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Students', teachers' and professionals' perceived knowledge, skills and attitudes about welfare technology

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Abstract

Welfare technology is expected to provide relief especially for the challenges of aging societies. This requires knowledge, skills, and acceptance from health care professionals. This also challenges health and social care education institutes to provide future health care professionals up-to-dated training. Health care staff's interest and knowledge on welfare technology has been shown to vary. Only little is known about health and social care education teachers' knowledge, skills and attitudes towards welfare technology. The purpose of this study was to compare health and social care students', teachers' and professionals' perceived knowledge, skills, and attitudes to utilize welfare technology. This information can be used in the development of social and health care education.

The cross-sectional quantitative data was collected with online surveys in Finland, Norway, Netherlands, and Portugal. Health and social care students (n=103) and teachers (n=51) were mainly vocational school students and teachers. Health and social care professionals (n=40) were persons, who worked in the care of older adults. They were contacted by educational institutes. Nonparametric Mann-Whitney U test (2-samples) was used to test the difference between students and teachers, students and professionals as well as teachers and professionals.

The results suggested that teachers had better theoretical knowledge about welfare technology than students and professionals. However, all these groups had mainly similar knowledge levels regarding more applied knowledge and skills. The results also showed that teachers perceived that nurses' attitudes to welfare technology were more negative than they were.

Health and social care students, teachers, and professionals need further training about welfare technology. Moreover, especially teachers require practical training to be able to provide innovate and motivating welfare technology education for future health and social care professionals.

Keywords: welfare technology, knowledge, skills, attitudes, health care, social services

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Introduction

Nordic Welfare Centre [1] defines welfare technology as all the technology which in one way or another improves the lives of those who need it. Welfare technology is a Scandinavian concept [2] without official international definition [3]. Globally the term eHealth is preferred about the use of information and communication technology (ICT) to support health and health care [4]. WHO [5] defines eHealth as the cost-effective and secure use of ICT in support of health and health-related fields. These fields include health care services, health surveillance, health literature, and health education, knowledge, and research.

Due to population aging [6], technology is especially developed to promote good health and wellbeing of older adults [7], offer alternatives for the service implementation and support employees [8-10]. Long-term institutional care of older adults has been decreased, and the role of home care has increased during the last few decades in all Nordic countries [11-13]. Therefore, especially living at home is more and more supported by technology [9,13]. The most common technologies in older adults' home care in Finland [14] and in Norway [15] are safety technology solutions. Thereafter in Finland come medicine-dispensing robots, enterprise resource planning systems and software, video calls, security systems and access controls [14]. In 2020, about 6% of all home care visits in Finland were carried out with a reception visit, telephone or electronic communication [16]. Similarly in Portugal, in 2017, the telecare represented 6,7% of the total home care services provided [17]. It seems that between 2020 and 2023, the use of home care technological solutions has not changed in Finland [18].

When there are plans to implement welfare technology for older adults, it is important to consider capacity, attitudes and values, health, expectations, participation, identity and lifestyle [3]. From health and care personnel perspective opportunities for education, gaining practice in the use of technology and access to support facilitate successful implementation [3]. Implementation of welfare technology requires resources and ethical discussions within organisation and with clients [19]. Welfare technology should be developed based on the needs and preferences of both clients [13,19] and care personnel [3]. Professionals working in older adults' care have requested to have technologies that would allow more time for patient work, as well as technology that would reduce the physical load of the work and thus make the work easier [20]. Health and care personnels' attitudes and trust in technology are affected by the concern about the quality of care [3,21] as well as patient safety, privacy and dignity [21]. Welfare technology has been both frightening and fascinating for professionals working in social services [19]. The resistance of health care staff from the municipalities during a welfare technology implementation project may change over time and even become a productive force that pushes the innovation process forward [21]. Therefore, it is important to include staff to cocreation process during the technology development.

Students have observed during their clinical practice a significant variety in the health care staff's interest and knowledge of welfare technology and related these to staff's uncertainty and self-confidence in handling new technologies as well as to organisational support [22]. Staff working in social services [19] and welfare services [22] lack the knowledge and skills to use welfare technology. Using technologies in older adults' care requires new skills from care workers and changes the work [10,23,24]. Care workers want to learn how to critically evaluate technology and its benefits and

drawbacks in care from different perspectives as well as more know-how and training in digital security [20]. Nursing students perceive that they should have more knowledge about ethical issues regarding technologies already before their clinical placement and have experienced a lack of knowledge and awareness about technology in services for people with intellectual disabilities [22]. They have pointed out that more focus should be on welfare technology in the curricula of universities. Health care professionals that are interested and eager to use technology, too often today gain their knowledge on their own initiatives without proper formal training courses regarding welfare technology [22].

Wentink et al [25] investigated perceived barriers and facilitators by functional exercise and physical therapy teachers and students for uptake of eHealth in education in the Netherlands. Teachers and students recognised similar barriers for uptake of eHealth in curricula. They considered that the concept of eHealth was unclear and that there was a lack of quality and evidence for eHealth meaning (applicability, usability, content, privacy, safety). In addition, although both teachers and students agreed that students were technically skilful and therefore capable to work with technology and eHealth, they perceived that students were not familiar with the available eHealth services and lacked experiences of applying them. According to both the teachers and students, there was a lot of variety in knowledge about eHealth and skills on how to use eHealth between individual teachers. Teachers felt insecure about eHealth education. Students perceived that teachers had a negative attitude towards eHealth. Both teachers and students expressed that students‘ attitudes towards eHealth differed between individuals, as some were highly interested in technology, while others were not. On the other hand, nursing students have been reported to have a mainly positive attitude towards welfare technology [22].

Brunner et al. [26] created an eHealth capabilities framework about those eHealth capabilities that are expected from health care workforce. According to the framework, graduated health care professionals should first understand the purpose and function of digital health technologies and systems that are implemented at a local, state, or national level. They should be able to consider the legal, policy, and ethical implications of these technologies. In addition, they should be able to integrate digital health to their clinical practice. Third, graduated health care professionals should be able to use data and data analyses to inform, deliver, and improve health and health care practices at individual, team and systems levels. Finally, they should be able to participate in digital health implementation, evaluation, and cocreation processes.

Although several studies have investigated health care students’ [22,25] and/or professionals’ [20,22] perceptions and knowledge on welfare technology and eHealth, to our knowledge, no studies exist that would have compared these. In addition, knowledge about the skills and attitudes of social and health teachers regarding welfare technologies seems to be more limited, although at least one study exists [25]. We therefore investigated and compared the perceived knowledge, skills, and attitudes of health and social care students, health and social care teachers, and health and social care professionals working in older adults’ care services regarding the use of welfare technology. We perceive that this kind of information is needed to target training and support for these groups and thus facilitate the implementation of welfare technology and eHealth in older adults’ care. The research question was: What differences and similarities are there in the perceived knowledge, skills and

attitudes of health and social care students, teachers and professionals about welfare technologies?

Materials and methods

The quantitative cross-sectional data were collected with online surveys (Webropol 3.0) in Finland, Norway, Netherlands, and Portugal prior COVID-19 pandemic, in December 2019 and January 2020. There were three questionnaires, one for each respondent group: health and social care students, health and social care teachers, and health and social care professionals. Separate surveys in national languages were distributed through selected organisations in Finland, Norway, Netherlands, and Portugal. The organisations were Mosjoen Videregående Skole (Mosjoen High School) in Norway, Stichting voor Christelijk Beroepsonderwijs en Volwasseneducatie Friesland/Flevoland in Netherlands, Fundação de Ensino Profissional da Praia da Vitória in Portugal and City of Kouvola, Vocational Education and Training Institute Sedu and Seinäjoki University of Applied Sciences in Finland. Therefore, the data were collected in Nordland County in Norway, in Friesland in Netherlands, in Azores in Portugal and in South Ostrobothnia and Southeastern Regions in Finland. The reason to include these four countries, these regions and these educational institutions was a collaborative development project to which the data collection was related. Seinäjoki University of Applied Sciences in Finland is a higher education institute, but other education institutions are vocational schools. Therefore, students and teachers were mainly vocational school students and teachers. The students were in their third year. Professionals were persons, who worked in the care of older adults in these four countries and geographical regions where the study was conducted. The care organisations where the professionals were working were contacted by educational institutes in the same geographical region. The managers of these care organisations were asked to distribute the questionnaire to employees.

The anonymized questionnaires consisted of structured questions. The questionnaires were purpose-designed for the current study. The development team that drafted, discussed and finalized the questions had representatives from all four countries and all five educational institutes. The team had experience in teaching welfare technology courses in their institutions and conducting the RDI projects about the topic. A pilot survey was conducted using the completed questionnaire. From all respondent groups 3-5 individuals piloted the survey. Based on their feedback, the questionnaire was further improved. There were three or four background questions depending on respondent group: gender, age, country of residence, work or teaching experience (only professionals and teachers, respectively). Excluding the background information questions, the questionnaires were similar for all the respondent groups. There were in total 23 statements in three statement categories: “Welfare technology and planning the use of welfare technology” (7 statements), “Working methods, tools and materials” (8 statements) and “General statements about welfare technology” (8 statements) (Supplement 1). The instruction for respondents was: *Please read the statements and choose the option that indicates to what extent you agree or disagree with each statement.* In all the statements the response options were given at 5-point Likert scale: *1= strongly disagree, 2= disagree, 3= neither agree nor disagree, 4= agree, 5= strongly agree*.

The study followed the principles of Helsinki Declaration [27] and General Data Protection Regulation GDPR [28]. Research permits were applied from organisations according to organizational guidelines when needed. The survey used an anonymous

questionnaire and the name of the organization that the respondent represented was not asked. Thus, the individual respondents could not be identified. The respondents were sent a cover letter that explained the purpose of the study, the possible benefits to science and society, and that participation in the study was voluntary.

The data were analysed using IBM SPSS Statistics 26 Software. The results are presented as means and standard deviations (SD). Opinion scale (5-point Likert scale) variables were treated as continuous variables. Nonparametric test of Mann-Whitney U (2-samples) was used to test the difference between students and teachers, students and professionals and teachers and professionals. The level of statistical significance was set at 5% ($p<0.05$). Nonparametric test was chosen because Likert scale parameters were not normally distributed.

Results

In total, 194 people responded to the survey. From these 103 were students, 51 were teachers and 40 were professionals (Table 1). In all respondent groups over 90% were females. Most of the students (87%) were under 30 years old whereas teachers and professionals were older: only 4% of teachers and 23% of professionals were under 30 years old. Most of teachers (55%) and professionals (63%) had over 10 years teaching or work experience, respectively. Majority of students (51%) and teachers (71%) were from Finland whereas professionals were more evenly from Finland (40%), Norway (30%) and Portugal (25%).

Table 1. Respondents background information. Respondents were health and social care students, health and social care teachers, and health and social care professionals.

	Students n=103		Teachers n=51		Professionals n=40	
	n	%	n	%	n	%
Gender						
Female	94	91.2	47	92.2	39	97.5
Male	8	7.8	4	7.8	1	2.5
Other	1	1.0	0	0	0	0
Country of residence						
Finland	53	51.4	36	70.6	16	40.0
Netherlands	35	34.0	11	21.6	2	5.0
Norway	8	7.8	2	3.9	12	30.0
Portugal	7	6.8	2	3.9	10	25.0
Age						
under 30 years	90	87.4	2	3.9	9	22.5
over 30 years	13	12.6	NA	NA	NA	NA
31-40 years	NA	NA	8	15.7	13	32.5
41-50 years	NA	NA	20	39.2	10	25.0
51-60 years	NA	NA	17	33.3	8	20.0
over 60 years	NA	NA	4	7.8	0	0
Teaching/work experience						
under 10 years	NA	NA	23	45.1	15	37.5
over 10 years	NA	NA	28	54.9	25	62.5

NA= Not applicable

Welfare technology and planning the use of welfare technology: There were differences between students and teachers ($p<0.001$) as well as between students and professionals ($p<0.05$) in knowledge about what is meant with the term welfare technology where students responded lower values (less knowledge) in Likert scale (Figure 1). In addition, teachers answered higher values in Likert scale than students ($p<0.05$) or professional ($p<0.05$) regarding their knowledge about the selection of welfare technology devices and equipment the market has to offer meaning better knowledge. Thereafter, there were no statistically significant differences between respondent groups in answers regarding the statements of this statement category (Figure 1).

The working methods, tools and materials: Teachers had better knowledge than students ($p<0.05$) regarding the understanding of the ethical principles that are based on the values of health and care sector when using welfare technology (Figure 2). In addition, students answered higher values as compared to teachers ($p<0.05$) regarding the capability of guiding clients in using different welfare technology devices. Thereafter, there were no statistically significant differences in answers of different respondent groups to statements of this statement category (Figure 2).

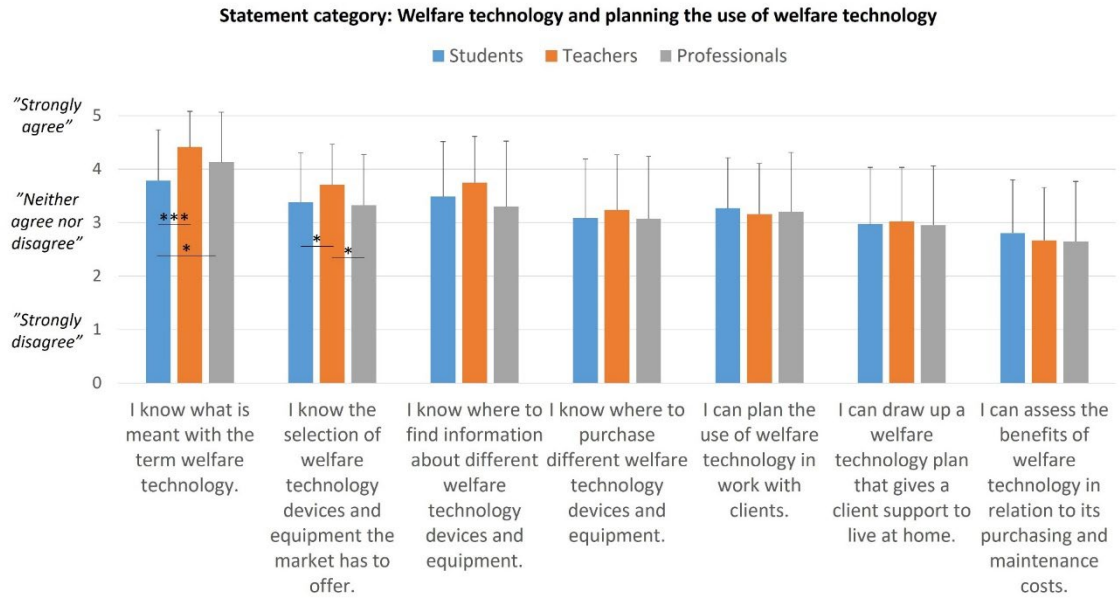

Figure 1. Welfare technology and planning the use of welfare technology. Answers of different health and social care respondent groups: students, teachers, and professionals. Likert scale: 1= strongly disagree, 2= disagree, 3= neither agree nor disagree, 4= agree, 5= strongly agree. Result for each question is presented as mean + SD. *, ***: significant difference between two respondent groups ($p<0.05$, $p<0.001$, respectively).

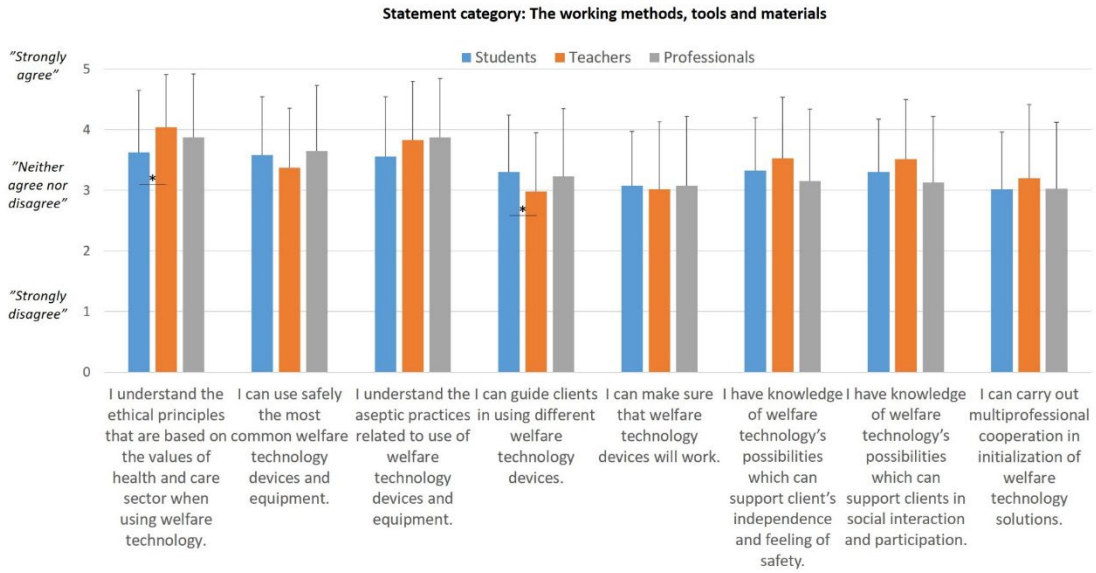

Figure 2. The working methods, tools and materials. Answers of different health and social care respondent groups: students, teachers, and professionals. Likert scale: 1= strongly disagree, 2= disagree, 3= neither agree nor disagree, 4= agree, 5= strongly agree. Result for each question is presented as mean + SD. *: significant difference between two respondent groups ($p<0.05$).

General statements about welfare technology: The third statement category had general statements about welfare technology. In this statement category, there were more differences between respondent groups as compared to two other statement categories (Figure 3). As compared to professionals, teachers perceived that technology has more problems in functionality ($p<0.05$). Similar was true regarding ethical challenges where teachers answered lower values as compared to students ($p<0.05$) meaning that they perceived that the use of welfare technology has more ethical challenges than students did. However, as compared to students, teachers had more positive experiences about welfare technology privacy issues ($p<0.05$), and they thought that welfare technology makes working easier ($p<0.001$) and older people can live longer at home with the support of welfare technology ($p<0.05$). The most differences between respondent groups arose from the statement regarding nurses' attitudes towards welfare technology where teachers had a lower perception as compared to students ($p<0.05$) and a clearly more negative perception than professionals ($p<0.001$). In addition, the professionals answered higher values (more positive perception) as compared to students ($p<0.05$).

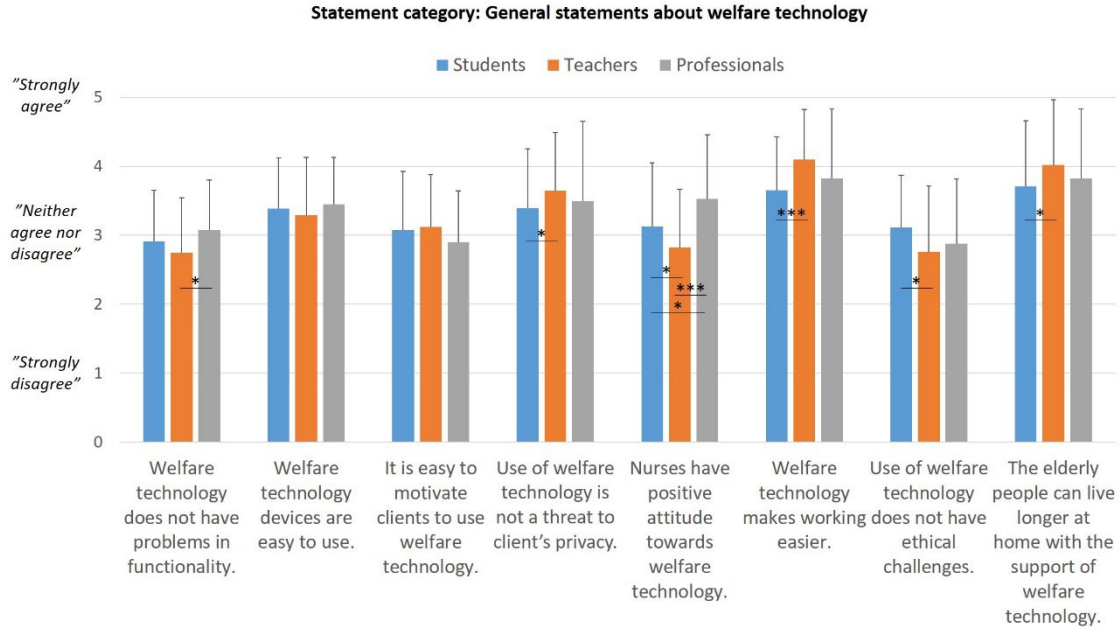

Figure 3. General statements about welfare technology. Answers of different health and social care respondent groups: students, teachers, and professionals. Likert scale: 1= strongly disagree, 2= disagree, 3= neither agree nor disagree, 4= agree, 5= strongly agree. Result for each question is presented as mean + SD. *, ***: significant difference between two respondent groups ($p<0.05$, $p<0.001$, respectively).

Discussion

The present study suggests that health and social care students, teachers and professionals have mainly similar perceived knowledge levels regarding welfare technology, planning the use of welfare technology as well as welfare technology working methods and tools. Teachers have better theoretical knowledge about the selection of welfare technology devices available than students and professionals. They also have better knowledge than students about ethical principles when using welfare technology, and more of them state that the use of welfare technology has ethical challenges. As compared to professionals, teachers also perceive that technology has more problems in functionality and think that nurses' attitudes towards welfare technology are more negative.

Several studies have identified health and social care professionals' [19,22], students' [22,25] and teachers [25] lack of knowledge and skills required to utilize welfare technology. The present study supports these and further shows that perceived knowledge and skills of health and social care students, teachers and professionals are relatively similar. Teachers have more theoretical basic knowledge about welfare technology than students and professionals, but more applied knowledge is not different between these groups. Knowledge levels of all groups decrease from basic theoretical knowledge to more applied knowledge. Therefore, the present study supports previous studies indicating that there is a need to increase welfare technology education in health care and social services degree training programs [22,26] as well as in continuing education for health and social care professionals [19] and for health and social care teachers.

Cuesta et al. [19] found that staff's lack of knowledge and skills in using welfare technology was due to not having received proper training, and they did not have time to learn about technologies because their work was hectic. Similarly, nursing students have observed during their clinical practice that lack of educated staff, high staff turnovers, and sick leaves affected the use of welfare technology [22]. Therefore, it must be recognized that especially continuing education requires support and resources from organisation [20]. Professionals feel that the training responsibility lies with both themselves, and the organization [20]. Staff should be supported until the use of welfare technology is a routine in their everyday work activities [19]. Especially practical training is required [20,22], supported also by the current study since the professionals perceived higher theoretical basic knowledge as compared to more applied practical knowledge. Opportunities for education, gaining practice in the use of technology and access to support facilitate successful implementation of welfare technology [3]. Digital education is popular today in higher education, including continuing education, but it is better applied to theoretical knowledge than practical skills teaching [29]. Therefore, continuing education for health and social care professionals about the practical use of welfare technologies may require face to face education in addition to possible digital education.

Students have expressed that teachers have a negative attitude towards eHealth [25]. This result is partly supported by the current study. Teachers were positive in that sense that they thought that welfare technology makes working easier, and older people can live longer at home with the support of welfare technology. However, they were clearly negative regarding nurses' attitudes towards welfare technology since they perceived these more negative than they were based on professionals' answers. Nearly half of teachers were over 50 years old with over 10 years teaching

experience so it may be that they have not received welfare technology training during their degree studies. This is supported by Elonen et al. [30] who found that social and health care teachers considered age to be linked to digital pedagogy competence through educational differences between generations. ICT, including welfare technology, has not been included in the training of teachers who have been in the workforce for a longer period.

The current study supports the need for continuing education for health and social care teachers because of fast developing use of welfare technology in health and social care sector. Wentink et al. [25] linked teachers' negative attitude towards eHealth to lack of their own skills and that they therefore felt insecure about eHealth education. Large amount of the identified barriers and facilitators for uptake of eHealth in education were overlapping between teachers and students [25]. Rasouli et al. [22] pointed out that it is important to build on the students' mainly positive attitudes and interests towards welfare technology by including education about ethical issues, use of technology, and innovative approaches towards technology. Supporting these, and Elonen et al. [30], the current study suggests that health and social care teachers need continuing education to be able to deliver innovate and motivating education regarding welfare technology for future health and social care professionals. Teachers' digital pedagogical competence is reflected in nursing work through the development of students' competence [30].

The methodological considerations and study limitations of this study need to be addressed. First, the study used a non-validated questionnaire and although it was conducted in four countries, the three respondent groups did not include similar proportion of respondents from each country. Majority of students and teachers were from Finland and thereafter from Netherlands. However, professionals were more evenly from Finland, Norway and Portugal but only 5 % were from Netherlands. Secondly, it was not possible to report the response rates for respondent groups since during the data gathering it was not recorded for how many recipients the online survey was sent to. However, the response rates can be estimated to be quite low especially for students and professionals. Therefore, the results are directional and not generalizable. Thirdly, it must be also noted that this study measured the perceived but not the actual knowledge and skills of students, teachers and professionals about welfare technology. It may be that these groups have different levels of illusions of knowledge [31] meaning that they may underestimate or overestimate their knowledge and skills differently. Last, it must be noted that the data collection was done just prior COVID-19 pandemic that increased the utilization of remote services in the welfare, social and health sectors at least in Finland [32]. It also affected the education sector and changed teaching methods and pedagogy [33] which may have changed the perceptions of students, teachers and professionals.

Conclusions

The current study suggests that although health and social care teachers have better perceived theoretical knowledge about welfare technology than students and professionals, all these groups have similar levels of applied knowledge and skills in using welfare technology. All these groups need training in welfare technology. The study also shows that teachers believe nurses' attitudes towards welfare technology are more negative than they actually are. Therefore, health and social care teachers especially require practical continuing education to provide innovative and motivating education on welfare technology for students.

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Declaration of interest statement

All authors declare that they have no conflicts of interest.

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Supplementary files

Supplement 1. Statements in the questionnaire. Response options were given at 5-point Likert scale in all the questions: 1= strongly disagree, 2= disagree, 3= neither agree nor disagree, 4= agree, 5= strongly agree.

Statement category: Welfare technology and planning the use of welfare technology
I know what is meant with the term welfare technology.
I know the selection of welfare technology devices and equipment the market has to offer.
I know where to find information about different welfare technology devices and equipment.
I know where to purchase different welfare technology devices and equipment.
I can plan the use of welfare technology in work with clients.
I can draw up a welfare technology plan that gives a client support to live at home.
I can assess the benefits of welfare technology in relation to its purchasing and maintenance costs.
Statement category: The working methods, tools and materials
I understand the ethical principles that are based on the values of health and care sector when using welfare technology.
I can use safely the most common welfare technology devices and equipment.
I understand the aseptic practices related to use of welfare technology devices and equipment.
I can guide clients in using different welfare technology devices.
I can make sure that welfare technology devices will work.
I have knowledge of welfare technology's possibilities, which can support client's independence, and feeling of safety.
I have knowledge of welfare technology's possibilities, which can support clients in social interaction and participation.
I can carry out multiprofessional cooperation in initialization of welfare technology solutions.
Statement category: General statements about welfare technology
Welfare technology does not have problems in functionality.
Welfare technology devices are easy to use.
It is easy to motivate clients to use welfare technology.
Use of welfare technology is not a threat to client's privacy.
Nurses have positive attitude towards welfare technology.
Welfare technology makes working easier.
Use of welfare technology does not have ethical challenges.
The elderly people can live longer at home with the support of welfare technology.