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THE APPEARANCE OF DIGITAL COMPETENCE IN THE WORK OF HEALTH SCIENCES EDUCATORS – A CROSS-SECTIONAL STUDY

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Abstract

The digital competence of health sciences educators is important for the delivery and development of modern education and lifelong learning. The aim of the study was to assess appearance of digital competence in the work of Finnish health sciences educators and to determine whether educators' background factors are related to the areas of digital competence appearance. The European Framework for the Digital Competence of Educators was used to as a theoretical background. The participants were Finnish health sciences educators (n = 388). Data were collected by quantitative survey and statistically analyzed. Results show that health sciences educators had participated in continuing education to develop their expertise and used a variety of digital methods and materials. Educators need more competence to improve healthcare students' ability to use digital technology. In the area of Teaching and Learning, educators under the age of 40 rated the appearance of digital competence as better than did those between the ages of 40 and 49. In the future, health sciences educators' basic and continuing education could take into account the competence requirements for digital competence, and educators' expertise must be increased in areas where digital competence does not appear strong.

Keywords

Competence; Digital Technology; Education; Nursing; Teachers

Introduction

The digitalization of society has received consistent attention during the last decade.[1,2] In the spring of 2020, the global COVID-19 pandemic closed educational institutions and instantly moved teaching online.[3,4] The increasing implementation of technology and digitalization has been and will be affecting also nursing practice and nursing education.[5,6] This places new competence requirements on health professionals. Undergraduate nursing students should have the digital competence to be able to work in the healthcare fields of the future.[5,7-9] With this development, educators' digital competence has been a topic of conversation. Research and development from the perspective of health sciences educators' education is required to ensure that the education meets the competence requirements of the ever-evolving field of healthcare education.[5,6,8,10]

The development of educators' digital competence is important in nursing education[6] for the growth of graduating students' digital competence.[7] Nurse educators must recognize the 21st century's challenges [7] and current conditions faced by health services[4] to ensure that students meet the competence requirements and maintain a high quality of care.[4,7] From the point of view of the development and evaluation of nurse educators' education, it is important to discuss how digitalization should be integrated into teaching and learning.[5,6,11]

Healthcare education can be developed with digital solutions, such as enabling access to distance or flexible learning. This could allow more students to participate in the education. For its part, that can address the global healthcare workforce shortage.[12] To develop and harmonize education internally, information on competence requirements is needed.[3,13,14] This paper reports on health sciences education from the perspective of social, healthcare, and rehabilitation educators' digital competence. Henceforth, in this paper, the term health sciences educator is used.

Background

Digital competence of educators

Digital competence can be broadly defined as the confident, critical, and creative use of different technologies to achieve goals related to work, employability, learning, leisure, inclusion, and participation in society.[2] With reference to the European Union, digital competence is one of the eight key competences for lifelong learning and is essential for participation in our increasingly digitalized society.[15] There are numerous definitions, which vary depending on context, and they are also used synonymously. For example, the concepts “digital competence” and “digital literacy” have been used in the literature. Digital literacy has been used mainly in the UK, US, and Asia, whereas digital competence has been used mainly in Continental Europe and South America.[16] Digital competence from the perspective of the health sciences educator has been focused on less, and more research is needed.[11,17]

The digital competence of a health sciences educator has not been defined, but the required competence can be described by the competence requirements set by the digitalized society and the field of health sciences education (Figure 1). Educators have a responsibility to teach both the suitable content and the necessary digital age skills.[18] The pedagogical methods used should meet students’ needs.[19] According to McDonald et al’s[20] integrative review about e-learning and nursing assessment skills and knowledge, when e-based learning and traditional teaching methods are used suitably together, it creates a great learning style. Other studies have brought up similar findings. Digital mobile learning interventions,[21] digital environments,[9] and digital collaborative learning[8] have been reported as suitable for nursing education[8,9,21] and health professionals’ education.[12]

The need for face-to-face teaching seemed to be more pronounced after the beginning of the COVID-19 pandemic.[4] Although e-based learning programs provide a flexible teaching method, e-based learning alone does not completely replace face-to-face teaching; for example, it lacks patient contact.[20] Thus, the use of different teaching methods enables the attention and involvement of distance and face-to-face students.[19] Therefore, there is a need

to integrate digital technology in the learning programs and examine the impact of integration on educators and students.[5, 22]

Health sciences educators are aware of the possibilities of what digital technology can offer, and they have a positive view on how the technology could be included in education.[11] They have been ready to adopt new digital methods.[18] However, this may require resources (e.g., digital technology, organizational support, time, training) and willingness to apply new digital solutions.[19] The educators' own attitude toward digitalization contributes to the development of teaching practice.[23] Positive self-efficacy or self-perception in the use of digital technology promotes the further development of digital competence.[1,5] To develop health sciences educators' digital competence in their work, broader knowledge is needed to plan and implement the necessary education and related assessment instruments.[11,13]

The European Digital Competence Framework for Educators (DigCompEdu framework)

As there is no single framework or definition of digital competence so far,[1,24,25] various frameworks for digital competence have been used (Figure 1). They all describe how technology can be integrated into education. In addition, they can be used to identify education needs for educator and preservice educator professional development to develop digital competence.[1,24] There are differences in the structures and terms used in the frameworks and in how broadly the integration of technology in the educators' work is seen.[24]

Insert Figure 1.

When utilizing existing frameworks, users need to be aware of the frameworks' structures and methodology. The suitability of the framework for the context should be assessed.[10,25] The European Framework for the Digital Competence of Educators (DigCompEdu framework) has been developed using expert consultations and by mapping, becoming

familiar with, and analyzing the existing international frameworks, self-assessment instruments, guidelines, conceptual models and instruments related to educators' digital competence.[2,10] This framework includes 22 educators' competences divided into six competence areas (Table 1).

Insert Table 1.

The content of the DigCompEdu framework has similarities to other internationally used frameworks.[1,10,24] This framework is applicable for teachers and educators at all levels of education, and modification to the specific context and purpose is possible.[10] This framework has been used to reflect on the educators' digital competences[1] and has been integrated into education courses and guidelines for educators.[10]

The aim of this study was to assess the areas of digital competence appearance from the perspective of health sciences educators in Finnish universities of applied sciences and in vocational institutions. The areas of digital competence are seen to be in line with Redecker's[2] framework, and appearance consists of the frequency or regularity of an activity in digital competences (see Table 1).

Research questions

1. How does digital competence appear in educators' work, as assessed by health sciences educators themselves?

2. What is the relationship between the individual background factors of health sciences educators and the areas of digital competence appearance?

Methods

Study design

A quantitative cross-sectional study design was used. The research project, called TerOpe, took place in 2017-2019, and this paper reflects one part of the whole project.[32] This key national project funded by the Finnish Ministry of Education and Culture aimed to develop the competence and continuous education of social, healthcare, and rehabilitation educators.

Participants

The target group included health sciences educators who were social, healthcare, or rehabilitation educators and who worked in purposely selected universities of applied sciences and vocational institutions. The sample covered all Finnish regions. In Finland, health sciences educators must have a professional qualification, a higher educational degree (e.g., a master's degree), and three years' clinical experience; pedagogical studies are not mandatory based on the law in the universities of applied sciences.[33] However, they are often required by the rules of the organization. In vocational institutions, 60 ECTS pedagogical studies are required.[34]

Instrument

The DigCompEduF instrument was developed and used in this study. This new instrument is based on an online self-assessment instrument called DigCompEdu CheckIn Self-reflection Tool[2,10]. The produced instrument describes the appearance of digital competence for educators. To ensure the reliability of the English instrument, the translation process was used (Finnish-English-Finnish).[35] The research team modified the scale of the instrument to a five-point scale. The teaching technology experts (n = 5) evaluated the content and the structure of the instrument. The evaluation was repeated twice, and the content validity was calculated (CVI = 0.97).[36] Of the instrument's 22 items, one item was omitted because it was found by the research team and expert panel to be inappropriate for the study's target group. The final instrument consists of 21 items with verbally formulated five-point-scale answer options describing the frequency or regularity of an activity (1 = never/not at all to 5 =

continuously/regularly/systematically). Descriptions of response options are intended to help educators to reflect on and understand their digital competence; educators can select the answer that best reflects their work.[10] In analysis, the response options 1 and 2 were merged and named “not at all or rarely,” and options 4 and 5 were merged and named “often or regularly.” Response option 3 was left as is and named “sometimes.” One open-ended question was added by the research team: “What else do you want to say about the use of digital technology in learning and/or teaching or your own digital competence?”

The instrument was pretested on 34 respondents, who were healthcare educators working at universities of applied sciences. These data were not included in the main data analysis. After testing, minor clarifications were made on a few items, consisting of the rewording of words. Permission to modify, translate, and use the original instrument was obtained from the developer of the instrument (Redecker C, version 17 / July 2018).

Data collection and analysis

The instrument was included in the broader survey used in the TerOpe project.[32] The invitation, with a Web link to the survey, was sent by e-mail to universities of applied sciences and vocational institutions (a total of 25 organizations from different parts of Finland) in autumn 2018. It was sent to a contact person at each organization, who forwarded an invitation e-mail to the health sciences educators (N = 2330) at their organization. A reminder e-mail to participate in the survey was sent three times. The response rate was 17% (n = 388) and respondents were from all 25 organizations.

The data were analyzed using IBM SPSS version 27.0 software (IBM Corp, Armonk, NY). The data were examined for missing values. The accepted limit for missing values was < 5%, and when missing values were minor, all available data were included.[37,38] Mean sum variables were formed from 21 items according to the six DigCompEdu areas. Five-point-scale answer options with verbal options were reclassified into three categories. Means and standard deviations were examined from the data, and frequencies and percentages were

also used in the description. The normal distribution of the items was tested using the Kolmogorov-Smirnov test, which showed that the items were not normally distributed ($p < 0.001$). The association of individual background factors with the mean sum variables was examined using the Mann-Whitney U test and the Kruskall-Wallis test. The statistically significant difference in the comparison of several groups was further examined using Tukey's test. The level of statistical significance was $p < 0.05$.[39] Qualitative data on the open-ended question were analyzed and reported previously.[40]

Ethical considerations

This study and TerOpe project were conducted in accordance with ethical guidelines. According to Finnish regulations, there was no need for formal authorization from an ethical committee to conduct the planned project. The study did not violate physical integrity, the use of the data was authorized by the participants, vulnerable groups did not participate, and the study had no psychological or physical effects on participants or their safety.[41] Research permission from all organizations was granted according to the Finnish data protection regulations.[42] All health sciences educators were informed about the study in an information letter via the invitation e-mail, and participation was voluntary. The collected data were treated anonymously. This study and the TerOpe research project followed the General Data Protection Regulation.[43]

Results

Health sciences educators' individual background factors

A total of 388 health sciences educators participated in this study. The average age of educators was 51 years (SD: 8.5), and the majority of educators were female (90.5%). Work experience as an educator varied between two months and 45 years. For most educators (92.3%), the highest level of education was a university degree, and most (61.6%) reported teaching in the healthcare field (Table 2).

Insert Table 2.

Health sciences educators' assessment of appearance of digital competence in their work

Health sciences educators assessed that digital competence in their work appeared strongest in the Professional Engagement area (mean: 3.67; SD: 0.70). Educators reported that the digital competence appeared weakest in the areas Empowering Learners (mean: 3.04; SD: 0.75) and Facilitating Learners' Digital Competence (mean: 2.97; SD: 0.77).

In the area of Professional Engagement, 68% of health sciences educators participated or had taken part often or regularly in online education. Almost the same amount of educators (64%) had used often or regularly digital communication channels (e.g., e-mail, institution's website, or applications) to communicate with students, colleagues, and partners. About half of the educators (52%) had used often or regularly digital technologies to cooperate with colleagues within their own educational institution, as well as externally. Of the educators, 56% often or regularly contemplated how to develop the use of digital equipment in teaching and learning, and 19% contemplated this not at all or rarely.

In the areas of Teaching and Learning, Digital Resources, and Assessment, educators mainly reported that they used digital technology sometimes or often or regularly. About a third of educators (32%) reported not at all or rarely taking precautions to protect sensitive content, such as exams, tests, or student grades. Of the educators, 39% reported having not at all or rarely considered carefully how, where, and when to use digital technology in the classroom, making sure it adds extra value to the teaching.

In the area of Empowering Learners, 45% of educators reported that when creating new digital exercises for their students, they often considered the possible problems students might have with the digital format. Of the educators, 56% had sometimes used digital technologies to include their students more actively. Almost half of the educators (47%) not at all or rarely used digital technology to offer their students individual learning opportunities.

In the area of Facilitating Learners' Digital Competence, 28% of health sciences educators often created tasks in which the students had to use digital technologies to communicate with each other or with outsiders. Of the educators, 54% sometimes encouraged students to use digital technology creatively to solve concrete problems. Thirty-six percent of educators not at all or rarely taught the students how to check the reliability of information and to recognize wrong information. Approximately half of the educators (45%) not at all or rarely taught the students how to behave safely and responsibly on the internet. More than half (57%) not at all or rarely planned exercises in which the students had to create digital content (see Table, Supplemental Digital Content 1, the appearance of digital competence in the work of health sciences educators assessed by themselves, adapted from Redecker[2]).

The relationship of background factors of health sciences educators with the appearance of areas of digital competence

In the educators' own assessments of appearance of digital competence according to DigCompEdu competence areas, in the area of Teaching and Learning, there was a difference between the age groups in the assessment ($p < 0.05$). According to the Tukey test, in the area of Teaching and Learning, educators under the age of 40 rated the appearance of digital competence (mean: 3.63; SD: 0.65) as better than those aged 40-49 did (mean: 3.29; SD: 0.72) ($p < 0.05$). There was no significant difference in the assessment according to health sciences educators' gender (female; male) or teaching experience as an educator (≤ 5; > 5 years) (Table 3).

Insert Table 3.

Discussion

This study provides new insights into the appearance of digital competence of health sciences educators. In the areas of the DigCompEdu framework, health sciences educators reflected that the appearance of digital competence in their work is positive. Still, there is a clear need for digital competence development in the work of educators.

Health sciences educators reported that they participated in online education and were motivated to consider how to develop their own digital competence. Similar results have been found in previous studies, where educators were willing to develop their digital competence.[11,23] In this study, educators used digital technology often to collaborate and work. On the other hand, some educators were less likely to consider how to utilize digital technology in teaching and learning. This could be because the educators did not have the resources or necessary self-esteem to adopt digital methods in their work.[5,19]

Almost all educators in this study used a variety of digital information sources and prepared the digital teaching materials they needed. This result is reflected in the fact that nurse educators' one core competence is conducting research and using evidence in teaching.[6] This work also includes protection of personal data, and thus, educators must be familiar with data protection regulations and copyright laws.[2] However, this study's results revealed that about a third of health sciences educators reported rarely taking precautions to protect sensitive content. Therefore, there is an obvious need to ensure that in the future, when utilizing new digital resources, educators and students are familiar with copyright rules.[19]

This study found that quite a few health sciences educators did not often carefully consider the need to use digital technology in the classroom. Additionally, it has previously been noted that educators were concerned that digitalization might be used simply for the sake of digitalization.[11] Although digital interventions can offer new ways to communicate and participate,[2,9,12] it is important to implement digital teaching as planned and evaluated.[5,22] For example, learning concepts need to be considered in relation to the objectives of learning and teaching,[2,8] and evidence-based educational strategies must be used.[7]

Although health sciences educators were willing to use digital technology, they estimated that they rarely used it to provide students with individualized learning opportunities. This must be considered more comprehensively in the future because digital technology offers the opportunity for learner-centered teaching and learning strategies (e.g., individual learning tasks and objectives).[2,8,19] The weakest estimated appearance of digital competence, in the area Facilitate Learners' Digital Competence, could be due to the nature of the required competence in this area. As McGarr and McDonagh[24] pointed out, on the other hand, educators must be competent to teach digitally in a pedagogically appropriate way, as well as be able to teach students the necessary digital competence. Digitally competent educators can enhance the development of students' digital competence.[2] This is important so that future healthcare professionals have the digital competence they need for their work environments.[5,7-9]

In this study, educators' gender and work experience as an educator were not clearly related to assessment of digital competence appearance. Age had a partial connection, but only in one area of digital competence. These results could be due to the fact that the study involved educators with a positive attitude and self-efficacy regarding digitalization, which might have been reflected in the assessments of digital competence appearance in their work,[1,5,23] and no differences in assessments emerged. There may be a need for continuing education for health sciences educators of different age groups to develop digital competence in their work.

Limitations

There are some limitations to this study. First, the response rate was quite low. However, the participating educators worked widely in different parts of the country, and on average, their backgrounds corresponded to those of participants in previous studies,[44] which enables a moderate picture of the appearance of digital competence in the work of health sciences

educators in Finland. Second, the data for this study were collected before the COVID-19 pandemic, which has contributed to the work of educators by increasing digital teaching.[3] The appearance of digital competence in the work of health sciences educators might have changed. Third, the instrument used in this study was used for the first time in Finland to measure appearance of digital competence from the perspective of health sciences educators. The instrument was developed based on the DigCompEdu framework, and its English version was found to be valid.[45] In this study, Cronbach's alpha was quite high (0.921). Of the individual mean sum variables, the lowest value was 0.548; here, the items were statistically significantly correlated.[39] Fourth, although in the used instrument the answer options defining digital competence were described in text, educators' self-assessments can be based on their own knowledge of the topic. In addition, the cultural context in which they work can affect their view of digital competence. In the future, it would be advantageous to use, for example, competency tests or observation as research methods. These have also been highlighted by Caena and Redecker.[10]

Conclusion

Using the European Framework for the Digital Competence of Educators (DigCompEdu framework) and the instrument based on it, new knowledge was obtained as a basis for a wider discussion of the current appearance of digital competence in the work of health sciences educators. Based on the results, health sciences educators are motivated to use and develop digital competence in their work to meet the needs of the technology-driven society. Empowering Learners and Facilitating Learners' Digital Competence were two weaker areas of educators' digital competence. It is important for health education organizations to design, provide, and enable continuing education for educators in these areas. For example, continuing education could involve training for educators to create a variety of digital exercises that can support students' individual needs, such as students' own

learning objectives. To maintain and develop digital competence in the work of health sciences educators, the government and organizations must provide appropriate and necessary resources for basic and continuing education for educators. This is crucial because it will support the necessary digital competence for future health professionals.

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Legends for Tables and Figures

Figure 1 Examples of the digital competence frameworks and their areas of digital competence (adapted from Cabero-Almenara et al[1] and McGarr & McDonagh[24])

Table 1 Content and structure of The European Framework for the Digital Competence of Educators according to Redecker[2]

Table 2 Educators' individual background factors

Table 3 The relationship between the health sciences educators' individual background factors and their assessment of digital competence appearance

Supplemental Digital Content 1. Table, the appearance of digital competence in the work of health sciences educators assessed by themselves, adapted from Redecker[2]. pdf

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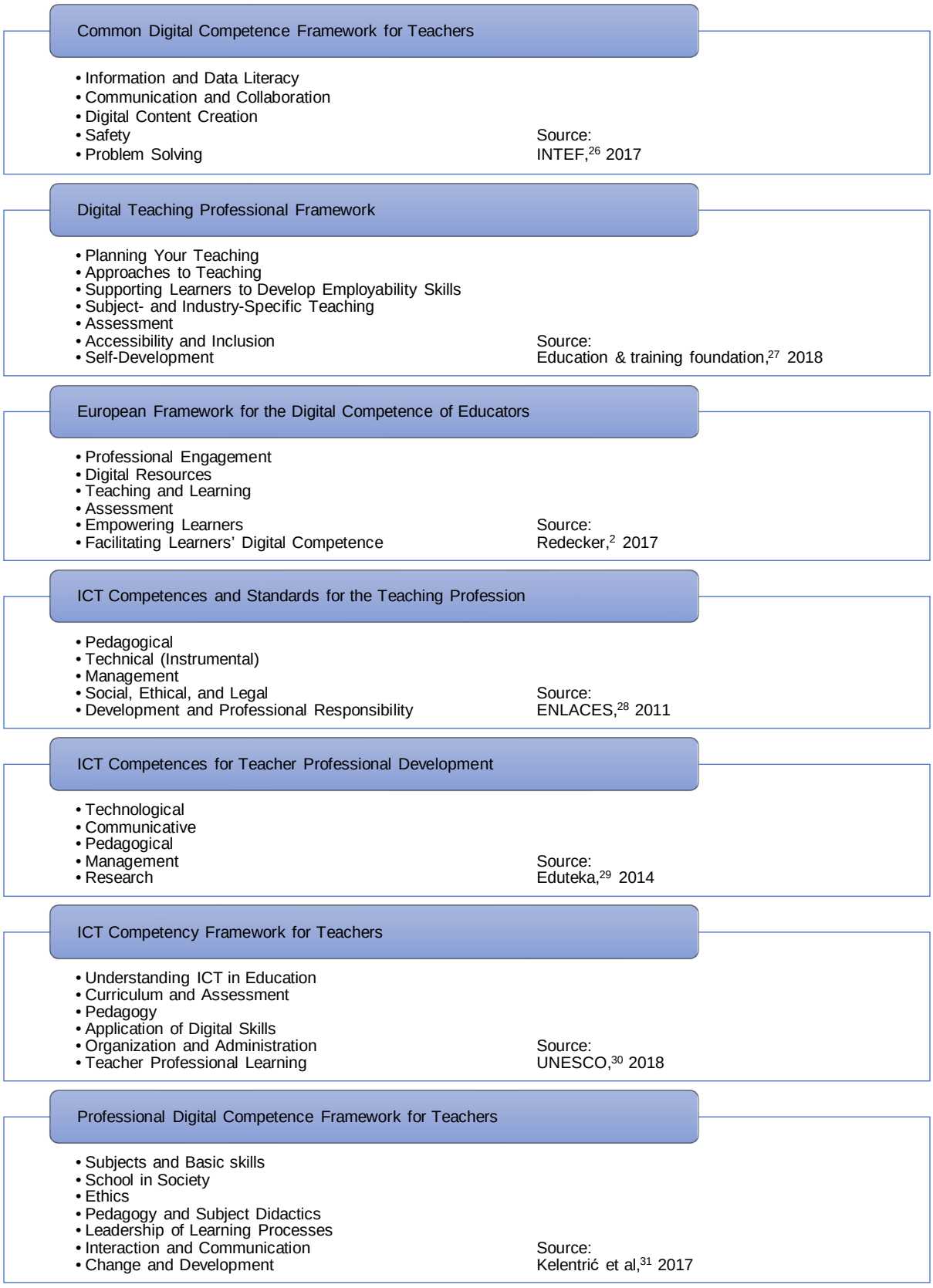

Figure 1 Examples of the digital competence frameworks and their areas of digital competence (adapted from Cabero-Almenara et al[1] and McGarr & McDonagh[24])

Table 1 Content and structure of The European Framework for the Digital Competence of Educators according to Redecker[2]

Areas of Digital Competence	**Digital Competences of Educators**
Professional Engagement	Organizational Communication
	Professional Collaboration
	Reflective Practice
	Digital Continuous Professional Development
Digital Resources	Selecting
	Creating & Modifying
	Managing, Protecting, Sharing
Teaching and Learning	Teaching
	Guidance
	Collaborative Learning
	Self-regulated Learning
Assessment	Assessment Strategies
	Analyzing Evidence
	Feedback & Planning
Empowering Learners	Accessibility & Inclusion
	Differentiation & Personalization
	Actively Engaging Learners
Facilitating Learners' Digital Competence	Information & Media Literacy
	Communication
	Content Creation
	Responsible Use
	Problem Solving

Table 2 Educators' individual background factors

Individual background factor	n	%	Mean	SD	Min	Max
Gender (n = 388)						
Female	351	90.5				
Male	35	9.0				
Other/not reported	2	0.5				
Age			51.2	8.5	23	66
Age group (n = 388)						
< 40	40	10.3				
40-49	112	28.9				
50-59	159	41.0				
60 ≥	77	19.8				
Highest level of education (n = 388)						
Doctoral degree (university)	82	21.1				
Master's degree (university)	273	70.4				
Bachelor's degree (university)	3	0.8				
Master's degree (university of applied sciences)	25	6.4				
Bachelor's degree (university of applied sciences)	4	1.0				
Vocational institution	1	0.3				
Work experience as an educator (n = 386)			13.8	9.0	0.2	45.0
≤ 5 years	71	18.4				
> 5 years	315	81.6				
The current field of teaching (n = 388)						
Healthcare	239	61.6				
Social	80	20.6				

Rehabilitation	31	7.7
Social and/or healthcare and/or rehabilitation	39	10.1

Table 3 The relationship between the health sciences educators' individual background factors and their assessment of digital competence appearance

Individual background factors		**Mean sum variable (DigCompEdu digital competence area)**					
		Professional Engagement	Digital Resources	Teaching and Learning	Assessment	Empowering Learners	Facilitating Learners' Digital Competence
		M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Gender							
(n = 386)	Female	3.67 (0,69)	3.36 (0.75)	3.41 (0.70)	3.31 (0.82)	3.06 (0.75)	2.97 (0.76)
	Male	3.67 (0,77)	3.43 (0.71)	3.31 (0.80)	3.17 (0.92)	2.83 (0.76)	2.87 (0.80)
p-value*		0.801	0.395	0.365	0.200	0.079	0.420
Age							
(n = 388)	< 40	3.88 (0.62)	3.57 (0.63)	3.63 (0.65)	3.45 (0.74)	3.25 (0.80)	3.15 (0.73)
	40-49	3.76 (0.66)	3.40 (0.64)	3.29 (0.72)	3.21 (0.82)	2.97 (0.73)	2.92 (0.75)
	50-59	3.62 (0.67)	3.36 (0.78)	3.48 (0.72)	3.36 (0.88)	3.02 (0.74)	2.97 (0.80)
	≥ 60	3.53 (0.82)	3.27 (0.87)	3.33 (0.69)	3.23 (0.80)	3.08 (0.79)	2.94 (0.74)
p-value**		0.058	0.324	**0.017**	0.220	0.204	0.448
Work experience as an educator							
(n = 386)	≤5 years	3.70 (0.63)	3.39 (0.63)	3.26 (0.73)	3.17 (0.81)	2.92 (0.80)	2.79 (0.68)
	>5 years	3.66 (0.72)	3.37 (0.78)	3.44 (0.71)	3.32 (0.83)	3.07 (0.75)	3.01 (0.78)
p-value*		0.707	0.886	0.108	0.246	0.151	0.052

* Mann-Whitney U, H0 = the means of the groups do not differ, $p < 0.05$

** Kruskal-Wallis, H0 = the means of the groups do not differ, $p < 0.05$ highlighted

M = mean, SD = standard deviation

Supplemental Digital Content 1. Table, the appearance of digital competence in the work of health sciences educators assessed by themselves, adapted from Redecker[2]

Mean sum variable	Item	Mean	SD	Not at all or rarely (%)	Sometimes (%)	Often or regularly (%)
Professional Engagement (α = 0.730)		3.67	0.70			
	Educators participate / have taken part in online education. For example, online courses, MOOCs, web seminars, virtual meetings.	3.77	0.85	6	26	68
	Educators use digital communication channels (e.g. e-mail, institution's website, or applications) to communicate with students, colleagues, and partners.	3.76	0.76	4	32	64
	Educators use digital technology to cooperate with colleagues within their own educational institution as well as externally.	3.63	0.99	12	36	52
	Educators contemplate how to develop the use of digital equipment in teaching and learning.	3.52	1.14	19	25	56
Teaching and Learning (α = 0.754)		3.41	0.71			
	When educators' students work in groups or teams, students use	4.04	0.75	4	14	82

	digital technology to create, share and save material.					
	Educators follow the students' activities and check that they remain interested in the cooperative digital environments.	3.45	0.95	14	38	48
	Educators use digital technology so that students can follow their own progress. For example, tests or questionnaires for self-appraisal, electronic portfolios, online diaries for reflection.	3.26	0.96	19	42	39
	Educators carefully consider how, where and when to use digital technology in the classroom, making sure it adds extra value to the teaching.	2.88	1.08	39	36	25
Digital Resources (α = 0.640)		3.37	0.75			
	Educators use different websites and search strategies to look for and choose digital material. For example, educational portals and data sources with presentations, work material, videos, images, apps, questionnaires, websites for creating wikis and blogs	3.65	0.97	13	29	58

	Educators create their own digital materials and edit existing ones according to their needs. For example, make presentations, digital questionnaires, videos, blogs, edit digital questionnaires or exercise sheets, edit programmes or apps, attach videos.	3.43	0.91	8	43	49
	Educators take great precautions in protecting sensitive content, such as exams / tests, or student grades.	3.04	1.07	32	35	33
Assessment (α = 0.719)		3,30	0,83			
	Educators use digital technology to give positive / corrective (critical, motivating) feedback.	3.43	0.96	15	39	46
	Educators use digital assessment methods (e.g. tests, surveys, blogs) to monitor students' progress.	3.17	0.93	21	48	31
Empowering Learners (α = 0.548)*		3.04	0.75			
	When creating new digital exercises for students, educators consider the possible problems students may have with the digital format. For example, not having access to the internet or digital equipment, compatibility and transferring problems, the	3.48	1.08	13	42	45

	students' lack of appropriate skills, access to email, Facebook, Google Docs, WhatsApp.					
	Educators use digital technology in order to include students more actively.	3.11	0.78	18	56	26
	Educators use digital technology in order to offer the students individual learning opportunities. For example, they give different students different digital exercises in order to focus on individual learning needs, preferences and interests.	2.53	1.22	47	30	23
Facilitating Learners' Digital Competence (α = 0.803)		2.97	0.77			
	Educators encourage students to use digital technology creatively in order to solve concrete problems. For example, problems related to long distances, interaction, sudden situations and finding information, and everyday problems.	3.41	0.90	7	54	39
	Educators teach students how to check the reliability of information and to recognize wrong information.	3.05	1.06	36	29	35
	Educators create tasks in which students have to use digital	2.94	1.01	36	36	28

technology to communicate with each other or with outsiders.					
Educators teach students how to behave safely and responsibly on the internet.	2.85	1.07	45	25	30
Educators plan exercises in which the students have to create digital content. For example, videos, audio content, images, digital presentations, blogs, wikis.	2.60	1.08	57	20	23

1 = never/not at all to 5 = continuously/regularly/systematically; 1 and 2 = not at all or rarely, 3 = sometimes, 4 and 5 = often or regularly

α = Cronbach's alpha

*Correlation (items within the mean sum variable) is significant at the 0.01 level

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