












Research article

Development and psychometric properties of the instrument used to measure occupational well-being of health and social care educators

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ABSTRACT

Aim: To develop and psychometrically test, using Finnish data, the structural validity and internal consistency of the instrument "Occupational well-being of social and health care teachers" and to re-test the internal consistency using Estonian data.

Design: A quantitative cross-sectional survey design.

Methods: The data were collected from health and social care educators in Finland (n = 552) and Estonia (n = 99). The Finnish data were tested for structural validity in two steps. Exploratory factor analyses were conducted to extract factors from four aspects of occupational well-being based on the theoretical model, followed by a higher-order confirmatory factor analysis to test the factor structure. The Finnish and Estonian data were tested for internal consistency using Cronbach's alpha coefficient. Internal consistency of the final factor structure was assessed using McDonald's omega on the Finnish data.

Results: The structural validity testing confirmed a higher-order 4-factors structure that was correlative: Working conditions, Work community, Worker's resources and work, and Professional competence, based on the theoretical model of occupational well-being. An underlying lower-order 15-factor structure was also established within these higher-order factors. Most of the model fit indices were exceeded but the relative fit indices, using the Tucker-Lewis Index and the Comparative Fit Index, did not reach the cut-off point value. The internal consistency was found to be from moderate to good.

Conclusions: This study provided the first evidence of the structural validity and internal consistency of this new and developed instrument which was based on a theoretical model in an educational context. Further development and testing of some items are recommended.

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Abbreviations:

AGFI = Adjusted goodness-of-fit statistic

CFI = Comparative fit index

Content Model ProSchoolSOWE = Content Model for the Promotion of School Community Staff's Occupational Well-being

COSMIN = Reporting guideline for studies on measurement properties of patient reported outcome measures

CTT = Classical Test Theory

ESEM = Exploratory structural equation modelling

FIML = Full Information Maximum Likelihood

OWESoHeT-instrument = Occupational well-being of social and health care teachers -index questionnaire

RMSEA = Root mean square error of approximation

SRMR = Standardised root mean square residual

STROBE = Strengthening the reporting of observational studies in epidemiology

TLI = Tucker-Lewis index

WYW-instrument = Well-being at Your Work instrument

1. Introduction

The shortage of health care educators is a global concern [1]. The work of health and social care educators is mentally demanding [2,3], and they are experiencing increasingly high workloads and backlog situations [2,4,5]. Organisational challenges, such as issues related to management, collegiality, teamwork, and mentoring [4,6–10], are also related to the occupational well-being of educators [4,7,9,10]. Despite a recent increase in research, the occupational well-being of health and social care educators is still an under-studied area, with various approaches to its conceptualisation. Educators' occupational well-being is recognised as a multi-component construct [11,12]; however, there is currently no widely accepted theoretical foundation guiding research in this area [12]. The concepts of well-being and occupational well-being have been interpreted in diverse ways, depending on the time, profession, discipline, and context [12,13].

Many studies examining the occupational well-being of educators have focused on diseases and their associated risk factors [12,14] rather than adopting a resource-based perspective. Some tools have been developed to study various dimensions of educators' work-related well-being, including the psychosocial environment [15–17], subjective well-being [18], and professional or general well-being [19–21]. Professional well-being has been studied using indicators such as job satisfaction, self-efficacy, recognition, aspiration, and authority [19,20]. The well-being of educators, including those in health and social care, has often been examined using commonly employed instruments measuring well-being or related concepts such as job satisfaction [4,6,9,22], professional quality of life [8,23–25], or psychosocial factors at work [26]. Some studies have utilised specific parts of these instruments [7], leading to results which are challenging to compare [12].

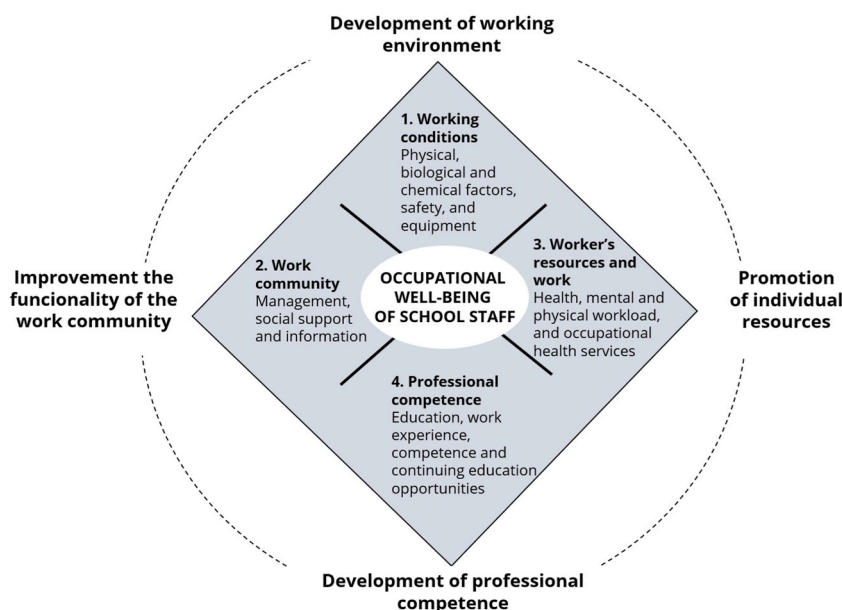


Fig. 1. Content Model for the Promotion of School Community Staff's Occupational Well-being. Adapted Saaranen et al., [27].

In this study, occupational well-being is broadly defined by its impact on both the individual and the community within a specific educational context. The theoretical framework guiding the study is the Content Model for the Promotion of School Community Staff's Occupational Well-being (Content Model ProSchoolSOWE) [27]. Originally, the Content Model ProSchoolSOWE was designed for the entire school staff, including, for example, cleaners and librarians. It was created based on literature and interviews conducted with school staff and occupational health nurses in the early 2000s. The model consists of four aspects: 1. Working conditions (e.g., physical working conditions such as physical and biological factors, occupational safety, and equipment); 2. Work community (e.g., management, social support, and information); 3. Worker's resources and work (e.g., health, mental and physical workload, and occupational health services); and 4. Professional competence (e.g., education, work experience, competence and continuing education opportunities [27], Fig. 1). According to the model, occupational well-being in an educational context can be seen as a balance of resources and workload factors [28].

Content Model ProSchoolSOWE and an instrument based on the model (Well-being at Your Work, WYW-instrument), have been used to both evaluate and promote the occupational well-being of school staff in action research projects conducted nationally and internationally [27]. The content of the WYW-instrument was validated during its development phase [27], and the structure of the Content Model ProSchoolSOWE, as well as the correlation between the four aspects, were confirmed by structural equation modelling [27,29]. According to the modelling, the WYW-instrument is based on a reflective model, indicating that the items in the instrument form the concept of occupational well-being in a school context [30]. The WYW-instrument can be used to identify development needs and to target workplace well-being initiatives toward the areas where those needs are identified [27].

Each profession has certain characteristics regarding the nature of the work. In the field of health and social care, the work of educators differs from that of educators in other disciplines. In addition to requiring pedagogical, field-specific and research competence, health and social care educators also need to have competence in both the clinical and theoretical aspects of their subject area [31–34]. Furthermore, the work is autonomous and therefore requires competence as regards to self-management and administration [4,31,32,34]. General well-being instruments that do not account for the specific characteristics of the health and social care education profession may provide a limited view of educators' work in relation to occupational well-being, offering few insights for its development [12]. Consequently, field-specific valid instruments and theoretically grounded instruments are needed to obtain reliable information in this setting [12,27]. Profession-specific instruments provide more accurate assessments of occupational well-being, supporting its promotion across regional, national, and international contexts. The primary aim of this study was to develop and psychometrically test the structural validity and internal consistency of the instrument *Occupational well-being of social and health care teachers* (OWESoHeT) using Finnish data. The secondary aim was to re-test the internal consistency of the instrument using Estonian data.

The research questions guiding this study were:

What are the psychometric properties of the OWESoHeT instrument, as assessed through exploratory and confirmatory factor analysis?

What is the internal consistency of the instrument?

2. Materials and methods

2.1. Design and setting

A quantitative cross-sectional study design was employed to collect nation-wide data from educators working in vocational and higher education institutions in the field of health and social care in Finland in 2020 and Estonia in 2021. These educators teach undergraduate students the theoretical and practical components of health and social care. Both data collections were part of two wider occupational well-being research and development projects in collaboration with three universities: Social and health care teachers' occupational well-being in Finland -research and development project, 2020-2023 and Developing Occupational Well-being of Health Care Teachers in Estonia – participatory action research, 2021–2023. Some parts of the data collected have been published elsewhere (see [Supplementary Material 1: Data transparency matrix](#)). When reporting the study, both the COSMIN (Reporting guideline for studies on measurement properties of patient reported outcome measures: [Supplementary material 2](#)) [35] and the STROBE (Strengthening the reporting of observational studies in epidemiology: [Supplementary material 3](#)) [36] checklist were used.

2.2. Ethical considerations

The research was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki [37]. Participation in this study was voluntary and based on informed consent. All participants were informed that consent to participate in the study and publish their data would be assumed on completion and submission of the study survey. An ethical statement was issued by the University of Eastern Finland Committee on Research Ethics (10/2020 June 12, 2020), Finland, and the Research Ethics Committee of the University of Tartu (345/T-21), Estonia. The research approval for the collection of data was issued by the Finnish Vocational Educators and Trainers and two health care colleges in Estonia. The general data protection regulation [38] was followed at all stages of the study.

2.3. Development of the OWESoHeT-instrument

The original Well-being at Your Work instrument was designed to assess occupational well-being among comprehensive and upper

secondary school staff [27]. To capture the characteristics of health and social care educators' work, the instrument was developed in several stages between 2011 and 2020 [28,39–41], as no prior instrument existed for this professional group. First in 2011, several items concerning competence areas of health care educators were added. The instrument was further refined in 2017 (Table 1) through a collaborative process involving experts in the field, including educators and researchers of health and social care education. It was pre-tested following the modifications in both 2011 and 2017 and revised based on the results. In addition, the revised structures from both development phases (years 2011 and 2017) were pilot tested using exploratory factor analyses and reported in scientific publications [39,40].

In 2020, the WYW-instrument was re-developed as the Occupational well-being of social and health care teachers -index questionnaire (OWESoHeT-instrument) to measure the occupational well-being of educators in this specific field [28,41]. Two items were added, and the wording of several items was updated and refined, and the response scale of four items were changed to continuous scale to enable broader analysis using linear models [42]. The cross-cultural adaptation followed the proposed guidelines by Guillemin et al. [43]. The instrument was developed to be suitable for both the Finnish and Estonian contexts. Native Estonian speakers on the research team translated the instrument into Estonian. Two background variables were modified to better reflect the Estonian educational setting. An Estonian philologist reviewed and proofread the translation, after which a separate philologist back-translated the Estonian version into Finnish. The research team then compared the original and back-translated versions, resolving minor discrepancies to reach consensus [43].

OWESoHeT-instrument contains 69 items covering four aspects of occupational well-being (1. Working conditions, 2. Work community, 3. Worker's resources and work, and 4. Professional competence) and uses a 1-5 Likert scale (1 = totally disagree to 5 = totally agree). The instrument also includes background variables, four questions on personal and work community occupational well-being and the activities that maintain and promote occupational well-being. In addition, nine open-ended questions map conducted occupational well-being activities in the workplace and experiences of promoting factors and needs contributing to occupational well-being development, which were not the focus of this study. The instrument was tested by 33 Finnish health and social care educators and eight Estonian university teachers and master's students in Nursing Science; it was found to be functional and comprehensible for usage.

2.4. Study population and data collection

This study used convenience sampling where all educators covering the eligibility criteria from both countries were invited to participate. For the Finnish sample (autumn 2020), eligible participants were Finnish speaking educators with employment contracts in health and social care education at universities of applied sciences or vocational institutions, and who were members of the Finnish Vocational Educators and Trainers association (N = 1772) during the data collection period (September 2020). The association includes about 70% of all educators working in health and social care education in Finland. For the Estonian sample (autumn 2021), eligibility included all Estonian-speaking educators with employment contracts at two healthcare colleges offering both vocational and higher education (N = 196) during the data collection period (October–November 2021). These two health care colleges are the only

Table 1
The development of the OWESoHeT-instrument 2017–2020 [28,39–41].

Factors/Variables	WYW 2017		OWESoHeT-instrument	
	80 variables	Added (removed)	82 variables	Revision
Occupational well-being and activities promoting occupational well-being	4 Likert-scale, 1 open-ended		4 continuous items, 1 open-ended variable	4 Likert scales changed to continuous scales 0–5
Working conditions	11 Likert scale items (3 sum variables), 2 open-ended variables	1 Necessity to a permanent working space	11 Likert scale* items, 2 open-ended variables	
Work community	23 Likert scale items (5 sum variables), 2 open-ended variables	2 Collaborative teaching and planning, 1 appreciation, 1 rewarding, 1 equal treatment, 1 influencing opportunities (1 collaboration, 1 change management training, 1 understanding of another task)	23 Likert scale* items, 2 open-ended variables	
Worker and work	15 Likert scale items (3 sum variables), 2 open-ended variables	1 ergonomic postures, 1 voice health, 2 occupational health services, (1 working time, 1 health checks)	16 Likert scale* items, 2 open-ended variables	Named worker's recourses and work. Added 1 item Enough occupational well-being activities during working hours, 2 items major revised
Professional competence	18 Likert scale items (6 sum variables), 2 open-ended variables	1 Working life period, 1 digital pedagogy, 1 research utilisation competence, 1 project and development competence	19 Likert scale* items, 2 open-ended variables	Added 1 item Cultural competence

Note: WYW-instrument = Well-being at Your Work instrument. OWESoHeT-instrument = Occupational well-being of social and health care teachers -index questionnaire. *Likert scale 1–5.

educational institutions providing basic health care education in Estonia. Unqualified and substitute educators were excluded from both study samples.

In Finland, the electronic survey was distributed in September 2020 by a contact person from the Finnish Vocational Educators and Trainers association. In Estonia, the survey was distributed in October 2021 by contact persons from the two participating healthcare colleges. The data were collected for a one-month period in both countries, and two to three reminders were sent. Altogether 552 (response rate 31%) Finnish and 99 (response rate 51%) Estonian educators voluntarily participated in the study. Participants were predominantly health care or both health and social care educators having a master's degree and pedagogical studies (Table 2).

2.5. Data analysis

The data were analysed statistically using IBM SPSS Statistics 27. In addition, R version 4.0.2 was used to analyse the Finnish data for confirmatory factor analysis and McDonald's omega. Descriptive analysis was used for participant demographics. Exploratory factor analysis (EFA) and higher-order confirmatory factor analysis (higher-order CFA) based on the Classical Test Theory (CTT) were conducted to test the structural validity of the instrument using the Finnish data ($n = 552$; Fig. 2) [30,44]. The sample size was adequate for the EFA and CFA; 500 being considered as very good. The small sample size forbade factor analysis for Estonian data ($n = 99$). [30,42]. Missing values were missing at random and dealt with by listwise deletion and in the higher-order CFA by the Full Information Maximum Likelihood (FIML) method. The univariate normality of residuals was confirmed by QQ-plots, and the data contained no significant outliers.

The division of the 69 items into the four higher-order factors was justified according to the Content Model ProSchoolSOWE [27]. Redeveloping the instrument omitted to use predefined lower-order factors [39,40]. Therefore, in the first step, the EFA with the maximum likelihood extraction and varimax rotation was performed separately for each higher-order factor to form new unifying lower-order factors [28,41]. The Kaiser-Meyer-Olkin (KMO) measure for sampling adequacy in each category was as follows: working conditions 0.78, work community 0.937, worker's resources and work 0.853, and professional competence 0.858, and the Bartlett's test of Sphericity (p -value < 0.001) for the correlation matrix were suitable for analysis. Factors were extracted based on an eigenvalue of ≥ 1 or a scree plot. The majority of communalities ranged between 0.3 and 0.8 [42].

In the second step, the structural validity of the whole factor structure, comprising four higher-order factors and the 15 lower-order factors created in the first step, were tested using a higher-order CFA (second-order CFA) [30,44]. Although the second-order factor structure was supported by the Content Model ProSchoolSOWE, alternative models with 64 items were tested to ensure the second-order CFA approach [44,45]: the first-order model and bi-factor model were rejected based on poor model fit (Supplementary material 4: Supplementary Fig. 1–2). Thus, the second-order measurement model consisted of four correlated higher-order factors,

Table 2
Demographics (Finnish data $n = 552$, Estonian data $n = 99$).

Variable	Finland 2020		Estonia 2021	
	F	%	F	%
Gender	550		99	
Female	509	92.2	94	94.9
Male	36	6.5	2	2.0
Other/prefer not to say	5	0.9	3	3.0
Age in years	547		96	
39 \geq	56	10.2	28	29.2
40–49	161	29.4	31	32.3
50–59	227	41.5	25	26.0
60 \leq	103	18.8	12	12.5
Work experience as an educator	548		98	
10 $>$	181	33	43	43.9
10–20	255	46	35	35.7
20 $<$	112	21	20	20.4
Highest degree	551		99	
Bachelor's degree	27	4.9	11	11.1
Master's degree	487	88.3	76	76.7
Doctor's degree	31	5.6	12	12.1
Other	6	1.1	0	0
Pedagogical studies	550		98	
Yes	547	99.5	56	57.1
No	3	0.5	42	42.9
Education field	551		99	
Health care	242	43.9	79	79.8
Social service	62	11.3	2	2.0
Both (health and social care)	247	44.8	18	18.2
Remote work at least partially	548		96	
Yes	308	56.2	51	53.1
No	240	43.8	45	46.9

Note: F = Frequency, which means the number of respondents per variable.

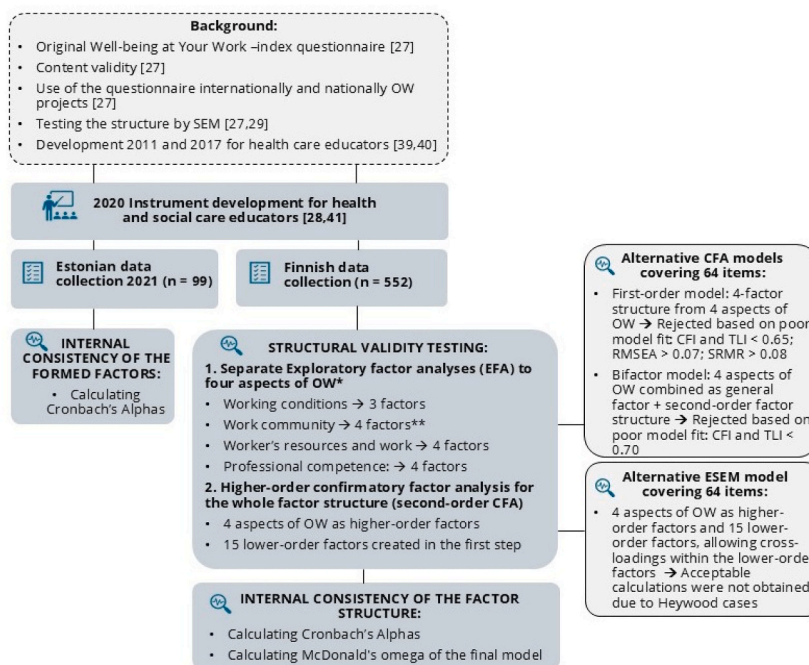


Fig. 2. Process of the psychometric testing. *factors extracted based on an eigenvalue of ≥ 1 , ** factors extracted based on the scree plot, OW occupational well-being.

under which the 15 lower-order factors were located. In addition, exploratory structural equation modelling (ESEM), more specifically Set-ESEM model, was tested using the structure of 4 s-order factors and 15 lower-order factors, allowing cross-loadings within the lower-order factors in the set of items belonging to each specific higher-order factor [46] (Supplementary material 4: Supplementary Fig. 3 and Description of the Set-ESEM calculations). Acceptable calculations were not obtained for the tested Set-ESEM model (Heywood cases), leading to the decision to proceed with the higher-order CFA. No correlations were allowed between measurement errors.

The following fit indices were used: chi-square (χ^2) with p-value, root mean square error of approximation (RMSEA), standardised root mean square residual (SRMR), adjusted goodness-of-fit statistic (AGFI), comparative fit index (CFI), and Tucker-Lewis index (TLI). The chi-square p-value is very sensitive to sample size, and this study contains large data ($n = 552$); therefore, the normed chi-square χ^2/df was used [47]. Mean values of the item correlation residuals ranged from -0.001 to 0.003 .

The internal consistency of the factors was assessed using Cronbach's alpha (α) coefficient for both the Finnish ($n = 552$) and Estonian ($n = 99$) data. Adequate sample size for Cronbach alpha reliability was confirmed using a Sample Size Calculator with a 95 percent confidence interval (expected width 0.1–0.2, expected Cronbach's Alpha 0.6–0.7 [48]). Finally, internal consistency of the final factor structure was assessed using McDonald's omega on the Finnish data [49].

3. Results

3.1. Structural validity testing

In the first step of the structural validity testing, five items were excluded from the EFA based on low correlations, communality, and factor loadings. These items were: the necessity to have a permanent working space; staff spending sufficient time together outside working hours; the opportunity to plan teaching together in a team; lifestyle supporting own resources; and participating in clinical working life periods offered by the employer. Based on four separate explorative factor analyses for the 64 remaining items, a total of 15 lower-order factors were extracted and named (Table 3).

In the second step, the structural validity of the higher-order factors and the 15 lower-order factors (comprising 64 items) were tested by higher-order confirmatory factor analysis. The model fit indices AGFI, RMSEA, SRMR, and Relative χ^2 indicated that the higher-order CFA model formed was supported by the data. The CFI and TLI values did not reach the cut-off point value (Table 4).

The factor loadings ranged from 0.337 to 0.938, and the correlations between the higher-order factors (1. Working conditions, 2. Work community, 3. Worker's resources and work, and 4. Professional competence) ranged from 0.198 to 0.825. The correlations were significant at level $p < 0.001$ except for professional competence and working conditions, which was significant at level $p < 0.05$ (Fig. 3).

Table 3

Extracted factors based on exploratory factor analysis and the factor loadings (Finnish data n = 552).

Factors	% of variance	Items included in the factor	Factor loading
1. Working conditions¹⁵	65.258		
Air and temperature	23.097	Ventilation OK (i3)* No draught (i4) Comfortable temperature (i9) Indoor air in order (i11)	0.833 0.546 0.558 0.779
Workspaces and equipment	16.818	Access to a quiet and appropriate working space (i5) The noise level not too high (i7) Good lighting (i8)	0.712 0.844 0.435
Workspace ergonomics	13.926	Appropriate equipment and devices (i10) Work posture has been considered (i1) Good ergonomics at the workstation (i2)	0.319 0.463 0.966
2. Work community³⁶	64.794		0.966
Management and information	16.680	Enough information about the performance expectations (i29) Help and feedback from the closest supervisor (i30) Well-working relationships between employees and their direct supervisors (i31) Sufficient information about changes (i24) Appropriate number of meetings (i25) Rewarded for a job well done (i33)	0.945 0.864 0.785 0.446 0.342 0.364
Working arrangements	14.067	Satisfactory working time arrangements (i15) Satisfaction with the organization of work (i16) Satisfaction with the opportunities to influence (i17) Opportunity for collaborative teaching (i35) Successful orientation of new workers (i14)	0.714 0.702 0.477 0.368 0.302
Collegiality and work atmosphere	14.896	Good interpersonal relationships between the employees (i26) No bullying in the working community (i27) Trust in others' work input (i32) Possibility for open discussion (i18) Equal treatment of all teachers (i28) Sufficient collaboration (i19) Help and support from the colleagues in challenging situations (i20)	0.883 0.728 0.508 0.474 0.432 0.415 0.333
Appreciation	11.974	Appreciated as an employee (i22) Own work appreciated in the working community (i23) Own work important and meaningful (i21)	0.878 0.841 0.597
3. Worker's resources and work²⁵	63.584		
Resources and mental workload	17.227	Appropriateness of mental workload (i39) Satisfaction with workload (i43) Backlog can be avoided (i44) Time to take breaks and moments of rest (i45)	0.716 0.885 0.633 0.616
Occupational health care services	16.027	Health examinations (i50) Support, advice and guidance to maintain and promote occupational well-being (i51) Sufficiency of the collaboration (i52) Possibility for rehabilitation (i53)	0.791 0.901 0.788 0.448
Workplace support	10.680	Support for mental resources and coping at work (i46) Support for promoting OW during leisure time (i47) Support for promoting OW during working hours (i48) Opportunities for work supervision (i49)	0.690 0.658 0.574 0.344
Resources and physical workload	7.459	Appropriateness of physical workload (i40) Avoidance of musculoskeletal symptoms (i41) Appropriateness of the vocal strain (i42)	0.516 0.668 0.425
4. Professional competence³⁹	59.854		
Teaching competence and collaboration with students	17.372	Sufficient competence for planning, implementing and evaluating teaching (i61) Sufficient pedagogical competence (i62) Sufficient competence for providing individuals with guidance and interacting with them (i63) Sufficient competence for providing groups with guidance and interacting with them (i64) Sufficient competence for dealing with specific situations related to the student (i65) Sufficient ethical competence required by the work (i66) Sufficient cultural competence required by the work (i67)	0.412 0.523 0.861 0.873 0.613 0.557 0.411
Research and project expertise	14.431	Sufficient competence when searching for research information (i71) Sufficient competence for utilising research information (i72) Sufficient competence in project and development activities (i73)	0.851 0.882 0.498

(continued on next page)

Table 3 (continued)

Factors	% of variance	Items included in the factor	Factor loading
Language and teaching technology competence	10.232	Sufficient competence in conducting research (i74)	0.618
		Sufficient linguistic competence required by the work (i68)	0.334
		Sufficient ICT competence (i69)	0.818
Professional competence and training	8.010	Sufficient education technology competence (i70)	0.874
		Sufficient education for the working tasks (i57)	0.659
		Enough continuing education (i58)	0.471
		Possibility to efficiently use one's own competence (i59)	0.385
		Sufficient clinical competence in teaching (i75)	0.211

Note: number amount of the missing information, *the correspondent item number in Fig. 2.

Table 4

Fit indices, statistical values, and cut-off point values (Finnish data n = 552).

Fit indices	Statistical value	Cut-point value
Chi-Square χ^2 (degrees of freedom), p-value	4521.534 (1931), <0.001	(p > 0.05)
Relative χ^2 (χ^2/df)*	2.342	>2
AGFI	0.952	>0.95
RMSEA	0.051	<0.07
SRMR	0.075	<0.08
CFI	0.847	>0.90, but >0.95 recommended
TLI	0.841	>0.80, but >0.95 recommended

Note: Cut-point values based on Mokkink et al. [30] and Hooper et al. [47]. *Relative chi-square (χ^2/df) minimizes the impact of sample size in Chi-Square statistics.

3.2. The internal consistency testing

In the internal consistency testing of the Finnish data, Cronbach's alpha (α) for the higher-order factors (1. Working conditions, 2. Work community, 3. Worker's resources and work, and 4. Professional competence) ranged from 0.824 to 0.938. For the lower-order factors, alpha values ranged from 0.652 to 0.887, except for two which were below 0.6. McDonald's omega value ranged from 0.771 to 0.897 for the higher-order factors and from 0.677 to 0.898 for the lower-order factors, with two also below 0.6. The internal consistency for the whole instrument was high (Cronbach's Alpha = 0.938; McDonald's omega = 0.909). In the Estonian data, all the Cronbach's alpha were above 0.6 (Table 5).

4. Discussion

Psychometric property studies are crucial for ensuring that researchers can employ validated instruments in their research. [30]. According to Mokkink et al. [30], the measurement properties used to evaluate patient-reported outcome measures include the domains of reliability, validity, and responsiveness. This study was the first to provide a validation of the *Occupational Well-being of Social and Health Care Teachers* (OWESoHeT) instrument based on empirical data and statistical analysis, focusing specifically on structural validity by assessing how well the instrument's scores capture the dimensionality of occupational well-being [30]. This is part of construct validity testing and is usually conducted using factor analysis [30,50]. The structural validity testing confirmed four correlative higher-order factors: 1. Working conditions, 2. Work community, 3. Worker's resources and work, and 4. Professional competence, based on the Content Model ProSchoolSOWE [27], and revealed a total of 15 underlying lower-order factors within these four higher-order factors. Most of the model fit indices exceeded the recommended thresholds; however, the relative fit indices, the Tucker-Lewis Index and the Comparative Fit Index, did not reach the cut-off point values. Nevertheless, when interpreting fit indexes of higher-order models, it is not recommended to rely solely on the cut-off point values. Models measuring broad constructs, such as occupational well-being, may be better evaluated using broader criteria [45]. Furthermore, when assessing factor structure, both statistical consideration and theoretical and practical aspects must be considered [42,44].

The theory for occupational well-being on which the instrument is based has been developed under a considerable period and tested using several cross-sectional datasets [27], covering multiple stages of theory and instrument development [51]. Recently, the Content Model ProSchoolSOWE has been tested in the context of health and social care education using structural equation modelling [52]. The study found that the four factors were associated with the occupational well-being of health and social care educators. Previously, Laine et al. [29] revealed correlations between sum variables representing these four aspects of occupational well-being using structural equation modelling with the earlier version of the WYW-instrument. However, this current research confirms the higher-order factor structure. The correlations between higher-order factors indicate that this novel instrument is based on a reflective model of occupational well-being, with the higher-order factors representing a manifestation of the single underlying construct of occupational well-being. However, the relative low correlation between Professional competence and Working conditions may indicate that some items in the instrument are formative [30]. For example, it is unlikely that improvements in professional competence would influence perceptions of indoor air quality. Conversely, functional working equipment could greatly affect the

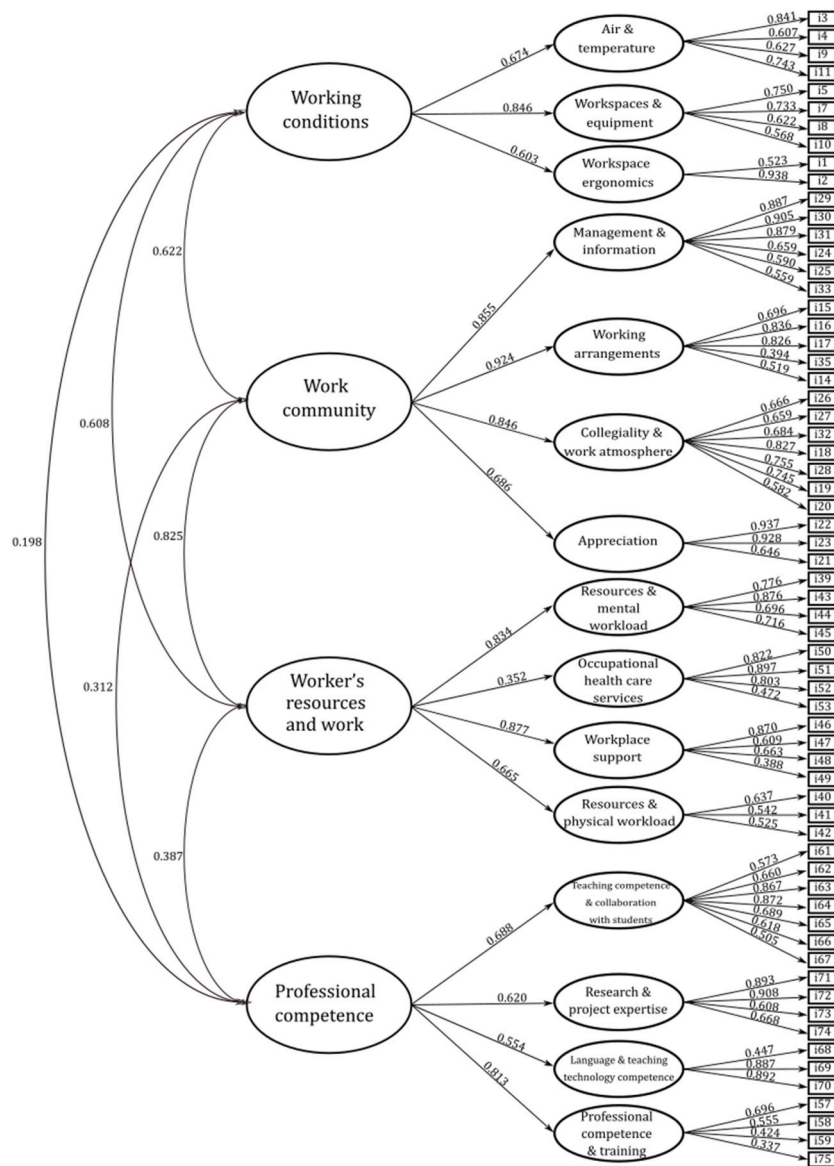


Fig. 3. CFA model of the occupational well-being aspects in OWESoHeT-instrument (Finnish data n = 552). The single-headed arrows indicate factor loading, the curved, double-headed arrows indicate correlation between higher-order factors, the correspondent item number in Table 3.

experience of technological competence.

The lower-order factor structure differed from the 2017 WYW-instrument [39,40]. The addition of new items justified the use of EFA to form 15 lower-order factors [42,44]. The prevalence of this revised lower-order factor structure can be justified based on earlier research in health and social care education. *Working conditions*, such as indoor air quality, temperature, and ergonomic workspaces and equipment, are considered important components of educators' occupational well-being and occupational health and safety [53–55]. However, they are an inadequately researched topic in the context of health and social care educators' work. One new item related to indoor air quality was added in the 2017 version of the WYW-instrument. Poor indoor air quality can lead to problems such as voice disorders of educators [55] and allergic symptoms [54], highlighting its relevance to occupational well-being.

Work community is also a well justified aspect of occupational well-being among health and social care educators [4,6–10,26]. The *resources and work* of these educators are inherently related to occupational well-being, job satisfaction, and the intention to stay in the profession [4,7,10,56]. Educators often value the variability, relevance, and autonomy of their work [4,10,56], viewing these characteristics as work-related resources. However, high work demand and workload can threaten the balance between resources and load factors [2,23]. Therefore, both workplace support and occupational health care services that promote occupational well-being during and after the workday are essential [28,57,58]. This consideration provided the rationale for adding an item related to occupational

Table 5

Cronbach's alpha coefficients of the instrument based on Finnish (n = 552) and Estonian data (n = 99).

Factors	Finnish data 2020			Estonian data 2021	
	Cronbach's Alpha	95% CI	McDonald's omega	Cronbach's Alpha	95% CI
1. Working conditions	0.824¹⁵	0.801–0.846	0.796	0.858⁴	0.812–0.897
Air and temperature	0.799 ⁶	0.770 – 0.825	0.801	0.774 ³	0.690 – 0.840
Workspaces and equipment	0.757 ⁷	0.722 – 0.789	0.784	0.716 ¹	0.611 – 0.798
Workspace ergonomics	0.652 ³	0.589 – 0.706	0.677	0.760	0.643 – 0.839
2. Work community	0.938³⁷	0.929–0.945	0.897	0.949³	0.932–0.962
Management and information	0.887 ⁶	0.871 – 0.901	0.890	0.874	0.831 – 0.909
Working arrangements	0.779 ¹⁰	0.748 – 0.807	0.806	0.821 ¹	0.758 – 0.872
Collegiality and work atmosphere	0.874 ¹¹	0.858 – 0.890	0.869	0.911 ¹	0.881 – 0.935
Appreciation	0.871 ¹⁰	0.851 – 0.889	0.898	0.852 ¹	0.792 – 0.896
3. Worker's resources and work	0.842²⁵	0.821–0.861	0.776	0.895³	0.862–0.923
Resources and mental workload	0.847 ⁵	0.825 – 0.867	0.861	0.834	0.774 – 0.882
Occupational health care services	0.824 ¹⁰	0.804 – 0.851	0.836	0.698 ²	0.586 – 0.785
Workplace support	0.711 ⁸	0.669 – 0.748	0.714	0.802	0.729 – 0.859
Resources and physical workload	0.582 ³	0.518 – 0.639	0.580	0.730 ¹	0.622 – 0.811
4. Professional competence	0.866³⁹	0.849–0.883	0.771	0.880²	0.842–0.912
Teaching competence and collaboration with students	0.845 ⁹	0.824 – 0.864	0.828	0.850 ¹	0.800 – 0.891
Research and project expertise	0.836 ¹²	0.812 – 0.857	0.802	0.857	0.805 – 0.898
Language and teaching technology competence	0.761 ⁷	0.724 – 0.793	0.801	0.719	0.607 – 0.803
Professional competence and training	0.550 ¹³	0.484 – 0.609	0.582	0.605 ¹	0.460 – 0.719

Note: CI = confidence interval for Cronbach's alpha, ^{number} amount of the missing information.

well-being support activities during working hours.

Professional competence is related to occupational well-being. This means that sufficient training is offered, and educators are able to adequately utilise their own competencies in education [4,33,34], and administrative competences, such as self-management, are supported, [31,34]. In recent years, several studies have focused on professional competence [31–34], particularly among health care educators. Therefore, the inclusion of new competence areas in the instrument was well justified.

Although many justified changes were made during the instrument development process, the OWESoHeT-instrument still requires further testing and refinement. Based on structural validity testing of the instrument in this study, it appears that not all items added to the WYW-instrument in 2017 are relevant or at least require further development to support the instrument's structure. Five items had to be excluded from the analysis prior to the EFA, three of which were additions made in 2017. Two items were formulated in a way that did not reflect the participants' perceptions of their actual occupational well-being. Instead, they focused on participants' opinions about the need for improvement. The third item concerned time spent together outside of working hours arranged by the work community. The remaining two excluded items addressed the opportunity for clinical working life periods and the educator's own resource-supporting lifestyle. Social restrictions and remote work resulting from the COVID-19 pandemic likely reduced opportunities for social interaction and may have negatively impacted physical activity among educators. These issues may explain the low proportion of common variance and weak factor loadings for these five items.

Nevertheless, some factor loadings in the higher-order CFA were below 0.4, which is considered a moderate loading [44]. All loadings were statistically significant, which is common in large samples. Literature suggests various minimum thresholds for acceptable factor loading ranging from 0.4 to 0.7 [59] and even a threshold of 0.3 is reported [42]. Several issues may explain weak factor loadings of the individual items related to clinical competence, opportunity for work supervision, and the lower-order factor occupational health services, which was modified in 2017. For some health and social care educators, clinical competence is not a central job requirement. Additionally, receiving work supervision and assessing occupational health services is not typical for employees who do not face challenges in performing their tasks or experience health-related problems. Kähkönen et al. [52] chose to remove items regarding occupational health services based on low regression weights when testing the Content Model Pro-SchoolSOWE. They suggested that the statutory nature of occupational health services for Finnish health and social care educators may explain the low regression weights, as these services may be taken for granted and not perceived as contributing meaningfully to occupational well-being.

The internal consistency differed between countries and was found to be higher in the Estonian data. This may be attributed to the Estonian study participants, who were mostly health care educators, resulting in more consistent responses. Although most factors in the Finnish data showed moderate to good internal consistency, based on Cronbach's Alpha and McDonald's omega, two lower-order factors had values below 0.6, indicating relatively low internal consistency [30,42,49]. One of those lower-order factors included clinical competence, which also showed a low factor loading, suggesting that at least this item should be revised to improve inter-relatedness among the items [30]. However, it is argued that in early-stage research, even values around 0.5 may be acceptable. The internal consistency of the whole instrument was high, which is typical for instruments with a large number of items [42].

The development of the OWESoHeT-instrument offers an opportunity to examine and promote the occupational well-being of educators in health and social care education at regional, national, and international levels. The instrument enables the identification of resource areas within both the individual educator and the work community, as well as the early detection of developmental needs. In addition, the different sections of the instrument can be used independently [28,41]. This instrument is suitable for both Finnish and Estonian contexts, and it has already been applied in occupational well-being research and development projects in both countries.

Furthermore, it has been translated into English, allowing its broader international use.

4.1. Strengths and limitations

The strengths of this study include the use of well-established theory of occupational well-being in the educational context [27], the widespread application of the previous version of the instrument, a large sample size representing a sufficient proportion of the study population, and the re-testing the internal consistency using Estonian data. However, this study also has limitations which may decrease the generalisability of the study findings. Despite a sufficient sample size, voluntary participation may have caused a self-selection bias. It is possible that educators experiencing particularly low occupational well-being or those with the busiest schedules chose not to participate. Although most fit indices for the higher-order CFA exceeded recommended thresholds, some parts of the factor structure require further development. Specifically, the TLI and CFI did not reach the conventional cut-off point values, and some of the factor loadings in the higher-order CFA were moderate (below 0.4) [44]. ESEM would have been an interesting alternative method for the CFA, as it allows cross-loadings [46]; however, acceptable calculations were not obtained for the tested Set-ESEM model. Nonetheless, ESEM remains a promising method for future testing of the instrument. Additionally, the internal consistency was relatively low in some of the lower-order factors [30,42,49]. Finally, the structural validity of the instrument may have been affected by exceptional working conditions, increased remote work, social distance, resulting from the COVID-19 pandemic.

5. Conclusions and recommendations for future research

This study provided evidence of the structural validity and internal consistency of the novel OWESoHeT-instrument. Exploratory and higher-order confirmatory factor analysis and internal consistency testing confirmed the higher-order 4-factor structure grounded in a well-established theoretical model of occupational well-being in the educational context. In addition, an underlying lower-order 15-factor structure was revealed within the instrument. This validated instrument provides reliable insights for assessing and promoting occupational well-being in the specific context of health and social care education. Further refinement and validity testing of the instrument are recommended to strengthen its applicability and ensure its continued relevance across diverse educational settings.

This was the first data collected using the Finnish and Estonian OWESoHeT-instrument, as such, further development and psychometric testing are needed to confirm its structural validity and internal consistency. Future research may consider revising or excluding certain items to improve the instrument's conciseness. This study addressed only some aspects of evaluating the measurement properties of the instrument. Further studies will contribute more information about how the instrument functions in repeated surveys (including test-retest reliability), across different sub-groups, and in various country contexts.

CRedit authorship contribution statement

Anneli Vauhkonen: Writing – original draft, Visualization, Software, Resources, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Mina Azimirad:** Writing – original draft, Software, Resources, Methodology, Formal analysis, Conceptualization. **Miko Pasanen:** Writing – original draft, Visualization, Validation, Software, Resources, Methodology, Formal analysis, Conceptualization. **Leena Salminen:** Writing – review & editing, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Jenni Rinne:** Writing – review & editing, Software, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Mari Kangasniemi:** Writing – review & editing, Resources, Investigation, Conceptualization. **Janne Kommusaar:** Writing – review & editing, Software, Resources, Investigation, Data curation, Conceptualization. **Kirsi Honkalampi:** Writing – review & editing, Supervision, Conceptualization. **Terhi Saaranen:** Writing – original draft, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization.

Ethics statement

This study was reviewed and approved by the UEF Committee on Research Ethics, with the approval number: [10/2020 June 12, 2020], Finland, and the Research Ethics Committee of the University of Tartu, with the approval number: [345/T-21], Estonia. The research approval for the collection of data was issued by the Vocational Educators and Trainers in Finland and both education institutions in Estonia. All participants were informed that consent to participate in the study and publish their data would be assumed on completion and submission of the study survey.

Data availability statement

Finnish data will be made available on request. For requesting data, please write to the corresponding author. The Finnish data presented in this study, excluding personal identifiers, will be available in the continuous research data storage service Fairdata IDA organized by the Finnish Ministry of Education and Culture after all the results from the project have been published. Due to small sample size and sensitive questions, Estonian research data are not shared.

Declaration of the use of AI statement

None.

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Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: This research was supported by OAJ's Occupational Well-being Fund – does not affect the content of the manuscript. Payment was made to the University of Eastern Finland, project leader professor Terhi Saaranen. Corresponding author Anneli Vauhkonen was the main researcher of this project. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2026.e44663>.

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