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TEACHERS' DIGITAL COMPETENCE: TOOLS FOR MEASURE AND SELF-ASSESSMENT

Pedagógusok digitális kompetenciái: mérő- és önértékelő eszközök

Digitalne kompetencije nastavnika: merni i samoprocenjujući instrumenti

The Digital Education Strategy of Hungary (2016) considers it as high priority to develop a proper framework and descriptors to measure teachers' digital competences. The relevance of tools to measure and self-assess teachers' digital competences is also underlined in the Hungarian qualification system of teachers working in public education. The Strategy lays special emphasis on the task to develop fine-tuned digital competence instruments for teachers and school-leaders for self-diagnosis and peer-assessment, too. In this paper, three international and two Hungarian research-based instruments will be focused on to measure teachers' digital literacy as well as their digital methodological competences. The main findings of a small-scale pilot study will reveal teacher's beliefs about a discussed digital competence tool to measure their digital literacy.

Keywords: teachers, digital competence, self-assessment, peer-assessment, measuring instruments

1. INTRODUCTION

It is a priority objective to make the measuring scales and instruments of teacher's digital competences more significant, for example in the Hungarian qualification system of teachers working in public education as it is stated in the *Digital Education Strategy of Hungary (Government Decree A 1536/2016. [X. 13.], 2016, pp. 70459–70461)*. The Strategy also underlines the importance of the application, and constant development of fine-tuned digital competence tools for students as well as teachers and

school-leaders for self- and peer-assessment purposes. Furthermore, it is also considered essential to establish a portal capable of distributing teachers' digital knowledge, autonomous self-development, self-assessment, self-reflection, the dissemination of digital contents and professional collaboration. Regarding teachers' self- and peer-assessment, the goal of the present study is to highlight two areas which are as follows: 1) teachers' digital competences/digital literacy, 2) teachers' digital/Information Communications Technology (ICT) methodological competences. Two Hungarian and three international digital literacy and ICT-methodology competence measuring devices suitable for self- and peer-assessment, which were developed based on scientific result, will be presented by reviewing the literature.

2. EUROPASS DIGITAL COMPETENCES – SELF-ASSESSMENT GRID (2015)

The ground of all digital methodological competences constitutes general digital competences. Consequently, Europass digital competences - self-assessment grid (2015) a part of the widespread *Europass CV* can be regarded as a basic step of teachers' self and peer-assessment. This scale distinguishes basic, independent and proficiency users divided into the following areas: information processing, communication, content creation, safety and problem resolution. *A Framework for Developing and Understanding Digital Competence in Europe (Ferrari, 2013)* developed by DigComp was created based on the results of literary reviews, case studies analyses, online surveys as well as workshops, interviews, expert reviews, presentations during a project in 2011–2012.

The instrument called *DigComp Digital Competence Framework for citizens 2.0* identifies twenty-one digital competences, which are presented in a chart, which consists of a self-assessment grid and a framework containing a detailed description of digital competences. The system contains the brief definition of competence, the descriptors of each level, some examples regarding knowledge and skills, the attitudes and two examples of how a particular competence can be applied for a specific purpose.

3. DIGCOMPEDU (2017)

To systemize and measure teachers' digital competences several Hungarian and international competence-frameworks have been made with different logic, specification and level of development. The *Digital Competence*

Framework for Educators at European Level (DigCompEdu) (Redecker, 2017) can be seen as a base of different Hungarian and regional initiatives as it can serve as a common standpoint regarding the characteristics of the crucial teacher digital competences in the member states, in different regions, educational institutions etc. DigCompEdu aims to identify and describe in detail teachers' digital competences and to provide a scientifically grounded tool, which is suitable to evaluate teachers' ICT-competence, as well as for self- and peer-assessment. Thus, it can be claimed that DigCompEdu is a validated background framework, which is suitable for the distribution of good practices across borders. The target population of the DigCompEdu framework are teachers at all levels and type of education including for example, teachers of special need students and teachers in informal educational environments, too.

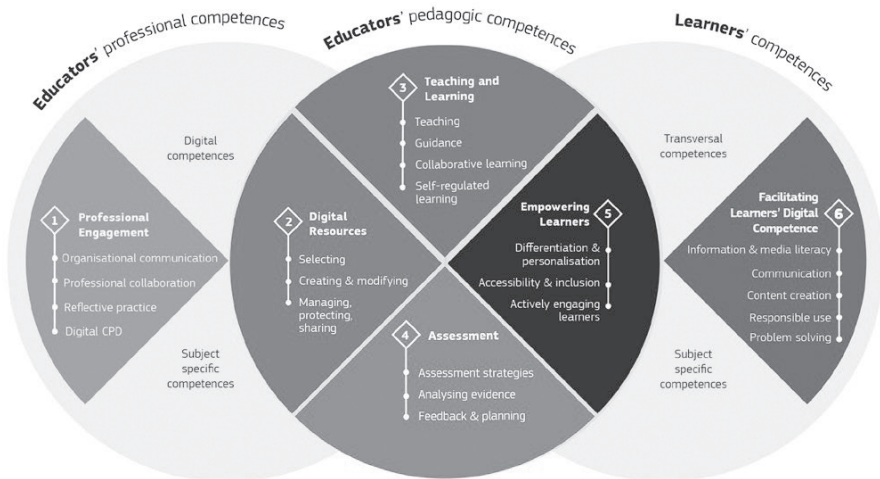


Figure 1: Synthesis of the DigCompEdu Framework (Redecker, 2017: 19)

The DigCompEdu framework created a coherent model reflecting on and synthesizing the existing measuring tools of teachers' digital competences (Figure 1), which enables teachers to have an overall assessment and development of their teacher's digital competence (Redecker, 2017: 13).

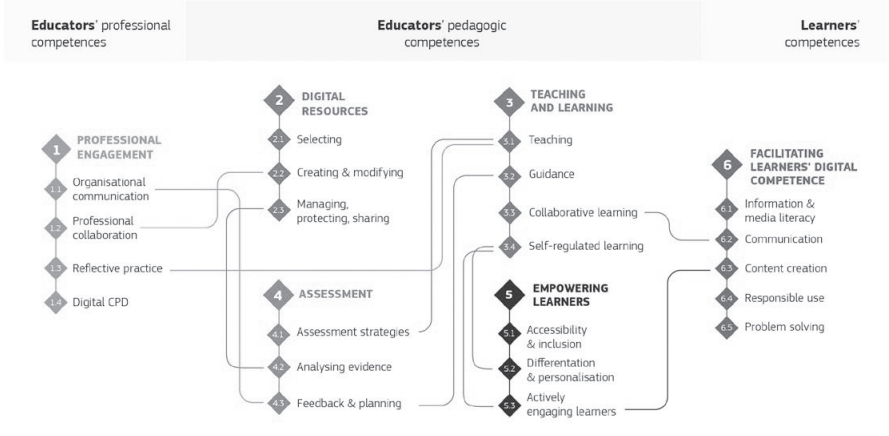


Figure 2: DigCompEdu Competences and their Connections (Redecker, 2017: 16)

The DigCompEdu framework extinguishes the following six areas: Professional Engagement, Digital Resources, Teaching and Learning, Assessment, Empowering Learners and Facilitating Learners Digital Competence, which comprise altogether twenty-two competences (Figure 2). Concerning all the twenty-two basic competences the competence descriptor is complemented with a list of typical activities. Figure 3 presents a six-level process model based on Bloom’s revised taxonomy (Anderson and Krathwohl, 2001). There is also an attached self-assessment rubric.

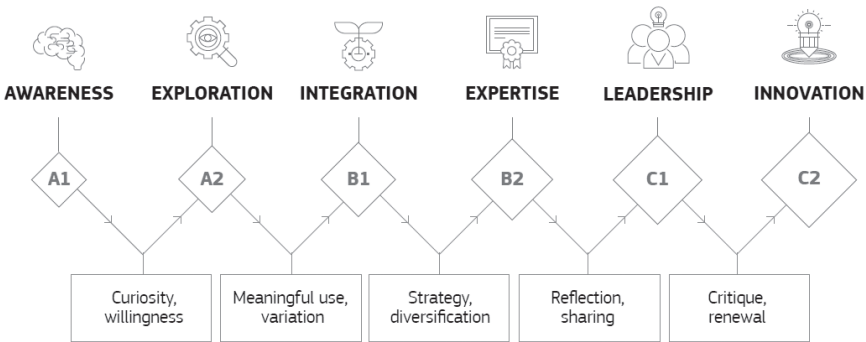


Figure 3: DigCompEdu Progression Model (Redecker, 2017: 29)

This model helps teachers to identify their digital strengths and weaknesses. The six competence areas are linked to the levels of Common European

Framework of Reference for Languages (CEFR), that is it comprises levels from A1 to C2 (Newcomer (A1), Explorer (A2), Integrator (B1), Expert (B2), Leader (C1) and Pioneer (C2). The descriptors of DidCompEdu also serve as drives since they motivate the teacher to achieve the next level, and to constantly develop (Redecker, 2017: 29).

4. DIGIMINA (2014)

DigiMina (Põldoja, Väljataga, Laanpere and Tammets, 2014) is a web application developed in Estonia, which functions as a part of a larger digital eco-system, for example the Estonian Koolielu educational portal, teachers' e-portfolios, register of teachers' qualification at the Estonian Ministry of Education and Research as well as several e-learning environments, all of which are used by teachers during they everyday work. For example, a test item is not developed by DigiMina, but it is imported. The teachers' competence profiles created by DigiMina can be linked and can be hyperlinked in other social media systems and international teachers' portals (Põldoja, Väljataga, Laanpere and Tammets, 2014).

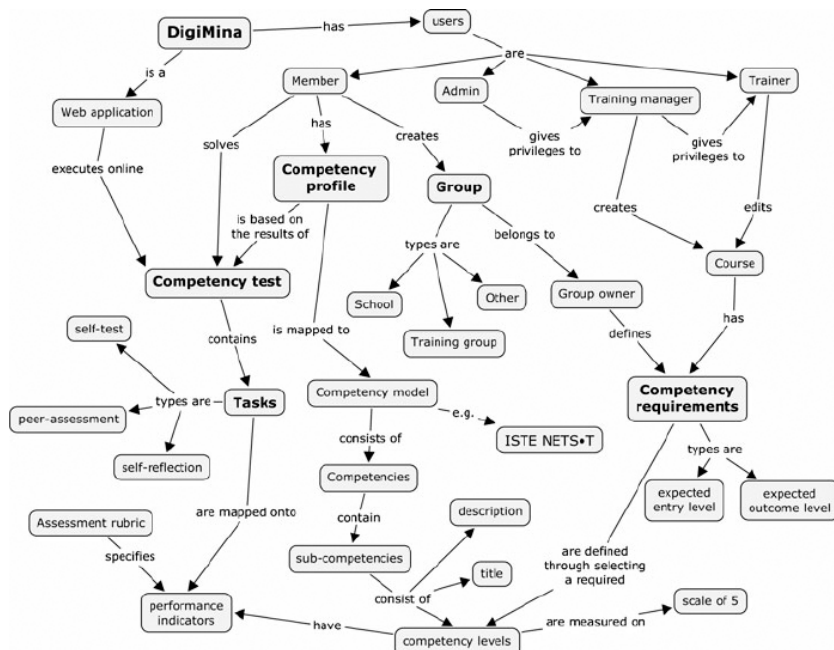


Figure 4: Key concepts of DigiMina (Põldoja, Väljataga, Laanpere és Tammets, 2014)

DigiMina consists of five components: a competence test, exercises, a competence profile, a group as well as competence criteria (Figure 4). The central element is a competence test, which is made up of twenty competences in five groups, where the evaluation is done on a five-point scale. Prior to the completion of the test the user does self-assessment in all the five competence areas and they have to fill in the test according to their self-evaluated current level of digital literacy. During the filling-in process the test can be saved and later it can be continued. To check development the test can be completed several times. The exercises of the competence test are placed and grouped along performance indicators. The tasks based on the method of evaluation can be divided into three groups: automatically evaluated self-test items, peer-assessed tasks and self-reflection exercises. An example of a self-test exercise is a screencast, to which a multiple-choice test belongs, where the teacher uploads some teaching material into the repository and during the process makes several mistakes. An example of peer-assessment can be an adaptation task, where the teacher has to adapt a particular learning guide to his/her own content (e.g. age of the target students, topic, software). The evaluation of the adapted learning guide is done via qualitative peer-assessment by another teacher. The peer-assessment exercise can be characteristically applied in case of higher competences, where the user has to write problem-solving for an authentic problem, which is evaluated by a DigiMina user with the same or higher level competences. An example of a self-reflection exercise is when the teacher has to reflect on the digital learning resource created by himself/herself. After the completion of the exercises the system makes a competence profile for the user. This profile is illustrated by a diagram, which contains the levels of all the twenty competences. Subsequently, these results can be compared to the means of the other users or DigiMina groups. The profile can be share with the target people. As a result, DigiMina can be seen as a ground for the development of other criterion systems, too.

5. IKER SELF-ASSESSOR TO MEASURE DIGITAL COMPETENCES

The result of IKER developer (ProgressConsult, 2015) is a self-assessment chart created with the commission of Kormányzati Informatikai Ügy-nökség (Government Informatics Agency), which provides guidance for the interpretation of digital key competences. Unlike Europass, IKER provides help for the self-assessment of digital competence (and peer-assessment) at four levels (based on the Hungarian Qualification Framework) at four

levels divided into five areas (based on DigComp), which are the following level-description categories: knowledge, ability, attitude, autonomy and responsibility (Table 1). These can be used not only in Hungarian, but in European context, as well.

European LLL tools		Hungarian LLL tools	
Levels of the European Qualifications Framework	Levels of the Framework for Developing and Understanding Digital Competence in Europe	Levels of the IKER	Levels of the Hungarian Qualifications Framework
8	C		8
7			7
6			6
5	B		5
4		4	4
3		3	3
2	A	2	2
1		1	1

Table 1: IKER levels compared to other European and Hungarian LLL tools

Along with IKER Self-assessment grid, IKER – Self-assessor with examples, as well as A Practical Guide for the use of IKER Reference Framework are also available. In sum, it can be claimed that IKER is suitable to serve as a digital competences measuring instrument.

6. SELF-ASSESSMENT REFERENCE BOOKS FOR PUBLIC EDUCATION INSTITUTIONS

Self-assessment reference books written for public education in Hungary (Oktatási Hivatal, 2016a, 2016b) are the cornerstones of teachers’ self-assessment and self-reflection. According to these books, the tools of teachers’ self-assessment are document analysis (e.g. earlier uploaded modified self-development plan, pages of institutional self-evaluation regarding the teacher, syllabus and related documents, lesson plans and plans of different types of classes, register, students’ exercise-books), lesson observation, teacher interview, teacher self-assessment questionnaire as well as colleague questionnaire applied in teachers’ self-assessment.

The most important method of teachers’ self-assessment is classroom observation which is grounded on a particular observation sheet, which takes into consideration the characteristics of the institution, the educational type, and which is complemented with peer-assessment. The classroom observation is carried out by a colleague named in the self-assessment plan. Subse-

quently, during the feedback another colleague can also participate if it is requested by the teacher. The observation sheet contains “To what extent were the applied methods, work forms competent with the up-to-date scientific knowledge related to the given subject?”, which can constitute digital competences and the methodological knowledge of a digital teacher (2016a: 29).

Further review of the literature should focus on empirical studies on the validity and credibility of the results of instruments developed to self-assess digital competence.

7. PILOT STUDY

A small-scale pilot study was conducted to highlight teachers' beliefs on DigCompEdu (Redecker, 2017) to assess their own and their peers' digital competences in educational contexts. A focus on this scientifically based validated instrument is relevant as it can be regarded as a common ground in an international context. The main research question was how teachers perceive the relevance of an internationally standard instrument to be able to measure their own and their colleagues' digital competences. The participants were two female Hungarian teachers of English (T1 aged 56, T2 aged 37) working at a secondary school public education, and who were invited to do a think-aloud completion of DigCompEdu (Redecker, 2017) as well as a semi-structured interview related to their think-aloud session and opinions on teachers' digital competences. The aim was to explore how they interpret the goal, the structure and the scales of DigCompEdu. As the first step of the data collection the participants were requested to read a brief introduction to DigCompEdu and then utter their thoughts about the self-assessment scales in six categories, which constitute twenty-two competences (see Figure 2). The participants were asked to record their thoughts during their self-assessment process in their home, and they could interrupt and resume this activity according to their space as it contained twenty-two competency scales. Subsequently, the interviews were carried out, during which the participants revealed their thoughts about the self-assessment of their own and their peers' digital competences in teaching. The preliminary findings show that both participants ranked themselves as A2-B1-level users as far as Professional Engagement, Digital Resources and Teaching and Learning are concerned. That is they consider themselves as explores and integrators in the afore-mentioned areas. To communicate in their profession, they use different communication channels with their students, colleagues (e.g. share good practices, new ideas, do peer learning etc.) and parents respecting the netiquette. Also they browse the Internet for various professional

development opportunities (e.g. training courses, projects etc.). They have discovered digital platforms from which they can derive resources and adapt their own teaching materials respecting the copyright regulations. Furthermore, they exploit ICT devices, for example laptop, projector, whiteboard or tablets available at school as well as they inspire their students to apply their digital devices in their learning processes. It must be emphasized that concerning Assessment, Empowering Learners and Facilitating Learner's Digital Competence they put themselves into lower, A1-A2 newcomer and explorer categories. In other words, the participant teachers do not tend to use digital evaluation formats. For example, they edit tests digitally which are distributed in paper format. However, they use electronic school record and register. As far as the accessibility of digital devices is concerned, they intend to use the school devices and rarely use them for home assignment, because there are disadvantaged students who cannot get access to Internet at home. Sometimes they use online quizzes, which are suitable for mixed-ability classes. Finally, they motivate their students to use search engines to collect information, but they do not touch upon the issues of protecting passwords, privacy etc. The interviews yielded that the participants found the completed self-assessment instrument motivating and thorough, thought-provoking, but time-consuming. They expressed their lack of confidence and competence regarding peer assessment as they do not have enough necessary information about their colleagues' digital competences. They believe that self-assessment and peer assessment are beneficial and crucial in the long-run, however, much time, practice and experience are essential to do it automatically, "properly" and with confidence.

8. SUMMARY

In the 21st century digital era, it is crucial for teachers to integrate the benefits of digital devices into their teaching and their students' learning processes. Also there is an increasing demand for scientifically based standard instruments for teachers to assess their own and their peers' digital competences in their teaching. This paper aimed to provide a brief overview of five tools (three international and two Hungarian) to measure and self-assess teachers' digital competences. Furthermore, a small-scale pilot study revealed some preliminary results of teachers' beliefs on self-assessment as well as peer-assessment regarding teachers' digital competences. Due to the qualitative sample size generalizations cannot be drawn from the presented findings of the two think-aloud sessions and semi-structured interviews. Further data-gathering, which is in progress, is essential to highlight teach-

ers' conviction about the nature of measuring their digital competences in more detail.

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Pedagógusok digitális kompetenciái: mérő- és önértékelő eszközök

Magyarország Digitális Oktatási Stratégiájában (2016) prioritásként jelenik meg, hogy kidolgozásra kerüljön a pedagógusi digitális kompetenciák mérésére alkalmas keretrendszer, valamint a hozzá tartozó deskriptorok. A digitális kompetenciák mérésére és az önértékelésre alkalmas eszközök kérdése relevánsnak tekinthető a magyar közoktatási pedagógusi minősítési rendszer miatt is. A stratégia különös hangsúlyt fektet arra, hogy megalkossanak a pedagógusoknak és az oktatási intézmények vezetőinek egy öndiagnosztizáláshoz és társértékeléshez is alkalmazható, jól kidolgozott digitális kompetenciamérő eszközt. Ebben a tanulmányban három nemzetközi és két magyar, kutatási eredményeken alapuló eszköz kerül bemutatásra, amelyek a pedagógusi digitális műveltség és a digitális módszertani kompetenciák mérésére készültek. Továbbá, egy kisebb volumenű pilottanulmány képet nyújt a pedagógusi nézetekről és tapasztalatokról egy, a pedagógusi digitális kompetenciák mérésére kifejlesztett eszköz tekintetében.

Kulcsszavak: pedagógusok, digitális kompetencia, önértékelés, társértékelés, mérő-eszközök

Digitalne kompetencije nastavnika: merni i samoprocenjujući instrumenti

U digitalnoj obrazovnoj strategiji Mađarske (2016) kao prioritet postavljen je zadatak da se razvije prigodan okvir za merenje pedagoških digitalnih kompetencija, kao i pripadajućih deskriptora. Pitanje instrumenata za merenje digitalnih kompetencija i samoprocenjivanje možemo da smatramo relevantnim i zbog mađarskog obrazovnog i pedagoškog sistema vredno-

vanja. Strategija poseban naglasak stavlja na stvaranje dobro razrađenog digitalnog instrumenta za merenje kompetencije nastavnika i rukovodioca obrazovnih institucija, koji se takođe može koristiti i za samodijagnostiku i samoprocenivanje. U ovoj studiji predstavljena su tri međunarodna i dva mađarska digitalna instrumenta zasnovana na istraživanjima akoja su osmišljena za merenje digitalne pismenosti i digitalnih metodoloških kompetencija pedagoga. Pored toga, mala pilot studija pruža uvid u stavove i iskustva prosvetnih radnika sa instrumentima razvijenim za merenje digitalnih kompetencija nastavnika.

Ključne reči: nastavnici, digitalna kompetencija, samoprocena, merni instrumenti

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