

**This is a self-archived version of an original article. This version may differ from the original in pagination and typographic details.**

**Author(s):** Martikainen, Susanna; Salovaara, Samuel; Ylönen, Katri; Tynkkynen, Elina; Viitanen, Johanna; Tyllinen, Mari; Lääveri, Tinja

**Title:** Social welfare professionals willing to participate in client information system development : Results from a large cross-sectional survey

**Year:** 2022

**Version:** Accepted version (Final draft)

**Copyright:** © 2022 Taylor & Francis

**Rights:** CC BY-NC 4.0

**Rights url:** <https://creativecommons.org/licenses/by-nc/4.0/>

**Please cite the original version:**

Martikainen, S., Salovaara, S., Ylönen, K., Tynkkynen, E., Viitanen, J., Tyllinen, M., & Lääveri, T. (2022). Social welfare professionals willing to participate in client information system development : Results from a large cross-sectional survey. *Informatics for Health and Social Care*, 47(4), 389-402. <https://doi.org/10.1080/17538157.2021.2010736>

**Social welfare professionals willing to participate in client information system development – Results from a large cross-sectional survey.**

Susanna Martikainen PhD

*University of Eastern Finland, Kuopio, Finland*

Samuel Salovaara, M.Soc.Sc

*University of Lapland, Rovaniemi, Finland*

Katri Ylönen, Lic.Soc.Sc.

*University of Jyväskylä, Jyväskylä, Finland*

Elina Tynkkynen, M.Soc.Sc

*University of Jyväskylä, Jyväskylä, Finland*

Johanna Viitanen, D.Sc. (Tech), Professor of Practice

*Aalto University, Espoo, Finland*

Mari Tyllinen, M.Sc (Tech)

*Aalto University, Espoo, Finland*

Tinja Lääveri, MD, PhD

*Inflammation Center, Infectious Diseases and Meilahti Vaccine Research Center  
MeiVac, University of Helsinki and Helsinki University Hospital, Helsinki, Finland*

**Corresponding author**

Susanna Martikainen

susanna.martikainen@uef.fi

Human-centered design methods should be implemented throughout the client information system (CIS) development process to understand social welfare professionals' needs, tasks, and contexts of use. The aim of this study was to examine Finnish social welfare professionals' experiences of participating in CIS development.

A national cross-sectional web-based survey on the CIS experiences of social welfare professionals (1145 respondents) was conducted in Finland in spring 2019. This study focused on statements concerning the experiences of end users with CIS development and participation. The results are reported by professional and age groups.

Half (50%) of the 1145 respondents had participated in CIS development. Half (56%) knew to whom and how to send feedback to software developers, but most (87%) indicated that changes and corrections were not made according to suggestions and quickly enough. The most preferred methods of participation were telling a person in charge of information systems development about usage problems (53%) and showing developers on site how professionals work (34%); 19% were not interested in participating.

Social welfare professionals are willing to participate in CIS development, but vendors and social welfare provider organizations are underutilizing this resource. Social welfare informaticists are needed to interpret the needs of end users to software developers.

**Keywords:** Human-centred design, Information systems, Social welfare professionals, Social care, Social work, Client information system, IT system development, Participatory methods; Survey; Informaticist;

**Subject classification codes:**

## **Introduction**

A thorough understanding of users, their needs, tasks, and contexts of use is necessary for the successful development and implementation of information systems (IS) with good usability<sup>1</sup>. Human-centered design (HCD) approach contributes to the success of IS by improving software quality and increasing user satisfaction<sup>2-7</sup>. Early focus on users and end-user involvement are particularly important in the case of complex systems that are used for complicated contexts and tasks,<sup>5</sup> such as those in social welfare or healthcare. However, the demanding task of developing IS can be undermined by poor communication and a failure to identify clear responsibilities for various stakeholders, such as social welfare professionals, managers, IT staff, and IS vendors<sup>8</sup>. HCD has also been suggested as a potential approach to achieve organizational innovation and change<sup>9</sup>.

Surveys, usability tests, and interviews are the most commonly used HCD methods for involving potential end-users in IS development<sup>1,10-11</sup>. Moreover, developers may observe and interview end users on site<sup>12</sup>. Larger numbers of end users can be engaged in focus groups<sup>13</sup>. End-user feedback, such as system error reporting, can also be collected with dedicated web-based systems<sup>14,15</sup>. In healthcare, many organizations train and employ physician or nurse informaticists who engage in both clinical work and health information system (HIS) development<sup>16-20</sup>. However, reports on such roles in social welfare are largely lacking, even though many authors have highlighted the importance of social welfare informaticists who actively participate in the design of technology that will shape, guide, and support their practice of social work<sup>21-23</sup>.

In Finland, IS coverage in healthcare and social welfare has been regularly monitored since the beginning of the 2000s<sup>24</sup>. While practically all public and major

private healthcare providers have already stored patient data electronically since 2007 and integrated to the national Patient Data Repository (“Kanta”) services since 2015,<sup>24-</sup><sup>26</sup> progress has been slower in social welfare. Only in 2017 did the availability of electronic client information systems (CIS) in public social welfare organizations exceed 90%<sup>24</sup>. However, of the 3,971 units registered as private sector social service providers and mainly providing institutional care for the elderly or the disabled, or in child welfare, only half reported electronically storing the majority of client data<sup>24</sup>. Perhaps as a consequence of the slower progress in social welfare in comparison with healthcare, the user experiences of physicians have been monitored nationally since 2010 and the experiences of nurses since 2017<sup>27-29</sup>, but the first national survey among social welfare professionals was only conducted in 2019<sup>30</sup>.

Information technology is seen as a means to transform the social and healthcare system<sup>24</sup>. In Finland, the strategic aims are to ensure the access of social welfare and healthcare professionals to information systems that support their work, refinement of information and knowledge management, and interoperable and modular architecture<sup>31</sup>. This strategy has pushed many social welfare organizations to develop and update their CIS. Moreover, some IS transformation projects seek to combine social welfare and healthcare data into a shared information system<sup>32-34</sup>.

In recent years, interest in end-user experiences of CIS has grown<sup>35-38</sup>. These studies have highlighted usability problems and experiences of managerial and reporting needs ruling over the needs of frontline professionals<sup>8, 35-39</sup>. However, research into the experiences of social welfare professionals while participating in CIS development is scarce; the few, mainly qualitative ethnographic investigations have

been conducted in Australia, England, New Zealand, and Scotland <sup>21, 35, 36, 40-42</sup>. These studies have only comprised a small number of social welfare professionals and they mainly focus on their user experiences rather than seek to comprehend how the end users could be engaged in CIS development. In a study conducted among physicians and nurses in Finland, the end users were dissatisfied with their ability to influence HIS development <sup>43</sup>. While some studies suggest that younger healthcare professionals are more contented with the usability of HIS than the older ones. <sup>44,45</sup>, younger age has not been associated with increased satisfaction among Finnish healthcare professionals. Similarly, younger clinicians have not been more contented with the vendors' responsiveness than the older; however, they are more willing to participate <sup>43</sup>.

The aim of this study was to explore the experiences of end users participating in CIS development in a large Finnish national survey conducted among social welfare professionals.

The research questions were as follows:

- RQ1. What experiences do social welfare professionals have with giving feedback to CIS developers?
- RQ2. Have they participated in CIS development?
- RQ3. How would they prefer to participate in CIS development?

### **Central concepts**

Since occupational positions in the field of social work and social welfare vary between countries depending on socio-political contexts and other factors, we chose to apply a generic concept of a social welfare professional when describing the respondents, regardless of their occupational position (e.g., social workers, social counselors, or practical nurses). In Finland, licensed social workers have university-level master's

degrees in either the social sciences or political sciences. Social counselors have bachelor's degrees in social services from universities of applied sciences. Many providers, particularly in the field of institutional care, have degrees in nursing (registered nurses/practical nurses).

HCD was used as a theoretical framework for this study. The international standard (ISO 9241-210:2019) describes HCD as “an approach to systems design and development that aims to make interactive systems more usable by focusing on the use of the system and applying human factors/ergonomics and usability knowledge and techniques”<sup>46</sup>. Most HCD techniques and methods require the participation of users.

Usability refers to the extent to which a system can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use<sup>46</sup>.

## **Materials and methods**

### *Social welfare organization professionals in Finland*

In Finland, local public authorities (municipalities or federations of municipalities) are responsible for organizing and funding general social services for the entire population and special services for certain population groups; the Social Insurance Institution of Finland (KELA) manages social income support. Local public authorities may purchase social services from private service providers, including non-governmental organizations (NGOs) (n = 3,971 in 2017) <sup>24</sup>. Social welfare and healthcare data are stored in separate registries; client data documented by social welfare professionals of, for example, elderly services are stored in the social welfare registry, but the physician addressing the health problems documents data in the healthcare registry. In many contexts of use, sharing client and patient data across social welfare and healthcare is only allowed after specific consent is given by the client/patient.

In 2018, most (3,888; 95%) social workers were employed by municipalities, and fewer (196; 5%) worked in the private sector/NGOs. Fifty-six percent (5,638) of social counselors worked in municipalities, and 44% (4,384) worked in private sector/NGOs. The work tasks of social workers mainly focus on managing cases and making decisions about services and benefits, whereas social counselors usually provide services during scheduled appointments or at housing service units, most often in child welfare and disability services. Moreover, 32,227 and 18,284 practical nurses provide daily care mainly for the elderly and disabled persons in municipalities and the private sector/NGOs, respectively <sup>47, 48</sup>.



***Design of the study***

This study was part of a large national cross-sectional CIS user experience survey conducted among social welfare professionals <sup>39</sup>. The user participation methods in the questionnaire were (Table 1; Q3): observation of/shadowing users (Q3.A), focus/end-user groups (Q3.B), provision of feedback (Q3.C and Q3.D), and communication with an end-user representative in the organization (Q3.E).

**Table 1.** Development-related questions in the questionnaire.

<p>Q1. Think of the experiences you have had in providing feedback about your client information systems. Please indicate your responses to the following statements.</p> <p><i>Scale: Fully agree / Somewhat agree / Neither agree nor disagree / Somewhat disagree / Fully disagree</i></p>	<p>A I know how and to whom I can send feedback about the information system if I wish to do so.</p> <p>B The information system vendor is interested in feedback about the system provided by the end users.</p> <p>C The information system vendor implements corrections and change requests according to the suggestions of the end users.</p> <p>D Corrections and change requests are implemented within a reasonable time frame.</p>
<p>Q2. Have you participated in information systems development work?</p>	<p>A lot A little Not at all</p>
<p>Q3. In which ways would you be interested in participating in information systems development work in the future? You may choose one or more alternatives.</p> <p><i>Scale: Fully agree / Somewhat agree / Neither agree nor disagree / Somewhat disagree / Fully disagree</i></p>	<p>A I would be interested in showing software developers how I work and describing my software-related needs.</p> <p>B I would be interested in participating in a development work group made up of end users.</p> <p>C I would be interested in providing suggestions and feedback about how the software can be designed and changed to the vendor using a dedicated website.</p> <p>D I would be interested in providing suggestions and feedback about how the software can be designed and changed to the vendor using email.</p> <p>E I would be interested in telling the person in charge of information systems development for the organization about usage-related problems.</p> <p>F I am not interested in participating.</p> <p>G How else would you like to participate?</p>

The survey questionnaire was adjusted from a validated National Usability-focused HIS Scale (NuHISS) instrument for physicians<sup>49</sup>. The statements were originally created for the national physician survey in 2010 and has been utilized for usability-focused surveys involving physicians and registered nurses.<sup>27,28,50,51</sup>

The survey included a section on the experiences of users participating in IS development; the results for physicians and registered nurses have been previously reported<sup>43,52</sup>. The adjustments for the social welfare professionals' questionnaire focused on the viewpoints of social workers and counselors. Registered and practical nurses working in social welfare mainly use HIS instead of CIS, and therefore the statements were not modified to consider their tasks and information needs. The demographic variables included in the survey were gender, level of education, employment sector, social welfare service line, and age group.

### ***Data collection***

The data were collected in April–May 2019 via an online questionnaire. To reach professionals from the various social welfare service lines and organizations, the questionnaire was distributed through the largest trade unions and associations with members from the field of social welfare. An invitation to participate with a non-individualized link to the questionnaire was sent by email to working-age social welfare professionals under 65 years of age who had provided email addresses and were members of the Talentia trade union for social welfare professionals with higher education (approximately 26,000 members; 11,302 emails sent), the Trade Union for the Public and Welfare Sectors (approximately 200 000 members; 6744 emails sent), or the Finnish Society of Social Work Research (565 members; 510 emails sent). The link was also distributed on social media when the number of respondents was at risk to remain low. The study protocol was approved by the ethics committee of Aalto

University. At the beginning of the questionnaire, there was a privacy statement, thereafter all voluntary respondents gave informed consent to participate in the study. No identifying information was collected as part of the survey and the researchers were not able to identify individual respondents.

The exact response rate cannot be calculated since the memberships to the above-mentioned unions/society may overlap and because of data protection regulations, the unions/society were not allowed to reveal to whom they had sent the emails.

Additionally, some respondents may have received the link from colleagues or via social media.

### ***Analysis***

For the analysis of statements Q1.A–D (Table 1), of the five-point Likert scale assessments, "Fully agree" and "Somewhat agree" were combined and denoted by "Agree", and "Somewhat disagree" and "Fully disagree" were denoted by "Disagree". Statistical analyses were carried out using SPSS 22 (IBM Corp, Armonk, NY). A chi-squared test was used to compare categorical variables. Statistical significance was set at  $p < 0.05$ .

## Results

A total of 1145 social welfare professionals responded to the questionnaire. Of these, 26% (n = 302) were social workers, 30% (n = 343) were social counselors, and 14% (n = 157) had leading or managerial positions. In the group “others”, 30% (n = 338) comprised other professionals and experts working in the field of social welfare; of these, 66 (6% of all respondents) were nurses. A total of 93% of the respondents were female, and 53% were under 45 years of age. Most of the respondents (80%) worked in public sector. Child welfare was specialty of 35% of respondents.

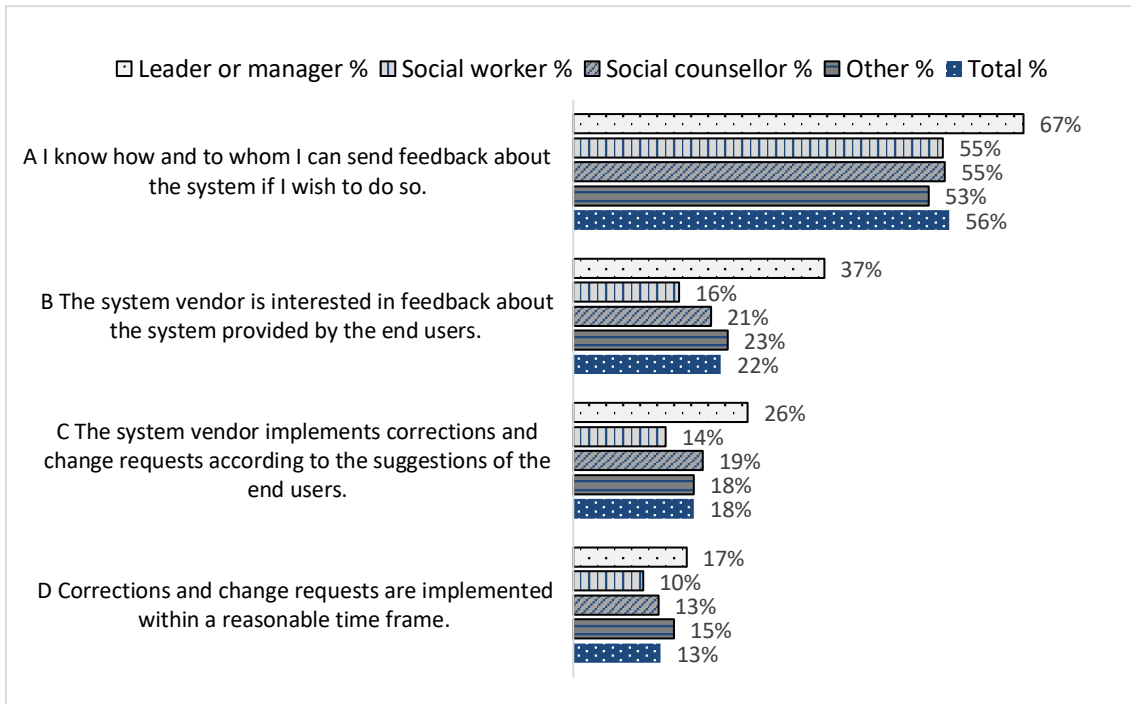
**Table 2.** Data characteristics (n=1145).

	n	%
<b>Age</b>	<b>1143</b>	
< 35	245	21.4
35-44	357	31.2
45-54	307	26.9
< 55	234	20.5
<b>Education</b>	<b>1125</b>	
Master's degree or higher	380	33.8
Bachelor's degree	586	52.1
College-level education	159	14.1
<b>Gender</b>	<b>1138</b>	
Female	1068	93.3
Male	67	5.9
Other	3	0.3
<b>Employment sector</b>	<b>1145</b>	
Public sector	911	79.6
Private sector or non-governmental organizations	193	16.9
Healthcare sector	32	2.8
Unemployed	9	0.8

<b>Specialty</b>	<b>1139</b>	
Child welfare	398	35.0
Services for working age	194	17
Elderly services	125	11
Family law services	16	1.4
Services for the disabled	184	16.2
Services for the substance abusers	35	3.1
Generalist	86	7.6
Other	101	8.9
<b>Role</b>	<b>1140</b>	
Managers	157	13.8
Social workers	302	26.5
Social counselors	343	30.1
Other	338	29.6

### *Experiences of giving feedback*

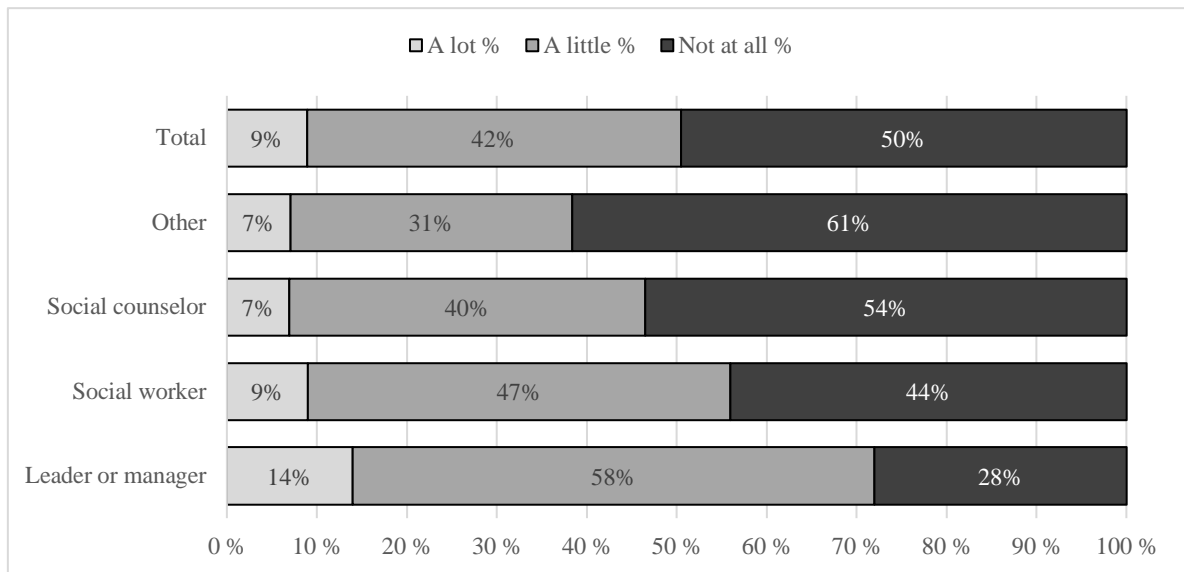
Approximately one-third did not know how to provide feedback to vendors and developers (Q1.A). In total, 22% thought that the vendor was interested in end-user feedback (Q1.B); 18% and 13% responded that corrections and development ideas were implemented according to suggestions (Q1.C) or quickly enough (Q1.D), respectively (Figure 1, supplementary table 1). Those in managerial or leadership positions appeared to have somewhat more positive experiences than social workers (67% of managers vs. 55% of social workers agreed with statement about providing feedback to vendors, and 37% vs.16% and 26% vs.14% agreed with statements about vendors being interested in end-user feedback and implementing corrections according to suggestions, respectively).



**Figure 1.** Experiences with providing feedback. Percentage of those who agree with the statement. Percentages for those who disagree and exact numbers of respondents per statement are provided in Supplementary table 1.

### *Participating in CIS development*

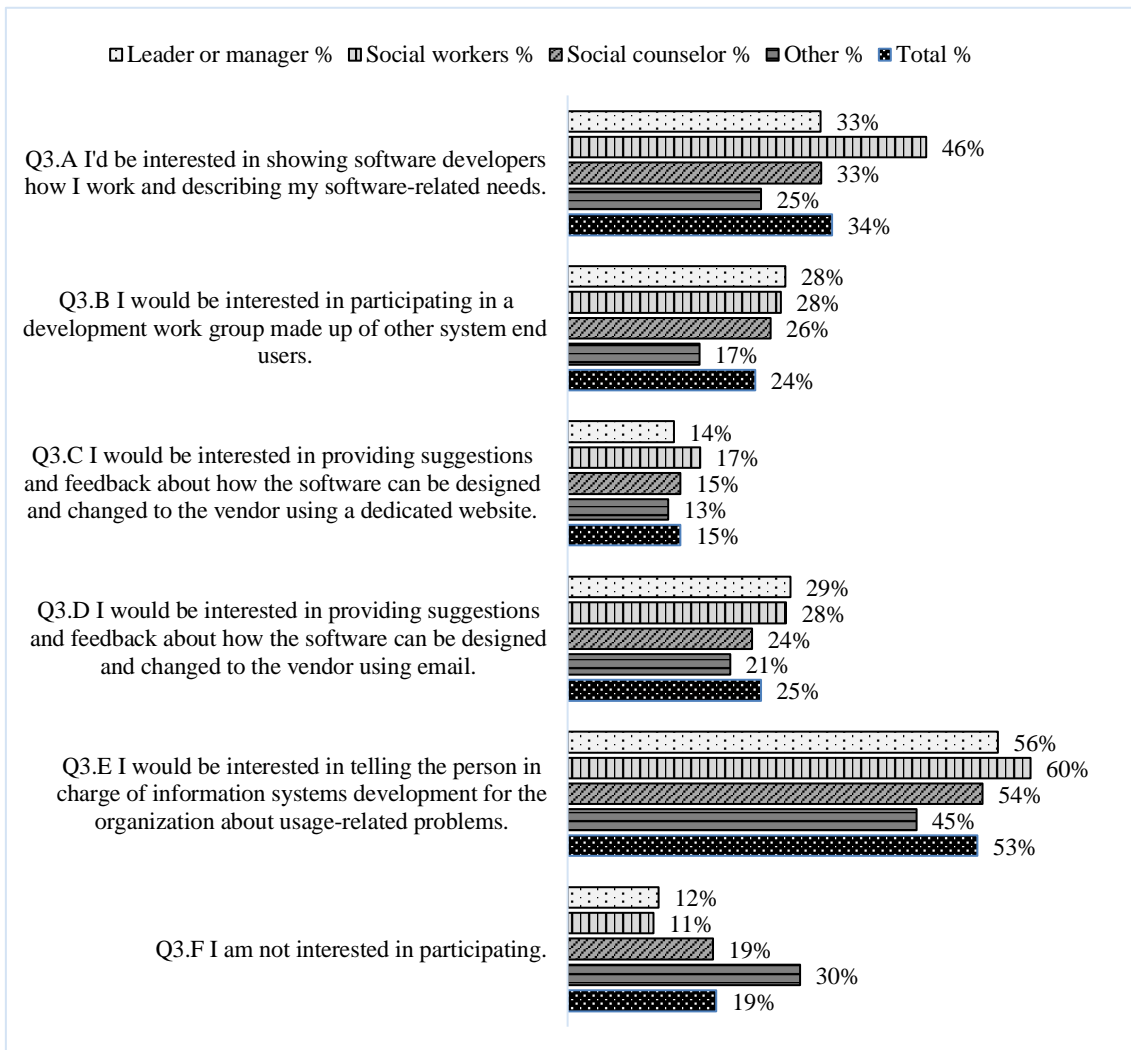
Half of the respondents had not been engaged at all in CIS development; 26% of social welfare professionals working in leading or managerial positions, but 44% of social workers, and 49–64% of others reported no participation ( $p < 0.001$  managers vs. others) (Figure 2, supplementary table 3).



**Figure 2.** Participation in IS development work. Exact numbers of respondents are provided in Supplementary table 3.

***Preferred methods to participate in CIS development***

The most preferred (53%) method of participating was communicating problems and development ideas to a person responsible for CIS development within the organization (Figure 3, supplementary table 2). Showing developers on site how social welfare professionals work was endorsed by 34% of respondents. Sending feedback via email (25%), participating in focus groups (24%), or documenting feedback on a dedicated webpage (15%) were less preferred. Of all the respondents, 19% were not interested in participation at all.



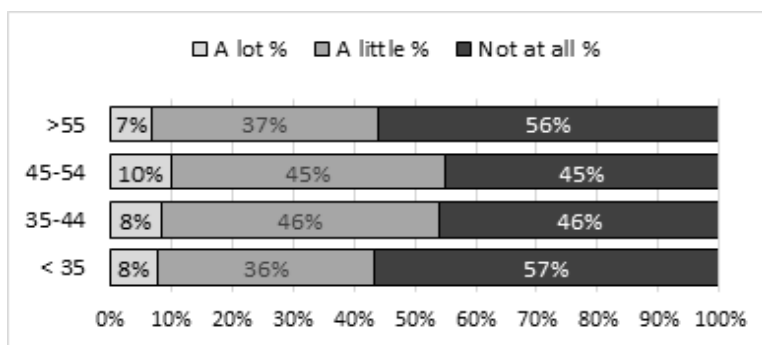
**Figure 3.** Preferred methods of participation in IS development. Percentage of those who agree with the statement. Percentages for those who disagree and exact numbers of respondents per statement are provided in Supplementary table 2.

***Relation of age and experiences of CIS development***

When the age groups were compared, the youngest (under 35 years) and the oldest (over 55 years) appeared to have participated less than the other groups (Figure 4; supplementary table 4). The youngest respondents did not have more positive experiences with vendor reactions to feedback than the older respondents



(supplementary table 5). The most popular participation method for all age groups was communicating with a person responsible for CIS development within the organization (Q3.E.), but those over 55 years of age favored this method the most. Only 25% of respondents over the age of 55, compared with 39% in the two youngest age groups, were interested in showing software developers how they work (Q3.A). The oldest were also the least interested in participating in focus groups (11% vs. 23–30%). The youngest were the most willing to send development ideas to developers via email (34% vs. 20% in the two oldest groups) and on a dedicated webpage (20% vs. 9–14% in the two oldest groups). In total, 17% of the two youngest age groups, but 24% of the oldest respondents, were not interested in participating at all (supplementary table 6).



**Figure 4.** Participation in IS development work by age group. Exact numbers of respondents are provided in Supplementary table 4.

## Discussion

Good usability is essential for developing successful and high-quality IS. Applying a HCD approach is one of the central means for achieving good usability<sup>1</sup>. Moreover, user involvement in IS development should be active, by participating in design, acting as a

source of relevant data, or evaluating solutions<sup>1,47,54</sup>. The main finding of this study was that social welfare professionals are willing to participate in CIS development, but vendors and social welfare provider organizations are not fully utilizing this resource. The results agree with those of physicians and nurses<sup>43</sup>.

### ***Vendors considered unresponsive to CIS-related feedback***

When compared with other social welfare professionals, those working in leadership and managerial positions reported more positive experiences regarding their feedback to CIS vendors and developers; however, only 26% and 17% of leaders/managers indicated that their suggestions were implemented according to their wishes and quickly enough, respectively. Interestingly, social workers provided the most negative assessments. There are several possible reasons behind this finding. In recent years, the development of CIS has been heavily directed by national guidelines. It is likely that frontline social workers have not been included in these discussions; therefore, they may not have fully understood why some changes were implemented in a particular manner. Moreover, they may not personally agree with the guidelines. In addition, nationally enforced CIS developments may emphasize data collection over practical informational needs and the objectives of social work<sup>53,55</sup>.

Presumably the employers of social care workers have not allocated working time for development; this may have led to the underrepresentation of social workers in various focus groups or the overlooking of their viewpoints. Some researchers suggest that end-user tools may have been mainly developed between vendors and IT staff,<sup>8</sup> or end-user participation may have been used to gain buy-in for technology instead of

seeking collaboration<sup>54</sup>. Since the developers do interact with end users,<sup>56,57</sup> the most probable explanation for end users experiencing unresponsiveness is that the vendors and developers fail to inform end users about developments and corrections in a timely and easily understandable manner. Simply fixing problems/issues is ineffective if users do not know they have been fixed and may lead to end users feeling that their ideas have not been considered at all.

### ***Social welfare informaticists and on-site developers highly valued***

Of the various HCD methods for user participation<sup>1</sup>, the respondents of this study favored the most explaining problems/development needs to a dedicated person in charge of CIS development in the organization. A social welfare informaticist could serve as an interpreter between the IT-focused language of the developers and the field-specific uses of the language of the end users<sup>8</sup>. They could also explain to both groups what is possible and what is not, either from a technical or workflow perspective. Indeed, Lagsten and Andersson (see ref. 8) identified that a lack of common language and structures for describing social work to CIS developers hampered critical discussions of CIS improvements. In healthcare, many organizations have employed physician and nurse informaticists who also use the information system themselves in clinical work<sup>16-20</sup>. International requirements for such roles in the social welfare sector are lacking, but Gillingham (see ref. 58), for example, has suggested that social workers and their managers should take the lead in CIS development as they know their work best. Similar to health care professionals<sup>9</sup> frontline social welfare professionals need to be supported in their attempts to act as champions of innovation and change. Social welfare informaticists would enable the development of CIS that multilaterally and effectively support the practice of social work, data utilization, and service development

for various stakeholders <sup>23</sup>. They are also needed when developing processes and workflows alongside information system development.

One third of respondents were willing to show their work to developers. On-site visits provide developers with a unique opportunity to understand how an information system is used and to hear immediate feedback on possible development plans. However, an individual end user does not necessarily represent a typical user or may not always be aware of the strategic goals of the organization. Therefore, site visits should always be complemented by collecting feedback from a diverse audience <sup>59,60</sup>.

One fourth of respondents were interested in participating by attending focus group meetings. It may be difficult to arrange time for frontline social welfare professionals who also see clients and manage cases. Moreover, to work efficiently, the participants of these groups should have a thorough understanding of not only the use contexts and end-user needs but also the CIS itself. We suggest that resource-intensive focus group meetings should be used sparingly. Instead, social welfare informaticists could gather end-user feedback through everyday work contacts.

From a vendor/developer perspective, collecting feedback on dedicated webpages or via email is often the most feasible method of obtaining detailed information on individual problems or issues in the CIS. However, providing screenshots and accurate descriptions on use contexts may require a considerable amount of work from the end users. Vendors should develop automated feedback collection tools built into the information systems <sup>61</sup>.

### ***Leaders and managers had participated more actively than the others***

Those working in leadership and managerial positions had participated more in CIS development than other social welfare professionals. Accordingly, managerial needs may have become overrepresented in the development of CIS<sup>36</sup>. As most leaders/managers in social welfare do not participate in frontline social work, special attention should be paid to routine workflow design by also engaging non-managerial professionals; this applies particularly to usability testing. On the other hand, leaders and managers are likely to be more aware of the strategic and quality goals of the organization, as well as national CIS documentation requirements; indeed, collaboration between the various stakeholders is important<sup>8</sup>. Moreover, more attention should be given in social welfare organizations to communicating these goals to frontline professionals.

### ***Younger social welfare professionals willing to participate in CIS development***

The finding that the youngest age groups had participated less than the older groups was not unexpected since CIS development requires an understanding of the work processes and strategic goals of an organization. The more experienced workers have been described as being more able to make constructive suggestions for changes to CIS user interfaces and functionality to serve their purposes more efficiently than novice users<sup>40</sup>.

However, since (at least in Finland) the majority of older social welfare professional generations have a relatively short history of electronic documentation and utilization of CIS in daily work, they may try to copy paper-based workflows into the CIS instead of being able to re-evaluate the whole process. Moreover, novice users may identify usability problems that may not be noticed by experienced users<sup>40</sup>. Except for

communicating via a social welfare informaticist, the youngest respondents were more interested than the oldest respondents in all other participatory methods included in our survey; while this has also been reported in studies involving physicians and nurses,<sup>43</sup> we found no studies that would explain this difference. However, vendors or social welfare organizations should not assume that, compared to older workers, the younger have more positive impressions of vendors being responsive to feedback and implementing CIS improvements.

***Only a few not interested at all in participating***

One of the central findings of this study was that a relatively small proportion (19%) of social welfare professionals were not interested in participating in CIS development. This is in accordance with the findings involving physicians and nurses<sup>43</sup>. Moreover, half of the respondents had participated to at least some extent. It is likely that those who responded to this survey have been more actively involved in CIS development than those end users who did not respond; this may have also resulted in overestimating the proportion of those interested. However, it is evident that a large proportion of social welfare professionals are willing to participate in CIS development. Since the majority were not satisfied with the end results of the interaction between end users and system developers and vendors (changes and corrections were not made according to suggestions and quickly enough), social welfare organizations, CIS vendors, and developers should seek to find more suitable means of improving this experience. The principles and methods of HCD provide tools for the involvement of end users for all stages of the IS design process; this may in turn improve the chances for successful IS development and outcomes<sup>1</sup>.

### *Limitations*

One of the central limitations of our study was that we could not assess the response rate; however, to our best knowledge, with 1145 respondents, this was the largest survey to date among social welfare professionals concerning their experiences with participating in CIS development. Moreover, the results can be considered generalizable since the respondents represented social welfare service lines in similar proportions as reported nationally<sup>48</sup>. It is evident that social welfare comprises different services and the social welfare professionals may have different educational levels in different countries; national surveys are needed to best implement HCD methods. Even though we did not ask the respondents open-ended questions about participation, the strength of our survey method was that we were able to also include those who do not usually participate in development; most previous observational studies have focused on those who are already involved, and the numbers of study subjects have been low<sup>21,35,36,40-42</sup>.

One limitation deserving attention is that our survey did not cover the experiences of the largest group of social welfare professionals in Finland i.e. practical nurses. However, they mainly use HIS instead of CIS, and their information needs differ considerably from those of social workers and social counselors. Moreover, in most international contexts, their tasks would be regarded as healthcare instead of social welfare. We suggest that their experiences should be covered in a separate survey.

We also did not ask how the participants had participated in CIS development; this should be addressed in future studies to assess whether, for example, those who have social welfare informaticists in their organizations or have had developers on site are more satisfied. Moreover, the questionnaire did not cover the phase of software development in which the respondents had participated. End users tend to be more

active in reporting errors and development ideas during the implementation phase of a new IS; however, at the time of the survey, there had been no major changes in the CIS brands in use in Finland <sup>62</sup>.

### ***Future research***

Although the usefulness of end-user participation in IS development is widely acknowledged, there are few studies on the experiences of social welfare professionals. Indeed, we encourage similar surveys in other countries as well. Moreover, large studies, both surveys and experimental studies, are needed to explore the usefulness of the various methods in the field of social welfare. Surveys should be complemented with interviews and usability tests, but the viewpoints of larger audiences are difficult to reach with qualitative ethnographic studies.

### ***Conclusion***

Our findings emphasize the importance of end-user involvement and the deployment of appropriate HCD methods for CIS development. One of the greatest challenges in the relationship between end users and developers is communication. End users must not only verbalize their needs to developers, but developers must also communicate when and how the needs of end users will be implemented; positions for social welfare informaticists should be established in organizations to alleviate this lack of communication. Social welfare professionals are willing to participate in CIS development, but vendors and social welfare provider organizations are not fully utilizing this resource.



### ***Acknowledgments***

We express our gratitude to Professor Sanna Hautala for guidance in the design of the survey. We thank the Talentia Union of Professional Social Workers, the Trade Union for the Public and Welfare Sectors, and the Finnish Society of Social Work Research for kindly sending questionnaire links.

### ***Declaration of interest statement***

Martikainen has been previously employed by one of the CIS software vendors included in the study. Lääveri, Salovaara and Tyllinen are/have been employed by a CIS software vendor not included in the study. The employer did not provide any support, financial or otherwise, for the study. Moreover, the vendor was not involved in the design of the study or in the collection, analysis, and interpretation of the data.

### ***Authors' contributions***

Susanna Martikainen (PhD) had the main responsibility for the manuscript. Tinja Lääveri (MD, PhD) had the main responsibility for the statistical analysis. All authors contributed to all parts of the article, including interpretation of the data and approval of the manuscript. In addition, the authors Martikainen, Salovaara, Ylönen, Tyllinen, Viitanen, and Lääveri contributed to the design of the survey study.

### **References**

1. Maguire M. Methods to support human-centred design. *Int. J. Human-Computer Studies*. 2001; 55: 587-634 doi:10.1006/ijhc.2001.0503
2. Qin Y, Zhou R, Wu Q, et al. The effect of nursing participation in the design of a critical care information system: A case study in a chinese hospital. *BMC medical informatics and decision making*. 2017;17(1):165.

<https://www.ncbi.nlm.nih.gov/pubmed/29212480>. doi: 10.1186/s12911-017-0569-3.

3. Subramanyam R, Weisstein F, Krishnan M. User participation in software development projects. *Communications of the ACM*. 2010;53(3):137-141.
4. Damodaran L. User involvement in the systems design process-a practical guide for users. *Behaviour & information technology*. 1996;15(6):363-377. <http://www.tandfonline.com/doi/abs/10.1080/014492996120049>. doi: 10.1080/014492996120049.
5. Mckeen JD, Guimaraes T. Successful strategies for user participation in systems development. *Journal of Management Information Systems*. 1997;14(2):133-150. <https://doi.org/10.1080/07421222.1997.11518168>. doi: 10.1080/07421222.1997.11518168.
6. Barki H, Hartwick J. Measuring user participation, user involvement, and user attitude. *MIS quarterly*. 1994;18(1):59-82. <https://www.jstor.org/stable/249610>. doi: 10.2307/249610.
7. Gould John D, Clayton L. Designing for usability: key principles and what designers think. *Communications of the ACM* 1985; 28(3):300-311.
8. Lagsten J, Andersson A. Use of information systems in social work - challenges and an agenda for future research. *European journal of social work*. 2018;21(6):850-862. <http://www.tandfonline.com/doi/abs/10.1080/13691457.2018.1423554>. doi: 10.1080/13691457.2018.1423554.
9. Zuber CD, Moody L. Creativity and Innovation in Health Care. *Nursing Administration Quarterly*. 2018;42(1):62-75. doi: 10.1097/NAQ.0000000000000267

10. Ellsworth MA, Dziadzko M, O'Horo JC, Farrell AM, Zhang J, Herasevich V. An appraisal of published usability evaluations of electronic health records via systematic review. *Journal of the American Medical Informatics Association*. 2017;24(1):218-226. <https://doi.org/10.1093/jamia/ocw046>. doi: 10.1093/jamia/ocw046.
11. Shah SGS, Robinson I. User involvement in healthcare technology development and assessment: Structured literature review. *International journal of health care quality assurance incorporating Leadership in health services*. 2006;19(6-7):500-515. <https://www.ncbi.nlm.nih.gov/pubmed/17100220>. doi: 10.1108/09526860610687619.
12. Niès J, Pelayo S. From users involvement to users' needs understanding: A case study. *International journal of medical informatics (Shannon, Ireland)*. 2009;79(4):e76-e82. <https://www.clinicalkey.es/playcontent/1-s2.0-S138650560900104X>. doi: 10.1016/j.ijmedinf.2009.06.007.
13. Bruseberg A, McDonagh-Philp D. Focus groups to support the industrial/product designer: A review based on current literature and designers' feedback. *Applied Ergonomics*. 2002;33(1):27-38. <https://www.sciencedirect.com/science/article/pii/S0003687001000539>. doi: 10.1016/S0003-6870(01)00053-9.
14. Fabijan A, Olsson HH, Bosch J. Customer feedback and data collection techniques in software R&D: A literature review. In: *Software business*. Cham: Springer International Publishing; 2015:139-153. [http://link.springer.com/10.1007/978-3-319-19593-3\\_12](http://link.springer.com/10.1007/978-3-319-19593-3_12). 10.1007/978-3-319-19593-3\_12.
15. Hess J, Randall D, Pipek V, Wulf V. Involving users in the wild—Participatory product development in and with online communities. *International Journal of Human-Computer Studies*. 2013;71(5):570-589. <https://www.sciencedirect.com/science/article/pii/S1071581913000074>. doi: 10.1016/j.ijhcs.2013.01.003.

16. AMIA, American Medical Informatics Association. History of the clinical informatics subspecialty. <https://www.amia.org/clinical-informatics-board-review-course/history>. Accessed May 1st, 2021.
17. Singer JS, Cheng EM, Baldwin K, Pfeffer MA. The UCLA health resident informaticist program – A novel clinical informatics training program. *Journal of the American Medical Informatics Association*. 2017;24(4):832-840. <https://doi.org/10.1093/jamia/ocw174>. Accessed May 1, 2021. doi: 10.1093/jamia/ocw174.
18. Sieja A, Markley K, Pell J, et al. Optimization sprints: Improving clinician satisfaction and teamwork by rapidly reducing electronic health record burden. *Mayo Clinic proceedings*. 2019;94(5):793-802. <http://dx.doi.org/10.1016/j.mayocp.2018.08.036>. doi: 10.1016/j.mayocp.2018.08.036.
19. Lehmann CU, Gundlapalli AV, Williamson JJ, et al. Five years of clinical informatics board certification for physicians in the united states of america. *Yearb Med Inform*. 2018;27(1):237-242.
20. Cummins MR, Gundlapalli AV, Gundlapalli AV, Murray P, Park H-, Lehmann CU. Nursing informatics certification worldwide: History, pathway, roles, and motivation. *Yearb Med Inform*. 2016;25(01):264-271. <http://www.thieme-connect.de/DOI/DOI?10.15265/IY-2016-039>. doi: 10.15265/IY-2016-039.
21. Gillingham P. Electronic information systems and social work: Principles of participatory design for social workers. *Advances in social work*. 2015;16(1):31-42. <https://search.proquest.com/docview/1821169018>. doi: 10.18060/18244.
22. Naccarato T. Child welfare informatics: A proposed subspecialty for social work. *Children and youth services review*. 2010;32(12):1729-1734. <http://dx.doi.org/10.1016/j.chilyouth.2010.07.016>. doi: 10.1016/j.chilyouth.2010.07.016.

23. Nguyen LH. Child welfare informatics: A new definition for an established practice. *Social Work*. 2007;52(4):361-363.  
<http://www.ingentaconnect.com/content/nasw/sw/2007/00000052/00000004/art00008>. doi: 10.1093/sw/52.4.361.
24. Vehko T, Ruotsalainen S, Hyppönen H, eds. E-health and e-welfare of Finland. Check Point 2018. The Finnish Institute for Health and Welfare (THL). Helsinki, Finland. 2019.
25. Kanta. kanta - patient data repository,  
<https://www.kanta.fi/en/professionals/patient-data-repository>. Updated 2019.
26. Jormanainen V. Large-scale implementation and adoption of the Finnish national kanta services in 2010–2017: A prospective, longitudinal, indicator-based study. *Finnish Journal of eHealth and eWelfare*. 2018;10(4):381-395.  
<https://doaj.org/article/e011e63af3704a06ac252375c37f8682>. doi: 10.23996/fjhw.74511.
27. Kaipio J, Kuusisto A, Hyppönen H, Heponiemi T, Lääveri T. Physicians' and nurses' experiences on EHR usability: Comparison between the professional groups by employment sector and system brand. *International journal of medical informatics*.  
<https://www.sciencedirect.com/science/article/pii/S1386505619306835>.
28. Kaipio J, Lääveri T, Hyppönen H, et al. Usability problems do not heal by themselves: National survey on physicians' experiences with EHRs in Finland. *International journal of medical informatics (Shannon, Ireland)*. 2016;97:266-281. <https://www.clinicalkey.es/playcontent/1-s2.0-S1386505616302258>. doi: 10.1016/j.ijmedinf.2016.10.010.
29. Viitanen J, Hyppönen H, Lääveri T, Vänskä J, Reponen J, Winblad I. National questionnaire study on clinical ICT systems proofs: Physicians suffer from poor usability. *International Journal of Medical Informatics*. 2011;80(10):708-725.

<https://www.sciencedirect.com/science/article/pii/S1386505611001481>. doi: 10.1016/j.ijmedinf.2011.06.010.

30. Martikainen S, Salovaara S, Ylönen K, Tynkkynen E, Kaipio J, Lääveri T. Sosiaalialan ammattilaiset halukkaita osallistumaan asiakastietojärjestelmien kehittämiseen: Osallistumistavoissa kehitettävää. *Finnish Journal of eHealth and eWelfare*. 2020;12(3). <https://jyx.jyu.fi/handle/123456789/72430>. doi: 10.23996/fjhw.96084.
31. Ministry of Social Affairs and Health. Information to support well-being and service renewal. *eHealth and eSocial strategy 2020*. <http://julkaisut.valtioneuvosto.fi/handle/10024/74459>. Updated 2015.
32. Kaipio J, Lääveri T, Tyllinen M. Menettelyprosessi käytettävyys- ja loppukäyttäjänäkökulman integroimiseksi tietojärjestelmähankintaan: Tapaus apotti. [procedural process for integrating the usability and end-user perspective into information system acquisition: The apotti case.]. *Finnish Journal of eHealth and eWelfare*. 2015;7(2-3):104-121. <https://journal.fi/finjehew/article/view/50897>.
33. Oy Apotti Ab. Apotti. <https://www.apotti.fi/>. Accessed 26.6.2021.
34. Aster. <https://www.asteraptj.fi/>. Accessed 26.6.2021.
35. Gillingham P. Technology configuring the user: Implications for the redesign of electronic information systems in social work. *British Journal of Social Work*. 2014;46:1-12. doi: 10.1093/bjsw/bcu141.
36. Gillingham P, Graham T. Designing electronic information systems for the future: Social workers and the challenge of new public management. *Critical Social Policy*. 2016;36(2):187-204. <https://doi.org/10.1177/0261018315620867>. doi: 10.1177/0261018315620867.

37. Huuskonen S, Vakkari P. "I did it my way": Social workers as secondary designers of a client information system. *Information Processing & Management*. 2013;49(1):380-391.  
<https://www.sciencedirect.com/science/article/pii/S0306457312000684>. doi: 10.1016/j.ipm.2012.05.003.
38. Devlieghere J, Roose R. Documenting practices in human service organisations through information systems: When the quest for visibility ends in darkness. *Social inclusion*. 2019;7(1):207-217.  
<https://search.proquest.com/docview/2300630936>. doi: 10.17645/si.v7i1.1833.
39. Ylönen K, Salovaara S, Kaipio J, et al. Sosiaalialan asiakastietojärjestelmissä paljon parannettavaa: Käyttäjäkokemukset 2019. *Finnish Journal of eHealth and eWelfare*. 2020;12(1):30-43. <https://journal.fi/finjehew/article/view/88583>. doi: 10.23996/fjhw.88583.
40. Gillingham P. Electronic information systems and social work: Who are we designing for? *Practice*. 2014;26(5):313-326.  
<https://doi.org/10.1080/09503153.2014.958454>. doi: 10.1080/09503153.2014.958454.
41. Gillingham P. Electronic information systems and human service organizations: The needs of managers. *Human Service Organizations: Management, Leadership & Governance*. 2016;40(1):51-61.  
<https://doi.org/10.1080/23303131.2015.1069232>. doi: 10.1080/23303131.2015.1069232.
42. Gillingham P. Electronic information systems to guide social work practice: The perspectives of practitioners as end users. *Practice*. 2016;28(5):357-372.  
<https://doi.org/10.1080/09503153.2015.1135895>. doi: 10.1080/09503153.2015.1135895.
43. Martikainen S, Kaipio J, Lääveri T. End-user participation in health information systems (HIS) development: Physicians' and nurses' experiences. *International*

journal of medical informatics (Shannon, Ireland). 2020;137:104117. doi: 10.1016/j.ijmedinf.2020.104117.

44. Jeddi FR, Nabovati E, Bigham R, Khajouei R. Usability evaluation of a comprehensive national health information system: relationship of quality components to users' characteristics. *Int J Med Inform* 2020;133:104026. doi: 10.1016/j.ijmedinf.2019.104026.
45. Raglan GB, Margolis B, Paulus RA, Schulkin J. Electronic health record adoption among obstetrician/gynecologists in the United States: physician practices and satisfaction. *Journal for Healthcare Quality*. 2014.
46. ISO. ISO 9241-210 ergonomics of human-system interaction — part 210: Human-centred design for interactive systems. 2009.
47. Ministry of Social Affairs and Health. Social and health services. <https://stm.fi/en/social-and-health-services>. Accessed 18.5.2021.
48. Vuorijärvi P, Raappana M, Kinnunen P, Kostamo-Pääkkö K. Sosiaalihuollon ammattihenkilöstö- ja tehtäväarakenneselvitys 2018. [http://www.sosiaalikallega.fi/poske/tapahtumat/kkp\\_soshuollonammattihlosto\\_tehtavararakenneselvitys2018](http://www.sosiaalikallega.fi/poske/tapahtumat/kkp_soshuollonammattihlosto_tehtavararakenneselvitys2018). Updated 2019.
49. Hyppönen H, Kaipio J, Heponiemi T, et al. Developing the national usability-focused health information system scale for physicians: Validation study. *Journal of medical Internet research*. 2019;21(5):e12875. <https://www.ncbi.nlm.nih.gov/pubmed/31099336>. doi: 10.2196/12875.
50. Viitanen J, Hyppönen H, Lääveri T, Vänskä J, Reponen J, Winblad I. National questionnaire study on clinical ICT systems proofs: Physicians suffer from poor usability. *International journal of medical informatics (Shannon, Ireland)*. 2011;80(10):708-725. <https://www.clinicalkey.es/playcontent/1-s2.0-S1386505611001481>. doi: 10.1016/j.ijmedinf.2011.06.010.



51. Kaipio J, Kuusisto A, Hyppönen H, Heponiemi T, Lääveri T. Physicians' and nurses' experiences on EHR usability: Comparison between the professional groups by employment sector and system brand. *International journal of medical informatics* (Shannon, Ireland). 2020;134:104018.  
<http://dx.doi.org/10.1016/j.ijmedinf.2019.104018>. doi: 10.1016/j.ijmedinf.2019.104018.
52. Martikainen S, Viitanen J, Korpela M, Lääveri T. Physicians' experiences of participation in healthcare IT development in Finland: Willing but not able. *International journal of medical informatics* (Shannon, Ireland). 2011;81(2):98-113. <https://www.clinicalkey.es/playcontent/1-s2.0-S138650561100178X>. doi: 10.1016/j.ijmedinf.2011.08.014.
53. Lyneborg AO, Damgaard MB. Knowledge lost – or gained? The changing knowledge base of Danish social work, *Nordic Social Work Research*, 2019;9:3,206-219, DOI: 10.1080/2156857X.2018.1494031
54. Kujala S. Effective user involvement in product development by improving the analysis of user needs. *Behaviour & Information Technology*. 2008. 27(6), 457-473.
55. Wastell D, White S. Beyond bureaucracy: Emerging trends in social care informatics. *Health informatics journal*. 2014. 20(3), 213-219.
56. Martikainen S, Korpela M, Tiihonen T. User participation in healthcare IT development: A developers' viewpoint in Finland. *International Journal of Medical Informatics*. 2013. 10.1016/j.ijmedinf.2013.12.003.
57. Rytönen J, Kinnunen U-M, Martikainen S. Sosiaali- ja terveydenhuollon tietojärjestelmäkehittäjien kokemuksia ja näkemyksiä yhteistyöstä käyttäjien kanssa. Submitted 5/2021.
58. Gillingham P. Implementing electronic information systems in human service organisations: The challenge of categorisation. *Practice* (Birmingham, England).

2015;27(3):163-175.

<http://www.tandfonline.com/doi/abs/10.1080/09503153.2015.1014334>. doi:  
10.1080/09503153.2015.1014334.

59. Lazar J, Feng JH, Hochheiser H. Research methods in human-computer interaction. Morgan Kaufmann. 2017
60. Salovaara S. Considering the informational needs of social work in the information system Apotti. Finnish Journal of EHealth and EWelfare, 2021;13(2), 133–146. <https://doi.org/10.23996/fjhw.100692>
61. Otokiti A, Craven C, Shetreat-Klein A, Cohen S, Darrow B. Beyond Getting Rid of Stupid Stuff in the Electronic Health Record (Beyond-GROSS): Protocol for a User-Centered, Mixed-Method Intervention to Improve the Electronic Health Record System. JMIR Res Protoc 2021;10(3):e25148  
URL: <https://www.researchprotocols.org/2021/3/e25148>. DOI: 10.2196/25148
62. Sosiaali- ja terveydenhuollon tietojärjestelmä-palveluiden seuranta ja arviointi (STePS 3.0). <https://thl.fi/fi/tutkimus-ja-kehittaminen/tutkimukset-ja-hankkeet/sosiaali-ja-terveydenhuollon-tietojarjestelmapalveluiden-seuranta-ja-arviointi-steps-3.0>. Accessed 13.7.2021.