The definitions of health care and social welfare informatics competencies

Minna Tiainen[1], Outi Ahonen[2], Leena Hinkkanen[3], Elina Rajalahti[2], Alpo Värri[4]

[1] Tampere University of Applied Sciences, Tampere, Finland; [2] Laurea University of Applied Sciences, Vantaa, Finland; [3] Metropolia University of Applied Sciences, Helsinki, Finland; [4] Tampere University, Tampere, Finland

Minna Tiainen, Senior Lecturer, MHSc, Tampere University of Applied Sciences, Kuntokatu 3, FI-33520 Tampere, FINLAND. Email: minna.tiainen@tuni.fi

Abstract

Digital transformation is changing the ecosystem and at the same time professionals' competencies worldwide. Minimising health care and social welfare costs while increasing citizens' health and well-being is challenging. Technology and digital tools play an important role in reaching this goal. However, there are inequalities concerning technology, and this has many impacts. Digitalisation brings challenges not only to health care and social welfare professionals but to citizens, too. Working with or using services in digital environments demands new skills. This has social and ethical impacts, e.g. how is equal access to services ensured. Health and social care professionals should have different competencies to respond to this, such as societal competencies. The purpose of this article is to describe how the definition of competencies in health care and social welfare version 1.0 (developed in the national SotePeda 24/7 project) was finalised as the final version 2.0 for *Finnish healthcare and social welfare education* by experts' evaluation.

Data was collected through an electronic questionnaire administered to selected experts (N=140) during January 2020. The number of experts who responded to the study was 52. These experts (social and health, business and IT) work or have worked in tasks related to the digitalisation of social and health care. The questionnaire was based on version 1.0 of the definition of digital competencies of health care and social welfare informatics. The questionnaire was mainly quantitative, but it also included open-ended qualitative questions. The experts agreed to a large extent on the version 1.0 definition, but some adjustments were made to the definition based on our study. The resulting definition is intended for use in the planning, implementation and evaluation of health care and social welfare education, but it can also be used for polytechnic education. The aim is to develop the digital skills of educators, degree students and in-service trainees in a multidisciplinary way (social and health, business and IT) to meet the needs of working life.

Keywords: health care, social welfare, digital technology, competence, informatics

Introduction

The digital transformation of health care is changing the ecosystem and enhancing professional competencies worldwide [1,2,] Under the pressures of increasing costs and changing demographics, Finland wants to reform its health care and social welfare system [3,4]. The goals of the reform are to develop equal access to care, minimise the growth of costs and increase citizens' health and well-being. Digital tools are expected to have an important role in reaching these goals and in supporting the continuum of care. These tools also enable customers to be better informed and to be more involved in their care. [2-4] The increasing digitalisation and transformation of working methods also requires new competencies from health and social care professionals. These competencies are needed not only for the use of new information systems [5], but also for the development of services in multi-professional cooperation [5,6.] Competence updating will be a precondition to manage working life, and continuous learning is a strategy for that [7]. To reach these objectives, it is important to allocate human resources in a productive way. Leading the process of developing professionals' competencies [3] is the European Qualification Framework (EQF), level six [8] which is based on the needs of the health and well-being ecosystem [9].

The need for health care and social welfare informatics competencies is increasing [10]. Keeping up-to-date is challenging for health care and social welfare professionals. It has been found that training and technical support is important for professionals' acceptance of informatics and system use because some professionals have difficulties using the new technology [11]. To support this training, from 2018 to 2020, the Finnish Ministry of Education and Culture financed the SotePeda 24/7 pro-

ject, hereafter called SotePeda. Two of the main goals of the SotePeda project were to produce definitions of health care and social welfare informatics competencies and to produce material that could be used in EQF level six education, in continuing the education of professionals, and in self-education in all educational areas such as health care and social welfare, business and information technology [12].

Purpose and aim

After developing version 1.0 of the definitions of health care and social welfare informatics competencies, the SotePeda project began to collect feedback. The purpose of this paper is to present the results of this feedback and present the final version 2.0 of the definitions of health care and social welfare informatics competencies in Finnish healthcare and social welfare education. The aim is to develop the competencies of degree students, educators and in-service trainees related to the digitalisation of health and social care in a multidisciplinary way, including health and social care and related business and IT professions, to meet the needs of working life.

Methods

The definition process of informatics competencies began with searching competencies from the HITComp database [13] and the International Medical Informatics Association´s (IMIA) international multidisciplinary informatics curriculum [14]. The selected HITComp competencies were from the domain of "direct patient care" and levels of "baseline" and "basic" competencies which included 144 competencies [13]. These HITComp competencies were compared to the international informatics curriculum [14]. These selected com-

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petencies levels corresponded to EQF level six [12]. In order to adapt the competencies to the national context, some modifications were necessary. Information produced by national top projects, reports and studies were included in the definition (e.g. the Ministry of Social Affairs and Health, National Registration Model, Kanta national patient health and social welfare data repository [15], the Finnish Nurses' Association's Digital Health Services Strategy [16], Steps 2.0 coordinated by the Institute of Health and Welfare in Finland [17], the Cope project [18,19] and the Finnish care classification system [20]. The future vision for how digitalisation is supporting health and social care is outlined e.g. by the Ministry of Social Affairs and Health [21], robotics and automation guidelines of the Ministry of Finance [22] and the strategy of digitalisation from the Ministry of Social Affairs and Health [4]. The results of the previous projects suggest that the themes of person-centred care and multidisciplinary cooperation should be included in the definition 2.0. This work resulted in the SotePeda competence definition version 1.0 [23] shown in Table 3. Figure 1 describes the definition process of health care and social welfare informatics competencies from the beginning to the final version 2.0.
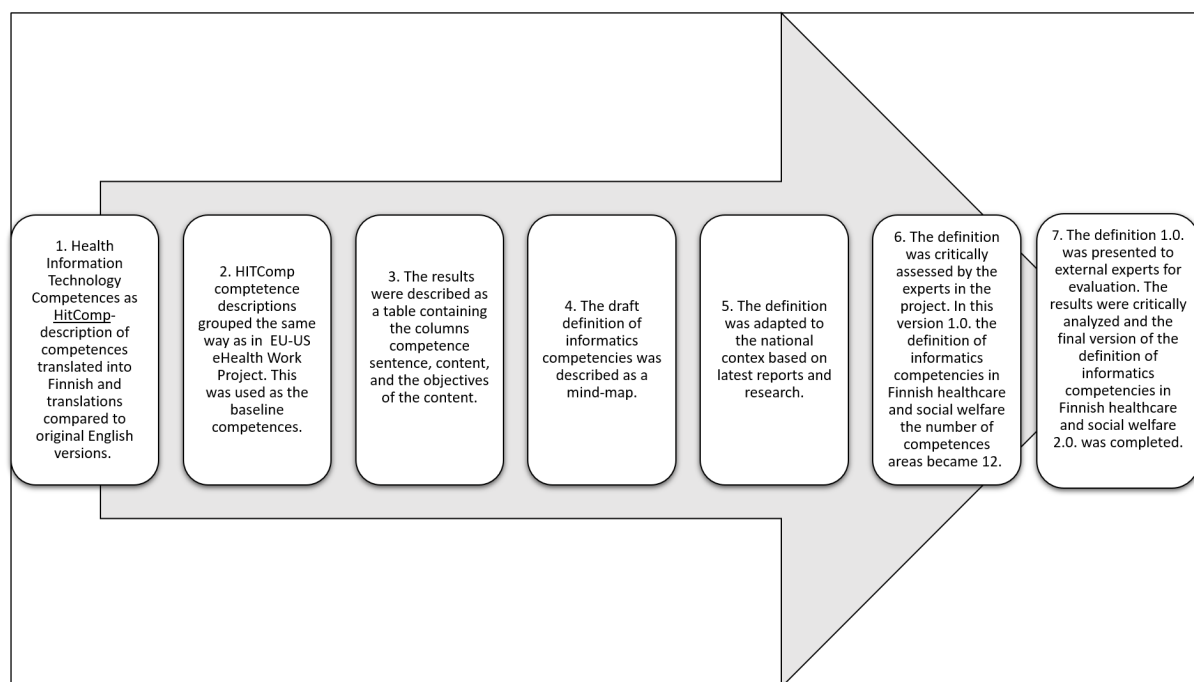

Figure 1. The definition process of health care and social welfare informatics competencies from the beginning to the final version 2.0.

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Data collection and sample

Our study was based on an electronic questionnaire. A pilot test of the questionnaire was conducted within the SotePeda project team (n=10). As a result, some minor improvements were made to the questionnaire. Data from the pilot test were not included in the final study data.

The final questionnaire was sent by e-mail to select experts (N=140) during January 2020. These experts (social and health, business and IT) work or have worked in tasks related to the digitalisation of social and health care. The e-mail contained information regarding the study and a hyperlink to the questionnaire. The first part of the questionnaire collected background information about the experts and their job descriptions. The second part presented the version 1.0 definition of the competencies in the 12 competence areas and their contents related to the digitalisation of health and social care and asked for feedback on them. Two reminders were sent, and the response time was extended twice. The questionnaire was mainly quantitative, where items used a five-point Likert scale ranging from 1 to 5, where 1 means strongly disagree and 5 means strongly agree. The questionnaire also included open-ended qualitative questions that asked for explanations from the participating experts about the potential competence areas or content that they would like to add. These qualitative questions were analysed with deductive content analysis based on version 1.0 of the definition of competencies [23,24] Quantitative questions were analysed with descriptive statistics [25].

This study was ethically justified and followed the guidelines of the Scientific Ethics Advisory Board [26] in accordance with good scientific research practice throughout the research process. Permission for this study was applied for in advance by each participating organisation in the SotePeda project. Participation in the study was voluntary, and total anonymity was ensured. The link to the questionnaire was built so that neither the researcher nor the organisation involved could identify the participants. Data collected from the questionnaire was treated confidentially in accordance with good research ethical guidelines and practices. All personal data collected during the study was treated confidentially as required by the Data Protection Act [27] and General Data Protection Regulation, GDPR 679/2016 [28]. Participants were informed of the study by an information letter, which included the study's purpose and the rights of the participants, such as voluntary participation and the possibility to withdraw from the study. Confidentiality and anonymity were assured at all stages of the study. The collected material was processed throughout the research and analysis phases with care and precision. The research results have been checked by several members of the research team.

Results

The number of experts who responded to the questionnaire was 52. Thus, the final response rate was 37% (N=140). The work experience of the participants ranged from 1 to 33 years. Most of the participants (78.8%) identified health care as their professional field. The least represented professional field was technology (1.9%). Some participants chose more than one professional field. Nearly half (44.2%) of the participants had work experience ranging from 2 to 15 years. Table 1 contains background information about the participants.

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Table 1. Background information about the responders.

		n	%
Working experience	1-11 years	5	9.6
	2-15 years	23	44.2
	16-33 years	9	17.3
	Total	37	
Professional field	Business Administration	2	3.8
	Technical	1	1.9
	Informatics	11	21.2
	Healthcare	41	78.8
	Socialcare	12	23.1
	Other	4	7.7
	Total	71	

Table 2. Mean and standard deviation values of competence areas.

Area of competence	Mean values	Std. Deviation
Basic information and communications technology (ICT) competencies	4.78	0.34
Online interactive competencies	4.74	0.40
Service competencies in digital health and the social care sector	4.59	0.33
Person-centred guiding competencies in a digital environment	4.06	0.85
Competencies to monitor health and well-being in a digital environment	4.12	0.66
Health and social care informatics competencies	4.55	0.44
Multi-actor service co-development competencies	4.36	0.63
Ethical competencies	4.60	0.55
Service design competencies	4.10	0.73
Knowledge-based management competencies	4.57	0.55
Research, development and innovation competencies	4.18	0.72
Societal competencies	4.37	0.64

The participants mostly agreed with the version 1.0 definition of the competencies. Table 2 shows that the highest mean values for agreement were in the competence areas of basic information and communications technology (ICT) competencies (M=4.78) and online interactive competencies (M=4.74). The lowest agreement was with person-centred guiding competencies in a digital environment (M=4.06) and service design competencies (M=4.10). The highest standard deviations were found for person-centred guiding competencies in a digital environment (SD=0.85) and service design competencies (SD=0.73).

Participants provided qualitative data for 9 of the 12 competence areas. *The need for online interactive competencies* was emphasized in health care and social welfare the in the future but was not currently a part of everyone's work.

The person-centred digital service competencies sector was not seen as a competence for all professionals in health care and social welfare. The participants saw these competencies as more related to their work tasks. The understanding of the digital service path was identified as an important professional tool. Cost awareness was mainly evaluated as a basic competence of all profession-

als, but some still considered it mainly as a managerial competence.

Online guiding competencies were seen by participants an essential area of competence. The basics of online guidance should be taught to all professionals in health care and social welfare services, but deeper skills are needed for those who use online guidance regularly.

The participants pointed out that *the health and social care informatics competencies*, including the interoperability of digital service systems, are not everyone's competence. Competence in information management legislation was mainly considered a responsibility of the organisation. The participants reported that the required general level of *information management competence* is lower than suggested in the version 1.0 definition. However, the number of experts in information management was seen to increase. As a result, this area of expertise was considered by the participants to be an important optional and complementary area of expertise.

Participants thought *that knowledge-based management competence* belongs to everyone to some extent, but deeper competence in this area are only needed by managers. One participant

suggested that the use of information produced by the customers should be included in this area of competence.

Not all professionals need to be developers, but everyone must have basic *service design competencies*. The benefits of service design were seen in the development of the digitalisation of health care and social welfare.

The participants described *research, development and innovation competencies* as management-level activities, and for others, a development-friendly attitude would suffice. On the other hand, the competence related to giving and receiving peer feedback was highlighted in the participants' comments on development competences.

The societal competence was a meaningful area to the participants. They commented that it is important to understand the digitalisation that produces exclusion-related elements and inequality.

Feedback that addressed a specific item and which came from several responders were given more weight than comments that came from only one individual. Also, the SotePeda project team finalised the competence definitions and sentences. This elaboration resulted in the final version of the definitions presented in Table 3.

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Table 3. The definitions of health care and social welfare informatics competencies.

Area of competence	Main content in version 1.0.	Main content in version 2.0
Basic information and communications technology (ICT) competencies	Information management and its tools, information and communication technologies and information literacy skills. Introducing new operating models, anticipating service and training needs, anticipating future digital literacy skills and motivation.	Skills to use information and communication technologies; General understanding of information and communication technologies Information literacy skill; Information management
Online interactive competencies	Online dialogue with persons, changes in the roles of professionals, digital communication environments, online meetings and consultations and the use of social media and online services.	Factors affecting online dialogue; Skills to plan successful online interaction situations; Skills to use various online interaction applications; Online etiquette
Person- centred digital service competencies	Health and social care service structures, the usefulness of digital health services, different digital service environments and tools, the roles of social and healthcare actors, digital service pathways, e-services and virtual reception.	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-centered health and social care in the welfare ecosystem; Digital service pathways; E-services and virtual reception; Accessibility of eHealth and eWelfare services; Cost awareness
Online guiding competencies	Assessing customers' IT skills, IT guidance for customers, directing customers in search of information, supporting self-care by clients, the preparation of digital guidelines, the production of online material, digital outpatient clinics and information services, such as chat rooms.	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
Health monitoring competencies	Artificial intelligence, sensors, robotics, wearable technology, utilities, various monitoring tests and instruments, monitoring information literacy and assessing the reliability and adequacy of information.	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
Health and social care informatics competencies	The interoperability of digital systems, the communication of information via digital information systems, digital logging, Kanta.fi, digital data storage and roles and responsibilities regarding the use of information and legislation.	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; information management guidance and cooperation; data protection and security; cyber security

Interprofessional work in development communities competencies	Assessing the reliability of data sources, information management guidance and collaboration, privacy and security, co-operation and new operating models.	Key principles of human-centred design in development cooperation; Different concepts and stages, models and methods of multifunctional development cooperation; Different actors and roles of actions, as well as different forms of expertise in a multifunctional development community; Personal expertise and substance expertise in multifunctional cooperation; Utilization of digital tools, methods and platforms in multifunctional collaboration; Development of multifunctional activities; Equal and respectful activities and a respectful encounter in the field of multifunctional collaboration
Ethical competencies	Ethical operating models and ethical competence in digital services.	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
Service design competencies	User orientation, participation, innovativeness and new service pathways.	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
Knowledge-based management competencies	The use of monitoring and research data, customer- and patient-specific information, availability, quality and effectiveness of services (e.g., considering changing needs).	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
Research, development, and innovation competencies	Assessment and continuous improvement of one's own skills, work community skills development, the development of digital services, quality criteria for digital services, the development of health and well-being technologies, exploitation of evidence-based information and an evaluation of effectiveness.	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
Societal competencies	Continuous consideration of information security in operations, the social impact of health technology on well-being and daily life, digital democracy and the promotion of social inclusion.	Promoting digital inclusion; Inequalities associated to technology: The social impact of technology

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Discussion

Participants determined that the competence areas were comprehensive and included all main areas of informatics competencies. The participants did not suggest more content to the competence areas in version 2.0. This indicates that the sources used [7,13-15,18-21] were sufficient for the definition of informatics competencies in Finnish Healthcare and Social Welfare EQF level six [12]. The participants agreed with many areas of the definition of health care and social welfare informatics competencies version 1.0, but there were disagreements. In definition 1.0, the competencies were developed based on the vision that citizens are more than previously active participants more so than they were previously [4,22].Professionals in health care and social welfare services are developers of the services from their point of view [4,5]. The developers of IT systems need to understand the complexity and the stringent requirements of social and health care data processing. They need to understand the importance of continuity of care. This study revealed that participants did not fully share this vision.

Mean values from the questionnaire were all over 4.0, which indicates very high agreement with the version 1.0 definition. Standard deviations were highest for areas in which most of the comments were received, especially for service design competencies and online guiding competencies Service design competencies were an area in which the participants did not fully agree with the version 1.0 definition of competencies. The overall impression from the responses is that the participants believe that every professional in health care and social welfare does not need service development competence or deeper online guiding competence for person-centred care. Despite the comments for these areas, competencies were kept in the final

version of the definition due to international and national recommendations [22,10]. Respondents were mostly from the health care sector, and the response rate to the questionnaire was low (37%); however, this is typical of electronic surveys [29]. What is considered an adequate response rate and the relationship between reliability varies. [30,31]. Nevertheless, a low response rate and the participants' professional backgrounds should be taken into account, as these factors can undermine the reliability of the study and affect the generalisability of the results. The low response rate is likely explained by many different factors, such as willingness to respond, fatigue, distractions related to data collection, or unfamiliarity with the research topic [32].

Health care and social welfare professionals need to have a general picture of online service environments and become extensively acquainted with the services related to their own work. With the help of service design, we know how to develop digital service paths that are understandable and easily approachable for customers. In relation to service design, the most important thing is to understand the role of health care and social welfare professionals in the process. This also involves understanding the research evidence in development work [9].

In the EQF, research development and innovation (RDI) is one of the general competencies of all professionals [8]. However, the participants described RDI-competencies mainly as managerial level activity. It is apparent from some responses that there is a need to define and clarify some concepts concerning health care and social welfare informatics. In the area of health and social care informatics, the participants did not see the interoperability of health information systems as a competence required by every health care and

social welfare professional. In the IMIA curriculum 2010, the interoperability of health information systems is an advanced level of competence [14]. On the other hand, in the HITComp, interoperability was also mentioned in baseline and basic levels [13]. Multidisciplinary cooperation and development demand a common language and mutual understanding [6].

The strongest agreements with the version 1.0 definition were with basic ICT competence and online interaction areas. These were main competence areas included in the report *The Competencies and Skills in 2035* published by the Finnish National Agency for Education [9]. Based on the participants' comments, there is a need to encourage professionals to experiment with different kinds of digital environments, tools and social media platforms, bearing in mind information security and privacy. In the WHO's recommendations [11] and the Nursing Association's strategy [16], professionals need to become familiar with the service system to attain successful guidance for the client and for the client to commit to a service.

Digitalisation is developing quickly in health and social care [1]. It is difficult to define core competence and complementary competence. Required competencies are related to the working environment of different professionals. In the definition of health care and social welfare informatics competencies, every area completes others. This definition offers a good base for evaluating healthcare professionals' competencies and what kind of competencies are needed. It is important that all employers have flexible lifelong learning models and resources for professionals to study the digital environments in which they work [3]. This article describes the competencies for bachelor (EQF6) students [8] and at the same time competencies for use in health care and social welfare profes-

sionals. Future research could explore the contents related to these competencies that could be used in master's studies (EQF7) [8]. Although mainly intended for health care and social welfare professionals, the described competencies may also be used in the planning, implementation and evaluation of health care and social welfare related polytechnic and business education.

Conclusion

This paper described how the definition of health care and social welfare informatics competencies were completed for Finnish bachelor level education and for continuing education of professionals at work. Starting from the international competence definitions of the HITCOMP database, the definitions were adapted to the Finnish national context by using recent national studies and literature, evaluated by experts in the field, and finalised based on this feedback. The resulting competence definitions are believed to be the best available to be used in the Finnish Universities of Applied Sciences. They help to develop the digital competencies of educators, degree students and in-service trainees in a multidisciplinary way.

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Conflict of interest

The authors declare no conflicts of interest.

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