Undefined %	Yes %
I use collaboration tools for project development, implementation and monitoring (Google Drive, Dropbox, etc.)	48 %	23%	30%
I use tools like Facetime, Skype, Webex, Zoom, etc. to have online meetings with others	43 %	17%	40%
I take part in learning activities such as open access online courses (MOOC's), webinars, streaming, etc. through collaborative environments: Moodle, WebCT, etc.	53%	18%	29%
Visit virtual spaces for collaboration and co-working (Coworking)	71%	20%	9%
I promote and organize online collaboration projects between people from my work, educational and/or personal environment	69%	21%	11%

Here again we can see a rather low level of use of online collaboration tools and the use of video links for collaboration. Only 30% of participants indicated that they use online file sharing tools

(Wetransfer, Google drive, etc.), which confirms the information from the previous area "Information".

A large percentage of survey participants do not take advantage of the opportunity to participate in open access online training (MOOC's), webinars, streaming, Moodle, etc.

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When you communicate with other people on the Internet:	Low %	Medium %	High %
I use Internet-accepted "codes of conduct" such as not capitalizing, saying hello, respecting others' privacy, being sincere, etc.	6%	1 3%	81%
I try to be respectful and avoid offensive language (about religion, race, politics, sexuality, or otherwise)	4%	8%	88%
I check every message I write to make sure it is concise and understandable (written in terminology I am confident the recipient understands), relevant to the topic	5%	1 2%	83%
I am aware of ethical practices when using the Internet (Netiquette)	14%	25%	61%
I remind people close to me of the basic rules of good behaviour on the Internet when necessary	20%	24%	56%

In the area of ethical behaviour on the internet and 'netiquette' , where participants responded on a scale of 1 to 10, the level indicated was significantly higher, with 81% stating

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that they use accepted internet 'codes of conduct' and 61% being aware of ethical practices online.

MODULE 4 "CONTENT CREATION"

In this module, 38 statements are assigned, divided into 6 main areas. Self-assessment in this area is at one of the lowest levels, which is an expected result given the type of skills and nature of the work of administrative staff.

How familiar are you with the programs in each group?	No knowledge	Basic level	IIntermediate level	Advanced	Expert
Създаване и обработване на текст: Word, GoogleDocs, Writer	3%	4%	18%	35%	41%
Презентации: PowerPoint, Impress, Google Presentations	15%	14%	24%	26%	21%
Динамични презентации: Prezi, Keynote, Emaze, PowToon	70%	14%	10%	4%	3%
Редактиране на изображения: Photoshop, Gimp, Coreldraw	35%	24%	21%	12%	8%
Електронни таблици: Excel, Calc, Google Spreadsheet	7%	12%	25%	31%	26%
Бази данни: Access, MySQL, Dbase, ORACLE	52%	19%	15%	9%	6%
Редактиране на видео: Adobe premiere, Youtube редактор, Pinnacle Studio	60%	17%	12%	6%	5%
Аудио редактиране: Audacity, Adobe Audition, Audio Editor	67%	15%	10%	5%	4%
Създаване на уеб страници: Dreamweaver, MAGIX Web Designer, WebSite X5	75%	12%	8%	4%	3%
I use online content creation tools (Canva, Powtoon, etc.)	81%	10%	6%	2%	2%

What is your experience in creating digital content:	Low %	Medium %	High %
I can create simple digital content using Word, PowerPoint, etc.	18%	21%	60%
I can create digital content in different formats and with different tools, including multimedia	43%	29%	8%
I can use different digital media to present ideas in a creative way: graphic diagrams, concept maps, infographics, etc.	56%	25%	18%
I use a variety of digital tools to create original multimedia products	65%	21%	14%

Which of these statements most closely matches your experience with digital content:	% INDICATED
I can edit digital content	87%
I can make basic changes to content created in the process of my work with office software applications: documents, presentations, excel files, etc.	75%
I can make basic changes to multimedia content: photos, audio, video	9%
I can modify the format of different file types: photos, videos, texts, etc.	0%
I have knowledge and experience in combining different file types when creating new material: photos, video, music, texts, etc.	27%

Employees have the highest self-evaluation in creating and processing text

- 75% define themselves as advanced or expert. In creating presentations, 71% are at the intermediate, advanced and expert proficiency levels. Regarding the use of various content

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creation and processing programs, the highest percentages of employees claimed to be at an advanced and expert level in Word and Powerpoint. For the other programs, the percentage identifying as advanced or expert is small. In the area of dynamic presentations, 70% claim to have no expertise with 75% having no expertise in the area of web page creation and in the area of audio and video content creation, the percentages are 67% and 60% respectively.

For spreadsheets, only 19% said they had no knowledge or that their knowledge was low. Things change when it comes to using more serious computing programs - nearly 70% say they have no knowledge or their knowledge is at a basic level.

In the area of the use of tools for creating graphics and multimedia products, the percentages with high competence are 18% and 14% respectively.

Regarding the "virtual identity" you have adopted on the Internet:	Low %	Medium %	High %
The way other users perceive my image on the Internet is determined by what I post on social networks	23%	31%	45%
I know how to generate a personal or professional profile on social networks and pay attention to the details I want to convey	19%	26%	55%
I know that my actions on the Internet leave a trace (fingerprint) and I know how to monitor it (my overall activity on the Internet)	19%	31%	49%
I may have more than one 'digital identity' depending on context and purpose (who we are to others on the web)	55%	25%	20%
I am careful with the information I post to protect my "digital reputation" (what is written about you on the Internet, the comments and opinions of others.	12%	19 %	69%
I know how to act and who to turn to when I have problems with my digital identity (cyber bullying, etc.)	30%	30%	40%

Participants' self-assessment in the area of digital reputation protection on the Internet is high. Nearly 51% of respondents do not have a high enough judgement about the digital fingerprints a person leaves on the internet. More than half of the respondents do not have enough information about who they can turn to in case of a digital identity problem (cyber bullying, etc.).

Regarding copyrights and licenses usage :	Low %	Medium %	High %
I can detect illegal content on the Internet	57%	27%	16%
I can distinguish content with copyright restrictions on use	51%	29%	20%
I am aware of the consequences of downloading illegal content	22%	24%	53%
I distinguish between (copyright), (copyleft) and creative commons	44%	29%	26%
When I post something on the Internet, I know how to choose the right use license and how to use copyrighted content	54%	27%	19%
I try to raise awareness of copyright protection and am able to articulate my ideas clearly	57%	26%	17%

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The percentage of staff with advanced or intermediate level skills in copyright, knowledge of illegal content on the internet and use of licences is also significantly low. Only 16 per cent rate their ability to judge illegal content on the internet as high, and only 20 per cent can clearly distinguish content with copyright restrictions on use.

In terms of application configuration and programming:	Low %	Medium %	High %
I understand the principles of software programming	67%	19%	13%
I can make basic configuration changes to the programs I use	69%	18%	14%
I can configure more complex settings of the programs I use	75%	15%	10%
I can create web pages using a programming language	86%	9%	6%
I can program software for different needs	88%	8%	5%
I am inquisitive and keep up with new developments in programming and software	78%	14%	8%
I collaborate with other people to do workshops, webpages, live labs	89%	8%	4%

The lowest skills are in the area of programming. Percentages of high competence are low both in configuring the programs used and in creating web pages. In programming software for various needs, only 5% of respondents said they had high-level knowledge in the area.

MODULE 5 „SECURITY“

In this domain, participants respond to statements formed in 6 main questions. Here respondents made a significantly higher self-assessment of their skills.

Do you care about the security of your digital devices?	No %	Undefined %	Yes %
I use antivirus programs on my devices and update them regularly	3%	9%	88%
I am careful when I receive messages with or without an attachment whose sender I do not know (spam)	1%	3%	95%
I use different passwords on my digital devices and services, and change them periodically	6%	13%	81%
I help my close ones avoid risks when using their digital devices	12%	20%	68%

When it comes to the care they take with their digital gadgets, the levels are extremely high, with only 6% not updating their device passwords periodically and a full 95% being careful when they receive a message from a stranger.

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Do you care about the security of your data on the Internet?	No %	Undefined %	Yes %
I know that my data may be used by others	1%	5%	95%
I am aware of the risk of data being spoofed on the Internet (identity theft, extortion, etc.)	1%	6%	93%
I take extreme care before providing personal information on the Internet such as address, telephone, bank details, credit cards, personal photographs, etc.	1%	8%	91%
I am aware when a webpage has a security certificate	16%	31%	53%
I know how to identify webpages or email messages that are spoofed/fake	1%	35%	4%
I participate in initiatives that promote information protection and privacy practices	50%	29%	21%

91% say they are careful before providing personal information on the internet, such as address, bank details, etc. This may indicate both high skills and a lack of trust in the security of the online environment.

You can be "green" while using digital technology	% indicated
I understand what "green technology" means	66%
I implement basic measures to save energy (avoid printing on paper, improve energy-saving devices, turn off devices at the end of the work day, etc.)	72%
Recycle devices, and leave them in the right places	41%
I implement videoconferencing, for convenience, saving time and therefore reducing the use of other environmentally harmful resources	21%
I participate in social networking to initiate, raise awareness and share sustainability ideas	11%

On the health risks posed by the digital environment, employees surveyed also showed a high degree of competence, with only 9% stating that they were unaware of the risks posed by prolonged sitting in front of a computer

.

The use of technology can impact health:	Low %	Medium %	High %
I am aware of the health risks of improper use of technology (poor lighting, incorrect body position, etc.)	9%	25%	66%
When using a computer, tablet, etc., I take steps to protect my health and that of others	16%	37%	47%

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I am aware of the risks and consequences of cyber-bullying	16%	30%	54%
I take precautions to avoid cyber-bullying, both in relation to myself and those closest to me	24%	32%	44%
I inform myself about and disseminate health and safety recommendations when using technology	34%	32%	34%

66% of respondents say they know what "green technology" means, and 72% are taking action versus conserving energy. 21% say they are videoconferencing to save time and resources, and only 11% are participating in social networks to initiate, raise awareness, and share sustainability ideas.

Do you apply basic security measures when using social networks?	% посочили
I never disclose personal information	57%
I use privacy settings to approve or deny access to my social media account	59%
I only share my social media account with friends	59%
I only add people I really know as friends on my social networks	65%
I pay attention to the privacy policies of online applications and what they use my information for	44 %
I usually check the security settings of my devices and the apps I use	42 %

Regarding security on social networks, nearly half of respondents say they apply basic measures in this area. 57% do not disclose personal information online, and only 44% pay attention to the privacy policies of online applications.

MODULE 6 „PROBLEM SOLVING“

In the area of problem solving, a total of 11 statements are asked, divided into 2 main questions

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When problems occur while using digital devices:	Low %	Medium %	High %
I can independently resolve common issues when working with digital devices	29%	35%	36%
I know how to find help with technical problems encountered when using a digital device, program or application	9%	31%	50%

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In the event of a technical problem that I cannot solve, I can find an alternative way to achieve the same results	25%	35%	40%
I consult forums where people collaborate to solve a technical problem	44%	28%	28%

It is interesting to note that over 50% of respondents have difficulty finding an alternative way of dealing with a technology problem or searching for an answer online.

How do you upgrade your ICT skills?	No %	Undefined %	Yes %
I keep up to date with the general trends in the digital sphere	9%	37%	44%
I integrate more and more technology into my daily activities to improve my quality of life	7%	35%	48%
I am aware of my level and know when I don't meet the demands that my work or training in a particular field imposes on me	4%	15%	81%
I usually attend events where I can learn new things about technology	36%	39%	25%
I help people around me improve their digital skills	25%	33%	42%
I follow video courses on topics of professional and personal interest	39%	31%	30%
I attend free online courses of professional and personal interest	46%	28%	26%

The analysis shows that a significantly small proportion of respondents take part in free online courses for professional or personal interest. The same statement was made in the Information domain. Only 25% attend events related to the development of technology and approximately the same number attend similar training (26%).

CONCLUSIONS

The main objective of the study is to establish the general digital competence of the employees in the administration, to identify where they have gaps in order to support their development in a digital environment. The results lead to several main conclusions:

1. Document processing, spreadsheets and presentation software

In the area of working with basic programs related to the administrative work of a civil servant, namely document processing, creating tables and presentations (Word, Excel and Powerpoint) the skills are significantly high, with a lower score in Excel. In terms of the frequent use of these products, it is good to focus on skills development in this area, a good example of such

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skills development being systems such as the ECDL, which offer a more individualised approach, splitting skills into different levels.

Regarding knowledge related to working with large databases, analysing and visualising this data, the results obtained also identify two levels of knowledge in this area, which it is good to separate and present the relevant solutions to the target groups. Offering trainings that are divided into different levels would support the choice of participants and stimulate them to professionalize their skills in the given field. As an example, we can mention the course "Database Analysis and Visualization" offered by IPA. In this case, the first level would cover skills in the standard uses of Excel for working with databases (working with formulas, formatting tables, etc.) and the second part would concentrate on working with large data sets and their presentation: spatial tables and fact tables; building KPIs; working with the MOffice Power BI product, i.e. concentrating on Power Pivot and Power BI.

Regarding the use of presentation software, it can be concluded from the survey results that the only presentation software that is known by employees is Powerpoint (and only 47% claim to have a high level of proficiency). Some newer products (e.g. Prezi, of which 70% claim to have no knowledge) are becoming increasingly popular in different environments (business, academia, etc.) and it would be extremely useful for administrative staff to become familiar with this type of tool. Moreover, being able to use it will help in particular to develop both the presentation skills of employees and their digital competence in general. Alongside this, there are many free and accessible online presentation and visualisation tools on the internet that can help employees to present complex visualisations and concepts, through infographics, mind maps and more.

2. Use of online applications and cloud technologies

As can be seen from the first 3 areas, the skills to work with online platforms either for communication, to work on shared content or to create online content is not high. Online platforms and cloud applications are still something undefined for a large part of civil servants, and their use would lead to facilitating work processes, mastering the possibilities that the digital environment provides, and a more comprehensive look at how to use the digital world to improve processes in administration and how to easily find solutions for given cases, whether analog or digital. Increasing skills in this area is very important for introducing quality e-government, finding solutions to technological problems as well as helping teleworking.

3. Content creation

The low score in the area of content creation is to be expected due to the nature of civil service work. Given the development of new technologies and the increasing use of different types of content (video, audio, etc.), improving staff competences in handling audio digital and graphic content, as well as how and when it needs to be used, will allow staff to make better use of the possibilities of the digital environment, give them the skills to work better with

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subcontractors in this field, and make communication with citizens easier, accessible and transparent.

Based on the results, it would be useful to develop courses focused on online work on shared content - collaborative work on text documents or spreadsheets. Only 30% of the respondents indicated that they use collaboration tools, and only 29% take part in open access online training (so-called MOOCs). Only 26% of respondents attend online courses and 25% are interested in events in this field. However, 81% of respondents felt that they were aware of their level of digital skills and knew when they were not up to the demands of their jobs.

4. Citizen engagement

The study raises an interesting question, namely the use of digital environment by public officials for the purpose of citizen participation, consulting websites of public institutions or civil society organizations. The Internet provides many opportunities for citizen engagement in public affairs, decision-making, etc. But it also provides opportunities for public officials to have more direct contact with citizens and with different organisations, for consultations, surveys, etc. The use of the digital environment and the development of various online channels is very important for improving communication between citizens and local and central government. Increasing the competence of the public administration in this area is essential for the development of civil society and for the introduction of quality e-government.

5. Copyright

The results in terms of knowledge of copyright are extremely low, which is why increasing competence in this area is of great importance. Only 53% indicated that they were aware of the consequences of downloading illegal content and 19% knew how to use copyrighted content.

6. Problem solving

In this area, 40% say that in the event of a technical problem they can find an alternative way to achieve similar results to those targeted. Here the competence is more complex than in other areas and it could be said that it requires a high general digital competence that would allow employees to quickly find solutions to all kinds of digital problems, to find alternatives to the tools used across different devices and to find the most appropriate ways to achieve the goal in a digital environment. If we link the Content Creation area to the Programming Skills part, we see that very few of the administration have such skills, which is understandable. But still, for the creation of quality e-services and for the presence of the administration in the online environment in a professional way, for a more productive work with ICT specialists and with subcontractors, there is a need to increase skills related to what digital transformation is, how to digitize administrative processes, how to design online services. Design skills are neglected in administration, and they could support the work of employees and give them new knowledge on how to take advantage of the digital environment to facilitate their work and especially in communicating with citizens. Appropriate areas of training could be user-centred service design (Human Center Design, UX design, Service design) and others.

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7. IT Experts

The survey is designed to determine the competence of government employees rather as citizens and no judgement can be made on the skills of IT experts in the administration on the basis of the determined statements. It is evident from the results that a small proportion of participants do have high IT expertise. However, the survey is not sufficient to provide guidance for the development of IT experts, which would be the purpose of further analysis that could be carried out in a later stage, in cooperation with the State Agency for Electronic Government, in order to determine the needs of IT experts working in the administration.

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