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Self-evaluated competences of multidisciplinary students before and after professional specialisation education in digital social and health care services

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Abstract

The integration of separate service systems, digitalisation, demographic changes, and staff shortages has increased the need for systematic and flexible skills development in social and health care services. In today's working life, learning and development take place in ecosystems. This study aimed to evaluate and identify differences between students' self-assessed competences and their beliefs about the importance of competence areas before and after professional specialisation education (PSE). The research questions were: 1) Was there any difference in students' self-evaluated level of multidisciplinary competences before and after professional specialisation education? 2) Based on students' self-evaluations, was there any difference between the multidisciplinary competences they considered important before and after professional specialisation education?

Analysis of variance (ANOVA) test and paired t-tests were used to examine the differences in the subjects' spontaneous responses about whether they had experienced a change in their competences after undertaking specialisation education. In the initial survey (N = 274), the student respondent group was 180, and the total number of student pairs was 65. The initial and final measurements of the 65 students who responded to the follow-up survey were therefore comparable. Four-point Likert scales were used in the questionnaires. The modified questionnaire was designed so that students answered each of the competences at two levels from their own perspectives.

First, they described how important the acquisition of the skills described in this sentence would be for their own professional competence. Then, they assessed their current level of competence in relation to the sentence in question. There were no statistical differences ($p>0.05$) between measurements taken before and after education in most of the qualification statements describing importance. There were statistical differences ($p<0.05$) between the initial (before education) and post-training measurements (after education) for all statements describing self-assessment competences. According to this study, even

micro-credentials promoted learning. In learning, ecosystem and perceived importance support the level of digital maturity of organisations.

Keywords: professional specialisation education, ecosystem, health informatics, lifelong learning

Introduction

Globally, digital technology is transforming society, including health care [1]. Service integration, digitalisation, demographic changes, and staff shortages have increased the need for systematic and flexible skills development in health and social care (HSC) services [2,3,4]. The European framework for health information governance provides guidelines and European values for how health systems and public health interventions can be used effectively and safely. To improve empowerment via digital health, professionals with advanced skills are required. [1] The rise of artificial intelligence further demands new skills from professionals [5,6].

Service design brings a new perspective to the development of HSC services. Service design requires the participation of HSC professionals in the service design process. [7] Service design requires multidisciplinary cooperation and a holistic understanding of the context. Many perspectives need to be considered, such as regulations and evidence-based practices. [8] Technology brings added value and convenience to health care. It supports user engagement and self-care, even if the technology is seen as complex and challenging. There need to be adequate conditions for the use of technology, to help both health professionals and patients. [9] The International Medical Informatics Association's (IMIA) recommendations for biomedical and health informatics education [10] and national [11] competence descriptions and curricula work are based on today's work needs and future development aims [12].

Lifelong learning (LL) is often defined as a process encompassing all learning activities with the aim of improving and updating knowledge and competences [13,14,15]. e-learning interventions for nurses can enhance their LL and lower the threshold for continued study. e-learning can have an impact on learning outcomes and foster positive attitudes among students. The effectiveness of e-learning interventions with regard to changes in practices remains unknown. [16,17] LL can be perceived from societal and systemic perspectives. LL is a political concept integral to systemic frameworks promoting economic growth, skill development and educational alignment with labour market demands. It enables organisational renewal and strategic management. Learning in workplaces transcends individual development to encompass the entire community as a learning ecosystem. [18] Organisational culture affects professionals' commitment to continued professional development [15]. While the need for continuous learning varies across professional contexts, concerns regarding the impact of professional specialisation programmes are not confined to specific sectors [19]. Future professional competences are created in learning ecosystems [20].

Professional development in adult education requires curiosity, self-awareness, and an understanding of the importance of competences. Educators should consider factors affecting professional development and create effective learning experiences that aim to develop complex skills. [21] It is important to analyse adult students' learning needs, interests, attitudes, and inclinations. Networked learning for adults provides opportunities within diverse ecosystems, fostering networking,

collaborative learning, and expertise renewal. Individuals can enhance their competence both professionally and personally. [22] In dynamic learning environments, adult learners must prioritise information literacy, needs-oriented and ecosystem-focused approaches, and measurable competence outcomes [20]. Meaningful learning goals, perceived competence, and learning autonomy are key to goal achievement [23].

In Finland, the Digivisio 2030 project, a collaboration among higher education institutions, aims to create an ecosystem offering flexible study and employment opportunities. This allows students to apply their skills during their studies. The project seeks to improve Finnish higher education standards [24] and increase educational flexibility through legislative reforms [25].

In Finland, there is a tradition of 30-credit professional specialisation education (PSE) rated at EQF level 6 [26]. Fourteen universities of applied sciences jointly developed a PSE to update work competences [14,27,28]. The PSE, 'Multidisciplinary competences in the development of digitalisation in social and health care', focused on enhancing digital competences in information management, digital services, and service design. It also provided training on the use and development of digital services in the HSC sector, aiming to attract professionals from diverse sectors. [29,30] The PSE comprised of mandatory and optional curriculum units (Table 1), aligning with nationally defined standards for digitalised HSC services [11], underlining the need for embedded digital literacy [31] to improve competences in digital HSC.

The structure of this PSE is presented in Table 1. The learning outcomes of each curriculum unit were expressed as competence sentences in the questionnaire (Annex 1). The education also incorporated a work–life-oriented development task, which applied the service design process and methodologies to address real-life workplace challenges [32].

Table 1. Curriculum units in multidisciplinary professional specialisation education for digital health and social care service development.

Mandatory studies 15 credits	
Work-life oriented Development work 10 credits	Service Design 5 credits
Health and social care digital services and informatics competence 10 credits. Students can choose 5 two-credit modules/curriculum units from a total of 8 curriculum units.	
Client-oriented Digital Service Competence in Health and Social Care 2 credits	Societal Competence in Digital Health and Social Care Services 2 credits
Online Interaction 2 credits	Online Guiding Competence 2 credits
Ethical Competence 2 credits	Informatics competence 2 credits
Knowledge-based Management Competences 2 credits	Competence in Monitoring Health and Well-being 2 credits
Optional contents 5 credits	
In the optional studies, students can choose content related to the digitalisation of health and social care according to their interests.	

Two pilot education were carried out during the project, concluding respectively in May 2022 and May 2023. Based on the experience gained from the pilots, a model was devised for the post-project execution of self-funded education. In this novel PSE, students are afforded the choice of undertaking either comprehensive 30-credit course or acquiring skills incrementally through the pursuit of individual curriculum units termed micro-credentials. [30]

Micro-credentials, denoting concise curriculum units centred on essential content or competencies, serve as a collective term for abbreviated courses [33], facilitating the agile integration of new skills. As per the European Commission [34], these credentials advocate for adaptable, ongoing learning strategies, aiding learners in swiftly and flexibly acquiring and updating competences, thereby enabling the fusion of work and study for individuals with limited educational opportunities [35]. European Qualifications Frameworks (EQF) are recommended to ensure the assessment and recognition of learning outcomes [33, 34]. In HSC education, an interdisciplinary approach can afford a comprehensive understanding of digitalisation [35].

This research produces a new understanding of a PSE consisting of micro-credentials and offers insight into the development of innovative learning ecosystems that encompass working life, education and adult learners and societal aspects.

The aim of this study is to identify differences between students' self-assessed competences and the importance of a particular competence areas before and after professional specialisation education. The research questions are as follows:

Was there any difference in students' self-evaluated level of multidisciplinary competences before and after the professional specialisation education?

Based on students' self-evaluations, was there any difference between the multidisciplinary competences they considered important before and after professional specialisation education?

Materials and methods

Data were collected from 274 students before (2021, 2022) and after (2022, 2023) education was delivered. In the initial survey, the total amount of students was (N = 274) and respondent group was (n = 180) in before measurement. The final survey was completed by 66 respondents, apart from one who did not complete the questionnaire. The total number of student pairs was therefore 65. The initial and final measurements of the 65 students who responded to the follow-up survey were therefore comparable.

The questionnaire, developed in the UUDO project, was based on the nine areas of competence described in earlier studies [11, 30]. It included four background questions, 61 Likert scale questions (Annex 1; scale: 1 = disagree, 2= partly disagree, 3= partly agree 4 = agree), and nine open-ended questions, one for each competence area. A revised questionnaire was developed, enabling students to evaluate each competence at two distinct levels from their personal perspective. First, they articulated the significance of acquiring the skills delineated in the statement for their professional competence (Annex 1). Then, they assessed their current competence level in relation to the statement in questions (Table 3). Open-ended responses are not included in this study.

In this study, ANOVA tests were used for variance analyses and paired t-tests were used with a 5%

significance level [36] (table 3). The t-test detected the differences between the pre-training and post-training measurements of the subject's spontaneous responses regarding perceived changes in their competences [37]. A preceding study utilising the identical questionnaire [30] reported Cronbach's alpha of 0.962 (n=126) for all results, a finding that was replicated in this study. SPSS 28.0 with a t-test was used to analyse the correlation between the perceived importance of the competence and the level of students' current competence levels.

Results

In the paired t-test, the students' group (n = 65) comprised 30 nurses, eight physiotherapists, 17 bachelor of social services students and seven individuals from other disciplines, such as bioanalyst and management. The majority of the students (n = 53) had over 10 years of working experience. Four students had five to 10 years of work experience, two students had four to five years and six had two to three years. The ANOVA test showed no significant differences in the importance section, but there were differences in the competence section. In all variables, the t-test detected differences ($p<0.05$) between the pre-training and post-training measurements. (Table 3.)

There were no statistical differences ($p>0.05$) between the measurements before and after education in most of the qualification statements describing importance (Table 2 and Annex 1), except for the following statements: 'I understand the different user profiles of electronic information use and the related responsibilities' (mean difference 0.74, $p < 0.01$), 'I am aware of the key content of health and social care legislation from the perspective of my own work and can act accordingly'(mean difference -0,24, $p<0,01$), 'In my work, I can base my decisions according to the principles of knowledge-based management' (mean difference -0,28, $p< 0,01$); 'I can propose solutions and present arguments, and I know how to make related decisions and act accordingly' (mean difference -0,24, $p < 0,01$). The subjects did not change their opinions about the importance of the variable in question in their own fields and competences. This also shows that the respondents were aligned as control pairs in the t-test. Of the 61 importance questions, 58 showed no statistical differences (Table 2 and Annex 1) which could be seen as small differences between the main groups. Small differences between the main groups shown in the last column of Table2 and Annex 1. Table 2 is the summary of Annex 1 and it presents sum variables based on national Competence descriptions [11].

The competence of the research subjects that changed in the self-assessment was reflected in statistical t-test differences ($p<0.05$) between the initial (before education) and post-(after education) measurements for all competence statements (Table 3). An increase in the mean differences for all variables was observed when comparing the initial and post-measurements, indicating that all respondents perceived their competences to have improved during the education.

Table 2. The difference between sum variables of the evaluated importance of the content before and after professional specialisation education.

Competence group name and description	Sum of Competence before	Sum of Comptence after	Difference (sum variable)
Informatics Competence	32.6	33.14	0.06
Interoperability of digital systems; information flow in information systems; Information management process; Document management process and practices; digital recording; roles and responsibilities in the use of information; information management; legislation; guidance and cooperation; data protection and security; cyber security			
Knowledge-based Management Competence	21.95	21.81	-0.02
Concepts of knowledge management; Knowledge based decision making; Customer as a user of information; Evidence-based information in health and social welfare services; Secondary use of data; Self-assessment and continuous development of personal digital competencies in health and social welfare; Assessment and development of the work community's digital competencies in health and social welfare; Understanding the importance of development activities to the society			
Competence in Monitoring Health and Well-being	27.42	26.97	-0.06
Basics of artificial intelligence; Introduction to sensory technology; Wearable technology; Tests and indicators related to monitoring; Interpretation and utilization of monitoring data; Robotics -In social and healthcare			
Client-oriented Digital Service Competence in Health and Social Care	29.95	29.08	0
Social and health care service structures; The utilization of eHealth and eWelfare services; Various eHealth and eWelfare service environments and tools; Citizen empowerment and person-centred health and social care in the welfare ecosystem; Digital service pathways; e-services and virtual reception; Accessibility of eHealth and eWelfare services; Cost awareness			
Ethical Competence	22.01	21.79	-0.04
Main principles of ethics; Ethics in digital health and social welfare services; Ethical leadership and development in digitalizing health and social welfare services; The future work in the changing environment of health and social welfare; Ethics in research and development; Ethics of teaching and learning			
Online Interaction Competence	25.58	25.61	0.00
Factors affecting online dialogue; Skills to plan successful online interaction situations; Skills to use various online interaction applications; Online etiquette			
Online Guiding Competence	28.18	27.13	-0.11
Introduction to Person-centred guiding skills in a digital environment; Assessing customers' IT skills; Designing a person-centred guiding in digital environment; Implementation a person-centred guiding in digital environment; Evaluation a person-centred guiding in digital environment			
Societal Competence in Digital Health and Social Care Services	14.85	14.54	-0.08
Promoting digital inclusion; Inequalities associated to technology: The social impact of technology			
Service design competence	18.75	18.76	0.00
Carrying out a preliminary study; Gaining customer understanding; Customer experience; Generating ideas; Creativity; Conceptualization; Prototyping; Service concept; Customer orientation; Service path; Maintenance session Touch point; Service innovation; Design thinking			

Table 3. The difference between average mean of students' (n = 65) self-evaluated current competences before and after professional specialisation education.

Current Competence -Before (CCB) -After (CCA)	CCB Mean Before	CCA Mean After	Difference in competence (n=65)	Competence Paired t-test significance	In Group Mean Difference	ANOVA significance (n=65)
Informatics Competence						
Compatible	3.11	3.60	0.49	0.000		
Accessible	2.83	3.60	0.77	0.000		
Mobility	2.74	3.46	0.72	0.000		
Records	3.29	3.65	0.36	0.000		
Profiles	2.92	3.55	0.63	0.000		
Legislation	3.08	3.60	0.52	0.000		
Reliability	3.29	3.71	0.42	0.000		
PrincGuide	2.42	3.40	0.99	0.000		
Protection	2.89	3.62	0.73	0.000		
Total	26.57	32.19	5.62		0.62	0.000
Knowledge-based Management Competence						
Know Manage	2.80	3.57	0.77	0.000		
Terminology	2.11	3.12	1.01	0.000		
Decision Know	2.62	3.43	0.81	0.000		
Evidence	2.72	3.37	0.65	0.000		
Develope	2.83	3.58	0.75	0.000		
Clients Prod	2.86	3.57	0.71	0.000		
Total	15.94	20.64	4.70		0.78	0.000
Competence in Monitoring Health and Well-being						
Adequacy	2.86	3.38	0.52	0.000		
Sensors	2.48	3.29	0.81	0.000		
Result Sens	2.43	3.20	0.77	0.000		
AI	2.52	3.51	0.99	0.000		
IoT	2.09	3.23	1.14	0.000		
Wearable	1.83	3.03	1.20	0.000		
Remote	2.62	3.40	0.78	0.000		
Robotics	2.05	3.43	1.38	0.000		
Total	18.88	26.47	7.59		0.95	0.000
Client-oriented Digital Service Comptence in Health and Social Care						
Use Inform	3.18	3.71	0.53	0.000		
Clien Approp	2,77	3.51	0.74	0.000		
Use eTools	3.18	3.75	0.57	0.000		
Multidiscipl	3.31	3.77	0.46	0.000		
Client Center	3.54	3.77	0.23	0.013		
ePaths	2.82	3.58	0.76	0.000		
Assess	2.54	3.62	1.08	0.000		
Costs	2.82	3.57	0.75	0.000		
Total	24.16	29.28	5.12		0.64	0.000
Ethical Competence						
Ethic Dilem	3.02	3.49	0.47	0.000		
Related Decis	3.11	3.46	0.35	0.000		
eEnviron	3.22	3.68	0.46	0.000		
Ethical Comp	2.88	3.43	0.55	0.000		
Analy AI Rob	2.06	3.11	1.05	0.000		
Ethic Manage	2.17	3.15	0.98	0.000		
Total	16.46	20.32	3.86		0.64	0.000
Online Interaction Competence						
Interaction CCB	2.49	3.51	1.02	0.000		
Fact Affect CCB	2.71	3.62	0.91	0.000		

Own Comp CCB	2.95	3.62	0.67	0.000		
Success Guid CCB	2.66	3.54	0.88	0.000		
Teams CCB	3.28	3.60	0.32	0.008		
Use Chat CCB	2.83	3.49	0.66	0.000		
SoMe CCB	2.18	3.49	1.31	0.000		
Total	19.10	24.87	5.77		0.82	0.000
Online Guiding Competence						
Desc eProcess CCB	2.51	3.32	0.81	0.000		
Clients Needs CCB	2.40	3.43	1.03	0.000		
Eval eSession CCB	2.37	3.49	1.12	0.000		
Copyright CCB	2.14	3.38	1.24	0.000		
Video CCB	2.14	3.23	1.09	0.000		
Audio CCB	2.06	3.34	1.28	0.000		
License CCB	1.82	3.02	1.20	0.000		
Assess Effect CCB	2.28	3.45	1.17	0.000		
Total	17.72	26.66	8.94		1.12	0.000
Societal Competence in Digital Health and Social Care Services						
Inclusion CCB	2.74	3.63	0.89	0.000		
Inequalities CCB	2.58	3.66	1.08	0.000		
Aw Discrimi CCB	2.82	3.68	0.86	0.000		
Life CCB	2.97	3.69	0.72	0.000		
Total	11.11	14.66	3.55		0.89	0.000
Service Design Competence						
Key Concep SD CCB	2.23	3.71	1.48	0.000		
Tools Meth SD CCB	2.20	3.78	1.58	0.000		
Evalu SD Project CCB	2.11	3.72	1.61	0.000		
Multidiciplinary CCB	3.03	3.83	0.80	0.000		
Dev Bussin SD CCB	2.05	3.45	1.40	0.000		
Total	11.62	18.49	6.87		1.37	0.000
		Total Sum	52.02			
		Total Mean	0.85			

Before the education, students assessed their service design skills as weak, except for their ability to participate in multidisciplinary work, which was the most highly evaluated domain, with a mean of 3.83 (Table 3). Students estimated that, their competence in service design strengthened the most, by a mean difference of 1.4–1.61. The biggest difference (Table 3) in the main group as a sum variable was in service design competence (1.37) and the smallest in informatics competence (0,62). The lowest mean (3.02) in competence level at the end of the education was in 'I can choose the correct licence for my guidance material' and 'I understand the meaning of licences.' This is part of the competence area of online guiding.

Discussion

The aim of the study was to identify differences between students' self-assessed competence and their opinions about the importance of a particular competence area before and after professional specialisation education (PSE). The results showed differences in students' self-evaluated level of multidisciplinary competences and a significant ($p<0.05$) difference in the importance of the almost all competences before and after the PSE.

There were statistically significant differences ($p<0.05$) between all self-assessed competence statements before and after education (Table 3). After PSE the students estimated that their competences had strengthened in all nine competence

areas. Differences in the competence area with two credits curriculum units exhibited statistical significance, indicating an increase in competence. (Table 3.) Similar results were obtained in earlier studies [16,17].

The lower the self-evaluated competence level before the PSE, the more it increased after the education.' The students' competence strengthened most in the service design competence area. Previous studies have shown that for adult learners, who work while studying, it is important that the content is relevant and directly used in their work [38,11,30]. In the present study, more than half of the students had worked for over 10 years, and nearly all worked in the health and social care (HSC) sector. Before their studies, they assessed their service design skills as weak, except for their ability to participate in multidisciplinary work with the highest mean and according to the students' estimates, their competence in service design strengthened the most (Table 3). Service design expertise is a new area of competence for HSC professionals, for which the PSE provided tools [30]. All students participated in a five credit service design studies and completed a 10-credit development work using service design methods [8]. Thus, each student's PSE included 15 credits of study focused on service design methods in HSC context (Table 1). In developing HSC services, it is important that professionals are actively involved in the service design process [7]. It seems that students´ evaluation is based on how their needs are met in working life and also how they will acquire new knowledge for example in technology and service design (Table 2).

One of the lowest means was in the competence area of monitoring health and well-being. Based on prior studies [9,16,17], the use of technology is challenging if users are unable to use it. Technology use should be supported in a personalised and targeted way; users should work with the chosen technology and be given time to learn how to use it. Based on the results of students' self-evaluations, there were few statistical differences (Table 2) between the multidisciplinary competences that the students considered important before and after the PSE. Significant differences were found in only four self-evaluated competence sentences.

The only topic that students considered more important after the education was 'I understand the different user profiles of electronic information use and the related responsibilities' (Annex 1). Students had a broad understanding of informatics-related security [30]. Even at the start of their education the students evaluated the importance of competencies high.

The opportunity to utilise new skills depends on the digital maturity of the work organisation [20]. Adult learners' inspiration for education is often strong for the things that are important to them. The importance of competence themes [11,30] was rated as important or very important before the PSE [30]. The students' interest factors in education and learning are in line with Utvær's [23] study results. According to Lukianova [22], the educational process includes learning processes, educational technologies and teachers with their specific techniques, experience, and abilities [40]. Students are involved in the learning process with their own abilities, interests, needs and goals [22].

The learning was supported by offering eight two-credit curriculum units focusing on different digitalisation topics, of which the students chose five (Table 1). In addition, the students chose optional curriculum units in the informatics competence areas [30]. A PSE can consist of micro credentials, which can be as small as two credits [32,33].

It is important that those who participate in PSE commit to change and utilise their skills in working life, such as in the development of skills between different professionals and in cooperation, management, and reflective practices. For professionals to use the skills acquired in a specialisation education in their work, the employer must support their continuous utilisation of skills and professional development as they utilise their expertise in achieving the organisation's missions and visions [21]. In this education, the competence areas were developing digital skills [10]. The results shows that the students' evaluated competence importance highly. According to Ramani et al. [21], a variety of skills are important to adult learners, obstacles to changes in their systems of working must be considered and the learning must be meaningfully targeted from the perspective of working life. It is essential to encourage reflection and tie studies to the practical social context of the participants. A strong belief in change and strategic commitments are more likely to lead to changes in work practices. [21] In this study, students already evaluated the importance of the competences very highly when they embarked on the PSE.

For trained professionals, e-learning is an effective method of continuing education [40]. In Finland, there is a broad process of integration at different levels of education to effectively use digital tools to deliver educational products for different needs and at different EQF levels. The aim is to raise the level of Finnish higher education through a common educational ecosystem [24]. Currently, PSE in social and health care is described as EQF level 6. [27]. Based on this understanding, it is important to consider the possibility of describing the competences of PSE in social and health care at EQF level 6 or 7, depending on the needs of the society.

The researchers took measures to interpret these results as objectively as possible, despite their roles in the development of the PSE in question. This research aimed to objectively shed light on both the successes of the education process and areas needing improvement [41]. The questionnaire used in this study was purposeful, using categories and content from Tiainen et al. and the EQF 6 levels [11, 42]. The same questionnaire was used before and after the PSE [30]. Quantitative data from the questionnaire were reported in this study. Our results are not from a representative sample, because they mainly reflect the opinions of the HSC professional specialisation education student participants as pairs (n = 65); however, these results indicate that students improved their competences during the PSE and evaluated the importance of the competences as high and at the same level before and after the PSE. In this study, the competences were contextualised to PSE. The questionnaire was evaluated using Cronbach's alpha (0.962) in the pre-education measurement [30], and the reliability of the questionnaire was found to be good.

This study and the measurement instrument were evaluated by the Human Sciences Ethics Committee of the Helsinki Region Universities of Applied Sciences 14/2021. Good ethical research methods were followed in the implementation of the research [42, 43]. Students were informed about the study and told that completing the questionnaire was voluntary. They were encouraged to participate because of the importance of the project, which may have affected the response rate and results.

Conclusion

In today's working life, learning and development take place in ecosystems. Professionals become attached to working life through factors that

motivate them and that are important to them either from the perspective of career development or other goals that are attached to, for example, emotional life. Often, personal importance is connected to the working life of an adult. When adult students enter professional specialisation education (PSE), they often consider the studies important. This research showed that the topics of PSE under study were considered important and were assessed at a high level throughout the education.

The competences identified as important in this study are relevant from a bidirectional development perspective, encompassing both the employee and employer, as well as the organisation and the individual. This study suggests that microcredentials promoted the learning of adult learners. Learning should support and reinforce digitalisation in the workplace and organisational development in diverse learning ecosystems.

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Conflicts of interest

The authors declare no conflicts of interest.

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Appendix

Annex 1. The difference between average mean of students' (n = 65) self-evaluated Importance of the competence before (ICB) and after (ICA) professional specialisation education.

Number of Question	Importance of competence before (ICB) Importance of competence after (ICA)	Mean ICB	Mean ICA	Difference Importance (n=65)	Importance Paired t-test Sig	Group Mean Difference
	Informatics Competence					
2.1.2	I understand the principles of **compatibility** of in relation to my own work	3.80	3.76	-0.04	0.83	
2.1.1	I understand the principles of **accessibility**, storing, saving, disclosure and ownership of electronic information	3.70	3.75	0.05	0.55	
2.1.3	I understand the **mobility** of information in electronic information systems	3.47	3.55	0.08	0.45	
2.1.4	I can explain the importance and principles of keeping electronic **records**	3.80	3.77	-0.03	0.67	
2.1.5	I understand the different user **profiles** of electronic information use and the related responsibilities	2.92	3.64	0.72	0.0017	
2.1.6	I am aware of the key content of health and social care **legislation** from the perspective of my own work and can act accordingly	3.84	3.66	-0.18	0.04	
2.1.7	I know how to critically assess the **reliability** of information sources	3.83	3.77	-0.06	0.45	
2.1.8	I understand the special **principles** and methods of **guidance** and cooperation in relation to informatics.	3.49	3.51	0.02	0.87	
2.1.9	In my own work, I can apply the special features of data **protection** and data security in the informatics of health and social care	3.75	3.73	-0.02	0.85	
	Total	32.6	33.14	0.53		0.06
	Knowledge-based Management Competence					
2.2.1	I can describe what is meant by '**knowledge**-based **management**'	3.67	3.69	0.02	0.87	
2.2.2	I can describe the concepts, related concepts, value chain and **terminology** of knowledge-based management	3.32	3.32	0.00	1.00	
2.2.3	In my work, I can base my **decisions** according to the principles of **knowledge**-based management	3.75	3.69	-0.06	0.45	
2.2.4	I can describe the principles of **evidence**-based activities	3.69	3.60	-0.09	0.28	
2.2.5	I can collect, assess, analyse and use information collected in healthcare and social welfare for the purpose of **developing** my own work	3.78	3.73	-0.05	0.55	
2.2.6	I can assess the role of **clients** in healthcare and social welfare as **producers** and users of information	3.74	3.78	0.05	0.55	
	Total	21.95	21.81	-0.13		-0.02
	Competence in Monitoring Health and Well-being					
2.3.1	I can assess and interpret the reliability and **adequacy** of information related to the monitoring of health and well-being	3.77	3.49	-0.28	0.006	
2.3.2	I can describe the different **sensors** and digital tests used to measure health and well-being, as well as their usability	3.37	3.34	-0.03	0.08	
2.3.3	I can make use of the **results** of different types of **sensors** and digital tests that measure health and well-being	3.53	3.40	-0.13	0.21	
2.3.4	I understand how **AI** (artificial intelligence) can be used in health and social care services	3.55	3.53	-0.02	0.89	
2.3.5	I understand the potential of **IoT** in clients' self-management	3.35	3.32	-0.03	0.83	
2.3.6	I know how to use and take advantage of **wearable** technology in the care of individuals	3.00	3.13	0.13	0.31	
2.3.7	I know how to use the solutions of **remote** healthcare in the treatment of clients	3.58	3.41	-0.17	0.12	
2.3.8	I can explain the purposes of **robotics** in health and social care	3.27	3.35	0.08	0.56	
	Total	27.42	26.97	-0.45		-0.06

Client-oriented Digital Service Competence in Health and Social Care						
2.4.1	I can search for and **use information** related to health and social care legislation	3.69	3.81	0.12	0.10	
2.4.2	I can help a **client** choose the **appropriate** electronic health and social care service	3.56	3.61	0.05	0.62	
2.4.3	I can **use** electronic service environments and **tools** in my work	3.81	3.81	0.00	1.00	
2.4.4	I understand the role of my professional group in **multidisciplinary** and client-oriented health and social care	3.78	3.86	0.08	0.30	
2.4.5	I understand what is meant by placing the **client** at the **centre** of the service system	3.90	3.87	-0.03	0.62	
2.4.6	I recognise and manage different electronic service **e-paths** of clients and the related tools	3.80	3.75	-0.05	0.50	
2.4.7	I can **assess** different electronic services and digital appointments from the user's perspective	3.68	3.67	-0.01	0.38	
2.4.8	I understand factors affecting **costs** in the development of health and social care services	3.73	3.60	-0.13	0.26	
	Total	29.95	29.98	0.03		0.00
Ethical Competence						
2.5.1	I recognise the existence of **ethical dilemmas** in the digital operating environment of health and social care services	3.72	3.73	0.01	0.85	
2.5.2	I can propose solutions and present arguments, and I know how to make **related decisions** and act accordingly	3.88	3.64	-0.24	0.004	
2.5.3	I can act professionally in a variety of interaction situations in digital operating **environments**	3.80	3.80	0.00	1.00	
2.5.4	I can apply and assess professional **ethical competences** in different digital operating environments	3.73	3.66	-0.07	0.41	
2.5.5	I can **analyse** special characteristics related to artificial intelligence and robotics **AI Rob**	3.34	3.47	0.13	0.24	
2.5.6	I can present ways to implement **ethical** and encouraging **management** in digital health and social care services	3.55	3.49	-0.06	0.63	
	Total	22.01	21.79	-0.22		-0.04
Online Interaction Competence						
2.6.1	I can describe the characteristics of online **interaction**	3.51	3.61	0.10	0.20	
2.6.2	I can analyse **factors affecting** online interaction	3.64	3.67	0.03	0.73	
2.6.3	I can assess and analyse my **own competence** in online interactions	3.68	3.69	0.01	0.85	
2.6.4	I can plan, implement and assess a **successful** online **guidance** situation	3.71	3.66	-0.05	0.58	
2.6.5	I can make use of electronic environments in online interaction, such as Zoom or **Teams**	3.86	3.80	-0.06	0.35	
2.6.6	I know how to **use chat** when providing guidance to a client	3.61	3.57	-0.04	0.62	
2.6.7	I can assess and compare the use of social media (**SoMe**) applications in online professional interaction	3.58	3.61	0.03	0.74	
	Total	25.58	25.61	0.03		0.00
Online Guiding Competence						
2.7.1	I can **describe** the process of online guidance. **e-process**	3.46	3.40	-0.06	0.53	
2.7.2	I can assess **clients' needs** for online guidance and their IT competence	3.58	3.44	-0.14	0.13	
2.7.3	I can plan, implement and **evaluate** an online guidance **e-session** with a client	3.57	3.40	-0.17	0.08	
2.7.4	I can prepare accessible guidance material for online use, taking into account **copyright** issues	3.64	3.53	-0.11	0.26	
2.7.5	I can produce **a video** for online guidance in accordance with the accessibility instructions	3.49	3.46	-0.03	0.75	
2.7.6	I can create an **audio** file for the purposes of providing guidance to a client	3.43	3.37	-0.06	0.55	
2.7.7	I can choose the correct **license** for my guidance material, and I understand the meaning of licenses	3.37	3.22	-0.15	0.17	
2.7.8	I can **assess** the **effects** of online guidance	3.65	3.49	-0.15	0.08	

	Total	28.18	27.31	-0.88		-0.11
	Societal Competence in Digital Health and Social Care Services					
2.8.1	I can use my own role to promote the **inclusion** and opportunities for participation of people in an increasingly technological society	3.73	3.64	-0.09	0.27	
2.8.2	I can analyse the **inequalities** taking place in society as a result of technological development	3.58	3.66	0.08	0.50	
2.8.3	I understand the inequalities related to technological development. I am **aware** of the **discriminatory** structures and practices related to technology	3.71	3.60	-0.11	0.30	
2.8.4	I understand how the technological development of electronic health and social care services and society affect the well-being and everyday **life** of people	3.83	3.64	-0.19	0.06	
	Total	14.85	14.54	-0.31		-0.08
	Service Design Competence					
2.9.1	I can define the **key concepts** of service design (**SD**)	3.71	3.74	0.03	0.72	
2.9.2	I can use the **tools** and **methods of SD** in the development of the world of work	3.80	3.81	0.01	0.83	
2.9.3	I can plan, implement, and **evaluate** an **SD project**	3.75	3.73	-0.02	0.85	
2.9.4	I can operate in **multidisciplinary** teams and bring my own competence to co-creation	3.89	3.87	-0.02	0.80	
2.9.5	I can apply the possibilities of service design to the development of **business** activities	3.60	3.62	0.02	0.88	
	Total	18.75	18.76	0.02		0.00
			Total Sum	97.17		
			Total Mean	1.59		