Acta Universitatis Sapientiae, Philologica, **14**, 2 (2022) 1–14

DOI: 10.2478/ausp-2022-0012

Digital Competence of Language Teacher Trainees. A Comparative Study

Katalin HARANGUS
Sapientia Hungarian University of Transylvania (Cluj-Napoca, Romania)
Department of Teacher Training, Târgu-Mureş
katalin@ms.sapientia.ro
https://orcid.org/0000-0001-7041-4039

Gabriella KOVÁCS
Sapientia Hungarian University of Transylvania (Cluj-Napoca, Romania)
Department of Applied Linguistics, Târgu-Mureş
kovacs_gabriella@ms.sapientia.ro
https://orcid.org/0000-0002-0227-8618

Abstract. Digital competence plays an essential role in the work of teachers in general, and it has its specific challenges regarding language teachers. In their future profession, teachers will need to be able to respond to challenges of the digital world and to develop 21st-century competencies in a conscious, goal-oriented way supported by digital tools. Our survey proposes to map the level of development of digital competence among first-year translation and interpretation students, also enrolled in language teacher training. The tool of the survey was a questionnaire. In compiling the questions, we relied on the digital competence elements of the five competence areas of the European Union DigComp 2.1 reference framework. The results suggest that students' digital competence level is advanced, but there are areas and competences that require targeted intervention.

Keywords: teacher training, translation and interpretation students, DigComp 2.1 competence areas

1. Introduction

In Romanian higher education, teacher training takes place within the framework of teacher training institutes, which are under the authority of universities but can operate as independent institutions as well. Teacher training programmes are organized at two levels of education (Level I and Level II) during undergraduate studies (in our case, in parallel with studying translation and interpretation) or in the form of postgraduate studies (after obtaining a university degree and a master's degree). Completion of the Level I pedagogical module provides an

opportunity to work as teachers in the compulsory phase of public education (from preparatory grade to the 10th grade). By completing the Level II module, the teacher candidate will have the possibility to teach in all grades (from preparatory to the 12th grade) and in university education.

The Teacher Training Institute of Sapientia University operates in three locations (Târgu-Mureş, Miercurea Ciuc, Cluj-Napoca) and provides training in three fields of study: technology and engineering, language and communication, humanities and social studies. The goal of the institution is the training of teacher candidates who will be able to convey the knowledge content of their field and to develop key competencies using effective pedagogical methods and procedures (Pletl (ed.) 2019).

Due to the emergence of new digital tools and applications, the development of digital competencies is a considerable challenge in education. The subject Computer Aided Education, which is included in the national curriculum of teacher education, provides an opportunity to develop students' digital literacy and competency.

In this study, we propose to examine the level of digital competency among the first-year translation and interpretation students also enrolled in language teacher training, as compared to students from other fields in order to determine the areas and levels of proficiency where there are appropriate results and where there are deficiencies. We also assess the knowledge, skills, and abilities that need to be further developed in order to help them become proficient in the effective use of digital resources as teachers.

2. European frameworks of reference for digital competence and for languages

As a result of the European Commission's 2005 study *Learning and Skills in the Digital Age*, the Joint Research Centre (JRC) published an EU document in 2013 providing a common reference framework for the interpretation and development of digital competences. In a document known as DigComp 1.0, the European Digital Competence Framework for Citizens defined a level of proficiency in five other competence areas in three dimensions (basic, intermediate, and advanced).

The current document, DigComp 2.1 (Carretero et al. 2017), distinguishes eight proficiency levels in five competence areas in four dimensions: basic level (levels 1 and 2), intermediate level (levels 3 and 4), advanced level (levels 5 and 6), and master level (levels 7 and 8). It illustrates the overlapping levels of digital competencies through practical examples. The Framework is an EU basic document that defines digital competence levels and thus makes them measurable. The following competence areas are identified in the framework as part of digital competence: information and data literacy; communication and collaboration; digital content creation; safety; problem solving.

In the field of digital transformation of educational institutions, education and learning, a number of other frameworks and assessment tools have been developed with the aim of helping to assess and identify areas of competence that need targeted development. These include the DigCompEdu and DigCompOrg digital competency frameworks and the OpenEdu framework agreement.

DigCompEdu is "a scientifically sound framework describing what it means for educators to be digitally competent. It provides a general reference frame to support the development of educator-specific digital competences in Europe."[1] It describes 22 competences within six areas. Instead of technical skills, the framework focuses on giving details regarding how digital technologies may be used to innovate and enhance training and education.

According to Redecker (2017), the six main areas of competence are the following:

> Area 1: Professional engagement
> Using digital technologies for communication, collaboration and professional development.
> Area 2: Digital resources
> Sourcing, creating and sharing digital resources.
> Area 3: Teaching and learning
> Managing and orchestrating the use of digital technologies in teaching and learning.
> Area 4: Assessment
> Using digital technologies and strategies to enhance assessment.
> Area 5: Empowering learners
> Using digital technologies to enhance inclusion, personalisation and learners' active engagement.
> Area 6: Facilitating learners' digital competence
> Enabling learners to creatively and responsibly use digital technologies for information, communication, content creation, wellbeing and problem-solving. (Redecker 2017: 16)

The progression model proposed in DigCompEdu was designed to help educators discover and understand their strengths and weaknesses. It describes six different levels or stages of digital competence development. These levels are linked to the six proficiency levels ranging from A1 to C2 used by the Common European Framework of Reference for Languages (CEFR),[2] for easier use and understanding.

1 https://publications.jrc.ec.europa.eu/repository/handle/JRC107466.
2 https://www.coe.int/en/web/common-european-framework-reference-languages/level-descriptions.

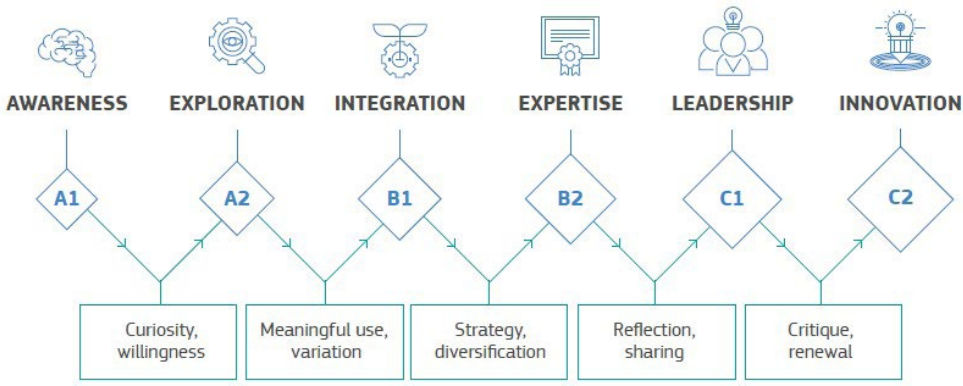


Figure 1. *DigCompEdu progression model* (Redecker 2017: 29)

DigCompOrg[3] is a competency framework describing the digital competencies of educational institutions, the aim of which is to help the institution's internal motivation-based self-development by assessing the IT infrastructure and to provide policy support for planning various short- and long-term strategies and specific interventions. It contains seven main competency areas:

1. Leadership and management practices,
2. Teaching and learning practice,
3. Professional development,
4. Assessment practice,
5. Content and curricula,
6. Collaboration and networking,
7. Infrastructure.

OpenEdu[4] is a framework agreement designed to provide a specified number of free educational applications and services to institutions. It provides students with an in-house operating system, free office suites, and a multimedia-based learning environment. It recommends educators to monitor, account for, and evaluate the process of teaching and learning. It is "a mode of realising education, often enabled by digital technologies, aiming to widen access and participation to everyone by removing barriers and making learning accessible, abundant, and customisable for all. It offers multiple ways of teaching and learning, building and sharing knowledge, as well as a variety of access routes to formal and non-formal education, bridging them."[5]

3 https://joint-research-centre.ec.europa.eu/european-framework-digitally-competent-educational-organisations-digcomporg_en.
4 https://joint-research-centre.ec.europa.eu/what-open-education_en.
5 https://joint-research-centre.ec.europa.eu/what-open-education/openedu-framework_en.

3. Previous studies

As part of a previous nationwide research related to the situation and problems of mother tongue vocational education in a bilingual education system, focusing on the conditions and participants of education (Pletl 2016), we conducted a questionnaire survey in the 2015–2016 school year, which examined the proficiency of teacher trainees in the use of ICT tools and their views on the role of ICT in education. The experience gained in this analysis helped us to design our current research. Students considered it necessary to use ICT tools in education. The usefulness of the knowledge available on the Internet in the learning process was emphasized, as it allowed home-based, self-paced learning. They had skill-level user competence, could use web 1.0 applications with a little help, but they already needed help with web 2.0 applications, and they could only be considered experienced in using certain online services (Harangus 2015).

Our research conducted in the 2019–2020 academic year can be considered a similar antecedent, in which two months after the transition to online education, we examined how teachers and students in higher education felt about the efficiency and form of online education. The students' answers supported the results of our previous research, meaning that the use of digital tools in everyday education was considered necessary, but the transition to full online education did not prove to be effective for them (Harangus et al. 2021).

Both studies show that the target groups are not actively involved in editing information and sharing knowledge. Although they are part of an Internet generation for whom opinion forming and community collaboration are an integral part of everyday life, they do not take the opportunity to share knowledge and produce and share content based on interaction.

In another study (Kovács 2020: 62), we demonstrated that:

> the concept of training language teachers only for face-to-face teaching (eventually complemented by the use of some ICT tools) has to be abandoned, and a more flexible approach is needed, with a stronger emphasis on the seemingly endless and continuously developing possibilities offered by familiarity with the experience and good practices accumulated in the domains of online, blended and adaptive learning and teaching.

Our present research is the initial stage of a three-year longitudinal study. We conducted it with the aim of exploring among teacher trainees what skills, abilities, and knowledge need further development and improvement based on self-evaluation.

4. Methodology

Our target group consists of first-year teacher candidates of Sapientia University, Faculty of Technical and Human Sciences, Târgu-Mureş. We proposed to provide a comprehensive picture of their digital competence levels. We started from the assumption that digital education can only be successful and productive if students have the necessary skill level to use digital competence. For our questionnaire, we used the practical examples of the DigComp 2.1 digital competence framework for citizens. Therefore, we designed the set of questions according to the five competence areas identified as part of digital competence: information and data management: 4 items; communication and collaboration: 4 items; digital content production: 3 items; security: 3 items; problem solving: 4 items. According to each area, the assessment of knowledge was measured on a scale from 1 to 7, where 1 meant *not at all* and 7 meant *completely*. Instead of 21 competences, the questions referred only to 18, omitting those that are not closely related to learning such as the Health and Welfare Protection or Environment competences in the Safety competence area.

The survey was conducted in the second semester of the 2020–2021 academic year, among 106 (80% of the total number) first-year teacher trainees. Distribution of students by fields of study: engineering sciences: 44.30%, humanities (translation and interpretation studies): 30.38%, and social sciences: 25.32%. In this article, we focus on the results of translation and interpretation students (also language teacher trainees), comparing their answers with those of students from other fields.

5. Results

With the introductory question, we asked students to determine their general digital competence level necessary for studying. We used the levels proposed by the DigCompEdu framework: Newcomer (A1), Explorer (A2), Integrator (B1), Expert (B2), Leader (C1), and Pioneer (C2) (Redecker 2017: 30). Students were provided an explanation about what each competence stage meant (e.g. Newcomer (A1) – rarely uses digital technologies for communication or Pioneer (C2) – analytically examines communication strategies and renews them), which they understood easily because the stages are linked to the proficiency levels of the Common European Framework of Reference for Languages (CEFR).

As it is shown in *Chart 1*, most students believe that they can integrate digital technologies effectively (Integrator 44.83%) and use them confidently, creatively, and critically (Expert 35.63%) in learning. More language teacher trainees (translation and interpretation students) consider themselves integrators and

pioneers than the average, while there are no self-declared newcomers, explorers, or leaders among them.

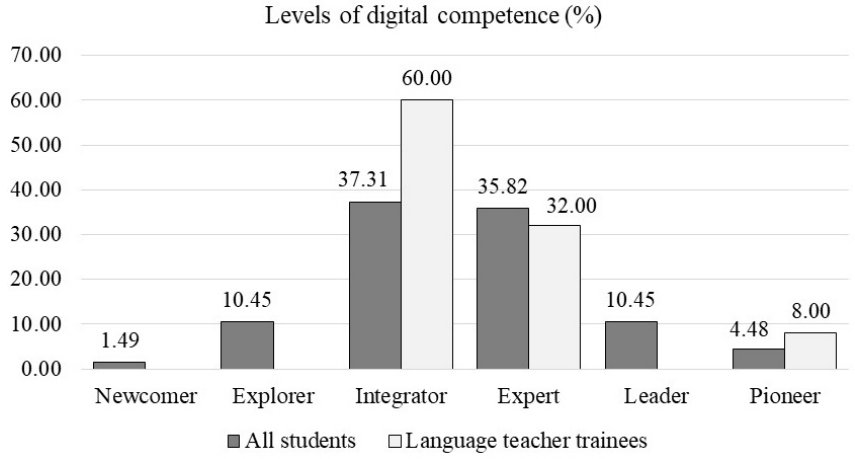


Chart 1. *Self-classification of students based on competence levels*

The following questions were designed to determine students' level of competencies belonging to each competence area.

Information and data literacy competence includes the following:

– "to articulate information needs, to locate and retrieve digital data, information and content;

– to judge the relevance of the source and its content;

– to store, manage, and organise digital data, information and content."[6]

In our questionnaire, the following questions measured this competence (using a 1 to 7 scale):

To what extent can you:

– evaluate the reliability and authenticity of information sources;

– recognize digital content from a variety of sources suitable for creating a report;

– store information, data, and content in an organized and easily retrievable form;

– use various Internet search engines and search strategies to find the information you need?

According to the averages obtained (*Table 1*), students are able to use a variety of Internet search engines and search strategies to select the information sources they need. They can evaluate the validity and authenticity of the data, the received information and content. They have a backup strategy and can store content in an organized and easy-to-retrieve format.

6 https://joint-research-centre.ec.europa.eu/digcomp/digital-competence-framework_en.

However, some differences can be observed regarding the average of students from different fields of specialization. The average of engineering students is the highest (5.97) followed by language teacher trainees (5.69), while the level of social sciences students is significantly lower (p = 0.017).

Table 1. *Information and data literacy – Average of students from three different fields*

Specialization	Average
Engineering students	5.97
Translation and interpretation students	5.69
Social sciences students	5.36

Communication and collaboration competence includes the following:

– "to interact, communicate and collaborate through digital technologies while being aware of cultural and generational diversity;

– to participate in society through public and private digital services and participatory citizenship;

– to manage one's digital identity and reputation."[7]

In our questionnaire, the following questions measured this competence (using a 1 to 7 scale):

To what extent can you:

– communicate and collaborate digitally;

– select, adapt, and combine different digital solutions for effective communication;

– to present the results of individual or group work in digital form;

– to adapt the appropriate communication strategy in the digital environment to the given target audience (e.g. address)?

There is no significant difference between the three specializations (*Table 2*). Engineering and translation and interpretation students use a wider range of digital communication tools to communicate with each other, share information and content, and use online services more actively than social sciences students.

Table 2. *Communication and collaboration – Average of students from three different fields*

Specialization	Average
Engineering students	5.78
Translation and interpretation students	5.79
Social sciences students	5.43

7 https://joint-research-centre.ec.europa.eu/digcomp/digital-competence-framework_en.

Digital content creation includes the following:

– "to create and edit digital content,

– to improve and integrate information and content into an existing body of knowledge while understanding how copyright and licenses are to be applied,

– to know how to give understandable instructions for a computer system."[8]

In our questionnaire, the following questions measured this competence (using a 1 to 7 scale):

To what extent can you:

– create digital content (e.g. edit videos, audio, photos, presentations, text documents);

– apply copyright and licensing requirements for data, information, and digital content;

– write a computer program or macro to solve a task.

Student-estimated averages are lower in digital content creation (*Table 3*). The average of the technical students' level of competence (5.39) is the highest, significantly higher than that of their colleagues (average of translation and interpretation students = 4.37, p = 0.001; average of social sciences students = 4.38, p = 0.049). Due to their specialization, they are more familiar with licences required to use various information and content. They can alter settings or apply changes in various applications and programs. They are more familiar with the media tools that can be used to compile digital content.

Table 3. *Digital content creation – Average of students from three different fields*

Specialization	Average
Engineering students	5.39
Translation and interpretation students	4.37
Social sciences students	4.38

Safety includes the following:

– "to protect devices, content, personal data and privacy in digital environments;

– to protect physical and psychological health and to be aware of digital technologies for social well-being and social inclusion;

– to be aware of the environmental impact of digital technologies and their use."[9]

In our questionnaire, the following questions measured this competence (using a 1 to 7 scale):

To what extent can you:

– identify misleading information and prejudices;

– behave safely and responsibly in the online space;

8 https://joint-research-centre.ec.europa.eu/digcomp/digital-competence-framework_en.

9 https://joint-research-centre.ec.europa.eu/digcomp/digital-competence-framework_en.

– implement secure protection of personal data (e.g. with complex passwords, encryption, and frequent software updates)?

Student averages are high in assessing skills and competencies related to security (*Table 4*). There is no significant difference between the three fields of specialization: they all believe that they can behave safely and responsibly in the online space. They know how to implement secure protection of their personal information, identify misleading information and prejudices.

Table 4. *Safety – Average of students from three different fields*

Specialization	Average
Engineering students	5.88
Translation and interpretation students	5.70
Social sciences students	5.60

Problem solving includes the following:

– "to identify needs and problems and to resolve conceptual problems and problem situations in digital environments,

– to use digital tools to innovate processes and products,

– to keep up-to-date with the digital evolution."[10]

In our questionnaire, the following questions measured this competence (using a 1 to 7 scale):

To what extent can you:

– identify a technical problem that arises when using a digital learning platform,

– customize the digital environment to meet user needs,

– clarify conceptual problems in the digital environment,

– resolve technical situations in the digital environment?

The averages for problem solving are also lower compared to the other competence areas, similarly to the averages for digital content (*Table 5*). Compared to the averages of students with a basic technical education, the average of translation and interpretation students are significantly lower than the average of engineering students ($p = 0.001$). Translation and interpretation students are less able to identify a technical problem that arises while using a digital learning platform or to solve problems arising from the use of technology. It is difficult to choose the means to achieve a given goal. Even if they know the technologies that would help solve the problem, they may not be able to use it.

The results show that, overall, students perform well in all fields (*Table 6*). They are good in the areas of security (5.70), information and data management (5.69), and communication cooperation (5.79), while they are less experienced in problem solving (4.55) and digital content production (4.37).

10 https://joint-research-centre.ec.europa.eu/digcomp/digital-competence-framework_en.

Table 5. *Problem solving – Average of students from three different fields*

Specialization	Average
Engineering students	5.66
Translation and interpretation students	4.55
Social sciences students	4.98

Table 6. *Students' averages in different areas of competence*

	All students	Engineering students	Translation and interpretation students	Social sciences students
Safety	5.72	5.88	5.70	5.60
Information and data literacy	5.67	5.97	5.69	5.36
Communication and collaboration	5.66	5.78	5.79	5.43
Problem solving	5.02	5.66	4.55	4.98
Digital content creation	4.83	5.39	4.37	4.38

A comparison of the language teacher trainees' self-classification with their digital competence level assessed with the help of their answers to the questions (*Chart 2*) shows that almost all of them classified themselves in a lower category than where they belong to. The students underestimated the level of their own digital competence. Based on the scores of the questionnaire, they all belong to the top three categories. There is a weak correlation between the data, with the majority of students having a higher level of competence based on the questionnaire than where they initially classified themselves, but there were also some students whose self-classification was higher than their knowledge based on the questions.

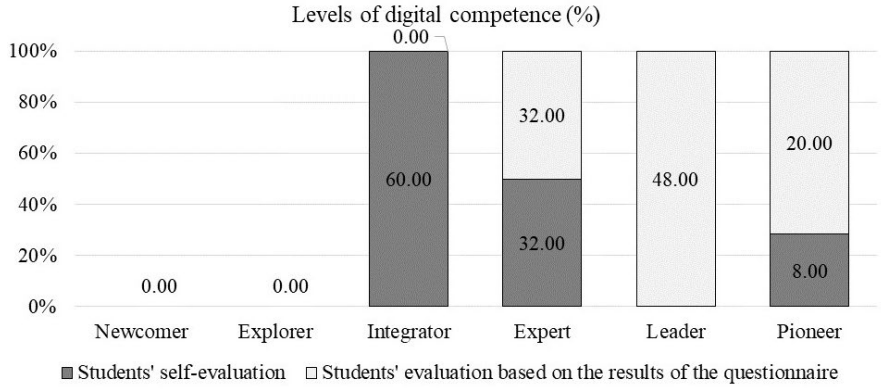


Chart 2. *Language teacher trainees' self-classification compared to their assessed levels based on the results of the questionnaire*

6. Conclusions

Digital competence is one of the eight key competences identified by the European Union. Its role in e-learning is decisive, and its lack hinders the realization of an effective learning process. It includes skills that may help develop other key competences. The aim of the IT subject in school education is the development of digital competence and knowledge. However, in reality, more emphasis is placed on computer use and less on actual IT knowledge. In high school, the chosen classes or specializations determine the number of hours per week in the subject of informatics and the content of the subject. The higher the number of hours per week they have in IT, the more emphasis is placed on developing digital competence. Students' level of competence entering university education is largely determined by the quantity and quality of the IT education they received in their school years.

One of the features of our measurement tool (questionnaire) is that it helps us classify students into categories corresponding to the European Digital Competence Framework for Teachers (DigCompEdu) based on self-assessment. The survey took place in the second semester of the first year of university studies, at a time when students had been studying online for a year, using digital technologies to communicate and access information. It is therefore surprising that about 7% of them consider that they do not have the digital competences necessary for studying.

The data of our series of questions assessing the students' digital competence level by competence area show an overall positive result. In all areas of the DigComp 2.0 framework, students scored significantly higher than the average, suggesting that their level of digital competence is advanced.

Not surprisingly, the averages of engineering students are higher in all fields. For admission, they must have a high school diploma in computer science, mathematics, or physics, i.e. they can enter university from high school classes where the teaching of these subjects is more emphasized. The scores of translation and interpretation students (language teacher trainees) and social sciences students are also higher than expected. Despite the fact that online education has been challenging, the tools, technologies, and strategies used for learning have developed their digital competence. Examining the variance values of the competence areas, it can be stated that there are students, regardless of their basic education, who lack certain competencies, so it is recommended to plan targeted development, focusing on their specific needs. The areas for improvement we have identified are those of digital content production and problem solving. Translation and interpretation students (language teacher trainees) may need to use these competencies in their future professions.

References

Carretero, Stephanie–Riina Vuorikari–Yves Punie. 2017. *DigComp 2.1: The Digital Competence Framework for Citizens with Eight Proficiency Levels and Examples of Use. https://publications.jrc.ec.europa.eu/repository/handle/JRC106281* (Last accessed: 09 May 2022).

Harangus, Katalin. 2015. Információs és kommunikációs technológiák ismerete és fontosságuk a tanárképzésben [Knowledge of information and communication technologies and their importance in teacher education]. In Rita Pletl (ed.), *Anyanyelvoktatás. A magyar tannyelvű szakközépiskolai oktatás helyzete* [Mother Tongue Teaching. The Situation of Hungarian-Language Vocational Secondary Education], 38–61. Cluj-Napoca: Ábel Kiadó. *https://www.abelkiado.ro/uploads/Pletlanyanyelv/Pletl%20-%20Anyanyelvoktatas%2007.pdf* (Last accessed: 09 May 2022).

Harangus, Katalin–Zsófia-Irén Horváth–Erzsébet Szentes. 2021. Transitioning to online education: Experiences and challenges. *INTED Proceedings*: 4717–4723. *https://library.iated.org/view/HARANGUS2021TRA* (Last accessed: 09 May 2022).

Kovacs, Gabriella. 2020. Online language teacher training – Challenges and new perspectives. *International Journal of Innovative Research in Education* 7(2): 53–63. *https://www.un-pub.eu/ojs/index.php/IJIRE/article/view/5470* (Last accessed: 09 May 2022).

Pletl, Rita. 2016. A vizsgálat kontextusa, célja, tárgya, módszerei [The context, aim, object, and methods of the study]. In Rita Pletl (ed.), *Anyanyelvoktatás. Adottságok és lehetőségek a magyar tannyelvű szakképzésben* [Mother Tongue Teaching. Features and Opportunities in Hungarian-Language Vocational Training], 27–35. Cluj-Napoca: Ábel Kiadó.

—— 2019. *Anyanyelvoktatás. A feladatmegoldástól a problémamegoldásig*. Cluj-Napoca: Ábel Kiadó. *https://www.abelkiado.ro/uploads/Pletlanyanyelv/Pletl%20-%20Anyanyelvoktatas%2008.pdf* (Last accessed: 09 May 2022).

Redecker, Christine. 2017. *European Framework for the Digital Competence of Educators: DigCompEdu*. Luxembourg: Publications Office of the European Union. *https://publications.jrc.ec.europa.eu/repository/handle/JRC107466* (Last accessed: 09 May 2022).

Online sources

https://www.coe.int/en/web/common-european-framework-reference-languages/level-descriptions (Last accessed: 09 May 2022).

https://joint-research-centre.ec.europa.eu/european-framework-digitally-competent-educational-organisations-digcomporg_en (Last accessed: 09 May 2022).

https://joint-research-centre.ec.europa.eu/digcomp/digital-competence-framework_en (Last accessed: 09 May 2022).