

# Evaluating Welfare Technology Implementation in Municipal Care Services

## Contextual Adaptation of the Measurement Instrument for Determinants of Innovation

Janne Dugstad<sup>1</sup>, Vibeke Sundling<sup>2</sup>, Ety Nilsen<sup>1</sup> and Hilde Eide<sup>1</sup>

<sup>1</sup>The Science Centre Health and Technology, University of South-Eastern Norway, Drammen, Norway,

[Janne.Dugstad@usn.no](mailto:Janne.Dugstad@usn.no)

<sup>2</sup>National Centre for Optics, Vision and Eye Care, University of South-Eastern Norway, Kongsberg, Norway

### Abstract

The Measurement Instrument for Determinants of Innovations (MIDI) was developed to identify facilitators and barriers during implementation processes in healthcare. Thereby the implementation strategies can be better targeted to obtain successful implementation. MIDI is theory- and evidence based, and provides a generic description of 29 determinants with suggested questions that need to be adapted to the specific innovation and implementation context. This paper aims to describe how MIDI can be contextually adapted; using welfare technology implementation in municipal care services as context. Based on this process we suggest operationalization of specific determinants on item-level in the MIDI adapted to the welfare technology context (MIDI-WT).

### Keywords

Welfare technology, implementation strategies, determinants, contextual adaptation, questionnaire survey.

## 1 INTRODUCTION

Recent implementation research have called for improved methods for tailoring implementation strategies and for measuring implementation outcomes in healthcare [1, 2]. *Implementation strategies* represent the ‘how to’ in introducing and making use of an innovation in healthcare services [3]; the actions needed to make an innovation fit the organization and services, and to enable the organization, the healthcare providers and patients to use the innovation. *Determinants* are factors that act as *facilitators* for or *barriers* to achieve the desired outcomes of the implementation strategies [4]. *Implementation outcomes* are intermediate process results that influence the later production of *service outcomes*, such as increased efficiency, safety and patient centeredness, and *patient outcomes*, as increased patient satisfaction and function [5].

There is a multitude of theories, frameworks and models in implementation science [6], of which some are suitable for research, some for pragmatic implementation and some for both. The Measurement Instrument for Determinants of Innovations (MIDI) is a theory- and evidence based questionnaire in the latter category [7]. MIDI determinants and their underpinning theories overlap with other implementation frameworks [8-11], and are founded in Rogers’ Diffusion of Innovations theory [12]. Healthcare organizations can use MIDI just prior to and/or during an implementation process. MIDI was designed to identify how healthcare providers evaluate the innovation and factors related to the implementation process. The care providers’ feedback reveal the facilitating or impeding effects of the determinants, allowing for adjustments of implementation strategies in order to support successful implementation, achieve expected outcomes, and sustained use of the innovation. MIDI encompasses 29 determinants

(D1-D29) related to the innovation, the adopting user, the organization and the socio-political context (table 1).

The innovation category consists of seven determinants associated with the welfare technology: procedural clarity (D1), correctness (D2), completeness (D3), complexity (D4), compatibility (D5), observability (D6) and relevance for the patient/resident (D7). In MIDI-WT, this category details how the welfare technology is delivered from the vendor and how it fits with the current practice, whereas integration of the welfare technology in the care workflow is detailed in the adopting user and care organization categories.

The adopting user category captures 11 determinants associated with the care provider who is using the welfare technology: personal benefits and drawbacks (D8), outcome expectations (D9), professional obligation (D10), resident satisfaction (D11), resident cooperation (D12), social support (D13), descriptive norm (D14), subjective norm (D15), self-efficacy (D16), knowledge (D17) and awareness of content of innovation (D18).

Ten determinants associated with the care organization or underlying unit implementing the welfare technology form the third category, the organization. This category includes formal ratification by management (D19), replacement when staff leave (D20), staff capacity (D21), financial resources (D22), time available (D23), material resources and facilities (D24), coordinator (D25), unsettled organization (D26), information accessible about use of innovation (D27) and performance feedback (D28).

The socio-political context determinant (D29) in the fourth category is related to legislation and regulations of the Norwegian municipal healthcare services.

The categories and determinants correspond well with factors associated with effective implementation of digital health reported in the literature [e.g. 13, 14-16].

A 5-point Likert response scale is applied to assess most of the MIDI items, with 1 representing the lowest level of agreement and 5 representing the highest level. D14 has a 7-point Likert scale ranging from 1 representing 'not a single colleague', to 7, 'all colleagues'. D18 has a 4-point Likert scale ranging from 1, 'I am not familiar with the (technology)', to 4, 'I am thoroughly familiar with the (technology)'. A dichotomous Yes/No scale applies to D19, D25 and D26.

According to the MIDI manual, the generic instrument needs to be adapted to the specific innovation and context, based on 'use as intended by the developers' [17]. Developers and vendors are challenged by the variety in users and needs when developing welfare technology instructions and guidelines. Firstly, a specific technology can be applied to solve a range of needs. Secondly, welfare technology implementation is characterized by various factors related to the care contexts, patients, organizational culture, infrastructure, work practices, and management practices [15]. Thirdly, implementations involve technical installation and service innovation processes related to training, clinical procedures, routines, and responsibilities [18]. Previous studies that used MIDI to assess health innovation implementations [19-21] have not described the contextual adaptation processes of the determinants and their items.

This paper aims describe the contextual adaptation of the MIDI questionnaire to the implementation of welfare technology in municipal care services. The research question was: Which welfare technology related items should be included to cover the determinants in MIDI-WT?

## 2 METHODS

### 2.1 Design and study setting

During 2014-2019, we performed an iterative evaluation of our adaptations of the MIDI questionnaire to the implementation of welfare technology in residential care services in eight municipalities.

### 2.2 Data collection

We collected and analyzed data in order to get deep knowledge about welfare technologies, service innovation processes, implementation strategies and outcomes by reading political documents, procurement protocols, technology manuals, instructions, and clinical routines. We interviewed healthcare managers, project managers, professional development advisors, care providers, vendors, IT service managers, and –staff, individually and in groups. We observed meetings between stakeholders, participated in and facilitated implementation workshops and co-creation activities. Moreover, we observed some care providers while they responded to the MIDI questionnaire. The data collection was integrated in larger implementation research projects that explored facilitators and barriers, implementation strategies and outcomes, types of resistance, co-creation as an overall implementation strategy, and the roles of different stakeholders, and their analyses and results are detailed in previous studies [18, 22-27].

### 2.3 Iterative evaluation of MIDI adaptation

The iterations included: 1) a cross-cultural adaptation of MIDI to the Norwegian healthcare setting [28] in parallel to piloting the MIDI during the first year of an implementation of digital night monitoring of persons with dementia in five residential care facilities [23]. 2) a cross-sectional study that used MIDI to assess the implementation of wireless nurse call systems in five residential care facilities [27]. In both iterations, the MIDI was contextually adapted and distributed to care providers, and their responses were analyzed. We documented and discussed our reflections related to the research question during each step of the iterative evaluation, resulting in an improved adaptation process over time, as detailed below, and recommendations for MIDI-WT determinants and items.

The adaptation of the questionnaire relied on contributions from stakeholders involved in the implementation, preceded by an agreement to undertake the MIDI-based measurement of the implementation of welfare technology. Through the iterative evaluation approach, we developed the following procedure for implementations that were new to the researchers, with novel technologies and contexts:

#### 2.3.1 Interview with healthcare top management

The first step was an interview with a municipal healthcare top manager at the care institution level or higher. The interview addressed the long-term welfare technology implementation strategy and how the top management had prepared the implementation, including procurement of technology, delegation of responsibilities and allocation of resources. The interview was done by phone or in a meeting, and lasted for about 15 minutes. We made written notes of responses, reflections and concerns.

#### 2.3.2 Interview with care unit management team

The next step was a meeting with the management team of the unit(s) in the care organization where the implementation took place. Following a brief introduction of the MIDI and the need for adaptation, the management team was asked about the same issues as the top management representative, in order to reveal familiarity with and any concerns regarding the procurement, planning, allocation of resources and responsibilities. The team was then encouraged to describe the welfare technology and how it would be used in the unit, as well as the implementation strategies in the order that they would be effected. We specifically asked about the responsibilities of and cooperation with the IT service and the vendors. The meetings lasted for 30 to 45 minutes and we made written notes of the team members' responses, reflections and concerns. Comments directly relevant for the adaptation of items, such as the expressions used to describe the welfare technology, were written directly on a printout of the MIDI questionnaire.

#### 2.3.3 Interview with vendors and/or IT service

The vendors and the IT service employees were presented with the same questions as the care unit management teams. Both the vendors and the IT services provided detailing and contrasting information about all parts of the welfare technologies, technological infrastructure, and safety aspects, as well as the implementation strategies and the managers' and care providers' overall technological

competence level. We interviewed vendors and IT services in meetings or by phone for 20 to 30 minutes and documented as for the management teams.

### 2.3.4 *Co-creating the adaptation of MIDI items with a super user*

Succeeding the interviews, we discussed the questionnaire in an item-by-item manner with a super user of the welfare technology, based on a drafted version of MIDI-WT. Caution was taken to ensure that relevant items were included, detailing the welfare technology, the clinical use, the implementation strategies and the stakeholders involved, and that irrelevant items were omitted. Further, to ensure that the wording of the items was unequivocal and in line with the expressions used in the care unit. The meeting lasted for 30 to 45 minutes and notes were made directly on the MIDI-WT printout.

### 2.3.5 *Additional sources of information*

The implementations relied on the joint and coordinated efforts of a number of stakeholders; hence, we observed the interactions between them. This was particularly useful when the interviews indicated disagreements or resistance. The observations included status-meetings between the vendors, IT service and the healthcare service; training sessions for care providers; and information meetings for nursing staff or patients/residents/families. We arranged to do the interviews just prior to or after these observations, which eased the access for doing interviews.

Moreover, we asked all informants for available written material, such as implementation plans, technical data sheets, checklists, and clinical procedures. We received and analyzed the written material as the MIDI-WT adaptation progressed, and it added useful information.

### 2.3.6 *Verification of MIDI-WT*

We e-mailed the proposed MIDI-WT to the care unit management for verification and discussed their feedback in meetings or by phone, in which we also coordinated the practical details of distributing the questionnaire to the care providers. Finally, the MIDI-WT questionnaire adapted to the specific welfare technology was completed.

## 3 RESULTS

The results sum up determinants and items relevant to the MIDI-WT, based on the information collected and validated by the procedure described in section 2.3. Table 1 details MIDI-WT determinants and items.

### 3.1 **Recommended determinants and items in the MIDI-WT, adapted to welfare technology**

#### 3.1.1 *The innovation/ welfare technology category*

The seven determinants in the innovation category was successfully presented as suggested in the MIDI manual, by replacing the word 'innovation' with the name of the technology, but with no further detailing. A short description of the welfare technology and related material/equipment, written procedures, and information was included in the introduction section of the questionnaire in order to prepare the respondents. In the cross-cultural adaptation of the correctness-determinant (D2), we used the expression 'knowledge based' in Norwegian instead of 'based on factually correct knowledge'. Managers and super users questioned the

relevance of D2, and we observed that some care providers who were non-native Norwegian speaking found the expression difficult. Hence, D2 can possibly be omitted.

#### 3.1.2 *The adopting user / care provider category*

The care providers were grouped as nurses (registered nurse), healthcare workers (nurse assistant) other healthcare professions (e.g. physiotherapist and learning disability nurse) and unskilled (lack of formal education), in the background section of the questionnaire, which also asked for gender, age and number of years of professional experience.

Their anticipated or experienced personal benefits (D8) included how the welfare technology made their work better, more efficient and safer; and how the welfare technology implied more benefits than drawbacks, overall. One personal drawback (D8) was included, regarding how demanding it was to learn how to use the welfare technology. The outcome expectations (D9) were based on how the care services had defined the aims of the specific welfare technology with regards to the patients/residents, modified by the information collected in the interviews. D9 was detailed with a probability and an importance item for each expected outcome, as recommended in the MIDI manual. We found outcome expectations related to enhanced safety for patients/residents, faster detection of their need for assistance, and decreased response time to calls.

We did not adapt the professional obligation determinant (D10) to all tasks related to the welfare technology, but included an overall statement: 'I feel it is my responsibility as a professional to use the (welfare technology)'.

During the implementations of welfare technology, the care providers cooperated closely with families of residents who had dementia. Hence, 'families' were added to all items related to the residents (i.e., D11, D12, D15 and D16).

We found the unit manager, the implementation project manager (if appointed), the care providers (we included nurses and healthcare workers), the super users, the IT service, the vendors, and the patients and families to influence the implementation strategies (i.e. D13 social support and D15 subjective norm, including normative beliefs and motivation to comply items). The influence by municipal politicians, municipal top management, janitor and union representatives was of less importance and could be omitted in the questionnaire.

The self-efficacy determinant (D16) was tailored with items detailing the operation and use of the welfare technology, e.g. being able to operate all the parts, charge the technology, troubleshoot if something does not work, prepare the technology for a patient/resident, and inform and instruct patients/residents/ families. We also included tasks related to the implementation process, such as participating in training and communicating with the different actors responsible for the implementation.

The knowledge determinant (D17) was detailed with items related to the current status of knowledge, background knowledge, and training. We included items regarding practical demonstrations of the welfare technology and acquisition of skills in relation to training.

<b>Determinant</b>	<b>Item specification</b>
<b>Innovation: welfare technology</b>	
D1 Procedural clarity	WT clearly describes all activities and their order
D2 Correctness	WT is based on factually correct knowledge
D3 Completeness	Information and materials provided by WT are complete
D4 Complexity	WT is too complex for me to use
D5 Compatibility	WT is a good match for how I am used to working
D6 Observability	The outcomes of using WT are clearly observable
D7 Relevance for resident	I think WT is relevant for the residents
<b>Adopting user: care provider</b>	
D8 Personal benefit	WT implies more benefits than drawbacks; makes my work performance better; more efficient; more interesting; safer
D8 Personal drawback	WT is too demanding to learn
D9A Outcome expectation	It is important that WT.... (e.g. increases safety for residents; gives faster assistance; increases safety for families)
D9B Outcome expectation	It is probable that WT .... (e.g. increases safety for residents; gives faster assistance; increases safety for families)
D10 Professional obligation	It is my responsibility as a professional to use WT
D11 Resident satisfaction	Residents/families will be satisfied when I use WT
D12 Resident cooperation	Residents/families will cooperate when I use WT
D13 Social support	To use WT, I can get support from the manager, a super user, a nurse, a healthcare worker, the IT service, the vendors
D14 Descriptive norm	The proportion of my colleagues that use WT as intended
D15A Normative beliefs	I'm expected to use WT by the manager, a super user, a nurse, a healthcare worker, the IT service, the vendors, the residents, the families
D15B Motivation to comply	I comply with opinions of the manager, a super user, a nurse, a healthcare worker, the IT service, the vendors, the residents, the families
D16 Self-efficacy	I can teach residents/families to troubleshoot if WT doesn't work; operate each part of WT; provide feed-back to the manager or super user
D17 Knowledge	I know enough to use WT; I had sufficient prior knowledge; I was offered training; I participated in training; I need more training; WT was demonstrated during training; I practice in idle time; I understand instructions by super users, managers, IT-service, vendors; I need to discuss my experiences and reflections
D18 Awareness of content	The extent to which I am familiar with WT
<b>Organization: care unit</b>	
D19 Formal ratification	Use of WT is integrated in plans
D20 Staff turnover	New colleagues are prepared to use WT
D21 Staff capacity	We are enough people to use WT as intended
D22 Financial resources	WT is supported by sufficient financial resources
D23 Time available	I have enough time available to use WT
D24 Material resources	I have enough equipment to use WT
D25 Coordinator	Responsible for WT implementation: Manager/super user, IT service
D26 Unsettled organization	Major changes are ongoing in parallel to WT implementation
D27 WT use information	I can easily find information about WT use
D28 Performances feedback	We get regular feedback about WT implementation
<b>Socio-political context: Norwegian legislation</b>	
D29 Legislation and regulations	WT activities fall within current regulations

**Table 1** MIDI determinants and detailing items adapted to welfare technology implementation in municipal care services  
Abbreviations: D; determinant, WT; welfare technology.

Further, items were included to specify whether the care providers understood instructions by all actors responsible for training. Finally, we included items about the need for repeated training and for discussions of experiences and ethical reflections.

The awareness of content determinant (D18) was presented with the following alternatives: 1) I'm not familiar with the (technology), 2) I'm familiar with the (technology), but have not explored it, 3) I'm familiar with the (technology) and have some experience with it, and 4) I'm well acquainted with and use the (technology).

### 3.1.3 The organization / care unit category

The coordinator (D25) determinant was detailed with items for the actors who had specific responsibilities in the implementation, i.e. the care unit manager, the implementation project manager (if appointed), and the IT service. We included 'I don't know' to the response scales of the formal ratification of management (D19), the replacement when staff leaves (D20), the staff capacity (D21), the financial resources (D22), the coordinator (D25) and the unsettled organization (D26) determinants. The recommendations during the interviews indicated that the care providers were not concerned with these issues and that some of the determinants could be omitted.

### 3.1.4 The socio-political context / Norwegian municipal healthcare service category

We included 'I don't know' to the response scale of the legislation and regulations determinant (D29), in line with recommendations during interviews.

## 4 DISCUSSION

By contextually adapting the MIDI to welfare technology implementation as proposed in the methods section of this paper, we have found the MIDI-WT useful for evaluating welfare technology implementation in research as well as in clinical practice. The item scores indicate whether the implementation strategies are functioning well or need adjustments [27]. Applying MIDI is an implementation strategy in itself. As suggested by Powell and colleagues, it 'Assesses various aspects of an organization to determine its degree of readiness to implement, barriers that may impede implementation, and strengths that can be used in the implementation effort' [29].

As implementation strategies are applied over time, various determinants come to play in the early, mid- and late stages of welfare technology implementation [18]. Hence, the adaptation of MIDI may very well include a smaller selection of determinants, customized to the strategies or outcomes that one seeks to evaluate [17]. Likewise, for well-known implementations, the process of adapting the MIDI could possibly be less extensive than the procedure for novel technologies and contexts previously described. We would like to urge the importance of including the perspectives of multiple stakeholders, as both the language and expressions used, as well as the detailing items of the determinants tend to be perceived as more relevant and easier to comprehend by the intended respondents by this approach.

MIDI-WT aims to support *successful implementation*. However, defining success in implementation is a complex notion to make. The digital monitoring technology implementation included in this paper was regarded successful because the new service was sustained in all municipalities 1.5 years after the implementation was completed. Even if a number of service- and patient outcomes were realized [24], numerous barriers were encountered and many participants did not perceive the implementation as successful [18]. Whereas the municipalities are motivated by and frequently define service- and patient outcomes prior to the implementation of welfare technology, it will be useful to look further into implementation outcomes in future research. Proctor and colleagues [5] classified the intermediate implementation outcomes as adoption, acceptability, appropriateness, feasibility, penetration, cost, fidelity and sustainability.

## 4.1 Recommendations for implementation practice

MIDI-WT can be applied to evaluate implementation-, service- and expected patient outcomes, as far as they have been realized, in relation to the following implementation strategies: 1) WT adopted as part of strategic development of care unit. 2) Management plans implementation, defines roles and responsibilities, and allocates resources. 3) Disturbances from other ongoing processes in municipality/unit are avoided. 4) Implementation coordination team established: unit/project manager, super users, IT service and vendors. 5) End users (patients) selected/recruited. 6) Information meetings for care providers and for patients/residents/families prior to implementation. 7) WT tested before integrated in workflow. 8) WT implemented as complete system or stepwise, introducing more parts and functionalities over time. 9) WT manuals available to care providers. 10) Written clinical procedures related to technology use available to care providers. 11) Training sessions, supervision and support offered to care providers by unit/project manager, super users, IT service and vendors. 12) Care providers can operate WT and instruct residents/patients/families. 13) Unit manager is actively involved in implementation and can operate WT. 14) Implementation issues, technological issues and clinical/ethical implications discussed during care providers' meetings on regular basis. 15) New clinical procedures, tasks and/or responsibilities developed/adjusted and integrated in workflow. 16) Service outcomes measured for care providers and care unit, and patient outcomes measured for patients/residents and families.

## 5 SUMMARY

This paper presents a recommended procedure for the contextual adaptation of the MIDI questionnaire to the implementation of welfare technology, MIDI-WT, including the order of collecting information from useful sources and settings, practical issues regarding planning and documentation of the process and the final adaptation of each MIDI-WT determinant with detailing items.

## 6 REFERENCES

- [1] Powell BJ, Fernandez ME, Williams NJ, Aarons GA, Beidas RS, Lewis CC, et al. Enhancing the Impact of Implementation Strategies in Healthcare: A Research Agenda. *Frontiers in Public Health*. 2019;7(3).
- [2] Lewis CC, Fischer S, Weiner BJ, Stanick C, Kim M, Martinez RG. Outcomes for implementation science: an enhanced systematic review of instruments using evidence-based rating criteria. *Implementation Science*. 2015;10(1):155.
- [3] Proctor EK, Powell BJ, McMillen JC. Implementation strategies: recommendations for specifying and reporting. *Implementation Science*. 2013;8(1):139.
- [4] Lewis CC, Klasnja P, Powell B, Tuzzio L, Jones S, Walsh-Bailey C, et al. From classification to causality: Advancing Understanding of Mechanisms of change in implementation science. *Frontiers in public health*. 2018;6:136.
- [5] Proctor E, Silmere H, Raghavan R, Hovmand P, Aarons G, Bunger A, et al. Outcomes for Implementation Research: Conceptual Distinctions, Measurement Challenges, and Research Agenda. *Administration and Policy in Mental Health and Mental Health Services Research*. 2011;38(2):65-76.
- [6] Nilsen P. Making sense of implementation theories, models and frameworks. *Implementation Science*. 2015;10(1):53.
- [7] Fleuren MAH, Paulussen TGWM, Van Dommelen P, Van Buuren S. Towards a measurement instrument for determinants of innovations. *International Journal for Quality in Health Care*. 2014;26(5):501-10.
- [8] Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implementation Science*. 2009;4(1):50.
- [9] Kitson A, Harvey G, McCormack B. Enabling the implementation of evidence based practice: a conceptual framework. *BMJ Quality & Safety*. 1998;7(3):149-58.
- [10] Michie S, Johnston M, Abraham C, Lawton R, Parker D, Walker A, et al. Making psychological theory useful for implementing evidence based practice: a consensus approach. *Quality & safety in health care*. 2005;14(1):26-33.
- [11] Greenhalgh T, Robert G, Macfarlane F, Bate P, Kyriakidou O. Diffusion of Innovations in Service Organizations: Systematic Review and Recommendations. *The Milbank Quarterly*. 2004;82(4):581-629.
- [12] Rogers EM. Diffusion of innovations. New York: Free Press; 2003.
- [13] Cresswell KM, Bates DW, Sheikh A. Ten key considerations for the successful implementation and adoption of large-scale health information technology. *Journal of the American Medical Informatics Association*. 2013;20(e1):e9-e13.
- [14] Granja C, Janssen W, Johansen MA. Factors Determining the Success and Failure of eHealth Interventions: Systematic Review of the Literature. *J Med Internet Res*. 2018;20(5).
- [15] Frennert S, Östlund B. Narrative Review: Technologies in Eldercare. *Nordic Journal of Science and Technology Studies*. 2018;6(1):21-34.
- [16] Lassen AM. Velfærdsteknologi i et medarbejderperspektiv-Et kvalitativt studie af kommunale medarbejders erfaringer med velfærdsteknologi. *Tidsskrift for omsorgsforskning*. 2017;3(02):106-17.
- [17] Fleuren MAH, Paulussen TGWM, Van Dommelen P, Van Buuren S. Measurement Instrument for Determinants of Innovations (MIDI). Leiden: TNO; 2014.
- [18] Dugstad J, Eide T, Nilsen ER, Eide H. Towards successful digital transformation through co-creation: a longitudinal study of a four-year implementation of digital monitoring technology in residential care for persons with dementia. *BMC Health Services Research*. 2019;19(1):366.
- [19] de Wit LM, van Uden-Kraan CF, Lissenberg-Witte BI, Melissant HC, Fleuren MA, Cuijpers P, et al. Adoption and implementation of a web-based self-management application “Oncokompas” in routine cancer care: a national pilot study. *Supportive Care in Cancer*. 2018:1- 10.
- [20] Kuunders TJM, Jacobs MAM, Goor IAMvd, Bon-Martens MJHv, Oers HAMv, Paulussen TGWM. Implementation of a guideline for local health policy making by regional health services: exploring determinants of use by a web survey. *BMC Health Services Research*. 2017;17(1):562.
- [21] Verberne LM, Kars MC, Schepers SA, Schouten-van Meeteren AYN, Grootenhuis MA, van Delden JJM. Barriers and facilitators to the implementation of a paediatric palliative care team. *BMC Palliative Care*. 2018;17(1):23.
- [22] Nilsen ER, Dugstad J, Eide H, Gullslett MK, Eide T. Exploring resistance to implementation of welfare technology in municipal healthcare services – a longitudinal case study. *BMC Health Services Research*. 2016;16(1):657.
- [23] Dugstad J, Nilsen E, Eide H. Piloting the Norwegian version of the “The Measuring Instrument for Determinants of Innovations” (MIDI)- a new instrument for implementation of innovations in health care.

Scandinavian Conference on Health Informatics; August 22; 2014; Grimstad; Norway; 2014: Linköping University Electronic Press.

- [24] Dugstad J, Nilsen E, Gullslett MK, Eide T, Eide H. Implementering av velferdsteknologi i helse- og omsorgstjenester: opplæringsbehov og utforming av nye tjenester—en sluttrapport. 2015.
- [25] van Dulmen S, Brembo E, Dugstad J, Eide H. 13 Person-Centred Technology-Supported Interventions. In: McCormack B, van Dulmen, S., Eide, H., Skovdahl, K., & Eide, T. , editor. Person-Centred Healthcare Research. Hoboken, New Jersey: Wiley-Blackwell; 2017. p. 159.
- [26] Stendal K, Dugstad J. The role of IT-service in future health care, can they be ignored? Proceedings from The 15th Scandinavian Conference on Health Informatics 2017 Kristiansand, Norway, August 29–30, 2017; 2018: Linköping University Electronic Press.
- [27] Dugstad J, Sundling V, Nilsen ER, Eide H. Nursing staff's evaluation of facilitators and barriers during implementation of wireless nurse call systems in residential care facilities. A cross-sectional study. Submitted. 2019.
- [28] Beaton D, Bombardier C, Guillemin F, Ferraz M. Guidelines for the Process of Cross-Cultural Adaption of Self-Report Measures 2001. 3186-91 p.
- [29] Powell BJ, Waltz TJ, Chinman MJ, Damschroder LJ, Smith JL, Matthieu MM, et al. A refined compilation of implementation strategies: results from the Expert Recommendations for Implementing Change (ERIC) project. *Implementation Science*. 2015;10(1):21.