ORIGINAL PRACTICE DEVELOPMENT AND RESEARCH

Lessons learned from mixed-methods research when designing and evaluating an education intervention in nursing homes: a retrospective reflection

Tone Elin Mekki*, Ingalill Rahm Hallberg and Christine Øye

*Corresponding author: Western Norway University of Applied Sciences, Bergen, Norway
Email: Tone.Elin.Mekki@hvl.no

Abstract
Background: Several interacting factors, such as the evidence, modes of delivery, and care recipients and their contexts influence the success or failure of implementation and practice development in health services. Mixed-methods research has the potential to unpack these elements and clarify their effect. However, mixed-methods approaches embedded in different worldviews may challenge both the designing and conducting of such studies.
Aims and objectives: To share lessons learned in a research team whose members were novices in mixing methods situated in different paradigms within the same study. By sharing insight gained from reflecting on the advantages and challenges the team experienced, this article hopes to inspire researchers and practice developers to create and conduct innovative mixed-methods research, and also to help them avoid challenges that may hamper collaboration in such research and practice development teams.
Methods: A retrospective reflection on lessons learned when designing, conducting and evaluating a facilitated education intervention in 24 Norwegian nursing homes from 2012 to 2015. The intervention aimed to help staff reduce the use of restraint in residents living with dementia, while the research study mixed a cluster-randomised controlled trial with participatory action research and ethnography to evaluate both the effect of the implementation process and the factors influencing it. The study findings prompted the retrospective reflection on lessons learned. Field notes from the first and third authors, as well as published advice and reports from experienced mixed-methods researchers were used in the reflection processes between the three authors.
Lessons learned: Qualitative data enriched the causal explanations based on trial findings and provided explanatory contextual illuminations of how implementation succeeded or failed in different nursing homes. However, conducting mixed-methods research in a multidisciplinary team with members anchored in either qualitative or quantitative traditions was challenging due to different paradigmatic positions, as well as the team's reluctance to address openly the resulting difficulties.
Conclusions and implications for practice: Mixing research methods may illuminate the powerful influence of context on the implementation and effectiveness of studies. As part of the preparation, researchers should allocate sufficient time to discuss potential differences in values and underlying ontological and epistemological assumptions, and demonstrate mutual methodological respect.
The implications for practice are:

- Theoretically informed mixed-methods evaluation offers the potential to identify and systematically evaluate the key components and outcomes of practice development endeavours

- Results from rigorous mixed-methods research may enable more precision illumination of the complex interaction between the staff's skills and intentions to perform person-centred care, and the contextual conditions employers offer them in which to practice their care
- Thus, mixed-methods research results may be useful, in terms of accountability and value for money, to health leaders, who are increasingly challenged to apply evidence-informed, person-centred approaches to care

Keywords: Practice development, paradigmatic positions, mixed-methods research, randomised controlled trial, ethnography, participatory action research, PARiHS framework

Introduction
Using mixed methods to evaluate implementation and practice development
Healthcare and practice development activities usually comprise several interacting components and multiple dimensions of contextual complexity (McCormack, 2015; Nilsen, 2015; Richards and Hallberg, 2015). Consequently, evaluation of such activities should use methods that can deal with the inherent complexity, while informing and uncovering both the processes and outcomes for those involved (Hardy et al., 2013; Fairbrother et al., 2015). If the aim is to provide legislators and bureaucrats with solid evidence to support the implementation of new evidence-informed healthcare initiatives, the evaluation should also address questions of 'what works for whom in what circumstances, and why?' (Bonell et al., 2012; Marchal et al., 2013; Pawson, 2013).

Studies aiming to evaluate interventions and activities within the complex reality of healthcare systems and practice increasingly combine qualitative and quantitative methods within a single design (Craig et al., 2008; Curry et al., 2013). The underlying core assumption is that statistical trends (quantitative data) combined with stories and personal experiences (qualitative data) will provide a better understanding of the research problem (Creswell, 2015). Moreover, when applied rigorously, the combination of methods may address the limitations of single-method approaches and provide better insight than either approach alone (Borglin, 2015). However, mixed-methods research should not be confused with research approaches where multiple forms of qualitative data are collected (for example, interviews and observations), or where qualitative data are simply added to a quantitative design. The defining characteristic of the design is that:

> '...the investigator gathers both quantitative (close-ended) and qualitative (open-ended) data, integrates the two, and then draws interpretations based on the combined strengths of both sets of data to understand research problems' (Creswell, 2015, p 2).

The influence of paradigms
Mixed-methods research requires skills in quantitative, qualitative and mixed methods. Therefore it is advisable to compose research teams whose members have different methodological orientations and experiences (O'Cathain, 2009; Creswell, 2015). However, these orientations are likely to be situated in different paradigms in terms of shared beliefs and methodologies (Kuhn, 1962). The paradigm shapes for its holder 'the nature of the "world", the individual's place in it, and the range of possible relationships to that world and its parts' (Guba and Lincoln, 2008, p 259). Consequently, mixed-methods and interdisciplinary research often take place in a social context of scholars sharing dissimilar conceptions of what constitute appropriate research questions, methods, procedures, and forms of interpretation and inference. Phoenix and colleagues (2013, p 219) maintain that a 'lack of shared vocabularies, attitudes, use of tools, and understanding between the different disciplines and subsequent methods' underpins many of the shortcomings or difficulties experienced in interdisciplinary work. Understanding the paradigm from which each researcher operates, therefore, is fundamental to enabling and optimising integration of research from different disciplines.

Prerequisites of well-functioning mixed-methods research teams

Several essential features of well-functioning teams have been described as important to achieve integrated research outcomes from mixed-methods healthcare research. The two most significant, according to O'Cathain and colleagues (2008 p 1574), are 'methodological respect' between team members, and a principal investigator who values 'methodological integration'. Additional factors that have been identified as important are:

- Teams that treat differences as assets rather than causes of conflict (O'Cathain et al., 2008; Stokols et al., 2008; Curry et al., 2012)
- Effective team communication (Stokols et al., 2008)
- The time- and resource-intensive nature of mixed-methods research (Curry et al., 2013)
- Appropriate contextual resources for each particular project (Kessel and Rosenfield, 2008)

For more information, please see mmira.wildapricot.org/.

Nevertheless, despite mixed-methods research being increasingly used and valued in healthcare services, more attention needs to be paid to the experiences of those who have used it (Fetters and Freshwater, 2015). The same applies to how such approaches can be undertaken and integrated in a productive manner within nursing and health services (Richards and Hallberg, 2015), as well as studies that offer details of the analysing processes and provide examples of how the different datasets have been and can be integrated (Borglin, 2015).

The study case reflected on in this article used a theory-informed, mixed-methods intervention design (Creswell, 2015), mixing methods situated in different paradigms. Details of the study and results have been published elsewhere (Øye et al., 2015, 2016, 2017; Testad et al., 2015; Jacobsen et al., 2017; Mekki et al., 2017). The study case and overall results are presented only briefly here because the main objective is to share the learning from a retrospective reflection on the advantages and challenges of conducting such research in a team with different methodological orientations and experiences. The retrospective reflection was prompted by the findings from the MEDCED study. Field notes from the first and last authors (TEM and CØ), as well as published advice and reports from experienced mixed-methods researchers were used in the reflection processes, which took place between the authors in three meetings, and several written comments and reflections during the drafting process of this article. The article concludes by sharing the authors' plans for implementing the lessons learned in future projects.

The MEDCED study case

The MEDCED study (Modelling and Evaluating eviDence-based Continuing Education programme in Dementia care) designed, conducted and evaluated an education intervention in 24 nursing homes in Norway between 2011 and 2015. The intervention aimed to help staff reduce the use of restraint in residents living with dementia (Mekki et al., 2017). The study built on a previous Norwegian trial that reported promising results (Testad, 2015), and was based on the principles of person-centred care (Dewing, 2008; McCormack and McCance, 2010) and theories of workplace learning (Billett, 2004; Eraut, 2012). Thus, the content and learning methods were designed to improve or change collective staff decisions by providing person-centred and confidence-building alternative measures. During a facilitated two-day seminar and six monthly coaching sessions, the care staff on the wards and their leaders were introduced to a seven-step decision-making model. The theory underlying the decision model had been tested in the previous trial (Testad, 2015), indicating that increased understanding of person-centred care, as well as dementia and agitation in persons living with dementia, would help staff to find alternatives to the use of restraint. Hence, the decision-making model and theoretical underpinnings were introduced during the seminars, while the coaching sessions aimed to facilitate the staff members' use of the model in collective reflection and decision making in their care of residents living with dementia.

Rationale for the choice of MEDCED research design

Research designs should be based on factors such as what researchers hope to accomplish, their backgrounds and skill levels, and the orientation toward designs found in their specific field and discipline (Creswell, 2015). A mixed-methods 'intervention design' was chosen (Creswell, 2015, p 44) combining a cluster-RCT with participatory action research (PAR) and ethnographic research, because the intent was to evaluate the effect of the intervention and to add qualitative data to study the influence of factors that helped or hindered implementation. A trial approach situated in a positivist paradigm was selected because it was felt the representational knowledge gained would be essential for strengthening the power to influence changes based on any potentially positive findings (Park, 2011; Fairbrother et al., 2015). A PAR design situated in a participatory worldview was selected (Reason and Bradbury, 2011) because it allowed for engaging four teams of eight co-researchers in the dual role of facilitating the intervention in 24 nursing homes and, simultaneously, collecting observational field notes from the implementation process as participant researchers. Ethnography was chosen, situated in an interpretive paradigm to depict organisational and cultural factors influencing how the staff acted on the education intervention. The PARiHS theoretical framework (Promoting Action into Research Implementation in Health Services, Kitson et al., 2008) was used prospectively to inform the study design and the analysing processes (Helfrich et al., 2010).

Composition of the research team

The multidisciplinary research team was composed of members with expertise in each of the chosen research methods: three nurse scientists, one sociologist, two social anthropologists and one cultural scientist, in addition to the facilitators acting as co-researchers. The eight facilitators were registered nurses with masters degrees.
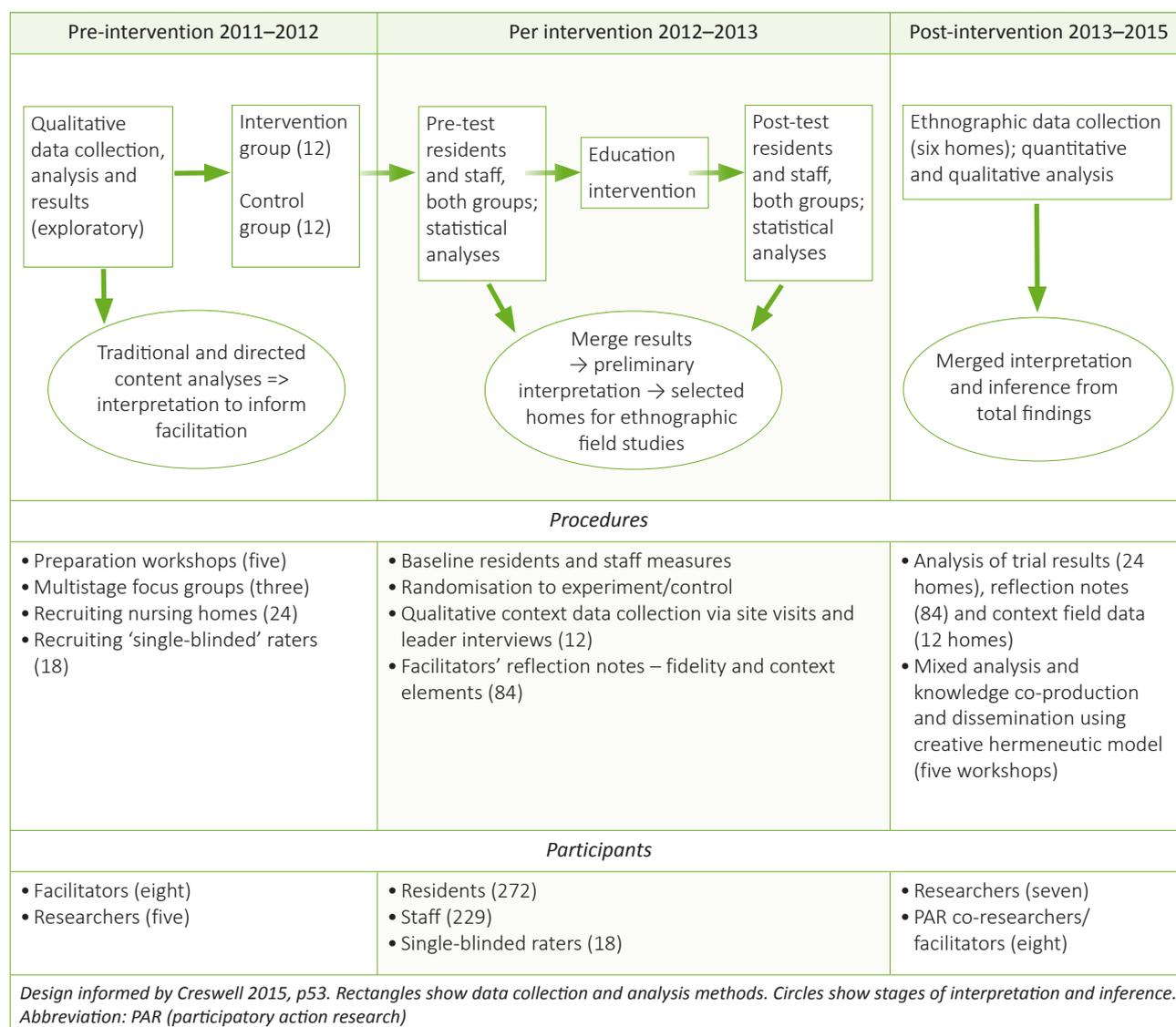
All team members agreed that the study hypotheses and research questions would require a methodological approach that combined qualitative and quantitative methods. However, the inherent paradigmatic challenges of mixing these methods were not addressed when the team was composed. Due to limited knowledge of the methodological discussions and development within the community of mixed-methods research scholars, neither were researchers with experience from methodological integration sought.

Nonetheless, despite being novices in mixed-methods research, all researchers were experienced and familiar with qualitative, quantitative and multimethod research. Three members had mainly applied quantitative methods connected to trial and survey designs, while the other five – among them TEM and CØ – had been involved in a wider range of implementation projects, including action research and ethnographic field studies within healthcare and education. TEM had main responsibility for the PAR study, and CØ for the ethnographic studies. The principle investigator had led several interdisciplinary projects and valued the potential of methodological integration. It was, however, the first time the principle investigator had headed a mixed-methods research project.

The MEDCED study design

As illustrated in the diagram (figure 1), the study was organised in pre-, per and post-intervention phases, between 2011 and 2015. Figure 1 displays an overview of how and when the methods and analysing approaches were mixed within each phase, as well as showing the procedures used and the number of participants.

Figure 1: The MEDCED intervention mixed-methods design

Pre-intervention 2011–2012	Per intervention 2012–2013	Post-intervention 2013–2015
Qualitative data collection, analysis and results (exploratory) → Intervention group (12) / Control group (12)	Pre-test residents and staff, both groups; statistical analyses → Education intervention → Post-test residents and staff, both groups; statistical analyses	Ethnographic data collection (six homes); quantitative and qualitative analysis
Traditional and directed content analyses => interpretation to inform facilitation	Merge results → preliminary interpretation → selected homes for ethnographic field studies	Merged interpretation and inference from total findings

Procedures		
• Preparation workshops (five) • Multistage focus groups (three) • Recruiting nursing homes (24) • Recruiting 'single-blinded' raters (18)	• Baseline residents and staff measures • Randomisation to experiment/control • Qualitative context data collection via site visits and leader interviews (12) • Facilitators' reflection notes – fidelity and context elements (84)	• Analysis of trial results (24 homes), reflection notes (84) and context field data (12 homes) • Mixed analysis and knowledge co-production and dissemination using creative hermeneutic model (five workshops)

Participants		
• Facilitators (eight) • Researchers (five)	• Residents (272) • Staff (229) • Single-blinded raters (18)	• Researchers (seven) • PAR co-researchers/ facilitators (eight)

Design informed by Creswell 2015, p53. Rectangles show data collection and analysis methods. Circles show stages of interpretation and inference. Abbreviation: PAR (participatory action research)

Pre-intervention (2011 -12) In addition to recruiting nursing homes and preparing the trial, facilitators and researchers engaged in a collaborative and participatory action approach during workshops and focus group interviews (Reason and Bradbury, 2011) to shape the facilitators' dual educator and co-researcher role. They also co-produced a template for registration of fidelity issues (WIDER, 2008) and observations related to the context elements of the PARiHS framework (leadership, culture and evaluation) (Kitson et al., 2008; Mekki et al., 2017).

Per intervention (2012-13) Single-blinded raters conducted pre- and post-intervention tests of residents and staff groups. In between, the facilitators simultaneously delivered the intervention (seminars and coaching), and collected observation data from each of the seminar and coaching sessions. Qualitative contextual data were collected via site visits and individual leader interviews. In addition, the researchers did statistical and preliminary content analyses.

Post-intervention (2013-15) The qualitative and quantitative datasets were analysed separately and thereafter merged during iterative rounds, where findings from the qualitative dataset raised questions that prompted new analyses of the quantitative dataset, and vice versa. Based on these findings, six homes were chosen for ethnographic field studies. Across these six, the ethnographers

performed field observations of activities, conduct, perceptions, events and interactions (320 hours) and individual open-ended interviews with staff and leaders (72 hours). Thereafter, facilitators and researchers used a creative knowledge co-production approach (Mekki et al., 2017), inspired by a creative hermeneutic co-analysing model (Boomer and McCormack, 2010), during five workshops to co-create knowledge from all datasets, with the aim of understanding the interaction, if any, between context and facilitation relative to the intervention effect.

Overall MEDCED results

The trial data revealed an unexpectedly low level of use of restraint in the nursing homes at baseline, measured as the rate of patients subjected to at least one means of restraint in the preceding week (Testad et al., 2015; Jacobsen et al., 2017). A statistically significant reduction in the use of restraint was found in all homes during the intervention despite this low baseline. Nevertheless, there was a tendency to a greater reduction in the control group than in the intervention group (Testad et al., 2015; Jacobsen et al., 2017). The mixing of cluster-RCT, PAR and ethnography methods, however, helped achieve a more comprehensible view of why restraint was reduced in some homes and not in others, even though the merged results identified an overall satisfaction with the intervention among staff across all homes (Øye et al., 2016, 2017). Moreover, the combination of structured facilitators' observations of education sessions and in-depth ethnographic follow-up studies provided more detailed insight into who acted on the knowledge gained from the intervention, as well as why and under what circumstances they did so (Bonell et al., 2012).

Reflecting on the advantages of mixing RCT, ethnography and participatory action research

When the trial findings showed that use of restraint was reduced, but not in all homes, and more so in the control group than in the intervention group (Testad et al., 2015), the advantage of mixing methods was obtaining different explanations for various elements of the education intervention. Unlike traditional exploratory ethnographic studies, and as demonstrated in the examples below, the chosen sequential mixed-methods design allowed the ethnographic researchers to build their observations in the nursing homes on preliminary analyses of data collected from the PAR and trial datasets. In line with Sherman and Strang's (2004) concept of 'experimental ethnography', it was found that the combination of ethnographic research and an RCT study provided a more complete explanation of the extent to which the MEDCED intervention worked. Thus, it contributed to an increased understanding of how complex dynamic and fluctuating nursing home conditions influenced the ability of the staff to instigate person-centred, restraint-free care. Several situations were identified where the social process of using the intervention knowledge were influenced by fluctuating contextual factors, such as staff culture, patient mix and milieu, as well as structural conditions.

These findings can be understood as a ball of clay that moulds itself differently when coming into contact with staff culture and their collective and individual experiences (Øye et al., 2015). Hence, the combination of methods could increase the understanding of the processes embedded within the implementation 'black box' (Hoagwood et al., 2013).

Mixing methods offered complementary but invariably distinct insights

Related to the baseline findings of low use of restraint, the qualitative dataset identified that before or during the intervention period, all homes had participated in one or more national training programme. The Norwegian health authorities initiated these programmes as a follow-up to a change in the Patient Rights Act governing the use of restraint for people lacking cognitive capacity (Norwegian Ministry of Health and Care Services, 2009).

Likewise, the qualitative findings added contextual information that illuminated the greater reduction in the use of restraint in the control group. For the 12 nursing homes in the intervention group, the ethnographic and PAR studies showed that staff reported an increased level of awareness after participation in the education intervention, thereby providing more solid arguments for or against the use of restraint in each situation they discussed. Recordings in the facilitators' reflection notes

showed that 92 situations of restraint were discussed in the coaching groups, from a total of 72 sessions. Of these, 37 (41.1 %) concerned assisting patients with personal hygiene and clothing, while 17 (18.9 %) involved physical detention and physically removing agitated patients from situations of actual or potential conflict with other patients (Mekki, 2015). However, the findings revealed that the staff sometimes found it difficult to discriminate correctly between restraint as defined in the Patient Rights Act (Norwegian Department of Health, 2009) – for example, removing a patient from a situation against his/her will or locking doors to prevent patients from going out – and what they saw as 'necessary .... non-restraint actions' justified to prevent patients from hurting themselves or others. After facilitated reflection during coaching sessions, several situations were identified when staff realised that their initial description of a difficult situation as 'not including restraint' fell within the Act's restraint definition. This was the case in two of four homes in the intervention group that had reported zero restraint cases at baseline (Mekki et al., 2017).

Moreover, the trial design's fidelity and rigour issues prompted more systematic recording of the quantitative characteristics of relevance to education interventions than would have been done if the recommendations for reporting behavioural change trials (WIDER, 2008) had not been followed. The degree of delivering the intervention according to the protocol was determined by the facilitators' recording of traits such as the number and characteristics of attendants and other fidelity issues at each education session. Descriptive analysis of these recordings pointed to a connection between leadership presence and the number of staff attending coaching sessions, and how this in turn affected the degree of follow-up between coaching sessions (Øye et al., 2016; Mekki et al., 2017).

The PAR study showed that the active involvement of the leader enhanced the use of the decision-making model in practice, and this connection was further illuminated by the ethnographic study identifying how different leadership styles influenced the degree to which the staff acted on shared decisions (Mekki et al., 2017). These qualitative findings led to additional regression analysis of staff trial data, finding that respondents who evaluated their leaders as 'open and inclusive' were most likely to think their institution was committed to person-centred care after having participated in the education intervention (Jacobsen et al., 2017).

Reflecting on the discrepancies between qualitative and quantitative findings
The mixing of methods allowed plausible explanations of discrepancies between the qualitative and quantitative datasets (O'Cathain, 2009). For example, why the reduction in restraint remained relatively small compared with staff survey results indicating that they had changed their attitudes and inclination towards finding solutions that could avoid or reduce use of restraint.

The ethnographic study showed that contextual factors such as staff culture, resident mix, milieu and location could partly explain how the staff acted on the intervention knowledge and the use of restraint (Øye et al., 2017). For instance, in one nursing home located in a rural area the residents could walk freely inside and outside of the building, so the staff did not have to worry about dangers such as traffic or getting lost. In contrast, in another nursing home with a highway close by, the contextual conditions promoted the use of restraint to protect wandering residents – despite improved staff knowledge and attitudes. The staff rightly feared that the heavy traffic put residents living with dementia at risk if the staff-patient ratio did not allow residents to be accompanied on a walk.

Moreover, at the time of the ethnographic study one nursing home had difficulties in using the decision-making model to find an alternative to restraint. Despite skills and motivation, a lack of staff resources alongside a challenging mix of residents meant they were not able to meet and collectively discuss restraint-reducing alternatives. Therefore, the ethnographic study illuminated how the diverse contextual circumstances at different times dictated the uptake of the intervention knowledge. This could partly explain the discrepancies between the staff's reported knowledge and inclination to reduce restraint, and the quantitative findings showing little or no change from baseline measures in particular homes.

Revision and further development of instruments and framework
The findings from the ethnographic study were also able to contribute to revising the quantitative data on the use of restraint (Øye et al., 2017). In one nursing home where the quantitative data indicated a low occurrence of restraint, the ethnographic study showed the home employed other types of restraint, such as isolation of patients with agitated behaviour, which were not captured by the quantitative instrument. Moreover, the mixed design facilitated studies of how different contextual elements interacted with facilitation relative to the identified trial outcomes, thereby suggesting ways to develop the PARiHS implementation framework further (Pentland et al., 2011; Mekki et al., 2017).

In conclusion, when reflecting retrospectively on the above-mentioned elements, the advantage of the mixed-methods intervention design was that it provided a richer and more contextualised understanding of how dynamic and fluctuating factors influenced the degree of falsification of the trial hypotheses.

Reflecting on challenges arising when mixing RCT, ethnography and participatory action research
The main challenge of combining RCT, ethnography and PAR occurred in discussions of methodological approaches and decisions about when, where, and how mixing of the trial and ethnographic research could and should happen. As different research actors, the team members were anchored in different paradigms that influenced their ways of viewing and understanding the world of research. Consequently, their stances on the best way to produce valid and useful knowledge from the intervention differed, as did their views on how to mix methods during the course of the study. The team members were not familiar with the scholarly debates within the mixed-methods research community. When reflecting on these, in hindsight, our team experiences validate the value and importance of these debates.

Reflecting on how paradigmatic differences influenced team collaboration
The team did not prioritise time to debate our philosophical and methodological positions, despite the suggestion that this would increase the likelihood of differences being treated as assets rather than causes of conflict (Kessel and Rosenfield, 2008; Curry et al., 2013). Nor were extra collaboration time and resources allocated. When the team encountered group challenges, these were mostly treated as the 'forming, storming, norming, and performing phases' that all new teams experience (Tuckman, 1965). However, by being too pragmatic, the actual paradigmatic influences were underestimated. In agreement with Maxwell and Mittapalli (2010), the team has learned that such differences should be embraced rather than corrected. As argued by several scholars (Guba and Lincoln, 2008; O'Cathain et al., 2008; Alise and Teddlie, 2010; Mertens, 2012), the differences and tensions the team experienced when combining qualitative and quantitative methods were generated by variations in paradigms, which challenged our reciprocal 'methodological respect' (O'Cathain et al., 2008). They were not related merely to practical and personal collaboration challenges. For instance, when the ethnographers in the MEDCED team wanted to perform ethnographic field studies of the contextual and structural mechanisms during the intervention, their arguments were opposed by positivist researchers, who considered that the falsification of the effect hypotheses was the most important aspect of the study. Consequently, the quantitative researchers argued to minimise the number of known and unknown factors that could influence and/or confound the outcomes. Hence, reducing the number of factors involved in the trial was given priority, rather than the overall aims of the mixed research questions. One of the consequences was that the ethnographic field studies were not performed before the post-intervention ratings were obtained.

Team communication and methodological respect
Despite the suggestions from experienced scholars, no priority was given to discussing issues related to communication and methodological respect between the team members (O'Cathain et al., 2008; Stokols et al., 2008). In face-to-face meetings, the team concentrated on solving all the practical issues of getting the research project up and running. In the first meeting, when disagreements and conflicting discussions occurred over how the study should be planned and performed, the team was

unprepared and stressed because of time constraints. The atmosphere was tense, and increasingly so because the team did not openly challenge actions and comments that some persons interpreted as implying a lack of respect. Instead of taking time out to ask for clarifications, the teambuilding process was hampered by unproductive individual interpretations that were only partly discussed within the quantitative and qualitative subgroups.

For instance, some members disengaged from the team discussions of methodological issues they were less familiar with, and instead openly checked their emails. Nor was the inappropriate use of words challenged, for example when qualitative approaches were labelled as 'all the nice things' that could be discussed after the trial had been planned and organised, and the trial was referred to as 'the hard work' or the 'core business'. Unfortunately, when this happened in first meeting of the whole team, there was no time to address it. Priority was therefore given to harmony and practicality. In hindsight, and based on experiences shared by other mixed-methods scholars, this represented a lost opportunity to discuss methodological respect and team communication. Likewise, the decision to prioritise planning of all the trial details left insufficient time to explore the pros and cons of other potential mixed-intervention design options (Creswell, 2015).

Discussions of lessons learned
Conducting mixed-methods research in a multidisciplinary team was challenging. However, our foremost learning is that the richness and power of the outcomes made the struggle worthwhile, particularly due to better insight into the implementation process. By systematically reflecting on both the MEDCED study findings and on TEM and CØ's field notes during the lifetime of the project, it was identified that the qualitative and quantitative datasets together enabled insight into the complex and reciprocal interaction between the staff's skills and motivation to provide person-centred and restraint-free care on the one hand, and on the other the limits of the contextual conditions imposed by the organisation in terms of time, patient mix and staffing levels. Among the contextual elements, the interplay between leadership and staff culture was found to be the most important factor affecting implementation (Mekki et al., 2017).

Furthermore, the retrospective reflection has revealed that the challenges of mixed-methods research can be reduced by paying attention to advice and experience from previous conductors of such research (O'Cathain et al., 2008; Curry et al., 2012). As suggested by such scholars, an important lesson is to allocate time to discuss the potential differences in values, underlying philosophical and epistemological assumptions and frameworks related to the choices of mixed-methods research design (Stokols et al., 2008; Johnson and Gray, 2010). A 'values clarification exercise' (Manley et al., 2013) among the team members could have been useful in this respect, not only to avoid time-consuming disputes, but more importantly to prepare the team to expect disagreements and cherish the added gains that conflicting views may provoke. Thus, it is important to highlight and respect that 'methods don't make assumptions, researchers do' (Bonell et al., 2013, p 124). Regrettably, by not addressing the underlying notions of ontology and epistemology, our discussions tended to revolve around what could or could not be 'allowed' to prevent the trial data from being confounded. Instead, the team should have discussed the different choices of what could be done, by whom and when, in terms of suitability relative to the research questions and the end users of the knowledge gained. Accordingly, a key challenge is determining the appropriate level of strictness and rigour in the trial design. The PARiHS mid-level theory (Kitson et al., 2008) could have been used in our case to discriminate between the elements in the trial that had to remain fixed and those that could be flexible and adjusted to the contextual mechanisms and outcome configurations in different nursing homes (Biesta, 2010; Bonell et al., 2012; Pawson, 2013).

In future mixed-methods research projects, this knowledge can be transferred to create a shared paradigmatic model consisting of the underlying worldviews connected to the applied methods. This shared model can be used to guide the research process and choice of research designs, helping to obtain pragmatic solutions, as suggested by other scholars (Hart et al., 2005; Phoenix et al., 2013). Likewise, it can be used to focus on the purpose of the research, given that the wider aims of the study should guide the research, rather than epistemological questions related to a 'world-mind scheme' framing discussions of the relative importance between quantitative and qualitative methods (Biesta, 2010, p 211). The lessons learned from reflecting on the MEDCED study echo Biesta (2010), in that looking separately at each element – such as data, methods, design, epistemology, ontology, research aims and group dynamics – might have made it possible to identify with greater precision whether the different aspects involved in the mixed research were potentially problematic. Moreover, it could have helped to identify specific areas requiring further attention, such as details of the research design and the optimal way of mixing the applied methods. Starting the collaboration with a values clarification exercise (Manley et al., 2013), and constructing a paradigmatic model based on a common platform of understanding and methodological respect could have minimised frustrating and unproductive discussions, resulting in a better and more innovative intervention design. A shared model would also have made it easier throughout the course of a long-term mixed-methods study to discuss available choices with respect to the overall intervention purpose, rather than what 'can and cannot be allowed' in terms of the rigour and rules of a trial.

Conclusions
Retrospective reflection on experiences from a mixed-methods research study that combined cluster-RCT, PAR and ethnography shows that the mix of methods used proved successful in providing insight into the dynamic interplay of shifting contextual conditions, and how these influenced both facilitation and impact of an education intervention in nursing homes. The multitude of qualitative data enriched the causal explanations derived from the trial findings and enabled the researchers to engage with stakeholders in policy discussions and provide explanatory contextual illuminations of how the implementation succeeded or failed in different nursing homes. However, caution is advised when providing recommendations to policymakers who wish to adapt a seemingly successful education intervention, because of the complexity of the interrelated contextual factors that can impact on success. The findings lend support to the value of context assessment as starting point for interventions and practice development, followed by facilitated actions tailored to the complex and shifting contexts that characterise the everyday lives of those living and working in nursing homes.

Nevertheless, it was found that this mixed intervention design could identify patterns of factors that promoted and hindered implementation, thereby highlighting promising practices and plausible explanations based on dynamic interactions between context and the implemented knowledge. The complementary findings from the qualitative and quantitative studies made it possible to engage more productively with the stakeholders and relate the interpretations of the findings to their particular contexts. It remains the case however, that it was difficult to discern general criteria for success and failure because what worked as a factor promoting implementation in one nursing home might not do so for another. Therefore, there are further lessons to be learned when mixing RCT with PAR and ethnography methods to evaluate the success, failure, or mixed outcomes of implementation and practice development activities in healthcare services. It is suggested that the learning process will improve if multidisciplinary teams build on existing guidelines for conducting and reporting mixed studies when composing their teams, and include strategies created and used in practice development. Future mixed-methods research projects can be strengthened by an initial values clarification exercise, followed by co-creating a paradigmatic model based on the research teams' ontological and epistemological understanding. Thus, the model can promote research rigour while seeking pragmatic solutions related to the different elements and dimensions involved in evidence-informed practice development endeavours.

References

Alise, M. and Teddlie, C. (2010) A continuation of the paradigm wars? Prevalence rates of methodological approaches across the social/behavioral sciences. *Journal of Mixed Methods Research.* Vol. 4. No. 2. pp 103-126. https://doi.org/10.1177/1558689809360805.

Biesta, G. (2010) Pragmatism and the philsophical foundation of mixed methods research. Chp 4 *in* Tashakkori, A. and Teddlie, C. (2010) (Eds.) *SAGE Handbook of Mixed Methods in Social and Behavioral Research. (*2ⁿᵈ edition). Thousand Oaks, US: Sage. pp 95-118.

Billett, S. (2004) Learning through work: workplace participatory practices. Chp 7 *in* Rainbird, H., Fuller, A. and Munro, A. (2014) (Eds.) *Workplace Learning in Context.* London and New York: Routledge. pp 109-126.

Bonell, C., Fletcher, A., Morton, M., Lorenc, T. and Moore, L. (2012) Realist randomised controlled trials: a new approach to evaluating complex public health interventions. *Social Science and Medicine.* Vol. 75. No. 12. pp 2299-2306. https://doi.org/10.1016/j.socscimed.2012.08.032.

Bonell, C., Fletcher, A., Morton, M., Lorenc, T. and Moore, L. (2013) Methods don't make assumptions, researchers do: a response to Marchal et al. *Social Science and Medicine*. Vol. 94. October. pp 81-82. https://doi.org/10.1016/j.socscimed.2013.06.026.

Boomer, C. and McCormack, B. (2010) Creating the conditions for growth: a collaborative practice development programme for clinical nurse leaders. *Journal of Nursing Management.* Vol. 18. No. 6. pp 633-644. https://doi.org/10.1111/j.1365-2834.2010.01143.x.

Borglin, G. (2015) The value of mixed methods for researching complex interventions. Chp 3 *in* Hallberg, I. (2015) (Ed.) *Complex Interventions in Health: An Overview of Research Methods.* Oxford: Routledge. pp 29-45.

Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I. and Petticrew, M. (2008) Developing and evaluating complex interventions: the new Medical Research Council guidance. Retrieved from: tinyurl.com/complex-MRC (Last accessed 6ᵗʰ September 2014).

Creswell, J. (2015) *A Concise Introduction to Mixed Methods Research.* Thousand Oaks, US: Sage.

Curry, L., O'Cathain, A., Clark, V., Aroni, R., Fetters, M. and Berg, D. (2012) The role of group dynamics in mixed methods health sciences research teams. *Journal of Mixed Methods Research.* Vol. 6. No. 1. pp 5-20. https://doi.org/10.1177/1558689811416941.

Curry, L., Krumholz, H., O'Cathain, A., Clark, V., Cherlin, E. and Bradley, E. (2013) Mixed methods in biomedical and health services research. *Circulation: Cardiovascular Quality and Outcomes.* Vol. 6. No. 1. pp 119-123. https://doi.org/10.1161/CIRCOUTCOMES.112.967885.

Dewing, J. (2008) Personhood and dementia: revisiting Tom Kitwood's ideas. *International Journal of Older Peoples Nursing.* Vol. 3. No. 1. pp 3-13. https://doi.org/10.1111/j.1748-3743.2007.00103.x.

Eraut, M. (2012) Developing a broader approach to professional learning. Chp 2 *in* McKee, A. and Eraut, M. (2012) (Eds.) *Learning Trajectories, Innovation and Identity for Professional Development.* Dordrecht, Netherlands: Springer. pp 21-46.

Fairbrother, G., Cashin, A., Mekki, T., Graham, I. and McCormack, B. (2015) Is it possible to bring the emancipatory practice development and evidence-based practice agendas together in nursing and midwifery? *International Practice Development Journal.* Vol. 5. No. 1. Article 4. pp 1-11. Retrieved from: fons.org/library/journal/volume5-issue1/article4 (Last accessed 18ᵗʰ September 2018).

Fetters, M. and Freshwater, D. (2015) Publishing a methodological mixed methods research article. *Journal of Mixed Methods Research.* Vol. 9. No. 3. pp 203-213. https://doi.org/10.1177/1558689815594687.

Guba, E. and Lincoln, Y. (2008) Pardigmatic controversies, contradictions and emerging confluences. Chp 8 *in* Lincoln, Y. and Denzin, N. (2008) (Eds.) *The Landscape of Qualitative Research.* (3ʳᵈ edition). Thousand Oaks, US: Sage. pp 255-286.

Hardy, S., Wilson, V. and McCance, T. (2013) Evaluation approaches for practice development: contemporary perspectives. Chp 9 *in* McCormack, B., Manley, K. and Titchen, A. (2013) (Eds.) *Practice Development in Nursing and Healthcare.* Chichester, UK: Wiley-Blackwell. pp 169-189.

Hart, E., Lymbery, M. and Gladman, J. (2005) Methodological understandings and misunderstandings in interprofessional research: experiences of researching transitional rehabilitation for older people. *Journal of Interprofessional Care*. Vol. 19. No. 6. pp 614-623. https://doi.

org/10.1080/13561820500215152.

Helfrich, C., Damschroder, L., Hagedorn, H., Daggett, G., Sahay, A., Ritchie, M., Damush, T., Guihan, M., Ullrich, P. and Stetler, C. (2010) A critical synthesis of literature on the Promoting Action on Research Implementation in Health Services (PARiHS) framework. *Implementation Science.* Vol. 5. Article 82. https://doi.org/10.1186/1748-5908-5-82.

Hoagwood, K., Atkins, M. and Ialongo, N. (2013) Unpacking the black box of implementation: the next generation for policy, research and practice. *Administration and Policy in Mental Health and Mental Health Services Research.* Vol. 40. No. 6. pp 451-455. https://doi.org/10.1007/s10488-013-0512-6.

Jacobsen, F., Mekki, T., Førland, O., Folkestad, B., Kirkevold, Ø., Skår, R., Tveit, E. and Øye, C. (2017) A mixed method study of an education intervention to reduce use of restraint and implement person-centered dementia care in nursing homes. *BMC Nursing.* Vol. 16. Article 55. https://doi.org/10.1186/s12912-017-0244-0.

Johnson, B. and Gray, R. (2010) A history of philosophical and theoretical issues for mixed methods research. Chp 3 *in* Tashakkori, A. and Teddlie, C. (2010) (Eds.) *SAGE Handbook of Mixed Methods in Social and Behavioral Research.* (2nd edition). Thousand Oaks, US: Sage. pp 69-94.

Kessel, F. and Rosenfield, P. (2008) Toward transdisciplinary research: historical and contemporary perspectives. *American Journal of Preventive Medicine.* Vol. 35. No. 2. Suppl. pp S225-S234. https://doi.org/10.1016/j.amepre.2008.05.005.

Kitson, A., Rycroft-Malone, J., Harvey, G., McCormack, B., Seers, K. and Titchen, A. (2008) Evaluating the successful implementation of evidence into practice using the PARiHS framework: theoretical and practical challenges. *Implementation Science.* Vol. 3. Article 1. https://doi.org/10.1186/1748-5908-3-1.

Kuhn, T. (1962) *The Structure of Scientific Revolutions.* Chicago: University of Chicago Press.

Manley, K., Tichen, A. and McCormack, B. (2013) What is practice development and what are the starting points? Chp 3 *in* McCormack, B., Manley, K. and Titchen, A. (2013) (Eds.) *Practice Development in Nursing and Healthcare.* Chichester, UK: Wiley-Blackwell. pp 45-65.

Marchal, B., Westhorp, G., Wong, G., van Belle, S., Greenhalgh, T., Kegels, G. and Pawson, R. (2013) Realist RCTs of complex interventions – an oxymoron. *Social Science and Medicine.* Vol. 94. No. 1. pp 124-128. https://doi.org/10.1016/j.socscimed.2013.06.025.

Maxwell, J. and Mittapalli, K. (2010) Realism as a stance for mixed method research. Chp 6 *in* Tashakkori, A. and Teddlie, C. (2010) (Eds.) *SAGE Handbook of Mixed Methods in Social and Behavioral Research.* (2nd edition). Thousand Oaks, US: Sage. pp 145-168.

McCormack, B. and McCance, T. (2010) *Person-centred Nursing. Theory and Practice.* Oxford: Wiley-Blackwell.

McCormack, B. (2015) Action research for the implementation of complex interventions. Chp 31 *in* Richards, D. and Hallberg, I. (Eds.) (2015) *Complex Interventions in Health: An Overview of Research Methods.* Oxford: Routledge.

Mekki, T. (2015) *How do Characteristics of Context Influence the Work of Facilitators when Implementing a Standardised Education Intervention Targeting Nursing Home Staff to Reduce Use of Restraint in Dementia Care?* PhD Nursing Science. Edinburgh: Queen Margaret University.

Mekki, T., Øye, C., Kristensen, B., Dahl, H., Haaland, A., Nordin, K., Strandos, M., Terum, T., Ydstebø, A. and McCormack, B. (2017) The interplay between facilitation and context in the Promoting Action on Research Implementation in Health Services framework: a qualitative exploratory implementation study embedded in a cluster randomised controlled trial to reduce restraint in nursing homes. *Journal of Advanced Nursing*. Vol. 73. No. 11. pp 2622-2632. https://doi.org/10.1111/jan.13340.

Mertens, D. (2012) What comes first? The paradigm or the approach? *Journal of Mixed Methods Research.* Vol. 6. No. 4. pp 255-257. https://doi.org/10.1177/1558689812461574.

Nilsen, P. (2015) Making sense of implementation theories, models and frameworks. *Implementation Science.* Vol. 10. Article 53. https://doi.org/10.1186/s13012-015-0242-0.

Norwegian Ministry of Health and Care Services (2009) Chp 4A *in Pasientrettighetsloven* (*Patients' Rights Act*). Retrieved from: tinyurl.com/Norway-patients-rights. Oslo: Department of Health. (Last accessed 18th September 2018).

O'Cathain, A. (2009) Editorial: mixed methods research in the health sciences: a quiet revolution. *Journal*

of Mixed Methods Research. Vol. 3. No. 1. pp 3-6. https://doi.org/10.1177/1558689808326272.

O'Cathain, A., Murphy, E. and Nicholl, J. (2008) Multidisciplinary, interdisciplinary, or dysfunctional? Team working in mixed-methods research. *Qualitative Health Research.* Vol. 18. No. 11. pp 1574-1585. https://doi.org/10.1177/1049732308325535.

Øye, C., Mekki, T., Skaar, R., Dahl, H., Forland, O. and Jacobsen, F. (2015) Evidence molded by contact with staff culture and patient milieu: an analysis of the social process of knowledge utilization in nursing homes. *Vocations and Learning.* Vol. 8. No. 3. pp 319-334.

Øye, C., Mekki, T., Jacobsen, F. and Førland, O. (2016) Facilitating change from a distance – a story of success? A discussion on leaders' styles in facilitating change in four nursing homes in Norway. *Journal of Nursing Management*. Vol. 24**.** No. 6. pp 745-754. https://doi.org/10.1111/jonm.12378.

Øye, C., Jacobsen, F. and Mekki, T. (2017) Do organisational constraints explain the use of restraint? A comparative ethnographic study from three nursing homes in Norway. *Journal of Clinical Nursing.* Vol. 26. Nos. 13-14. pp 1906-1916. https://doi.org/10.1111/jocn.13504.

Park, P. (2011) Knowledge and participatory research. Chp 7 *in* Reason, P. and Bradbury, H. (Eds.) (2011) *The Handbook of Action Research.* (concise paperback edition). Thousand Oaks, US: Sage. pp 83-94.

Pawson, R. (2013) *The Science of Evaluation: A Realist Manifesto.* Thousand Oaks, US: Sage.

Pentland, D., Forsyth, K., Maciver, D., Walsh, M., Murray, R., Irvine, L. and Sikora, S. (2011) Key characteristics of knowledge transfer and exchange in healthcare: integrative literature review. *Journal of Advanced Nursing.* Vol. 67. No. 7. pp 1408-1425. https://doi.org/10.1111/j.1365-2648.2011.05631.x.

Phoenix, C., Osborne, N., Redshaw, C., Moran, R., Stahl-Timmins, W., Depledge, M., Fleming, L. and Wheeler, B. (2013) Paradigmatic approaches to studying environment and human health: (forgotten) implications for interdisciplinary research. *Environmental Science and Policy*. Vol. 25. pp 218-228. https://doi.org/10.1016/j.envsci.2012.10.015.

Reason, P. and Bradbury, H. (Eds.) (2011) *The Handbook of Action Research.* (concise paperback edition). Thousand Oaks, California: Sage.

Richards, D. and Hallberg, I. (Eds.) (2015) *Complex Interventions in Health: An Overview of Research Methods.* London: Routledge.

Sherman, L. and Strang, H. (2004) Experimental ethnography: the marriage of qualitative and quantitative research. *The Annals of the American Academy of Political and Social Science.* Vol. 595. No. 1. pp 204-222. https://doi.org/10.1177/0002716204267481.

Stokols, D., Hall, K., Taylor, B. and Moser, R. (2008) The science of team science: overview of the field and introduction to the supplement. *American Journal of Preventive Medicine.* Vol. 35. No. 2. Suppl. pp S77-S89. https://doi.org/10.1016/j.amepre.2008.05.002.

Testad, I., Mekki, T., Førland, O., Øye, C., Tveit, E., Jacobsen, F. and Kirkevold, Ø. (2015) Modeling and evaluating evidence-based continuing education program in nursing home dementia care (MEDCED): training of care home staff to reduce use of restraint in care home residents with dementia. A cluster randomized controlled trial. *International Journal of Geriatric Psychiatry*. Vol. 31. No. 1. pp 24-32. https://doi.org/10.1002/gps.4285.

Tuckman, B. (1965) Developmental sequence in small groups. *Psychological Bulletin.* Vol. 63. No. 6. pp 384-399. http://dx.doi.org/10.1037/h0022100.

WIDER (2008) *WIDER Recommendations to Improve Reporting of the Content of Behaviour Change Interventions*. Retrieved from: tinyurl.com/WIDER-interventions (Last accessed 6th September 2014).

Tone Elin Mekki (PhD, RN), Associate Professor, Western Norway University of Applied Sciences, Center for Care Research, Bergen, Norway.
Ingalill Rahm Hallberg (PhD, RN, STTI Member), Professor, The Pufendorf Institute, Lund University, Lund, Sweden.
Christine Øye (PhD), Professor, Western Norway University of Applied Sciences, Center for Care Research, Bergen, Norway.