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Supporting the use of theory in cross-country health services research: Normalisation Process Theory as an example

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Abstract

Objectives: To describe and reflect on the process of designing and delivering a training programme supporting the use of a theoretical framework, Normalisation Process Theory (NPT), in a multi-site health services research study.

Design: Participatory research approach utilising qualitative methods.

Setting: Six European primary care settings involving research teams from Austria, England, Greece, Ireland, The Netherlands and Scotland.

Participants: RESTORE research team consisting 8 project applicants, all senior primary care academics; 10 researchers. Professional backgrounds included 7 academic general practitioners; 4 social/cultural anthropologists; 4 sociologists; 3 health services/primary care researchers.

Primary outcome measures: Views of research team assessed using qualitative evaluation methods, analysed thematically by the trainers after each session.

Results: Most of the team had no experience of using NPT and many had not applied a theoretical framework to prospective, qualitative projects. Early training proved didactic and overloaded participants with information. Drawing on the methodological approach Participatory Learning and Action, workshops using role play, experiential interactive exercises and light-hearted examples not directly related to the study subject matter were developed. Evaluation showed the study team quickly grew in knowledge and confidence in applying theory to fieldwork.

Recommendations applicable to other studies include: accepting that theory application is not a linear process; that time is needed to address researcher concerns with the process; and that experiential, interactive learning is a key device in building conceptual and practical knowledge. An unanticipated benefit was the smooth transition to cross-country qualitative coding of study data.

Conclusion A structured programme of training enhanced and supported the prospective application of a theory, NPT, to our work, but raised challenges. These were not unique to NPT, but

could arise with any theoretical framework, especially in large multi-site projects. The lessons learned could be applied by future research teams carrying out other theoretically-informed studies.

Keywords

Theory; Health services research; Training; Normalisation Process Theory.

Strengths and Limitations

The use of theory in health services research can increase the validity and rigor of the research being conducted.

There is a lack of explicit guidance and materials to help researchers apply theory to health services research projects.

This is a particular issue when the research is based across multiple countries with different languages and cultural understandings of the theoretical constructs being described.

The experience of clinical and non-clinical researchers were utilised to inform the on-going development of training to enhance the use of NPT.

The lessons learned are generic and can be applied to the development of training to support other theoretical frameworks.

Introduction

Bridging the research to practice gap is a recognised problem in health services research.[1 2] One important solution is to underpin such research with strong theoretical approaches.[1 3 4] Advantages include providing a framework that is generalizable across settings and individuals; incremental generation of knowledge; and a guide for analysis.[3 5 6] Theory can also enhance our understanding of the barriers to research translation and implementation and alert us to the context into which new interventions and services are placed. [6-9] However, many interventions and services are implemented with little or no attention to theory.[3 5] When theoretical frameworks are used, they often guide analysis rather than inform the design and conduct of the overall study.[5 10 11] This may be due, in part, to some recognised challenges in applying theory to health services research.

Challenges in using theory in health services research

The first challenge is a lack of conceptual clarity as to what a "theory" is. MacDonald describes theory as "an organized, heuristic, coherent, and systematic articulation of a set of statements related to significant questions ……. providing a generalizable form of understanding".[12] There are three recognised levels of "theory". Grand theory is abstract and broadly applicable across different areas and subjects.[6 12 13]. The next level – mid-range or "big theory" – is less abstract, addressing specific phenomena and concepts that can be incorporated into testable propositions or questions and inform intervention development.[6 12] The third level, programme theory, is often considered as "small" theory, specifying particular components of an intervention in logic models and explicitly linking a programme's processes and inputs to its intended outcomes.[6 14]

The second challenge is to decide which theory best informs the work being conducted. For example, theory can focus on: explaining individual behaviours and responses (e.g. Theory of Planned Behaviour); understanding organisational responses (e.g. Diffusion of Innovation); dissemination (e.g. Streams of Policy Process); or implementation (e.g. Promoting Action on

Research Implementation in Health Services or PARIHS).[15] While theoretical choice is informed by the research, the disciplinary composition and background of the research team is also influential.[16] [17] Health services research is often multidisciplinary and draws on many fields including sociology, psychology, biostatistics, health economics and clinical disciplines. This requires teams to understand and respect each other's theoretical and paradigmatic positions.[3] The final challenge is a lack of guidance in applying theory to studies.[7] [18]

The application of theory in practice

Consideration has been given to how research teams could apply theory in practice. For example, the Reach, Effectiveness, Adoption, Implementation and Maintenance (RE-AIM) framework was developed for use in the evaluation of public health programmes and interventions but is now widely applied.[19] [20] RE-AIM focuses researchers' attention on: population reach; the intervention's adoption, implementation and effectiveness; and, finally, on its maintenance in practice.[20] The developers of Re-AIM have released training and support for other researchers (http://www.re-aim.hnfe.vt.edu/). However, even with such training available, it is not always applied consistently. Gaglio identified 71 papers published between 1999-2010 that used RE-AIM;[20] of these, "reach" was the most frequently reported dimension, with "maintenance" reported least often. There was also variation in the reporting of the individual components of each construct. Most reporting was quantitative, with little qualitative research to explore how components were used or understood.

Similar results were reported for the PARIHS framework, which describes several interacting components including clinical and patient experience; local context; culture and leadership; and facilitation.[21] Again, there was variation in its use across studies, with a lack of detail on the application of different sub-components to fieldwork.[18] [22] Two other reviews examined the application of the Knowledge to Action (KTA) Framework[23] and Normalisation Process Theory[24] to implementation studies. In both, the authors found stability in the application of the high level

constructs across studies but, again, variation in researchers' attention to the sub-constructs of each. This lack of "theory fidelity" has been raised in other fields, notably health promotion.[23 25]

Translating the constructs of a chosen theory into interventions can be challenging, especially when applied across multiple research sites.[5 7 23] Research teams must be comfortable and aligned with the use of the selected theory and in agreement about the meaning and application of its individual components or constructs. Such challenges are enhanced when teams are working in different settings, countries and across language as construct understanding and implementation are likely to be both culturally and context-dependent. This mirrors challenges identified in conducting qualitative research across different settings.[26] These challenges faced the EU-funded RESTORE project, a multi-site implementation study across six European countries (Box 1).[27] Focussed on cross-cultural communication in primary care, the design and analysis of RESTORE was underpinned throughout by a recognised theoretical framework - Normalisation Process Theory (NPT). However, the application of theory to a research study was a new concept for many members of the team. As a result, we had to develop a training programme to familiarise and support the team in this process.

Box 1. Description of the RESTORE project.[27]

RESTORE (REsearch into implementation **ST**rategies to support patients of different **OR**igins and language background) was focussed on the implementation of guidance and training initiatives to support cross-cultural consultations in primary care for vulnerable migrant populations: asylum seeking and refugee populations; migrants in low paid employment; and undocumented migrants.[27] [28] Funded by the EU FP7 Programme, RESTORE aimed to bridge the research-practice gap by collecting empirical data on the selection, co-design and implementation of such interventions in five European primary care settings: Austria, England, Greece, Ireland, and the Netherlands. A sixth partner, Scotland, focused on the policy environment and the health systems of participating countries.[29]

RESTORE used a participatory research approach – Participatory Learning and Action (PLA) – as its over-arching methodological approach, generating rich, in-depth qualitative data.[27] [30] This involved a range of stakeholders including primary care practitioners, migrant service users, community interpreters and policy makers. To shape the study approach, facilitate data collection and guide the analysis, a theoretical framework was essential; for this, we selected Normalisation Process Theory (NPT).

Here, we describe and reflect on the process of designing training in the use of a theoretical framework in a multi-site research project. This training aimed to: (i) enhance the team's conceptual clarity about using theory; and (ii) ensure its operationalisation in a consistent and rigorous way across settings and languages. We discuss the challenges this brought, as well as the benefits. Finally, we make recommendations that could be applied to other theoretically-driven health services research located in multiple settings, regardless of the theoretical framework selected.

Methods

RESTORE study design

RESTORE was designed and implemented in three stages over 48 months (Figure 1).[27]. Stage 1 identified and recruited key stakeholders in each country, including migrants, community interpreters, primary care practitioners and local policy-makers. An extensive mapping exercise was conducted in each country to identify guidance and training initiatives (G/TIs) supporting inter-cultural communication in primary care [31] and to assess their initial suitability for implementation [31]. Stage 2 focussed on engaging with local stakeholders to review the identified G/TIs and democratically select one for implementation by considering the implementation potential of each G/TI.[32] In Stage 3, the selected G/TI was refined by local stakeholders, implemented, monitored and, where necessary, further refined to improve the chances of sustaining it in routine practice.

INSERT FIGURE 1 HERE.

The RESTORE Team

The research team included research and clinical disciplines, with a wide range of expertise and knowledge of the chosen theoretical framework (Supplementary File 1). Three country teams (Austria, Greece and the Netherlands) had no experience of using NPT. Four team members (MacFarlane, Mair, Dowrick and O'Donnell) had extensive experience of using NPT[33-36] including applying NPT prospectively to complex interventions.[29 37-39] These four team members thus formed the NPT trainers group, leading the development and delivery of the training reported here.

Theoretical framework

NPT is a mid-range sociological theory concerned with the work that individuals and organisations have to carry out in order to embed and normalise new, complex ways of working into routine practice.[40 41] It does this by focussing attention on four principal constructs or areas of work:

coherence (sense-making work); cognitive participation (engagement work); collective action (enacting work); and reflexive monitoring (appraisal work). Each construct has its own set of sub-constructs. Table 1 describes these and identifies the set of NPT-informed questions developed for use in the RESTORE project.[32 42]

NPT has been applied to a range of studies,[24] including guideline implementation,[43 44] treatment burden in chronic disease [45-47] and evaluating models of care.[8 36] However, training in the use of NPT was not an explicit feature of these studies.

Table 1. NPT constructs and sub-constructs as applied to RESTORE[32 42]

Coherence	Cognitive Participation	Collective Action	Reflexive Monitoring
Can stakeholders make sense of the intervention?	**Can stakeholders get others involved in implementing the intervention?**	**What needs to be done to make the intervention work in practice?**	**Can the intervention be monitored and evaluated?**
Differentiation:	**Enrolment:**	**Interactional workability:**	**Systematisation:**
Do stakeholders see this as a new way working?	Do the stakeholders believe they are the correct people to drive forward the implementation?	Does the intervention make it easier or harder to complete tasks?	Will stakeholders be able to judge the effectiveness of the intervention?
Individual specification:	**Initiation:**	**Skill set workability:**	**Individual appraisal:**
Do individuals understand what tasks the intervention requires of them?	Are they willing and able to engage others in the implementation?	Do those implementing the intervention have the correct skills and training for the job?	How will individuals judge the effectiveness of the intervention?
Communal specification:	**Activation:**	**Relational integration:**	**Communal appraisal:**
Do all those involved agree about the purpose of the intervention?	Can stakeholders identify what tasks and activities are required to sustain the intervention?	Do those involved in the implementation have confidence in the new way of working?	How will stakeholders collectively judge the effectiveness of the intervention?
Internalisation:	**Legitimation:**	**Contextual integration:**	**Reconfiguration:**
Do all the stakeholders grasp the potential benefits and value of the intervention?	Do they believe it is appropriate for them to be involved in the intervention?	Do local and national resources and policies support the implementation?	Will stakeholders be able to modify the intervention based on evaluation and experience?

Application of theory to the RESTORE study

As described previously, the RESTORE project was designed in three, inter-related stages (Figure 1). Although not entirely linear, the study was designed to broadly align to the four constructs of NPT (Figure 2). Stage 1 focused on familiarisation, first on the broad need to apply theory to RESTORE and then, with NPT itself. Stage 2 mapped to coherence and cognitive participation; Stage 3 mapped to collective action and reflexive monitoring. This structure then influenced the design of the training for the team, which is now described in detail.

INSERT FIGURE 2 HERE

Description of the training programme

Face-to-face training sessions each lasted one day. Training content was initially developed by the NPT trainers based on our knowledge of the content that needed to be covered. As time progressed, however, the content was developed based on feedback and evaluation from the RESTORE team members. Here we briefly describe the content of the training sessions. More detailed description of the training sessions and the participatory exercises are contained in Supplementary Files 2 and 3; the short presentations can be accessed on Slideshare (see Supplementary File 4 for links).

Early project training (Months 1 to 12).

Training began at Month 8, after the RESTORE researchers had been appointed in each country. The rationale for using theory to shape and inform research was presented and NPT, the theory chosen to underpin RESTORE, was introduced using previous studies as examples as well as the on-line NPT toolkit (http://www.normalizationprocess.org/). In an interactive group exercise, the researchers were asked to consider what issues might arise during the implementation of professional

interpreters in primary care. To assist this exercise, we used the 16 NPT-informed questions outlined in Table 1.

This approach, however, proved too prescriptive and over-whelming for team members trying to assimilate knowledge about applying theory to research (see Results). This led to several important modifications in the development of the training. In consultation with our PLA experts (MO'RdeB and TdeB), we incorporated more PLA-informed exercises and approaches into the training.[42] Consequently, later sessions had one or at most two short didactic presentations, with the remaining time spent on participatory exercises. The training content was aligned more closely to the temporal arrangement of the project itself and linked to the over-arching constructs of NPT. Thus, we focused principally on sense-making (coherence) and engagement work (cognitive participation) first, before turning to the actual work undertaken (collective action) and, finally, monitoring and appraisal work (reflexive monitoring) (Figure 2).

Mid-project training (Months 13 to 24).

At month 13, we focused on coherence (sense-making) and cognitive participation (engagement). Learning from early training, we first used a non-RESTORE "light" example with a humorous exercise which all the team could relate to – namely, could you contemplate staying in a circus tent at a future RESTORE team meeting? (Figure 3)

INSERT FIGURE 3 HERE

A set of pre-developed NPT-informed sensitising questions focussed the team collectively and individually on what they thought of such an idea and who would need to "buy-into" it to make it work. This reduced the stress of assimilating too much information in a short space of time, and gave the team space to build their knowledge and confidence about the theory and its constructs without having the challenge of connecting the theory to fieldwork.

Following this, a RESTORE specific role play was employed to think through the issues of using professional interpreters in a primary care setting; this example drew on team members' own experiences of working with interpreters. Although this was designed to focus the discussion on issues relating to coherence and cognitive participation, issues relating to collective action and reflexive monitoring also arose (see Results).

By month 20, when the next face-to-face training took place, the teams were preparing to commence fieldwork with their stakeholders (Stage 2 of RESTORE). Teams were given another opportunity to participate in an interactive role play. For this, a G/TI selected by one of the RESTORE teams in collaboration with their stakeholders was used, with team members asked to role play the kind of discussions they might encounter in their fieldwork. The issues and questions that arose during this were recorded and mapped to the four NPT constructs by the other team members, using large wall charts and stickie notelets. The resultant mapping was then reviewed by the NPT trainers and discussed by the group.

Later training sessions (Months 25 to 40).

By month 25, teams were conducting fieldwork and moving into Stage 3, where the chosen G/TI would be fully adapted, implemented and the result of that implementation monitored. Teams were now generating qualitative data about that process, which required the development of a coding framework broadly applicable across all the participating sites. Thus, training focused both on the constructs of collective action and reflexive monitoring and on the process of analysis.

To address training in analysis, an anonymised extract of data generated from RESTORE fieldwork in Ireland was selected. This was pre-circulated to the teams for coding to the four constructs and, if possible, to the sub-constructs. In addition to team coding, the extract was sent to the trainers and to three recognised external experts in NPT. Coded data were collated and presented at the Consortium training at Month 25.

Training sessions at Months 38 and 43 focussed on analysis. Teams were asked to review extracts of data or to bring examples of coding dilemmas with them. Coding dilemmas included examples of data that researchers were concerned were being miscoded; data did not appear to fit into the NPT framework; and data that appeared to be particular to only one site. Evaluation at the end of these later sessions allowed the NPT trainers to clarify the team's understanding of the coding process and to address any on-going concerns through teleconferences or email.

Non face-to-face support

Several mechanisms were put into place to support teams in-between face-to-face sessions, including buddy groups (linking teams experienced in theory use with less experienced teams); telephone and video conferences; email feedback on issues and problems. Later in the project, telephone and video conferences were also used to support data analysis, promoting consistency in the application of theory to analysis across the participating countries.

Outside the formal training sessions, we uploaded NPT relevant information such as key papers and links to the NPT Toolkit website (www.normalizationprocess.org) to a shared folder accessible by all the research team to serve as a resource whenever required.

Evaluation of the NPT training content

Face-to-face training was evaluated qualitatively at the end of each training day. Methods included: written lists of the 3 most positive and 3 most negative features of the training; speed evaluation where each participant was given two minutes to verbally record which aspects of training had, or had not, been effective for them; scoring elements of the training on a Likert scale (e.g. from 1 = very poor to 5 = very good). These data were collected either as short written comments or recorded on a digital recorder. Trainers reviewed the feedback thematically and used it to inform subsequent

training sessions. Additional evaluation was conducted approximately three weeks after the first session, when the team were emailed a short set of questions asking what had worked well; what had not worked well; and what they wanted from future training sessions. The results of the evaluations were summarised and fed back at RESTORE Consortium meetings providing researchers with a further opportunity to comment on whether they believed all the key issues or suggestions regarding training had been captured and addressed.

Results

Team evaluation indicated that the early stages of training were too didactic and prescriptive. The early use of the 16 NPT sensitising questions were not well liked by some researchers used to more inductive methods of working. However others, particularly the clinicians, found this approach helpful as they tried to develop their understanding of the theory's different constructs.

> *The 16 questions of the [NPT] toolkit gave us a better insight into what was meant by terms like 'sense-making' 'participation' 'action' and 'monitoring'. (Buddy report from Dutch and English teams).*

In contrast, the use of practical examples grounded in the fieldwork they would have to conduct during the course of the project and the use of "light" humorous exercises, where the team could concentrate on the content of the theory without worrying about how it applied to future fieldwork were evaluated well. The issue of whether construct application and data generation, in the field, was linear was an on-going concern. Training, therefore, continuously emphasised the lack of linearity in the process and encouraged the researchers to think through how this would affect data collection in the field. This approach was described by some as follows:

> *Coherence and cognitive participation refer, in the main, to processes before any implementation work has occurred. However, we did note that the theory is fluid and not fixed*

or linear, so this means that the experience of doing the implementation work (collective action) and reflecting on that work (reflexive monitoring) could influence coherence and cognitive participation over time….. An 'aha!' moment occurred when we distilled the thinking in the group around the difference between cognitive participation and collective action as 'thinking about the doing' and 'doing the doing' (Buddy Report from Greek and Irish teams).

Interactive exercises and role play designed to focus on coherence and cognitive participation also spontaneously picked up issues relating to collective action (who would actually do the work; how would it be funded) and reflexive monitoring (how would teams know if professional interpreters had an impact). This served as an important reminder that, even when NPT sensitising questions from researchers were designed to focus on sense-making and engagement, other issues would naturally emerge in the discussion, emphasising the lack of linearity in the application of theory to data generation.

On-going telephone and email contact ensured that difficulties and tensions were quickly surfaced, particularly when theory was being applied to fieldwork. Training at month 20 began with an intensive de-briefing, where in-country teams were encouraged to freely discuss their concerns and challenges arising from using NPT. These focussed on two, related, concerns. There was a continued lack of confidence in their knowledge of NPT itself and of being able to correctly map issues and data generated in the field to the NPT constructs. However, the use of visual methods of collecting and displaying data generated during the interactive group exercises, as exemplified in PLA approaches,[42] meant that the trainers could quickly identify a high degree of fidelity in the assignment of data to NPT constructs, thus reassuring the team of their knowledge development (Figure 4).

INSERT FIGURE 4 HERE

The second major issue continued to reflect the disciplinary and epistemological differences within the research team. Some researchers were used to policy-related research, where the application of a theoretical framework to data and the use of approaches such as Framework Analysis[48] were

familiar. Others came from a sociological or anthropological background and were more comfortable with an inductive data-driven approach to analysis. This led to understandable concerns that data might be "flattened" and shoe-horned into the NPT framework. Thus, the face-to-face training session at Month 31 focussed mainly on coding data extracts and on round-table discussion of the approach being taken (Table 2). At this point, the work carried out in early training was invaluable as there was now a high degree of trust and mutual understanding of NPT within the overall RESTORE team.

Table 2. Coding example from a transcript

Speaker	Text	NPT Coding
Facilitator	So when we began this, this morning [name] as the policy person you made a very interesting comment and you started the whole ball rolling with this didn't you?	
Policy maker*	Yeah, I suppose just reflecting on where we are at, at the moment within the health organisation is that we have a ban on travel and there's an embargo on education and training initiatives.	Text coded to **coherence** – trying to make sense of the training initiative; what makes it a new way or working.
	So something like this that provides a DVD, training and guidance is a major plus. It's something that's really going to tick the boxes for us whilst be very meaningful for front line staff as well	Text coded to **collective action** – indicates what is involved and the resources provided (DVD, training and guidance).
	very meaningful for front line staff as well	Text double coded to **cognitive participation** – consideration of other groups that need to be engaged with
Facilitator	Okay so it's got two real advantages there, it's going to get over the problem you have about not being able to travel, not being able to go out and do the capacity building and training because it hands it to you right on the plate, as you see it. And also it's going to be very meaningful for front line staff, and if I remember [name] you found that interesting. You had a comment about that…	
GP*	Yeah I think this was mine here, so as a GP I really liked the fact that there was a resource available to me as a front line member of staff, a resource available to me which answers a lot of the questions that I have about using interpreters in my practice and how that might work. So I found that very helpful.	Coded to coherence – reflects that this is a new way of working (**differentiation**); recognises the benefits (**internalisation**).

* Transcript recorded as part of a training DVD where several researchers role-played a discussion amongst health care professionals, policy makers, migrants' representatives and interpreters about the implementation of a training initiative to support the use of trained interpreters in primary care consultations in Ireland. Researchers were assigned these roles; facilitator was one of RESTORE's PLA experts.

Discussion

Principal findings and their relation to other work

We have described our approach to applying a mid-level sociological theory – Normalisation Process Theory – to a multi-site research study, RESTORE. In our endeavour to use NPT to shape our overall implementation journey, including data collection as well as analysis, we had to develop iterative and flexible training to support our multi-disciplinary, cross-national project team. While this presented challenges, we believe it also strengthened and added value to our work, ensuring it was designed, implemented and analysed in a robust and consistent manner across all five countries in which empirical data collection was conducted. From our experience of developing training for using NPT, we have developed a series of generic recommendations that can be applied to other studies seeking to use theoretical frameworks in health services research (Table 3).

Table 3 Recommendations for the future development of training to support the use of theory in health services research

1. The application of theory is not linear and training must acknowledge this
2. Experiential learning and the use of interactive, participatory and visual approaches are an important learning device.
3. Training can be most effective when it focuses on the high level constructs of a theory.
4. Different disciplinary backgrounds must be acknowledged and welcomed.
5. Space is required in the training programme to acknowledge and address concerns.
6. Training in the qualitative application of theory can support the development and robustness of qualitative coding, especially for multi-site studies.

A key recommendation is to acknowledge, from the beginning of training, that theory is not linear or sequential. This is often a challenge when applying theoretical frameworks to fieldwork; for example, Michie and colleagues have developed their Behaviour Change model as a wheel, in order to address any pre-conceived conceptions of "linearity".[49] The model of candidacy has also been

criticised for an apparent linearity that is not found when applied in the field.[50 51] The nature and speed of fieldwork means it is important for researchers to be familiar with all constructs of a selected theory, in order to fully appreciate the theoretical relevance of the data as it is generated. Thus, training needs to both acknowledge and affirm the complexities of temporal order in prospective fieldwork and ensure that researchers are familiar with all the components of a theoretical framework early enough in the research study to ensure confidence when moving into fieldwork.

Team learning and understanding develops more rapidly and deeply by using participatory and experiential approaches to learning.[42] In our work, interactive exercises with visual methods of collecting data, role play and non-specific "light" examples were all effective approaches to supporting learning and understanding. We strongly recommend this approach in the development of training for any complex theory that requires new users to develop an understanding of a range of components. The second advantage of using multiple interactive exercises is as a means to check on research team's "theoretical fidelity" when analysing the data generated in the field.

Theoretical frameworks are often complex, with constructs which can themselves be broken down to ever smaller sub-constructs. This level of complexity can be daunting for researchers new to the theory being used and can lead to difficulties when coding data. Our experience suggests that a focus on the high level constructs of a theory works best in the early stages of training. Once teams have grasped and understood those, they can intuitively develop a deeper understanding of the underlying sub-components.

Throughout our training programme, we allowed ample time for concerns to be raised and discussed and for the team to develop solutions. An advantage of the time spent of training was apparent, however, later in the project as we moved onto coding the qualitative data generated across multiple sites. By then, the time spent in early training ensured that the team had a much clearer

and consistent view of the constructs and their meaning, leading to a consistency and robustness in coding and analysis.

Strengths and Limitations

This training programme in the use of a mid-level theory was developed for a multi-disciplinary team working across 6 European countries; thus, it also had to pay careful attention to both language and cultural differences across the RESTORE research team. The evaluation and careful monitoring of both the development and delivery of the training is a clear strength of this work. That the training programme was acceptable to such a diverse group is another strength. Weaknesses include the small group of researchers involved, although the team did include a range of disciplinary and research backgrounds. The training was focused on the use of only one theoretical framework – NPT – but we believe that the lessons learned from this and the recommendations arising from the work are applicable to other theoretical frameworks.

Conclusion

Overall, we have found the prospective application of NPT to our work to be invaluable but, at times, challenging. We believe that these issues were not unique to the use of NPT, but could arise with the use of other theoretical frameworks, especially in large multi-site projects. The development of a complementary package of training to support the use of our chosen theory ensured that our work has been consistently and robustly informed by theory at all stages of the project, from design through data collection to analysis. This approach can, and should, be adopted by future research teams carrying out theoretically-informed implementation studies.

Competing interests

The authors declare that there are no competing interests.

Authors contributions

All authors (COD, FM, CD, MO'RdeB, TdeB, NB, CL, AS, MP, MvdM, EvWB, KG, LC, CP, ET, FvdDM, MV, WS, AMcF0 made substantial contributions to the design and development of RESTORE and it's training programme, to the collection of data or to the analysis and interpretation of the data. Training materials were developed by COD, FM, CD and AMcF, with input from MO'RdeB and TdeB. COD wrote the first draft of the paper and led substantive re-drafting, supported by FM, CD and AMcF; all authors listed above were involved in revising and commenting on later drafts of the manuscript. All authors have given their final approval to this version.

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Consent to use data

Ethical approval to use data generated during training was obtained from the National University of Ireland, Galway. All members of the RESTORE team agreed to their evaluation comments being used in this paper.

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Data Sharing

No additional data available. Training materials are available as described in the Supplementary Files.

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Figure 1. The three stages of RESTORE

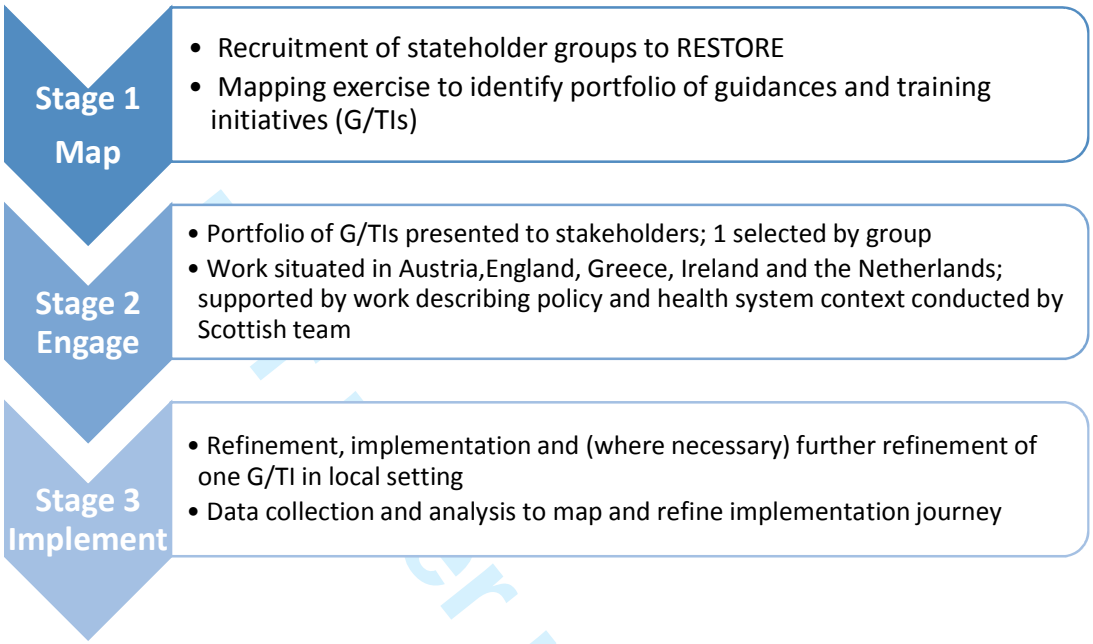

Figure 2. Stages of NPT training and alignment with RESTORE fieldwork

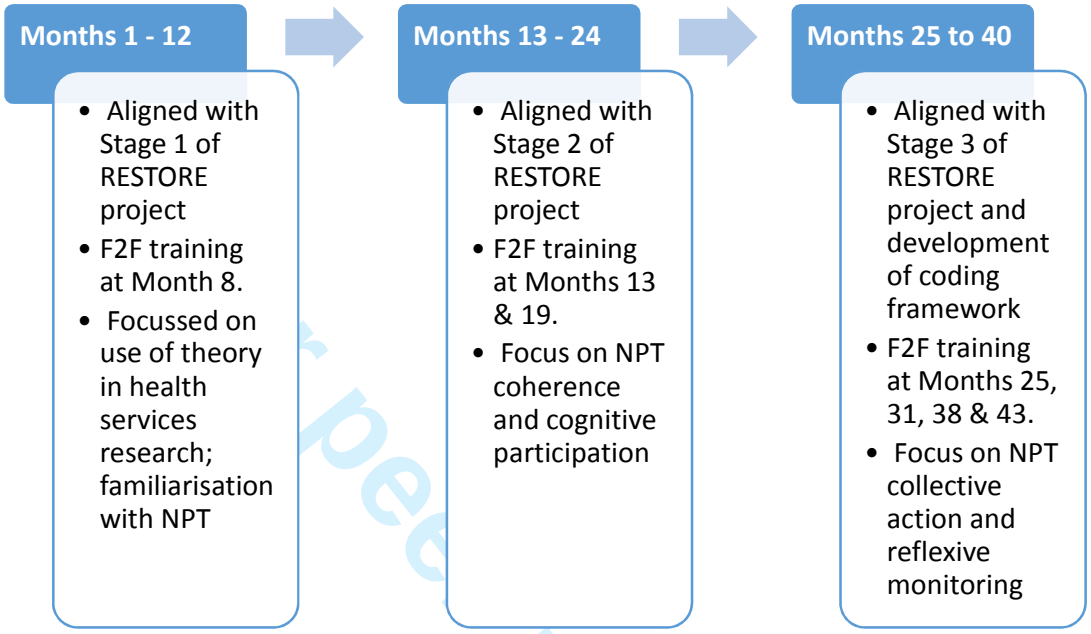

Figure 3. NPT "light" training material

Question: Do we think a circus tent can become a normalised venue for accommodation for our next RESTORE team meeting?

In addressing this question, consider the following NPT sensitising questions:

Does this make sense to the team as a whole and to individuals within the team? (Coherence)
What work needs to be done to get everyone in the team to engage with the idea? (Cognitive participation)
Who needs to do what to put this into action? What resources do we need? (Collective action)
How will we know if it worked in practice? (Reflexive monitoring)

Figure 4. Example of a visual data mapping exercise

Each "sticky" notelet corresponds to an item of verbal data identified from the interative role play discussion

Supplementary File 1. RESTORE team backgrounds and NPT experience

Country	Professional background	Experience of NPT	Country	Professional background	Experience of NPT
Austria			**Ireland**		
RESTORE Applicant	Academic general practitioner	New to NPT	RESTORE Applicant	Social scientist	Experienced in use of NPT; part of original group who developed NPT; using NPT in several projects
Researcher	Social scientist	New to NPT	Researcher	Social/cultural anthropologist	Familiar with NPM; New to NPT
			Researcher	Social/cultural anthropologist	New to NPT
England			**Netherlands**		
RESTORE Applicant	Academic general practitioner	Experienced in use of NPT; part of original group who developed NPT	RESTORE Applicant	Academic general practitioner	New to NPT
Researcher	Social anthropologist	New to NPT	RESTORE Applicant	Academic general practitioner	New to NPT
Researcher	Social scientist	New to NPT	Researcher	Academic general practitioner	New to NPT
			Researcher	Social/cultural anthropologist	New to NPT
Greece			**Scotland**		
RESTORE Applicant	Academic general practitioner; Primary health care services researcher	New to NPT	RESTORE Applicant	Health services research	Experienced in use of NPT; part of NIHR NPT user group; using NPT in several projects
Researcher	Public health researcher	New to NPT	RESTORE Applicant	Academic general practitioner	Experienced in use of NPT; part of original group who developed NPT; using NPT in

Researcher	Lecturer in social work	New to NPT	Researcher	Sociologist	several projects New to NPT

Supplementary File 2. NPT training programme

Training	Session & Duration	Content
Month 8 November 2011	Training Session 1. (2.5 hours)	**Introduction to NPT.** Development of NPT from ehealth research. Overview of NPT and its four main constructs.
	Training Session 2. (4.5 hours)	**Using NPT in RESTORE.** Example of using NPT in a qualitative study on use of interpreters in primary care. Using NPT in RESTORE – focus on constructs of coherence and cognitive participation. Participatory Exercise 1: Team asked to think about the issues arising from implementation of paid interpreters in primary care.
Month 13 April 2012	Training Session 3. (2.0 hours)	**Using NPT in RESTORE.** Focus of NPT constructs coherence and cognitive participation. Participatory Exercise 2: NPT "light" non-RESTORE exercise
	Training Session 4. (2.0 hours)	Focus of NPT constructs coherence and cognitive participation. Participatory Exercise 3: NPT RESTORE exercise
Month 20 November 2012	Training Session 5 (2.0 hours)	**Addressing anxieties.** Roundtable discussion of arising concerns. Review of why NPT being used and its role in the project.
	Training Session 6 (2.0 hours)	**Using NPT in RESTORE.** Participatory Exercise 4: NPT RESTORE exercise
Month 25	Training session 7	**Coding using NPT.**

April 2013	(2.5 hours)	Preparatory work of coding data extract; face-to-face discussion of coding decisions at Consortium training. Participatory Exercise 5: Discussion of coded extract of RESTORE data.
Month 31 October 2013	Training session 8 (1.5 hours)	**Addressing anxieties.** Roundtable discussion of progress with respect to using NPT in fieldwork and in coding.
	Training session 9 (3 hours)	**Coding using NPT.** Team reviewed coding exercise conducted in-between face-to-face meetings; discussed Irish data transcript coded by AMacF; and discussed team coding "dilemmas".
Month 38 May 2014	Training session 10 (3 hours)	**Coding using NPT.** Focused on reviewing where each country team was in relation to NPT coding; connections between fieldwork and NPT; identifying and discussing coding dilemmas.
Month 43 October 2014	Training session 11	Final discussion and clarification of coding framework.

Supplementary File 3. Participatory exercises

Month 8, Participatory Exercise 1	Consider the following scenario: Your health organisation is about to introduce paid interpreters into the primary care consultation. What NPT-informed questions might you ask to assess how well this is implemented into practice? Participants were directed to the NPT toolkit, with its 16 questions, to help them "think this through"
Month 13, Participatory Exercise 2	NPT "light": An exercise designed to get the research team thinking about coherence (understanding) and cognitive participation (participation). Using interactive small group work, the team focussed on an example entitle "Circus tent". Teams were asked to consider if a circus tent could become normalised as team accommodation for future Consortium meetings. While the team debated this, the NPT trainers observed the questions, took notes and assigned these to NPT categories. E.g. Is this something new to me? (Coherence - Differentiation) Do you think this will be helpful to the team? (Coherence – Internalisation) Will everyone agree that this is reasonable? (Cognitive participation - Legitimation) How many of the team buy into this idea? (Cognitive participation = Enrolment)
Month 13, Participatory Exercise 3	NPT RESTORE exercise: Teams asked to consider the issues that might arise when implementing paid interpreters in primary care. Half of the team were assigned roles (GP, nurse, interpreter, migrant patient) and role-played a discussion about using interpreters; other half of team watched, noting key questions and issues that arose, then assigned these to NPT constructs. N.B. The exercise was designed to focus on the constructs of coherence and cognitive participation; however, teams also had to pay attention to collective action and reflexive monitoring.
Month 20, Participatory Exercise 4	NPT RESTORE exercise: Teams given the G/TI selected by the Irish team. Asked to role play as a practice team with roles assigned to address the question "What levels and barriers will you encounter as you try to implement this guidance in practice?". Project members took turns at either role playing or noting NPT issue and assigning them to constructs.
Month 25, Participatory Exercise 5	NPT RESTORE exercise: Teams pre-circulated a short extract from a training DVD developed by the PLA trainers in which the Irish team role-played a training session with stakeholders. Teams were asked to code the qualitative extract to the main NPT construct. Three external researchers expert in the use of NPT also asked to code the extract, as

well as RESTORE NPT training team. Coding collated and presented, paragraph by paragraph, to team at face-to-face meeting.

Supplementary File 4. Location of NPT presentations on Slideshare

NPT Unpicked for the RESTORE project (http://www.slideshare.net/KateODonnell6/npt-unpicked-for-restore-project-57742520).

NPT training session 2 for RESTORE (http://www.slideshare.net/KateODonnell6/npt-training-session-2-for-restore)

NPT in RESTORE (http://www.slideshare.net/KateODonnell6/npt-in-restore)

NPT Coding exercise for RESTORE (http://www.slideshare.net/KateODonnell6/npt-coding-exercise-for-restore-57743364

O'Donnell et al.

Supporting the use of theory in cross-country health services research: Normalisation Process Theory as an example

Reporting Checklist.

Checklist used: Smith L, Rosenzweig L, Schmidt M. Best practices in the reporting of participatory action research: Embracing both the forest and the trees. The Counseling Psychologist 2010;**38**(8):1115-38

Guidelines for the reporting of participatory action research (PAR).

Criteria from Smith et al	As reported in O'Donnell et al
Organisational structure of the paper	We have based the organizational structure of our paper on the guidance issued by BMJ Open. We have, therefore, reported using the structure of Introduction, Methods, Results, Discussion. While we have sought to match the content of each section to the general expectations of the BMJ Open audience, the Methods section contains a more descriptive account on the way that the training programme evolved and developed in response to the needs of the research team. Again, the discussion section moves beyond a conventional discussion and is the place where we include our generic recommendations which, we believe, could be applied to the development of training in the use of other theoretical frameworks.
Key elements of the project	Please note: in the application of this checklist, the term 'project' is taken to apply to the training programme in the use of NPT (hereafter described as the 'NPT training programme', which is the subject of this paper. Where necessary, we also refer to RESTORE, which was the FP7 funded research project that the NPT training programme was designed to support. We hope this

	distinction is clear in our responses below.
How was the project initiated?	The NPT training programme was initiated in response to the needs of the RESTORE research team, to support them in their understanding and use of the theoretical framework being used. This is described in the paper as follows: **Introduction, Page 7:** Research teams must be comfortable and aligned with the use of the selected theory and in agreement about the meaning and application of its individual components or constructs. Such challenges are enhanced when teams are working in different settings, countries and across language as construct understanding and implementation are likely to be both culturally and context-dependent. This mirrors challenges identified in conducting qualitative research across different settings.[26] These challenges faced the EU-funded RESTORE project, a multi-site implementation study across six European countries (Box 1).[27] Focussed on cross-cultural communication in primary care, the design and analysis of RESTORE was underpinned throughout by a recognised theoretical framework - Normalisation Process Theory (NPT). However, the application of theory to a research study was a new concept for many members of the team. As a result, we had to develop a training programme to familiarise and support the team in this process.
What was the project's timeframe?	The RESTORE project was a 48-month project (see Figure 1); the NPT training programme was initiated at month 8 and ran in tandem with the project. This is described on Page 12 and illustrated in Figure 2: **Methods, Page 12: Application of theory to the RESTORE study** As described previously, the RESTORE project was designed in three, inter-related stages (Figure 1). Although not entirely linear, the study was designed to broadly align to the four constructs of NPT (Figure 2). Stage 1 focused on familiarisation, first on the broad need to apply theory to RESTORE and then, with NPT itself. Stage 2 mapped to coherence and cognitive participation; Stage 3 mapped to collective action and reflexive monitoring. This structure then influenced the design of the training for the team, which is now described in detail.
Who were the participants and/or co-researchers?	The participants were the 19 members of the RESTORE research team. They were also the co-researchers in the design, application and evaluation of the NPT training programme. The team consisted of the senior academics who wrote the RESTORE funding application and the researchers who were employed on RESTORE. The team was multi-professional and multi-disciplinary, consisting of academic general practitioners/family doctors, anthropologists, social

	scientists and health services/primary care researchers. The composition of the team is described in the **abstract**, in **Methods page 9** and more fully in **Supplementary File 1**. **Abstract: Participants:** RESTORE research team consisting 8 project applicants, all senior primary care academics; 10 researchers. Professional backgrounds included 7 academic general practitioners; 4 social/cultural anthropologists; 4 sociologists; 3 health services/primary care researchers. **Methods, Page 9: The RESTORE Team** The research team included research and clinical disciplines, with a wide range of expertise and knowledge of the chosen theoretical framework (Supplementary File 1). Three country teams (Austria, Greece and the Netherlands) had no experience of using NPT. Four team members (MacFarlane, Mair, Dowrick and O'Donnell) had extensive experience of using NPT[33-36] including applying NPT prospectively to complex interventions.[29 37-39] These four team members thus formed the NPT trainers group, leading the development and delivery of the training reported here.
What was the extent of their participation and the nature of their roles?	Four members of the team were experienced in the application of NPT to research projects and so took on the role of NPT programme trainers. The other members of the team were fully engaged in th training programme, first by participating in the NPT training programme and second, by their feedback and reflection on the process. Importantly, it was their feedback on the training that led to the continual development and evolution of the training programme. This is reported at various points of the paper, including: **Methods, Pages 13 – 17:** See paper for text. **Results, Pages 17 – 19:** See paper for text. **Discussion, Page 22:** Throughout our training programme, we allowed ample time for concerns to be raised and discussed and for the team to develop solutions. An advantage of the time spent of training was apparent, however, later in the project as we moved onto coding the qualitative data generated across multiple sites. By then, the time spent in early training ensured that the team had a much clearer and consistent view of the constructs and their meaning, leading to a consistency and robustness in coding and analysis.

What was the process within and/or methodology of the project?	The methodology of the work was informed by Participatory Learning and Action (PLA), mirroring the use of PLA in the wider RESTORE project itself. Throughout, we collected qualitative data from the RESTORE team on their views of the training sessions, analysed these data thematically and used the findings to inform the design of later training sessions. This is described in the paper: **Methods, Page 14:** This approach, however, proved too prescriptive and over-whelming for team members trying to assimilate knowledge about applying theory to research (see Results). This led to several important modifications in the development of the training. In consultation with our PLA experts (MO'RdeB and TdeB), we incorporated more PLA-informed exercises and approaches into the training.[42] Consequently, later sessions had one or at most two short didactic presentations, with the remaining time spent on participatory exercises. The training content was aligned more closely to the temporal arrangement of the project itself and linked to the over-arching constructs of NPT. Thus, we focused principally on sense-making (coherence) and engagement work (cognitive participation) first, before turning to the actual work undertaken (collective action) and, finally, monitoring and appraisal work (reflexive monitoring) (Figure 2). **Methods, Pages 16-17: Evaluation of the NPT training content** Face-to-face training was evaluated qualitatively at the end of each training day. Methods included: written lists of the 3 most positive and 3 most negative features of the training; speed evaluation where each participant was given two minutes to verbally record which aspects of training had, or had not, been effective for them; scoring elements of the training on a Likert scale (e.g. from 1 = very poor to 5 = very good). These data were collected either as short written comments or recorded on a digital recorder. Trainers reviewed the feedback thematically and used it to inform subsequent training sessions. Additional evaluation was conducted approximately three weeks after the first session, when the team were emailed a short set of questions asking what had worked well; what had not worked well; and what they wanted from future training sessions. The results of the evaluations were summarised and fed back at RESTORE Consortium meetings providing researchers with a further opportunity to comment on whether they believed all the key issues or suggestions regarding training had been captured and addressed.
What were the project outcomes and/or	Training outcomes were increased confidence and comfort amongst the RESTORE research team

emergent actions?	in (i) the use of theory in health services research projects; (ii) understanding of NPT.
What comes next (if the project is on-going)?	The RESTORE project is now finished. We hope, however, that this paper and our generic recommendations can be used to support training for other health service research projects whether they are using NPT or another theoretical framework. See **Discussion, Page 21.**
Consider charts, guidelines, tables, graphics to convey part or all of the project design	We have illustrated our data with a number of Figures and Illustrations.
Convey the experiences of the co-researchers	
Pay attention to who is writing the article and how their voices and experiences are represented	Although the lead author (COD) was one of the trainers, the paper has actively involved all members of the team. Therefore, we believe that all the voices of the RESTORE team are represented in this work.
Pay attention to who is *not* writing the article and how their voices and experiences are represented	See above.
What were the personal outcomes of the project?	A principal aim was to increase individuals' knowledge, expertise and confidence both in the use of theory in health services research projects more generally, and in the use of NPT in particular. We believe that we evidence that these personal outcomes were met. In addition, the team's level of understanding and confidence had the unintended consequence of aiding later processes within the RESTORE project such as cross-country qualitative data coding and analysis.
Address the challenges, pitfalls, and limitations of the project	
What were they?	We have discussed the general strengths and limitations of the project in the discussion: **Discussion, Page 23: Strengths and Limitations** This training programme in the use of a mid-level theory was developed for a multi-disciplinary team working across 6 European countries; thus, it also had to pay careful attention to both language and cultural differences across the RESTORE research team. The evaluation and careful

	monitoring of both the development and delivery of the training is a clear strength of this work. That the training programme was acceptable to such a diverse group is another strength. Weaknesses include the small group of researchers involved, although the team did include a range of disciplinary and research backgrounds. The training was focused on the use of only one theoretical framework – NPT – but we believe that the lessons learned from this and the recommendations arising from the work are applicable to other theoretical frameworks.
How were they managed?	A particular challenge in the training programme was managing th different levels of knowledge an expertise within the team. One important lesson was the need to build in time for critical reflection and discussion of the process – this is discussed within the Results section. **Results, Page 18:** Interactive exercises and role play designed to focus on coherence and cognitive participation also spontaneously picked up issues relating to collective action (who would actually do the work; how would it be funded) and reflexive monitoring (how would teams know if professional interpreters had an impact). This served as an important reminder that, even when NPT sensitising questions from researchers were designed to focus on sense-making and engagement, other issues would naturally emerge in the discussion, emphasising the lack of linearity in the application of theory to data generation. On-going telephone and email contact ensured that difficulties and tensions were quickly surfaced, particularly when theory was being applied to fieldwork. Training at month 20 began with an intensive de-briefing, where in-country teams were encouraged to freely discuss their concerns and challenges arising from using NPT. These focussed on two, related, concerns. There was a continued lack of confidence in their knowledge of NPT itself and of being able to correctly map issues and data generated in the field to the NPT constructs. However, the use of visual methods of collecting and displaying data generated during the interactive group exercises, as exemplified in PLA approaches,[42] meant that the trainers could quickly identify a high degree of fidelity in the assignment of data to NPT constructs, thus reassuring the team of their knowledge development (Figure 4).
What can we learn?	We believe that a key message from our work is the set of generic recommendations which could be applied to other training programmes seeking to support the use of theory in health services research projects. These are detailed in the **Discussion, pages 21 – 23.**

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Supporting the use of theory in cross-country health services research: A participatory qualitative approach using Normalisation Process Theory as an example

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Supporting the use of theory in cross-country health services research: A participatory qualitative approach using Normalisation Process Theory as an example

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Abstract

Objectives: To describe and reflect on the process of designing and delivering a training programme supporting the use of a theoretical framework, Normalisation Process Theory (NPT), in a multi-site cross-country health services research study.

Design: Participatory research approach utilising qualitative methods.

Setting: Six European primary care settings involving research teams from Austria, England, Greece, Ireland, The Netherlands and Scotland.

Participants: RESTORE research team consisting of 8 project applicants, all senior primary care academics; and 10 researchers. Professional backgrounds included general practitioners/family doctors; social/cultural anthropologists; sociologists; health services/primary care researchers.

Primary outcome measures: Views of all research team members (n=18) were assessed using qualitative evaluation methods, analysed qualitatively by the trainers after each session.

Results: Most of the team had no experience of using NPT and many had not applied a theoretical framework to prospective, qualitative research projects. Early training proved didactic and overloaded participants with information. Drawing on RESTORE's methodological approach of Participatory Learning and Action, workshops using role play, experiential interactive exercises and light-hearted examples not directly related to the study subject matter were developed. Evaluation showed the study team quickly grew in knowledge and confidence in applying theory to fieldwork.

Recommendations applicable to other studies include: accepting that theory application is not a linear process; that time is needed to address researcher concerns with the process; and that experiential, interactive learning is a key device in building conceptual and practical knowledge. An unanticipated benefit was the smooth transition to cross-country qualitative coding of study data.

Conclusion A structured programme of training enhanced and supported the prospective application of a theory, NPT, to our work, but raised challenges. These were not unique to NPT, but could arise

with any theoretical framework, especially in large multi-site, international projects. The lessons learned are applicable to other theoretically-informed studies.

Keywords

Theory; Health services research; Training; Normalisation Process Theory.

Strengths and Limitations

- The training programme was developed to support the use of a mid-level theoretical framework in 6 European countries with different primary care systems and cultures.
- Training development, delivery and evaluation engaged with a multidisciplinary team of clinical and non-clinical researchers encompassing multiple professional disciplines.
- Evaluation and careful monitoring of the training alerted us to delivery challenges and facilitated the development of a participatory approach to learning.
- The group of researchers involved in the design and feedback evaluation was relatively small.
- Training focused on one theoretical framework – Normalisation Process Theory – but has resulted in a set of generic recommendations.

Introduction

Bridging the research to practice gap is a recognised problem in health services research.[1 2] One important solution is to underpin such research with strong theoretical approaches.[1 3 4] Advantages include providing a framework that is generalizable across settings and individuals; incremental generation of knowledge; and a guide for analysis.[3 5 6] Theory can also enhance our understanding of the barriers to research translation and implementation and alert us to the context into which new interventions and services are placed. [6-9] However, many interventions and services are implemented with little or no attention to theory.[3 5] When theoretical frameworks are used, they often guide analysis rather than inform the design and conduct of the overall study.[5 10 11] This may be due, in part, to recognised challenges in applying theory to health services research.

Challenges in using theory in health services research

The first challenge is a lack of conceptual clarity as to what a 'theory' is. MacDonald describes theory as "an organized, heuristic, coherent, and systematic articulation of a set of statements related to significant questions ……. providing a generalizable form of understanding".[12] There are three recognised levels of 'theory'. Grand theory is abstract and broadly applicable across different areas and subjects.[6 12 13] The next level – mid-range or 'big theory' – is less abstract, addressing specific phenomena and concepts that can be incorporated into testable propositions or questions and inform intervention development.[6 12] The third level, programme theory, is often considered as 'small' theory, specifying particular components of an intervention in logic models and explicitly linking a programme's processes and inputs to its intended outcomes.[6 14]

The second challenge is to decide which theory best informs the work being conducted. For example, theory can focus on: explaining individual behaviours and responses (e.g. Theory of Planned Behaviour); understanding organisational responses (e.g. Diffusion of Innovation); dissemination (e.g. Streams of Policy Process); or implementation (e.g. Promoting Action on

Research Implementation in Health Services or PARIHS).[15] While theoretical choice is informed by the research, the disciplinary composition and background of the research team is also influential.[16] [17] Health services research is often multidisciplinary and draws on many fields including sociology, psychology, biostatistics, health economics and clinical disciplines. This requires teams to understand and respect each other's theoretical and paradigmatic positions.[3] The final challenge is a lack of guidance in applying theory to studies.[7] [18]

The application of theory in practice

Consideration has been given to how research teams could apply theory in practice. For example, the Reach, Effectiveness, Adoption, Implementation and Maintenance (RE-AIM) framework was developed for use in the evaluation of public health programmes and interventions but is now widely applied.[19] [20] RE-AIM focuses researchers' attention on: population reach; the intervention's adoption, implementation and effectiveness; and, finally, on its maintenance in practice.[20] The developers of Re-AIM have released training and support for other researchers (http://www.re-aim.hnfe.vt.edu/). However, even with such training available, it is not always applied consistently. Gaglio identified 71 papers published between 1999-2010 that used RE-AIM;[20] of these, 'reach' was the most frequently reported dimension, with 'maintenance' reported least often. There was also variation in the reporting of the individual components of each construct. Most reporting was quantitative, with little qualitative research to explore how components were used or understood.

Similar results were reported for the PARIHS framework, which describes several interacting components including clinical and patient experience; local context; culture and leadership; and facilitation.[21] Again, there was variation in its use across studies, with a lack of detail on the application of different sub-components to fieldwork.[18] [22] Two other reviews examined the application of the Knowledge to Action (KTA) Framework[23] and Normalisation Process Theory[24] to implementation studies. In both, the authors found stability in the application of the high level

constructs across studies but, again, variation in researchers' attention to the sub-constructs of each. This lack of 'theory fidelity' has been raised in other fields, notably health promotion.[23 25]

Translating the constructs of a chosen theory into interventions can be challenging, especially when applied across multiple research sites.[5 7 23] Research teams must be comfortable and aligned with the use of the selected theory and in agreement about the meaning and application of its individual components or constructs. Such challenges are enhanced when teams are working in different settings, countries and across cultural and language boundaries as construct understanding and implementation are likely to be both culturally and context-dependent. This mirrors challenges identified in conducting qualitative research across different settings.[26] These challenges faced the EU-funded RESTORE project, a multi-site implementation study across six European countries (Box 1).[27] Focused on cross-cultural communication in primary care, the design and analysis of RESTORE was underpinned throughout by a recognised theoretical framework - Normalisation Process Theory (NPT). However, the application of theory to a research study was a new concept for many members of the team. As a result, we had to develop a training programme to familiarise and support the team in this process.

The aim of this paper is to describe and reflect on the process of designing training in the use of a theoretical framework in a multi-site cross-country research project. We discuss the challenges this brought, as well as the benefits. Finally, we make recommendations that could be applied to other theoretically-driven health services research located in multiple settings, regardless of the theoretical framework selected.

Box 1. Description of the RESTORE project and its theoretical framework, Normalisation Process Theory.[27]

RESTORE (REsearch into implementation **ST**rategies to support patients of different **OR**igins and language background)** was focused on the implementation of guidance and training initiatives to support cross-cultural consultations in primary care for vulnerable migrant populations: asylum seekers and refugees; migrants in low paid employment; and undocumented migrants.[27 28] Funded by the EU FP7 Programme, RESTORE aimed to bridge the research-practice gap by collecting empirical data on the selection, co-design and implementation of such interventions in five European primary care settings: Austria, England, Greece, Ireland, and the Netherlands. A sixth partner, Scotland, focused on the role of the policy environment and health systems of participating countries.[29]

RESTORE used a participatory research approach – Participatory Learning and Action (PLA) – as its over-arching methodological approach, generating rich, in-depth qualitative data.[27 30 31] This involved a range of stakeholders including primary care practitioners, migrant service users, community interpreters and policy makers. To shape the study approach, facilitate data collection and guide the analysis, a theoretical framework was essential. For this, we selected Normalisation Process Theory (NPT), a mid-range sociological theory concerned with the work that individuals and organisations have to carry out in order to embed and normalise new, complex ways of working into routine practice.[32 33] NPT operates through four principal constructs or areas of work: coherence (sense-making work); cognitive participation (engagement work); collective action (enacting work); and reflexive monitoring (appraisal work), each with its own set of sub-constructs. NPT has been applied to a range of studies,[24] including guideline implementation,[34 35] treatment burden in chronic disease[36-38] and evaluating models of care.[8 39]

Methods

RESTORE study design

RESTORE was designed and implemented in three stages over 48 months (Figure 1).[27]. Stage 1 identified and recruited key stakeholders in each country, including migrants, community interpreters, primary care practitioners and local policy-makers. An extensive mapping exercise was conducted by each in-country RESTORE team to identify guidance and training initiatives (G/TIs) supporting inter-cultural communication in primary care and to assess their initial suitability for implementation [40]. Stage 2 focused on engaging with local stakeholders to review the identified G/TIs and democratically select one for implementation by considering the implementation potential of each G/TI.[41] In Stage 3, the selected G/TI was refined by local stakeholders supported by the in-country RESTORE team, implemented by the stakeholders and RESTORE team, monitored and, where necessary, further refined to improve the chances of sustaining it in routine practice.

INSERT FIGURE 1 HERE.

Although not entirely linear, the study was designed to broadly align to the four constructs of NPT (Figure 2). Stage 1 focused on familiarisation, first on the broad need to apply theory to RESTORE and then, with NPT itself. Stage 2 mapped to coherence and cognitive participation; Stage 3 mapped to collective action and reflexive monitoring. This structure then influenced the design of the training for the team, which is described below.

INSERT FIGURE 2 HERE.

The RESTORE Team

The research team of 18 included research and clinical disciplines, with a wide range of expertise and knowledge of the chosen theoretical framework (Supplementary File 1). Three country teams (Austria, Greece and the Netherlands) had no experience of using NPT. Four team members

(MacFarlane, Mair, Dowrick and O'Donnell) had extensive experience of using NPT[39 42-44] including applying NPT prospectively to complex interventions.[29 45-47] These four team members thus formed the NPT trainers group, leading the development and delivery of the training reported here.

Description of the training programme

Face-to-face training sessions each lasted one day. Training content was initially developed by the NPT trainers based on our knowledge of the content that needed to be covered. As time progressed, however, the content was developed based on feedback and evaluation from the RESTORE team members. Here we briefly describe the content of the training sessions. More detailed description of the training sessions and the participatory exercises are contained in Supplementary Files 2 and 3; the short presentations can be accessed on Slideshare (see Supplementary File 4 for links).

Early project training (Months 1 to 12).

Training began at Month 8, after the RESTORE researchers had been appointed in each country. In the first session, the rationale for using theory to shape and inform research study design, data collection and analysis was presented. NPT, the theory chosen to underpin RESTORE, was then introduced using previous studies as examples as well as the on-line NPT toolkit (http://www.normalizationprocess.org/). Following this, an interactive group exercise helped the research team to consider what issues might arise during the implementation of professional interpreters in primary care. To prompt discussion and improve understanding, the team used a set of 16 NPT-informed questions developed by the NPT trainers along with TdeB. These questions were also being used to guide the early stages of data analysis in the project (Table 1).[31 41]

Table 1. NPT constructs and sub-constructs as applied to RESTORE[31 41]

Coherence	Cognitive Participation	Collective Action	Reflexive Monitoring
Can stakeholders make sense of the intervention?	**Can stakeholders get others involved in implementing the intervention?**	**What needs to be done to make the intervention work in practice?**	**Can the intervention be monitored and evaluated?**
Differentiation:	**Enrolment:**	**Interactional workability:**	**Systematisation:**
Do stakeholders see this as a new way working?	Do the stakeholders believe they are the correct people to drive forward the implementation?	Does the intervention make it easier or harder to complete tasks?	Will stakeholders be able to judge the effectiveness of the intervention?
Individual specification:	**Initiation:**	**Skill set workability:**	**Individual appraisal:**
Do individuals understand what tasks the intervention requires of them?	Are they willing and able to engage others in the implementation?	Do those implementing the intervention have the correct skills and training for the job?	How will individuals judge the effectiveness of the intervention?
Communal specification:	**Activation:**	**Relational integration:**	**Communal appraisal:**
Do all those involved agree about the purpose of the intervention?	Can stakeholders identify what tasks and activities are required to sustain the intervention?	Do those involved in the implementation have confidence in the new way of working?	How will stakeholders collectively judge the effectiveness of the intervention?
Internalisation:	**Legitimation:**	**Contextual integration:**	**Reconfiguration:**
Do all the stakeholders grasp the potential benefits and value of the intervention?	Do they believe it is appropriate for them to be involved in the intervention?	Do local and national resources and policies support the implementation?	Will stakeholders be able to modify the intervention based on evaluation and experience?

Mid-project training (Months 13 to 24).

At month 13, we focused on the NPT constructs of coherence (sense-making) and cognitive participation (engagement). Learning from early training, we first used a non-RESTORE 'light' example with a humorous exercise which all the team could relate to – namely, could you contemplate staying in a circus tent at a future RESTORE team meeting? (Figure 3)

INSERT FIGURE 3 HERE

Following this, a RESTORE specific role play was employed to think through the issues of using professional interpreters in a primary care setting; this example drew on team members' own experiences of working with interpreters. Although this was designed to focus the discussion on issues relating to coherence and cognitive participation, issues relating to collective action and reflexive monitoring also arose (see Results).

By month 20, when the next face-to-face training took place, the in-country teams were preparing to commence fieldwork with their stakeholders (Stage 2 of RESTORE). Teams were given another opportunity to participate in an interactive role play. For this, a G/TI selected by one of the in-country RESTORE teams in collaboration with their stakeholders was used; some members of the RESTORE team were asked to role play the kind of discussions they might encounter in their fieldwork. The issues and questions that arose during this were recorded and mapped to the four NPT constructs by the other team members, using large wall charts and stickie notelets. The resultant mapping was then reviewed by the NPT trainers and discussed by the group.

Later training sessions (Months 25 to 40).

By month 25, teams were conducting fieldwork and moving into Stage 3, where the chosen G/TI would be fully adapted, implemented and the result of that implementation monitored. (This process and the results are reported in[41 48]). Teams were now generating qualitative data about that

process, which required the development of a coding framework broadly applicable across all the participating sites. Thus, training focused both on the constructs of collective action and reflexive monitoring and on the process of analysis.

To begin training in analysis, an anonymised extract of data generated from RESTORE fieldwork in Ireland was selected. This was pre-circulated to the teams for coding to the four constructs and, if possible, to the sub-constructs. In addition to team coding, the extract was sent to the trainers and to three recognised external experts in NPT. Coded data were collated and presented at the Consortium training at Month 25.

Training sessions at Months 38 and 43 continued to focus on analysis. Teams were asked to review extracts of data or to bring examples of coding dilemmas with them. Coding dilemmas included examples of data that researchers were concerned were being miscoded; data that did not appear to fit into the NPT framework; and data that appeared to be particular to only one site. Evaluation at the end of these later sessions allowed the NPT trainers to clarify the team's understanding of the coding process and to address any on-going concerns through teleconferences or email.

Non face-to-face support

Several mechanisms were put into place to support teams in-between face-to-face sessions, including buddy groups (linking teams experienced in theory use with less experienced teams); telephone and video conferences; email feedback on issues and problems. Later in the project, telephone and video conferences were also used to support data analysis, promoting consistency in the application of theory to analysis across the participating countries.

Outside the formal training sessions, we uploaded NPT relevant information such as key papers and links to the NPT Toolkit website (www.normalizationprocess.org) to a shared folder accessible by all the research team to serve as a resource whenever required.

Evaluation of the NPT training content

Face-to-face training was evaluated qualitatively at the end of each training day. Everyone present at the training days (generally all 18 members of the research team) participated in each evaluation; no one refused to participate. Methods included: written lists of the 3 most positive and 3 most negative features of the training; speed evaluation where each participant was given two minutes to verbally record which aspects of training had, or had not, been effective for them; scoring elements of the training on a Likert scale (e.g. from 1 = very poor to 5 = very good). These data were collected either as short written comments or recorded on a digital recorder. Additional evaluation was conducted approximately three weeks after the first session, when the team were emailed a short set of questions asking what had worked well; what had not worked well; and what they wanted from future training sessions. All the evaluation feedback was reviewed by the four members of the training team and the findings summarised into 'what worked', 'what didn't work' and 'what the team would like to do next'. The results of the evaluations were then summarised and presented back to the full team at the next face-to-face RESTORE Consortium meeting, providing the team with a further opportunity to comment on whether they believed all the key issues or suggestions regarding training had been captured and addressed.

Results

Early project training (Months 1 to 12).

Team evaluation indicated that the content of the first training sessions (Sessions 1 and 2, Supplementary File 2) was too didactic and prescriptive. The team felt overwhelmed trying to assimilate general knowledge about the application of theory to research along with NPT-specific information. The early use of the 16 NPT sensitising questions (Table 1) was not well liked by some researchers used to more inductive methods of working in qualitative projects. Others, particularly

the clinicians, found this approach helpful as they tried to develop their understanding of the theory's different constructs.

> *The 16 questions of the [NPT] toolkit gave us a better insight into what was meant by terms like 'sense-making' 'participation' 'action' and 'monitoring'. (Buddy report from Dutch and English teams).*

Mid-project training (Months 13 to 24).

As a result of team feedback on the didactic nature of the first sessions, the NPT trainers adopted a more PLA-focused style for the mid-project training sessions. This also reflected the methodological approach of the RESTORE project in the field, as described elsewhere.[27 31] Consequently, later sessions had one or at most two short didactic presentations, with the remaining time spent on participatory exercises. The mid-project training content was aligned more closely to the temporal arrangement of the project itself and linked to the over-arching constructs of NPT. Thus, we focused principally on sense-making (coherence) and engagement work (cognitive participation) first, before turning to the actual work undertaken (collective action) and, finally, monitoring and appraisal work (reflexive monitoring) (Figure 2).

The use of a 'light' humorous exercise, the circus tent (Figure 3), where the team could concentrate on the content of the theory without worrying about how it applied to future fieldwork evaluated well. Exercises using practical examples grounded in the fieldwork they would have to conduct during the course of the project were also helpful.

> *Exercises helped a lot! Very comfortable now! (Anonymous response in written evaluation feedback)*

> *Worked well. I'm beginning to see sense. The use of PLA methods/ techniques really helps grasping NPT and made it digestible! (Anonymous response in written evaluation feedback)*

Interactive exercises and role play designed to focus on coherence and cognitive participation also spontaneously picked up issues relating to collective action (who would actually do the work; how

would it be funded) and reflexive monitoring (how would teams know if professional interpreters had an impact). This served as an important reminder that, even when NPT sensitising questions from researchers were designed to focus on sense-making and engagement, other issues would naturally emerge in the discussion, emphasising the lack of linearity in the application of theory to data generation. This was reflected in feedback obtained from two of the in-country teams.

> *Coherence and cognitive participation refer, in the main, to processes before any implementation work has occurred. However, we did note that the theory is fluid and not fixed or linear, so this means that the experience of doing the implementation work (collective action) and reflecting on that work (reflexive monitoring) could influence coherence and cognitive participation over time..... An 'aha!' moment occurred when we distilled the thinking in the group around the difference between cognitive participation and collective action as 'thinking about the doing' and 'doing the doing' (Buddy Report from Greek and Irish teams).*

Later training sessions (Months 25 to 40).

Training conducted later in the project steadily moved from using theory to inform the collection of data in the field to using theory to underpin analysis of data. Face-to-face training session at Months 25 and 31 focused mainly on coding data extracts and on round-table discussion of the approach being taken. Prior to meeting at month 25, teams received an extract of data generated by the Irish team (Box 2); teams were asked to code this to the main constructs and, if possible, sub-constructs of NPT. Coding was then compared at the training session in Month 25.

Box 2. Background to data generation by Irish team.

MORdeB and TdeB developed training materials to support the RESTORE researchers use the methods of PLA in their fieldwork. One of these was a DVD in which researchers in Ireland role-played a discussion amongst health care professionals, policy makers, migrants' representatives and interpreters about the implementation of a training initiative to support the use of trained interpreters in primary care consultations in Ireland. Researchers were assigned these roles; the facilitator was one of RESTORE's PLA experts. The role play was filmed and the dialogue transcribed to allow teams to review and develop experience in applying NPT to coding data. This PLA training will be described more fully in future publications.

Table 2 shows examples of coding from two of the in-country teams, along with the final coding agreed by the whole RESTORE team. The first coding extract was selected because the data focused mainly on the construct of coherence, i.e. developing an understanding of the rationale for using interpreters in practice and the benefits of that. Overall, there was a high level of agreement between the team in their data coding, particularly when coding to the high-level constructs of NPT. Each in-country team showed a good degree of consistency in coding to the construct of Coherence, with some coding in particular to the sub-constructs of Differentiation ('seeing interpreters as a new way of working') and Internalisation ('articulating the benefits of working with interpreters'). The Dutch team also coded this portion of transcript to the construct Cognitive Participation, suggesting that the conversation was also discussing the need to enrol others into working with interpreters (Table 2). Face-to-face discussion at Month 25 led to a shared understanding and agreement that – where data was referring to both understanding the use of interpreters ***and*** considering who should be involved – then it was appropriate to double code data to both Coherence and Cognitive Participation. Likewise, where resources were referred to, for example the provision of training and DVD materials, text could be coded to Collective Action (Contextual Integration). Such discussions both helped the team refine their understanding of NPT, but also resulted in a robust coding framework which could be used across all country teams.

This process continued at later training meetings, at months 31 and 38 supplemented by telephone and video conferences, where coding of data was compared and differences in interpretation discussed. To facilitate this process, each country team nominated one person to lead on coding qualitative data generated in that country, who then worked with the leads in the other countries to review and discuss coding. Examples of coding were discussed and memos relating to data coding circulated across the team, ensuring consistency of meaning and interpretation in relation to coding data. The final coding frame was then reviewed and discussed at a final training meeting involving all members of the RESTORE team which took place at month 43.

Table 2. Coding example from a transcript: coding by in-country team and final coding after discussion

Speaker	Text	NPT Coding
Coding from Irish Team.		
Facilitator	So when we began this, this morning [name] as the policy person you made a very interesting comment and you started the whole ball rolling with this didn't you?	
Policy maker*	Yeah, I suppose just reflecting on where we are at, at the moment within the health organisation is that we have a ban on travel and there's an embargo on education and training initiatives.	Coded this text to **Coherence (Internalisation)–** understands the initiative; sees benefit in it.
	So something like this that provides a DVD, training and guidance is a major plus. It's something that's really going to tick the boxes for us whilst be very meaningful for front line staff as well	Underlined text double coded to **Collective Action (Contextual Integration)** due to mention of training.
Facilitator	Okay so it's got two real advantages there, it's going to get over the problem you have about not being able to travel, not being able to go out and do the capacity building and training because it hands it to you right on the plate, as you see it. And also it's going to be very meaningful for front line staff, and if I remember [name] you found that interesting. You had a comment about that…	
GP*	Yeah I think this was mine here, so as a GP I really liked the fact that there was a resource available to me as a front line member of staff, a resource available to me which answers a lot of the questions that I have about using interpreters in my practice and how that might work. So I found that very helpful.	Coded text to **Coherence (Internalisation)** – sees benefit in this initiative.
		Underlined text double coded to **Coherence (Differentiation)** as this seems to be a new way of working.
Facilitator	So that's a real positive for you about this particular training initiative. Okay and who else has comments here that they'd like to read out to us and remind us about? There's quite a few here.	

Interpreter*	Yeah I think that one there [name] that you pointed to is my one and as an interpreter I felt that this package was particularly relevant because it gives special attention to the Irish context and I feel that that's very important for me in my role as an interpreter. And that you know for interpreters working in Ireland that its just very useful, I don't think this has been done before.	Text coded to Coherence – understands initiative and sees benefit of it. Underlined text double coded to **Coherence (Differentiation)** as this seems to be a new way of working.
Coding from Dutch Team		
Facilitator	So when we began this, this morning [name] as the policy person you made a very interesting comment and you started the whole ball rolling with this didn't you?	
Policy maker*	Yeah, I suppose just reflecting on where we are at, at the moment within the health organisation is that we have a ban on travel and there's an embargo on education and training initiatives. So something like this that provides a DVD, training and guidance is a major plus. It's something that's really going to tick the boxes for us whilst be very meaningful for front line staff as well	Text coded to **Coherence.** Underlined text double coded to **Cognitive Participation**, as need to engage frontline staff.
Facilitator	Okay so it's got two real advantages there, it's going to get over the problem you have about not being able to travel, not being able to go out and do the capacity building and training because it hands it to you right on the plate, as you see it. And also it's going to be very meaningful for front line staff, and if I remember [name] you found that interesting. You had a comment about that…	
GP*	Yeah I think this was mine here, so as a GP I really liked the fact that there was a resource available to me as a front line member of staff, a resource available to me which answers a lot of the questions that I have about using interpreters in my practice and how that might work. So I found that very helpful.	Text coded to **Cognitive Participation** as this was interpreted by Dutch team as focusing on the individual's willingness to engage with interpreters.
Facilitator	So that's a real positive for you about this particular training initiative. Okay and who else has comments here that they'd like to read out to us and remind us about? There's quite a few here.	

Interpreter*	Yeah I think that one there [name] that you pointed to is my one and as an interpreter I felt that this package was particularly relevant because it gives special attention to the Irish context and I feel that that's very important for me in my role as an interpreter. And that you know for interpreters working in Ireland that its just very useful, I don't think this has been done before.	First part coded to **Coherence** – focused on understanding and a new way of working. Underlined text double coded to **Cognitive Participation** – focused on buy-in and engagement with interpreters.
Final coding after face-to-face discussion		
Facilitator	So when we began this, this morning [name] as the policy person you made a very interesting comment and you started the whole ball rolling with this didn't you?	
Policy maker*	Yeah, I suppose just reflecting on where we are at, at the moment within the health organisation is that we have a ban on travel and there's an embargo on education and training initiatives.	Text coded to **Coherence** – trying to make sense of the training initiative; what makes it a new way or working.
	So something like this that provides a DVD, training and guidance is a major plus. It's something that's really going to tick the boxes for us whilst be very meaningful for front line staff as well	Text coded to **Collective Action (Contextual Integration)** – refers to what is involved and the resources provided (DVD, training and guidance). Underlined text double coded to **cognitive participation** – consideration of other groups that need to be engaged with
Facilitator	Okay so it's got two real advantages there, it's going to get over the problem you have about not being able to travel, not being able to go out and do the capacity building and training because it hands it to you right on the plate, as you see it. And also it's going to be very meaningful for front line staff, and if I remember [name] you found that interesting. You had a comment about that…	
GP*	Yeah I think this was mine here, so as a GP I really liked the fact that there was a resource available to me as a front line member of staff, a resource available to me	Text coded to **Coherence** – reflects that this is a new way of working

	which answers a lot of the questions that I have about using interpreters in my practice and how that might work. So I found that very helpful.	(**Differentiation**); recognises the benefits (**Internalisation**).
Facilitator	So that's a real positive for you about this particular training initiative. Okay and who else has comments here that they'd like to read out to us and remind us about? There's quite a few here.	
Interpreter*	Yeah I think that one there [name] that you pointed to is my one and as an interpreter I felt that this package was particularly relevant because it gives special attention to the Irish context and I feel that that's very important for me in my role as an interpreter. And that you know for interpreters working in Ireland that its just very useful, I don't think this has been done before.	Text coded to **Coherence (Differentiation)** – seen as a new way of working. Text underlined double coded to **Collective Action (Contextual Integration)** – this refers to Irish context.

Challenges

On-going telephone and email contact ensured that difficulties and tensions were quickly surfaced, particularly when theory was being applied to fieldwork. Training at month 20 began with an intensive de-briefing, where in-country teams were encouraged to freely discuss their concerns and challenges arising from using NPT. These focused on two, related, concerns. There was a continued lack of confidence in their knowledge of NPT itself and of being able to correctly map issues and data generated in the field to the NPT constructs. However, the use of visual methods of collecting and displaying data generated during the interactive group exercises, as exemplified in PLA approaches,[31] meant that the trainers could quickly identify a high degree of fidelity in the assignment of data to NPT constructs, thus reassuring the team of their knowledge development (Figure 4).

INSERT FIGURE 4 HERE

The second major issue reflected the disciplinary and epistemological differences within the research team. Some researchers were used to policy-related research, where the application of a theoretical framework to data and the use of approaches such as Framework Analysis[49] were familiar. Others came from a sociological or anthropological background and were more comfortable with an inductive data-driven approach to analysis. This led to understandable concerns that data might be 'flattened' and shoe-horned into the NPT framework. To alleviate this concern, the trainers paid particular attention to the identification and recognition of coding which lay outside the NPT constructs, for example in relation to power dynamics between different stakeholders. A final concern was whether construct application and data generation, in the field, was linear or whether there were 'feedback loops'. For example, the research team considered the question of whether engaging in the work of implementing a G/TI could increase participants understanding or 'coherence' in relation to that G/TI. Training, therefore, continuously emphasised the lack of linearity in the process of applying theory to both data collection and analysis and encouraged the researchers to think through how this would affect data collection in the field.

Discussion

Principal findings and their relation to other work

We have described our approach to applying a mid-level sociological theory – Normalisation Process Theory – to a multi-site cross-country research study, RESTORE. In our endeavour to use NPT to shape our overall implementation journey, including data collection as well as analysis, we had to develop iterative and flexible training to support our multi-disciplinary, cross-national project team. While this presented challenges, we believe it also strengthened and added value to our work, ensuring it was designed, implemented and analysed in a robust and consistent manner across all five countries in which empirical data collection was conducted.

A multi-disciplinary, multi-national team inevitably has differences in terms of understanding the process of qualitative research and the use of theory. Professional and cultural perspectives impact on both individual and collective comfort (both in terms of country and professional discipline) with the concept of using theory to inform the design and conduct of a largely qualitative, implementation study. For example, researchers used to a more inductive approach to data analysis were initially cautious of an approach that applied a theoretical framework to data analysis. The design of a robust programme of training, which acknowledged and discussed these perspectives during the course of the training, was challenging but also allowed the team to reach a shared understanding of what the study was trying to achieve. The benefits of surfacing these tensions became apparent as the training moved to the process of data analysis.

From our experience of developing training for using NPT, we have developed a series of generic recommendations that can be applied to other studies seeking to use theoretical frameworks in health services research (Table 3).

Table 3. Recommendations for the future development of training to support the use of theory in health services research

1. The application of theory to study design and fieldwork is not linear and training must acknowledge this
2. Experiential learning and the use of interactive, participatory and visual approaches are an important learning device.
3. Training can be most effective when it focuses on the high level constructs of a theory.
4. Different disciplinary backgrounds must be acknowledged and welcomed.
5. Space is required in the training programme to acknowledge and address researcher concerns.
6. Training in the application of theory can support the development and robustness of qualitative coding, especially for multi-site studies.

A key recommendation is to acknowledge, from the beginning of training, that theory is not linear or sequential. This is often a challenge when applying theoretical frameworks to fieldwork; for example, Michie and colleagues have developed their Behaviour Change model as a wheel, in order to address any pre-conceived conceptions of 'linearity'.[50] The model of candidacy has also been criticised for an apparent linearity that is not found when applied in the field.[51 52] The nature and speed of fieldwork means it is important for researchers to be familiar with all constructs of a selected theory, in order to fully appreciate the theoretical relevance of the data as it is generated. Thus, training needs to both acknowledge and affirm the complexities of temporal order in prospective fieldwork and ensure that researchers are familiar with all the components of a theoretical framework early enough in the research study to ensure confidence when moving into fieldwork.

Team learning and understanding develops more rapidly and deeply by using participatory and experiential approaches to learning.[31] In our work, interactive exercises with visual methods of collecting data, role play and non-specific 'light' examples were all effective approaches to supporting learning and understanding. We strongly recommend this approach in the development of training for any complex theory that requires new users to develop an understanding of a range of

components. The second advantage of using multiple interactive exercises is as a means to check on research team's 'theoretical fidelity' when analysing the data generated in the field.

Theoretical frameworks are often complex, with constructs which can themselves be broken down to ever smaller sub-constructs. This level of complexity can be daunting for researchers new to the theory being used and can lead to difficulties when coding data. Our experience suggests that a focus on the high level constructs of a theory works best in the early stages of training. Once teams have grasped and understood those, they can intuitively develop a deeper understanding of the underlying sub-components.

Throughout our training programme, we allowed ample time for concerns to be raised and discussed and for the team to develop solutions. An advantage of the time spent of training was apparent, however, later in the project as we moved onto coding the qualitative data generated across multiple sites. By then, the time spent in early training ensured that the team had a much clearer and consistent view of the constructs and their meaning, leading to a consistency and robustness in coding and analysis.

Conclusion

Overall, we found the prospective application of NPT to our work to be invaluable but, at times, challenging. We believe that these issues were not unique to the use of NPT, but could arise with the use of other theoretical frameworks, especially in large multi-site and cross-country projects. The development of a complementary package of training to support the use of our chosen theory ensured that our work was consistently and robustly informed by theory at all stages of the project, from design through data collection to analysis. This approach can, and should, be adopted by future research teams carrying out theoretically-informed implementation studies.

Competing interests

The authors declare that there are no competing interests.

Authors contributions

All authors (COD, FM, CD, MO'RdeB, TdeB, NB, CL, AS, MP, MvdM, EvWB, KG, LC, CP, ET, FvdDM, MV, WS, AMcF made substantial contributions to the design and development of RESTORE and it's training programme, to the collection of data or to the analysis and interpretation of the data. Training materials were developed by COD, FM, CD and AMcF, with input from MO'RdeB and TdeB. COD wrote the first draft of the paper and led substantive re-drafting, supported by FM, CD and AMcF; all authors listed above were involved in revising and commenting on later drafts of the manuscript. All authors have given their final approval to this version.

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Consent to use data

Ethical approval to use data generated during training was obtained from the National University of Ireland, Galway. All members of the RESTORE team agreed to their evaluation comments being used in this paper.

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Data Sharing

No additional data available. Training materials are available as described in the Supplementary Files.

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Figure 1. The three stages of RESTORE

Figure 2. Stages of NPT training and alignment with RESTORE fieldwork

Figure 3. NPT "light" training material

Figure 4. Example of a visual data mapping exercise

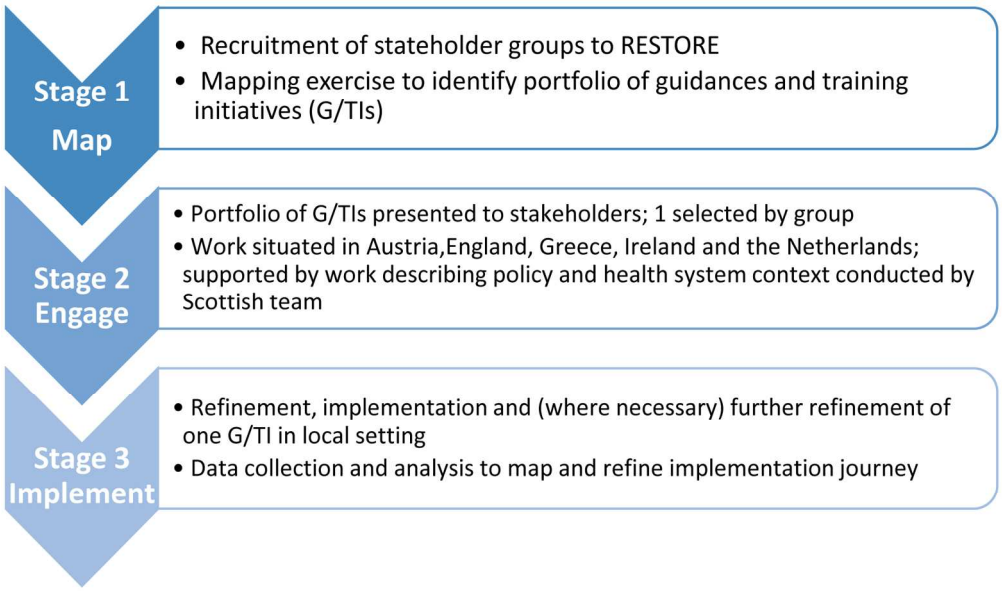

Figure 1. The three stages of RESTORE

154x91mm (300 x 300 DPI)

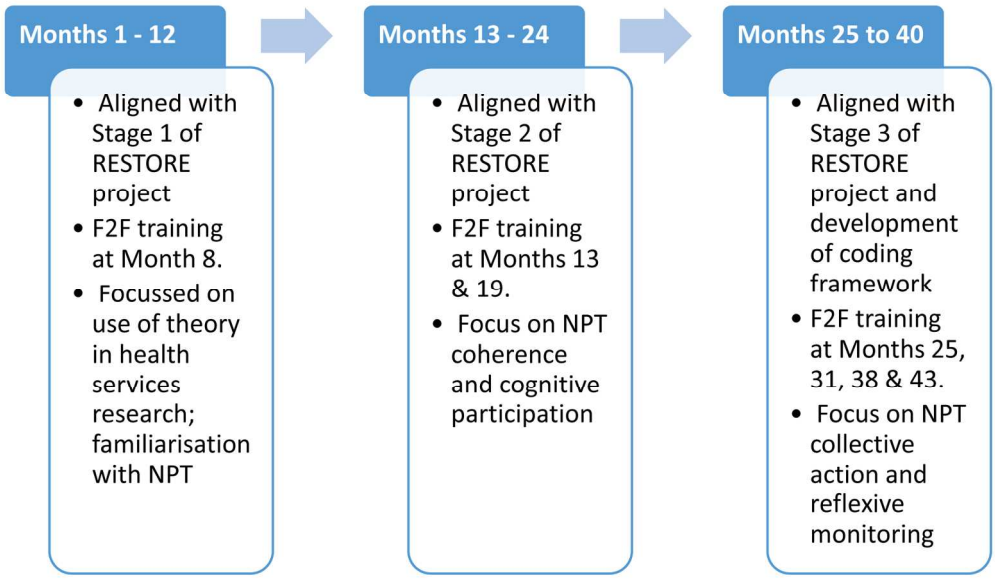

Figure 2. Stages of NPT training and alignment with RESTORE fieldwork

154x90mm (300 x 300 DPI)

Question: Do we think a circus tent can become a normalised venue for accommodation for our next RESTORE team meeting?

In addressing this question, consider the following NPT sensitising questions:

Does this make sense to the team as a whole and to individuals within the team? (Coherence)
What work needs to be done to get everyone in the team to engage with the idea? (Cognitive participation)
Who needs to do what to put this into action? What resources do we need? (Collective action)
How will we know if it worked in practice? (Reflexive monitoring)

Figure 3. NPT "light" training material

149x132mm (300 x 300 DPI)

Each "sticky" notelet corresponds to an item of verbal data identified from the interative role play discussion

Figure 4. Example of a visual data mapping exercise

160x129mm (300 x 300 DPI)

Supplementary File 1. RESTORE team backgrounds and NPT experience

Country	Professional background	Experience of NPT	Country	Professional background	Experience of NPT
Austria			**Ireland**		
RESTORE Applicant	Academic general practitioner	New to NPT	RESTORE Applicant	Social scientist	Experienced in use of NPT; part of original group who developed NPT; using NPT in several projects
Researcher	Social scientist	New to NPT	Researcher	Social/cultural anthropologist	Familiar with NPM; New to NPT
			Researcher	Social/cultural anthropologist	New to NPT
England			**Netherlands**		
RESTORE Applicant	Academic general practitioner	Experienced in use of NPT; part of original group who developed NPT	RESTORE Applicant	Academic general practitioner	New to NPT
Researcher	Social anthropologist	New to NPT	RESTORE Applicant	Academic general practitioner	New to NPT
Researcher	Social scientist	New to NPT	Researcher	Academic general practitioner	New to NPT
			Researcher	Social/cultural anthropologist	New to NPT
Greece			**Scotland**		
RESTORE Applicant	Academic general practitioner; Primary health care services researcher	New to NPT	RESTORE Applicant	Health services research	Experienced in use of NPT; part of NIHR NPT user group; using NPT in several projects
Researcher	Public health researcher	New to NPT	RESTORE Applicant	Academic general practitioner	Experienced in use of NPT; part of original group who developed NPT; using NPT in

Researcher	Lecturer in social work	New to NPT	Researcher	Sociologist	several projects New to NPT

Supplementary File 2. NPT training programme

Training	Session & Duration	Content
Early project training (Months 1 to 12)		
Month 8 November 2011	Training Session 1. (2.5 hours)	**Introduction to NPT.** Development of NPT from ehealth research. Overview of NPT and its four main constructs.
	Training Session 2. (4.5 hours)	**Using NPT in RESTORE.** Example of using NPT in a qualitative study on use of interpreters in primary care. Using NPT in RESTORE – focus on constructs of coherence and cognitive participation Participatory Exercise 1: Team asked to think about the issues arising from implementation of paid interpreters in primary care.
Mid-project training (Months 13 to 24)		
Month 13 April 2012	Training Session 3. (2.0 hours)	**Using NPT in RESTORE.** Focus of NPT constructs coherence and cognitive participation. Participatory Exercise 2: NPT "light" non-RESTORE exercise
	Training Session 4. (2.0 hours)	Focus of NPT constructs coherence and cognitive participation. Participatory Exercise 3: NPT RESTORE exercise
Month 20 November 2012	Training Session 5 (2.0 hours)	**Addressing anxieties.** Roundtable discussion of arising concerns. Review of why NPT being used and its role in the project.
	Training Session 6 (2.0 hours)	**Using NPT in RESTORE.** Participatory Exercise 4: NPT RESTORE exercise
Later training sessions (Months 25 to 48)		
Month 25 April 2013	Training session 7 (2.5 hours)	**Coding using NPT.** Preparatory work of coding data extract; face-to-face discussion of coding decisions at Consortium training. Participatory Exercise 5: Discussion of coded extract of RESTORE data.
Month 31 October 2013	Training session 8 (1.5 hours)	**Addressing anxieties.** Roundtable discussion of progress with respect to using NPT

		in fieldwork and in coding.
	Training session 9 (3 hours)	**Coding using NPT.** Team reviewed coding exercise conducted in-between face-to-face meetings; discussed Irish data transcript coded by AMacF; and discussed team coding "dilemmas".
Month 38 May 2014	Training session 10 (3 hours)	**Coding using NPT.** Focused on reviewing where each country team was in relation to NPT coding; connections between fieldwork and NPT; identifying and discussing coding dilemmas.
Month 43 October 2014	Training session 11	Final discussion and clarification of coding framework.

Supplementary File 3. Participatory exercises

Month 8, Participatory Exercise 1	Consider the following scenario: Your health organisation is about to introduce paid interpreters into the primary care consultation. What NPT-informed questions might you ask to assess how well this is implemented into practice? Participants were directed to the NPT toolkit, with its 16 questions, to help them "think this through"
Month 13, Participatory Exercise 2	NPT "light": An exercise designed to get the research team thinking about coherence (understanding) and cognitive participation (participation). Using interactive small group work, the team focussed on an example entitle "Circus tent". Teams were asked to consider if a circus tent could become normalised as team accommodation for future Consortium meetings. While the team debated this, the NPT trainers observed the questions, took notes and assigned these to NPT categories. E.g. Is this something new to me? (Coherence - Differentiation) Do you think this will be helpful to the team? (Coherence – Internalisation) Will everyone agree that this is reasonable? (Cognitive participation - Legitimation) How many of the team buy into this idea? (Cognitive participation = Enrolment)
Month 13, Participatory Exercise 3	NPT RESTORE exercise: Teams asked to consider the issues that might arise when implementing paid interpreters in primary care. Half of the team were assigned roles (GP, nurse, interpreter, migrant patient) and role-played a discussion about using interpreters; other half of team watched, noting key questions and issues that arose, then assigned these to NPT constructs. N.B. The exercise was designed to focus on the constructs of coherence and cognitive participation; however, teams also had to pay attention to collective action and reflexive monitoring.
Month 20, Participatory Exercise 4	NPT RESTORE exercise: Teams given the G/TI selected by the Irish team. Asked to role play as a practice team with roles assigned to address the question "What levels and barriers will you encounter as you try to implement this guidance in practice?". Project members took turns at either role playing or noting NPT issue and assigning them to constructs.
Month 25, Participatory Exercise 5	NPT RESTORE exercise: Teams pre-circulated a short extract from a training DVD developed by the PLA trainers in which the Irish team role-played a training session with stakeholders. Teams were asked to code the qualitative extract to the main NPT construct. Three external researchers expert in the use of NPT also asked to code the extract, as

well as RESTORE NPT training team. Coding collated and presented, paragraph by paragraph, to team at face-to-face meeting.

Supplementary File 4. Location of NPT presentations on Slideshare

NPT Unpicked for the RESTORE project (http://www.slideshare.net/KateODonnell6/npt-unpicked-for-restore-project-57742520).

NPT training session 2 for RESTORE (http://www.slideshare.net/KateODonnell6/npt-training-session-2-for-restore)

NPT in RESTORE (http://www.slideshare.net/KateODonnell6/npt-in-restore)

NPT Coding exercise for RESTORE (http://www.slideshare.net/KateODonnell6/npt-coding-exercise-for-restore-57743364

O'Donnell et al.

BMJOpen-2016-014289

Supporting the use of theory in cross-country health services research using Normalisation Process Theory as an example: A participatory qualitative approach

Reporting Checklist.

Checklist used: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care* 2007;19(6):349-57. doi: 10.1093/intqhc/mzm042

Criteria from Tong et al	As reported in O'Donnell et al
Domain 1: Research team and reflexivity.	
Personal Characteristics	
1. Interviewer/facilitator. Which author/s conducted the interview or focus group?	Training and qualitative evaluation of training led by Catherine O'Donnell and Anne MacFarlane, assisted by Christopher Dowrick, Frances Mair and Mary O'Reilly de Brun.
2. Credentials What were the researcher's credentials? E.g. PhD, MD.	Catherine O'Donnell (COD): BSc (Hons), PhD, MPH. Anne MacFarlane (AMcF): BA, MA, PhD. Christopher Dowrick (CD): BA, MSc, MD, CQSW, FRCGP, FFPHM. Frances Mair (FM): MBChB, MD, FRCGP, DRCOG. Mary O'Reilly de Brun (MORdeB): BA.Th, M.Th.
3. Occupation What was their occupation at the time of the study?	Catherine O'Donnell (COD): Professor of Primary Care Research & Development

	Anne MacFarlane (AMcF): Professor of Primary Healthcare Research. Christopher Dowrick (CD): Professor of Primary Medical Care. Frances Mair (FM): Professor of Primary Care Research. Mary O'Reilly de Brun (MORdeB): Research Fellow.
4. Gender. Was the researcher male or female?	NPT training team consisted of four females; one male.
5. Experience and training. What experience or training did the researcher have?	O'Donnell, MacFarlane, Mair, Dowrick are experienced, senior primary care academics. All four have led substantive programmes of research, using quantitative and qualitative methodologies, exploring a range of primary care issues. All have extensive experience of using NPT including applying NPT prospectively to complex interventions. These four team members thus formed the NPT trainers group, leading the development and delivery of the training reported here. Mary O'Reilly de Brun is an experienced researcher in the use of Participatory Learning in Action.
Relationship with participants	In answering these questions, I have regarded 'participants' as the members of the research team who were the focus of the training.
6. Relationship established Was a relationship established prior to study commencement?	Throughout the project, there was a close working relationship across the entire team of 18 individuals. Regular meetings of the project team, coupled with the training described in this paper, resulted in a strong-knot groups with high levels of confidence in each other. This also engendered a powerful sense of community within the team, which crossed county location, disciplinary background, and level of seniority.
7. Participant knowledge of the interviewer. What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	The NPT trainers, who led on the evaluation, were part of the full RESTORE team. Thus the other members of the RESTORE research team knew NPT trainers well. The purpose of obtaining evaluation feedback was explained to the team and all consented to their feedback being used both to inform future training, and to being used in future publications.
8. Interviewer characteristics. What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	Reasons for collecting evaluation feedback from the research team was explained, and re-iterated, at each training session. The research team knew that the NPT trainers group (COD, AMacF, CD and FM) were interested in developing future training for use with other research groups.
Domain 2: study design	
Theoretical framework	

9. Methodological orientation and Theory. What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	The methodological approach was that of Participatory Learning and Action, a participatory and democratic approach to the generation and analysis of data. The theoretical framework used was Normalisation Process Theory. This is a mid-range sociological theory concerned with the work that individuals and organisations have to carry out in order to embed and normalise new, complex ways of working into routine practice. NPT operates through four principal constructs or areas of work: coherence (sense-making work); cognitive participation (engagement work); collective action (enacting work); and reflexive monitoring (appraisal work), each with its own set of sub-constructs
Participant selection	
10. Sampling How were participants selected? e.g. purposive, convenience, consecutive, snowball	There was no participant sampling; all 18 members of the RESTORE team participated in the NPT training and in the evaluation of that training.
11. Method of approach How were participants approached? e.g. face-to-face, telephone, mail, email	N/A.
12. Sample size How many participants were in the study?	N/A.
13. Non-participation How many people refused to participate or dropped out? Reasons?	All members of the RESTORE team participated in the training and evaluation of that training; there were no drop-outs.
Setting	
14. Setting of data collection Where was the data collected? e.g. home, clinic, workplace	Data on the evaluation of the training were collected at each face-to-face RESTORE Consortium meeting. These meetings were held in the participating institutions across the 6 RESTORE countries: Austria, England, Greece, Ireland, the Netherlands and Scotland.
15. Presence of non-participants Was anyone else present besides the participants and researchers?	No.
16. Description of sample What are the	The RESTORE research team consisting of 8 project applicants, all senior primary care academics;

important characteristics of the sample? e.g. demographic data, date	and 10 researchers. Professional backgrounds included general practitioners/family doctors; social/cultural anthropologists; sociologists; health services/primary care researchers.
Data collection	
17. Interview guide Were questions, prompts, guides provided by the authors? Was it pilot tested?	Data were collected from the RESTORE team in a number of ways – all consistent with the methodological approach on Participatory Learning in Action. As described the paper methods included: written lists of the 3 most positive and 3 most negative features of the training; speed evaluation where each participant was given two minutes to verbally record which aspects of training had, or had not, been effective for them; scoring elements of the training on a Likert scale (e.g. from 1 = very poor to 5 = very good). These data were collected either as short written comments or recorded on a digital recorder. Additional evaluation was conducted approximately three weeks after the first session, when the team were emailed a short set of questions asking what had worked well; what had not worked well; and what they wanted from future training sessions.
18. Repeat interviews Were repeat interviews carried out? If yes, how many?	No
19. Audio/visual recording Did the research use audio or visual recording to collect the data?	Some feedback was recorded on a digital recorder.
20. Field notes Were field notes made during and/or after the interview or focus group?	No
21. Duration What was the duration of the interviews or focus group?	N/A
22. Data saturation Was data saturation discussed?	N/A
23. Transcripts returned Were transcripts returned to participants for comment and/or correction?	N/A. Evaluation comments were collated and feedback to the team at the next face-to-face meeting to permit discussion and clarification.

Domain 3: analysis and findings	
Data analysis	
24. Number of data coders How many data coders coded the data?	All the evaluation feedback was reviewed by the four members of the training team and the findings summarised into 'what worked', 'what didn't work' and 'what the team would like to do next'.
25. Description of the coding tree Did authors provide a description of the coding tree?	N/A
26. Derivation of themes Were themes identified in advance or derived from the data?	N/A
27. Software What software, if applicable, was used to manage the data?	No software was used
28. Participant checking Did participants provide feedback on the findings?	Evaluation feedback was presented back to the team for discussion and clarification.
Reporting	
29. Quotations presented Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? e.g. participant number	Yes – quotations have a descriptor that is non-identifiable of individuals.
30. Data and findings consistent Was there consistency between the data presented and the findings?	Yes.
31. Clarity of major themes Were major themes clearly presented in the findings?	N/A
32. Clarity of minor themes Is there a description of diverse cases or discussion of minor themes?	N/A.

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Supporting the use of theory in cross-country health services research: Normalisation Process Theory as an example

Reporting Checklist.

Checklist used: Smith L, Rosenzweig L, Schmidt M. Best practices in the reporting of participatory action research: Embracing both the forest and the trees. The Counseling Psychologist 2010;**38**(8):1115-38

Guidelines for the reporting of participatory action research (PAR).

Criteria from Smith et al	As reported in O'Donnell et al
Organisational structure of the paper	We have based the organizational structure of our paper on the guidance issued by BMJ Open. We have, therefore, reported using the structure of Introduction, Methods, Results, Discussion. While we have sought to match the content of each section to the general expectations of the BMJ Open audience, the Methods section contains a more descriptive account on the way that the training programme evolved and developed in response to the needs of the research team. Again, the discussion section moves beyond a conventional discussion and is the place where we include our generic recommendations which, we believe, could be applied to the development of training in the use of other theoretical frameworks.
Key elements of the project	Please note: in the application of this checklist, the term 'project' is taken to apply to the training programme in the use of NPT (hereafter described as the 'NPT training programme', which is the subject of this paper. Where necessary, we also refer to RESTORE, which was the FP7 funded research project that the NPT training programme was designed to support. We hope this

	distinction is clear in our responses below.
How was the project initiated?	The NPT training programme was initiated in response to the needs of the RESTORE research team, to support them in their understanding and use of the theoretical framework being used. This is described in the paper as follows: **Introduction, Page 7:** Research teams must be comfortable and aligned with the use of the selected theory and in agreement about the meaning and application of its individual components or constructs. Such challenges are enhanced when teams are working in different settings, countries and across language as construct understanding and implementation are likely to be both culturally and context-dependent. This mirrors challenges identified in conducting qualitative research across different settings.[26] These challenges faced the EU-funded RESTORE project, a multi-site implementation study across six European countries (Box 1).[27] Focussed on cross-cultural communication in primary care, the design and analysis of RESTORE was underpinned throughout by a recognised theoretical framework - Normalisation Process Theory (NPT). However, the application of theory to a research study was a new concept for many members of the team. As a result, we had to develop a training programme to familiarise and support the team in this process.
What was the project's timeframe?	The RESTORE project was a 48-month project (see Figure 1); the NPT training programme was initiated at month 8 and ran in tandem with the project. This is described on Page 12 and illustrated in Figure 2: **Methods, Page 12: Application of theory to the RESTORE study** As described previously, the RESTORE project was designed in three, inter-related stages (Figure 1). Although not entirely linear, the study was designed to broadly align to the four constructs of NPT (Figure 2). Stage 1 focused on familiarisation, first on the broad need to apply theory to RESTORE and then, with NPT itself. Stage 2 mapped to coherence and cognitive participation; Stage 3 mapped to collective action and reflexive monitoring. This structure then influenced the design of the training for the team, which is now described in detail.
Who were the participants and/or co-researchers?	The participants were the 19 members of the RESTORE research team. They were also the co-researchers in the design, application and evaluation of the NPT training programme. The team consisted of the senior academics who wrote the RESTORE funding application and the researchers who were employed on RESTORE. The team was multi-professional and multi-disciplinary, consisting of academic general practitioners/family doctors, anthropologists, social

	scientists and health services/primary care researchers. The composition of the team is described in the **abstract**, in **Methods page 9** and more fully in **Supplementary File 1**. **Abstract: Participants:** RESTORE research team consisting 8 project applicants, all senior primary care academics; 10 researchers. Professional backgrounds included 7 academic general practitioners; 4 social/cultural anthropologists; 4 sociologists; 3 health services/primary care researchers. **Methods, Page 9: The RESTORE Team** The research team included research and clinical disciplines, with a wide range of expertise and knowledge of the chosen theoretical framework (Supplementary File 1). Three country teams (Austria, Greece and the Netherlands) had no experience of using NPT. Four team members (MacFarlane, Mair, Dowrick and O'Donnell) had extensive experience of using NPT[33-36] including applying NPT prospectively to complex interventions.[29 37-39] These four team members thus formed the NPT trainers group, leading the development and delivery of the training reported here.
What was the extent of their participation and the nature of their roles?	Four members of the team were experienced in the application of NPT to research projects and so took on the role of NPT programme trainers. The other members of the team were fully engaged in th training programme, first by participating in the NPT training programme and second, by their feedback and reflection on the process. Importantly, it was their feedback on the training that led to the continual development and evolution of the training programme. This is reported at various points of the paper, including: **Methods, Pages 13 – 17:** See paper for text. **Results, Pages 17 – 19:** See paper for text. **Discussion, Page 22:** Throughout our training programme, we allowed ample time for concerns to be raised and discussed and for the team to develop solutions. An advantage of the time spent of training was apparent, however, later in the project as we moved onto coding the qualitative data generated across multiple sites. By then, the time spent in early training ensured that the team had a much clearer and consistent view of the constructs and their meaning, leading to a consistency and robustness in coding and analysis.

What was the process within and/or methodology of the project?	The methodology of the work was informed by Participatory Learning and Action (PLA), mirroring the use of PLA in the wider RESTORE project itself. Throughout, we collected qualitative data from the RESTORE team on their views of the training sessions, analysed these data thematically and used the findings to inform the design of later training sessions. This is described in the paper: **Methods, Page 14:** This approach, however, proved too prescriptive and over-whelming for team members trying to assimilate knowledge about applying theory to research (see Results). This led to several important modifications in the development of the training. In consultation with our PLA experts (MO'RdeB and TdeB), we incorporated more PLA-informed exercises and approaches into the training.[42] Consequently, later sessions had one or at most two short didactic presentations, with the remaining time spent on participatory exercises. The training content was aligned more closely to the temporal arrangement of the project itself and linked to the over-arching constructs of NPT. Thus, we focused principally on sense-making (coherence) and engagement work (cognitive participation) first, before turning to the actual work undertaken (collective action) and, finally, monitoring and appraisal work (reflexive monitoring) (Figure 2). **Methods, Pages 16-17: Evaluation of the NPT training content** Face-to-face training was evaluated qualitatively at the end of each training day. Methods included: written lists of the 3 most positive and 3 most negative features of the training; speed evaluation where each participant was given two minutes to verbally record which aspects of training had, or had not, been effective for them; scoring elements of the training on a Likert scale (e.g. from 1 = very poor to 5 = very good). These data were collected either as short written comments or recorded on a digital recorder. Trainers reviewed the feedback thematically and used it to inform subsequent training sessions. Additional evaluation was conducted approximately three weeks after the first session, when the team were emailed a short set of questions asking what had worked well; what had not worked well; and what they wanted from future training sessions. The results of the evaluations were summarised and fed back at RESTORE Consortium meetings providing researchers with a further opportunity to comment on whether they believed all the key issues or suggestions regarding training had been captured and addressed.
What were the project outcomes and/or	Training outcomes were increased confidence and comfort amongst the RESTORE research team

emergent actions?	in (i) the use of theory in health services research projects; (ii) understanding of NPT.
What comes next (if the project is on-going)?	The RESTORE project is now finished. We hope, however, that this paper and our generic recommendations can be used to support training for other health service research projects whether they are using NPT or another theoretical framework. See **Discussion, Page 21.**
Consider charts, guidelines, tables, graphics to convey part or all of the project design	We have illustrated our data with a number of Figures and Illustrations.
Convey the experiences of the co-researchers	
Pay attention to who is writing the article and how their voices and experiences are represented	Although the lead author (COD) was one of the trainers, the paper has actively involved all members of the team. Therefore, we believe that all the voices of the RESTORE team are represented in this work.
Pay attention to who is *not* writing the article and how their voices and experiences are represented	See above.
What were the personal outcomes of the project?	A principal aim was to increase individuals' knowledge, expertise and confidence both in the use of theory in health services research projects more generally, and in the use of NPT in particular. We believe that we evidence that these personal outcomes were met. In addition, the team's level of understanding and confidence had the unintended consequence of aiding later processes within the RESTORE project such as cross-country qualitative data coding and analysis.
Address the challenges, pitfalls, and limitations of the project	
What were they?	We have discussed the general strengths and limitations of the project in the discussion: **Discussion, Page 23: Strengths and Limitations** This training programme in the use of a mid-level theory was developed for a multi-disciplinary team working across 6 European countries; thus, it also had to pay careful attention to both language and cultural differences across the RESTORE research team. The evaluation and careful

	monitoring of both the development and delivery of the training is a clear strength of this work. That the training programme was acceptable to such a diverse group is another strength. Weaknesses include the small group of researchers involved, although the team did include a range of disciplinary and research backgrounds. The training was focused on the use of only one theoretical framework – NPT – but we believe that the lessons learned from this and the recommendations arising from the work are applicable to other theoretical frameworks.
How were they managed?	A particular challenge in the training programme was managing th different levels of knowledge an expertise within the team. One important lesson was the need to build in time for critical reflection and discussion of the process – this is discussed within the Results section. **Results, Page 18:** Interactive exercises and role play designed to focus on coherence and cognitive participation also spontaneously picked up issues relating to collective action (who would actually do the work; how would it be funded) and reflexive monitoring (how would teams know if professional interpreters had an impact). This served as an important reminder that, even when NPT sensitising questions from researchers were designed to focus on sense-making and engagement, other issues would naturally emerge in the discussion, emphasising the lack of linearity in the application of theory to data generation. On-going telephone and email contact ensured that difficulties and tensions were quickly surfaced, particularly when theory was being applied to fieldwork. Training at month 20 began with an intensive de-briefing, where in-country teams were encouraged to freely discuss their concerns and challenges arising from using NPT. These focussed on two, related, concerns. There was a continued lack of confidence in their knowledge of NPT itself and of being able to correctly map issues and data generated in the field to the NPT constructs. However, the use of visual methods of collecting and displaying data generated during the interactive group exercises, as exemplified in PLA approaches,[42] meant that the trainers could quickly identify a high degree of fidelity in the assignment of data to NPT constructs, thus reassuring the team of their knowledge development (Figure 4).
What can we learn?	We believe that a key message from our work is the set of generic recommendations which could be applied to other training programmes seeking to support the use of theory in health services research projects. These are detailed in the **Discussion, pages 21 – 23.**

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Supporting the use of theory in cross-country health services research: A participatory qualitative approach using Normalisation Process Theory as an example

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Supporting the use of theory in cross-country health services research: A participatory qualitative approach using Normalisation Process Theory as an example

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Abstract

Objectives: To describe and reflect on the process of designing and delivering a training programme supporting the use of theory, in this case Normalisation Process Theory (NPT), in a multi-site cross-country health services research study.

Design: Participatory research approach utilising qualitative methods.

Setting: Six European primary care settings involving research teams from Austria, England, Greece, Ireland, The Netherlands and Scotland.

Participants: RESTORE research team consisting of 8 project applicants, all senior primary care academics; and 10 researchers. Professional backgrounds included general practitioners/family doctors; social/cultural anthropologists; sociologists; health services/primary care researchers.

Primary outcome measures: Views of all research team members (n=18) were assessed using qualitative evaluation methods, analysed qualitatively by the trainers after each session.

Results: Most of the team had no experience of using NPT and many had not applied theory to prospective, qualitative research projects. Early training proved didactic and overloaded participants with information. Drawing on RESTORE's methodological approach of Participatory Learning and Action, workshops using role play, experiential interactive exercises and light-hearted examples not directly related to the study subject matter were developed. Evaluation showed the study team quickly grew in knowledge and confidence in applying theory to fieldwork.

Recommendations applicable to other studies include: accepting that theory application is not a linear process; that time is needed to address researcher concerns with the process; and that experiential, interactive learning is a key device in building conceptual and practical knowledge. An unanticipated benefit was the smooth transition to cross-country qualitative coding of study data.

Conclusion A structured programme of training enhanced and supported the prospective application of a theory, NPT, to our work, but raised challenges. These were not unique to NPT, but

could arise with the application of any theory, especially in large multi-site, international projects. The lessons learned are applicable to other theoretically-informed studies.

Keywords

Theory; Health services research; Training; Normalisation Process Theory.

Strengths and Limitations

- The training programme was developed to support the use of a mid-level theory in 6 European countries with different primary care systems and cultures.
- Training development, delivery and evaluation engaged with a multidisciplinary team of clinical and non-clinical researchers encompassing multiple professional disciplines.
- Evaluation and careful monitoring of the training alerted us to delivery challenges and facilitated the development of a participatory approach to learning.
- The group of researchers involved in the design and feedback evaluation was relatively small.
- Training focused on one theory – Normalisation Process Theory – but has resulted in a set of generic recommendations.

Introduction

Bridging the research to practice gap is a recognised problem in health services research.[1 2] One important solution is to underpin such research with strong theoretical approaches.[1 3 4] Advantages include providing a framework that is generalizable across settings and individuals; incremental generation of knowledge; and a guide for analysis.[3 5 6] Theory can also enhance our understanding of the barriers to research translation and implementation and alert us to the context into which new interventions and services are placed. [6-9] However, many interventions and services are implemented with little or no attention to theory.[3 5] When theories are used, they often guide analysis rather than inform the design and conduct of the overall study.[5 10 11] This may be due, in part, to recognised challenges in applying theory to health services research.

Challenges in using theory in health services research

The first challenge is a lack of conceptual clarity as to what a 'theory' is. MacDonald describes theory as "an organized, heuristic, coherent, and systematic articulation of a set of statements related to significant questions ……. providing a generalizable form of understanding".[12] There are three recognised levels of 'theory'. Grand theory is abstract and broadly applicable across different areas and subjects.[6 12 13]. The next level – mid-range or 'big theory' – is less abstract, addressing specific phenomena and concepts that can be incorporated into testable propositions or questions and inform intervention development.[6 12] The third level, programme theory, is often considered as 'small' theory, specifying particular components of an intervention in logic models and explicitly linking a programme's processes and inputs to its intended outcomes.[6 14]

The second challenge is to decide which theory best informs the work being conducted. For example, theory can focus on: explaining individual behaviours and responses (e.g. Theory of Planned Behaviour); understanding organisational responses (e.g. Diffusion of Innovation); dissemination (e.g. Streams of Policy Process); or implementation (e.g. Promoting Action on

Research Implementation in Health Services or PARIHS).[15] While theoretical choice is informed by the research, the disciplinary composition and background of the research team is also influential.[16] [17] Health services research is often multidisciplinary and draws on many fields including sociology, psychology, biostatistics, health economics and clinical disciplines. This requires teams to understand and respect each other's theoretical and paradigmatic positions.[3] The final challenge is a lack of guidance in applying theory to studies.[7] [18]

The application of theory in practice

Consideration has been given to how research teams could apply theory in practice. For example, the Reach, Effectiveness, Adoption, Implementation and Maintenance (RE-AIM) framework was developed for use in the evaluation of public health programmes and interventions but is now widely applied.[19] [20] RE-AIM focuses researchers' attention on: population reach; the intervention's adoption, implementation and effectiveness; and, finally, on its maintenance in practice.[20] The developers of Re-AIM have released training and support for other researchers (http://www.re-aim.hnfe.vt.edu/). However, even with such training available, it is not always applied consistently. Gaglio identified 71 papers published between 1999-2010 that used RE-AIM;[20] of these, 'reach' was the most frequently reported dimension, with 'maintenance' reported least often. There was also variation in the reporting of the individual components of each construct. Most reporting was quantitative, with little qualitative research to explore how components were used or understood.

Similar results were reported for the PARIHS framework, which describes several interacting components including clinical and patient experience; local context; culture and leadership; and facilitation.[21] Again, there was variation in its use across studies, with a lack of detail on the application of different sub-components to fieldwork.[18] [22] Two other reviews examined the application of the Knowledge to Action (KTA) Framework[23] and Normalisation Process Theory[24] to implementation studies. In both, the authors found stability in the application of the high level

constructs across studies but, again, variation in researchers' attention to the sub-constructs of each. This lack of 'theory fidelity' has been raised in other fields, notably health promotion.[23 25]

Translating the constructs of a chosen theory into interventions can be challenging, especially when applied across multiple research sites.[5 7 23] Research teams must be comfortable and aligned with the use of the selected theory and in agreement about the meaning and application of its individual components or constructs. Such challenges are enhanced when teams are working in different settings, countries and across cultural and language boundaries as construct understanding and implementation are likely to be both culturally and context-dependent. This mirrors challenges identified in conducting qualitative research across different settings.[26] These challenges faced the EU-funded RESTORE project, a multi-site implementation study across six European countries (Box 1).[27] Focused on cross-cultural communication in primary care, the design and analysis of RESTORE was underpinned throughout by a recognised mid-level, sociological theory - Normalisation Process Theory (NPT). However, the application of theory to a research study was a new concept for many members of the team. As a result, we had to develop a training programme to familiarise and support the team in this process.

The aim of this paper is to describe and reflect on the process of designing training in the use of theory in a multi-site cross-country research project. We discuss the challenges this brought, as well as the benefits. Finally, we make recommendations that could be applied to other theoretically-driven health services research located in multiple settings, regardless of the theory selected.

Box 1. Description of the RESTORE project and its underpinning theory, Normalisation Process Theory.[27]

RESTORE (REsearch into implementation STrategies to support patients of different ORigins and language background) was focused on the implementation of guidance and training initiatives to support cross-cultural consultations in primary care for vulnerable migrant populations: asylum seekers and refugees; migrants in low paid employment; and undocumented migrants.[27 28] Funded by the EU FP7 Programme, RESTORE aimed to bridge the research-practice gap by collecting empirical data on the selection, co-design and implementation of such interventions in five European primary care settings: Austria, England, Greece, Ireland, and the Netherlands. A sixth partner, Scotland, focused on the role of the policy environment and health systems of participating countries.[29]

RESTORE used a participatory research approach – Participatory Learning and Action (PLA) – as its over-arching methodological approach, generating rich, in-depth qualitative data.[27 30 31] This involved a range of stakeholders including primary care practitioners, migrant service users, community interpreters and policy makers. To shape the study approach, facilitate data collection and guide the analysis, a robust theoretical approach was essential. For this, we selected Normalisation Process Theory (NPT), a mid-range sociological theory concerned with the work that individuals and organisations have to carry out in order to embed and normalise new, complex ways of working into routine practice.[32 33] NPT operates through four principal constructs or areas of work: coherence (sense-making work); cognitive participation (engagement work); collective action (enacting work); and reflexive monitoring (appraisal work), each with its own set of sub-constructs. NPT has been applied to a range of studies,[24] including guideline implementation,[34 35] treatment burden in chronic disease[36-38] and evaluating models of care.[8 39]

Methods

RESTORE study design

RESTORE was designed and implemented in three stages over 48 months (Figure 1).[27]. Stage 1 identified and recruited key stakeholders in each country, including migrants, community interpreters, primary care practitioners and local policy-makers. An extensive mapping exercise was conducted by each in-country RESTORE team to identify guidance and training initiatives (G/TIs) supporting inter-cultural communication in primary care and to assess their initial suitability for implementation [40]. Stage 2 focused on engaging with local stakeholders to review the identified G/TIs and democratically select one for implementation by considering the implementation potential of each G/TI.[41] In Stage 3, the selected G/TI was refined by local stakeholders supported by the in-country RESTORE team, implemented by the stakeholders and RESTORE team, monitored and, where necessary, further refined to improve the chances of sustaining it in routine practice.

INSERT FIGURE 1 HERE.

Although not entirely linear, the study was designed to broadly align to the four constructs of NPT (Figure 2). Stage 1 focused on familiarisation, first on the broad need to apply theory to RESTORE and then, with NPT itself. Stage 2 mapped to coherence and cognitive participation; Stage 3 mapped to collective action and reflexive monitoring. This structure then influenced the design of the training for the team, which is described below.

INSERT FIGURE 2 HERE.

The RESTORE Team

The research team of 18 included research and clinical disciplines, with a wide range of expertise and knowledge of the chosen theoretical approach (Supplementary File 1). Three country teams (Austria, Greece and the Netherlands) had no experience of using NPT. Four team members (MacFarlane,

Mair, Dowrick and O'Donnell) had extensive experience of using NPT[39 42-44] including applying NPT prospectively to complex interventions.[29 45-47] These four team members thus formed the NPT trainers group, leading the development and delivery of the training reported here.

Description of the training programme

Face-to-face training sessions each lasted one day. Training content was initially developed by the NPT trainers based on our knowledge of the content that needed to be covered. As time progressed, however, the content was developed based on feedback and evaluation from the RESTORE team members. Here we briefly describe the content of the training sessions. More detailed description of the training sessions and the participatory exercises are contained in Supplementary Files 2 and 3; the short presentations can be accessed on Slideshare (see Supplementary File 4 for links).

Early project training (Months 1 to 12).

Training began at Month 8, after the RESTORE researchers had been appointed in each country. In the first session, the rationale for using theory to shape and inform research study design, data collection and analysis was presented. NPT, the theory chosen to underpin RESTORE, was then introduced using previous studies as examples as well as the on-line NPT toolkit (http://www.normalizationprocess.org/). Following this, an interactive group exercise helped the research team to consider what issues might arise during the implementation of professional interpreters in primary care. To prompt discussion and improve understanding, the team used a set of 16 NPT-informed questions developed by the NPT trainers along with TdeB. These questions were also being used to guide the early stages of data analysis in the project (Table 1).[31 41]

Table 1. NPT constructs and sub-constructs as applied to RESTORE[31 41]

Coherence	Cognitive Participation	Collective Action	Reflexive Monitoring
Can stakeholders make sense of the intervention?	**Can stakeholders get others involved in implementing the intervention?**	**What needs to be done to make the intervention work in practice?**	**Can the intervention be monitored and evaluated?**
Differentiation:	**Enrolment:**	**Interactional workability:**	**Systematisation:**
Do stakeholders see this as a new way working?	Do the stakeholders believe they are the correct people to drive forward the implementation?	Does the intervention make it easier or harder to complete tasks?	Will stakeholders be able to judge the effectiveness of the intervention?
Individual specification:	**Initiation:**	**Skill set workability:**	**Individual appraisal:**
Do individuals understand what tasks the intervention requires of them?	Are they willing and able to engage others in the implementation?	Do those implementing the intervention have the correct skills and training for the job?	How will individuals judge the effectiveness of the intervention?
Communal specification:	**Activation:**	**Relational integration:**	**Communal appraisal:**
Do all those involved agree about the purpose of the intervention?	Can stakeholders identify what tasks and activities are required to sustain the intervention?	Do those involved in the implementation have confidence in the new way of working?	How will stakeholders collectively judge the effectiveness of the intervention?
Internalisation:	**Legitimation:**	**Contextual integration:**	**Reconfiguration:**
Do all the stakeholders grasp the potential benefits and value of the intervention?	Do they believe it is appropriate for them to be involved in the intervention?	Do local and national resources and policies support the implementation?	Will stakeholders be able to modify the intervention based on evaluation and experience?

Mid-project training (Months 13 to 24).

At month 13, we focused on the NPT constructs of coherence (sense-making) and cognitive participation (engagement). Learning from early training, we first used a non-RESTORE 'light' example with a humorous exercise which all the team could relate to – namely, could you contemplate staying in a circus tent at a future RESTORE team meeting? (Figure 3)

INSERT FIGURE 3 HERE

Following this, a RESTORE specific role play was employed to think through the issues of using professional interpreters in a primary care setting; this example drew on team members' own experiences of working with interpreters. Although this was designed to focus the discussion on issues relating to coherence and cognitive participation, issues relating to collective action and reflexive monitoring also arose (see Results).

By month 20, when the next face-to-face training took place, the in-country teams were preparing to commence fieldwork with their stakeholders (Stage 2 of RESTORE). Teams were given another opportunity to participate in an interactive role play. For this, a G/TI selected by one of the in-country RESTORE teams in collaboration with their stakeholders was used; some members of the RESTORE team were asked to role play the kind of discussions they might encounter in their fieldwork. The issues and questions that arose during this were recorded and mapped to the four NPT constructs by the other team members, using large wall charts and stickie notelets. The resultant mapping was then reviewed by the NPT trainers and discussed by the group.

Later training sessions (Months 25 to 40).

By month 25, teams were conducting fieldwork and moving into Stage 3, where the chosen G/TI would be fully adapted, implemented and the result of that implementation monitored. (This process and the results are reported in two recent RESTORE project papers.[41 48]) Teams were now

generating qualitative data about that process, which required the development of a coding framework broadly applicable across all the participating sites. Thus, training focused both on the constructs of collective action and reflexive monitoring and on the process of analysis.

To begin training in analysis, an anonymised extract of data generated from RESTORE fieldwork in Ireland was selected. This was pre-circulated to the teams for coding to the four constructs and, if possible, to the sub-constructs. In addition to team coding, the extract was sent to the trainers and to three recognised external experts in NPT. Coded data were collated and presented at the Consortium training at Month 25.

Training sessions at Months 38 and 43 continued to focus on analysis. Teams were asked to review extracts of data or to bring examples of coding dilemmas with them. Coding dilemmas included examples of data that researchers were concerned were being miscoded; data that did not appear to fit into the NPT framework; and data that appeared to be particular to only one site. Evaluation at the end of these later sessions allowed the NPT trainers to clarify the team's understanding of the coding process and to address any on-going concerns through teleconferences or email.

Non face-to-face support

Several mechanisms were put into place to support teams in-between face-to-face sessions, including buddy groups (linking teams experienced in theory use with less experienced teams); telephone and video conferences; email feedback on issues and problems. Later in the project, telephone and video conferences were also used to support data analysis, promoting consistency in the application of theory to analysis across the participating countries.

Outside the formal training sessions, we uploaded NPT relevant information such as key papers and links to the NPT Toolkit website (www.normalizationprocess.org) to a shared folder accessible by all the research team to serve as a resource whenever required.

Evaluation of the NPT training content

Face-to-face training was evaluated qualitatively at the end of each training day. Everyone present at the training days (generally all 18 members of the research team) participated in each evaluation; no one refused to participate. Methods included: written lists of the 3 most positive and 3 most negative features of the training; speed evaluation where each participant was given two minutes to verbally record which aspects of training had, or had not, been effective for them; scoring elements of the training on a Likert scale (e.g. from 1 = very poor to 5 = very good). These data were collected either as short written comments or recorded on a digital recorder. Additional evaluation was conducted approximately three weeks after the first session, when the team were emailed a short set of questions asking what had worked well; what had not worked well; and what they wanted from future training sessions. All the evaluation feedback was reviewed by the four members of the training team and the findings summarised into 'what worked', 'what didn't work' and 'what the team would like to do next'. The results of the evaluations were then summarised and presented back to the full team at the next face-to-face RESTORE Consortium meeting, providing the team with a further opportunity to comment on whether they believed all the key issues or suggestions regarding training had been captured and addressed.

Results

Early project training (Months 1 to 12).

Team evaluation indicated that the content of the first training sessions (Sessions 1 and 2, Supplementary File 2) was too didactic and prescriptive. The team felt overwhelmed trying to assimilate general knowledge about the application of theory to research along with NPT-specific information. The early use of the 16 NPT sensitising questions (Table 1) was not well liked by some researchers used to more inductive methods of working in qualitative projects. Others, particularly

the clinicians, found this approach helpful as they tried to develop their understanding of the theory's different constructs.

> *The 16 questions of the [NPT] toolkit gave us a better insight into what was meant by terms like 'sense-making' 'participation' 'action' and 'monitoring'. (Buddy report from Dutch and English teams).*

Mid-project training (Months 13 to 24).

As a result of team feedback on the didactic nature of the first sessions, the NPT trainers adopted a more PLA-focused style for the mid-project training sessions. This also reflected the methodological approach of the RESTORE project in the field, as described elsewhere.[27 31] Consequently, later sessions had one or at most two short didactic presentations, with the remaining time spent on participatory exercises. The mid-project training content was aligned more closely to the temporal arrangement of the project itself and linked to the over-arching constructs of NPT. Thus, we focused principally on sense-making (coherence) and engagement work (cognitive participation) first, before turning to the actual work undertaken (collective action) and, finally, monitoring and appraisal work (reflexive monitoring) (Figure 2).

The use of a 'light' humorous exercise, the circus tent (Figure 3), where the team could concentrate on the content of the theory without worrying about how it applied to future fieldwork evaluated well. Exercises using practical examples grounded in the fieldwork they would have to conduct during the course of the project were also helpful.

> *Exercises helped a lot! Very comfortable now! (Anonymous response in written evaluation feedback)*
>
> *Worked well. I'm beginning to see sense. The use of PLA methods/ techniques really helps grasping NPT and made it digestible! (Anonymous response in written evaluation feedback)*

Interactive exercises and role play designed to focus on coherence and cognitive participation also spontaneously picked up issues relating to collective action (who would actually do the work; how would it be funded) and reflexive monitoring (how would teams know if professional interpreters had an impact). This served as an important reminder that, even when NPT sensitising questions from researchers were designed to focus on sense-making and engagement, other issues would naturally emerge in the discussion, emphasising the lack of linearity in the application of theory to data generation. This was reflected in feedback obtained from two of the in-country teams.

> *Coherence and cognitive participation refer, in the main, to processes before any implementation work has occurred. However, we did note that the theory is fluid and not fixed or linear, so this means that the experience of doing the implementation work (collective action) and reflecting on that work (reflexive monitoring) could influence coherence and cognitive participation over time….. An 'aha!' moment occurred when we distilled the thinking in the group around the difference between cognitive participation and collective action as 'thinking about the doing' and 'doing the doing' (Buddy Report from Greek and Irish teams).*

Later training sessions (Months 25 to 40).

Training conducted later in the project steadily moved from using theory to inform the collection of data in the field to using theory to underpin analysis of data. Face-to-face training session at Months 25 and 31 focused mainly on coding data extracts and on round-table discussion of the approach being taken. Prior to meeting at month 25, teams received an extract of data generated by the Irish team (Box 2); teams were asked to code this to the main constructs and, if possible, sub-constructs of NPT. Coding was then compared at the training session in Month 25.

Box 2. Background to data generation by Irish team.

MORdeB and TdeB developed training materials to support the RESTORE researchers use the methods of PLA in their fieldwork. One of these was a DVD in which researchers in Ireland role-played a discussion amongst health care professionals, policy makers, migrants' representatives and interpreters about the implementation of a training initiative to support the use of trained interpreters in primary care consultations in Ireland. Researchers were assigned these roles; the facilitator was one of RESTORE's PLA experts. The role play was filmed and the dialogue transcribed to allow teams to review and develop experience in applying NPT to coding data. This PLA training will be described more fully in future publications.

Table 2 shows examples of coding from two of the in-country teams, along with the final coding agreed by the whole RESTORE team. The first coding extract was selected because the data focused mainly on the construct of coherence, i.e. developing an understanding of the rationale for using interpreters in practice and the benefits of that. Overall, there was a high level of agreement between the team in their data coding, particularly when coding to the high-level constructs of NPT. Each in-country team showed a good degree of consistency in coding to the construct of Coherence, with some coding in particular to the sub-constructs of Differentiation ('seeing interpreters as a new way of working') and Internalisation ('articulating the benefits of working with interpreters'). The Dutch team also coded this portion of transcript to the construct Cognitive Participation, suggesting that the conversation was also discussing the need to enrol others into working with interpreters (Table 2). Face-to-face discussion at Month 25 led to a shared understanding and agreement that – where data was referring to both understanding the use of interpreters ***and*** considering who should be involved – then it was appropriate to double code data to both Coherence and Cognitive Participation. Likewise, where resources were referred to, for example the provision of training and DVD materials, text could be coded to Collective Action (Contextual Integration). Such discussions both helped the team refine their understanding of NPT, but also resulted in a robust coding framework which could be used across all country teams.

This process continued at later training meetings, at months 31 and 38 supplemented by telephone and video conferences, where coding of data was compared and differences in interpretation discussed. To facilitate this process, each country team nominated one person to lead on coding qualitative data generated in that country, who then worked with the leads in the other countries to review and discuss coding. Examples of coding were discussed and memos relating to data coding circulated across the team, ensuring consistency of meaning and interpretation in relation to coding data. The final coding frame was then reviewed and discussed at a final training meeting involving all members of the RESTORE team which took place at month 43.

Table 2. Coding example from a transcript: coding by in-country team and final coding after discussion

Speaker	Text	NPT Coding
Coding from Irish Team.		
Facilitator	So when we began this, this morning [name] as the policy person you made a very interesting comment and you started the whole ball rolling with this didn't you?	
Policy maker*	Yeah, I suppose just reflecting on where we are at, at the moment within the health organisation is that we have a ban on travel and there's an embargo on education and training initiatives.	Coded this text to **Coherence (Internalisation)–** understands the initiative; sees benefit in it.
	So something like this that provides a DVD, training and guidance is a major plus. It's something that's really going to tick the boxes for us whilst be very meaningful for front line staff as well	Underlined text double coded to **Collective Action (Contextual Integration)** due to mention of training.
Facilitator	Okay so it's got two real advantages there, it's going to get over the problem you have about not being able to travel, not being able to go out and do the capacity building and training because it hands it to you right on the plate, as you see it. And also it's going to be very meaningful for front line staff, and if I remember [name] you found that interesting. You had a comment about that…	
GP*	Yeah I think this was mine here, so as a GP I really liked the fact that there was a resource available to me as a front line member of staff, a resource available to me which answers a lot of the questions that I have about using interpreters in my practice and how that might work. So I found that very helpful.	Coded text to **Coherence (Internalisation)** – sees benefit in this initiative.
		Underlined text double coded to **Coherence (Differentiation)** as this seems to be a new way of working.
Facilitator	So that's a real positive for you about this particular training initiative. Okay and who else has comments here that they'd like to read out to us and remind us about? There's quite a few here.	

Interpreter*	Yeah I think that one there [name] that you pointed to is my one and as an interpreter I felt that this package was particularly relevant because it gives special attention to the Irish context and I feel that that's very important for me in my role as an interpreter. And that you know for interpreters working in Ireland that its just very useful, I don't think this has been done before.	Text coded to Coherence – understands initiative and sees benefit of it. Underlined text double coded to **Coherence (Differentiation)** as this seems to be a new way of working.
Coding from Dutch Team		
Facilitator	So when we began this, this morning [name] as the policy person you made a very interesting comment and you started the whole ball rolling with this didn't you?	
Policy maker*	Yeah, I suppose just reflecting on where we are at, at the moment within the health organisation is that we have a ban on travel and there's an embargo on education and training initiatives. So something like this that provides a DVD, training and guidance is a major plus. It's something that's really going to tick the boxes for us whilst be very meaningful for front line staff as well	Text coded to **Coherence.** Underlined text double coded to **Cognitive Participation**, as need to engage frontline staff.
Facilitator	Okay so it's got two real advantages there, it's going to get over the problem you have about not being able to travel, not being able to go out and do the capacity building and training because it hands it to you right on the plate, as you see it. And also it's going to be very meaningful for front line staff, and if I remember [name] you found that interesting. You had a comment about that…	
GP*	Yeah I think this was mine here, so as a GP I really liked the fact that there was a resource available to me as a front line member of staff, a resource available to me which answers a lot of the questions that I have about using interpreters in my practice and how that might work. So I found that very helpful.	Text coded to **Cognitive Participation** as this was interpreted by Dutch team as focusing on the individual's willingness to engage with interpreters.
Facilitator	So that's a real positive for you about this particular training initiative. Okay and who else has comments here that they'd like to read out to us and remind us about? There's quite a few here.	

Interpreter*	Yeah I think that one there [name] that you pointed to is my one and as an interpreter I felt that this package was particularly relevant because it gives special attention to the Irish context and I feel that that's very important for me in my role as an interpreter. And that you know for interpreters working in Ireland that its just very useful, I don't think this has been done before.	First part coded to **Coherence** – focused on understanding and a new way of working. Underlined text double coded to **Cognitive Participation** – focused on buy-in and engagement with interpreters.
Final coding after face-to-face discussion		
Facilitator	So when we began this, this morning [name] as the policy person you made a very interesting comment and you started the whole ball rolling with this didn't you?	
Policy maker*	Yeah, I suppose just reflecting on where we are at, at the moment within the health organisation is that we have a ban on travel and there's an embargo on education and training initiatives.	Text coded to **Coherence** – trying to make sense of the training initiative; what makes it a new way or working.
	So something like this that provides a DVD, training and guidance is a major plus. It's something that's really going to tick the boxes for us whilst be very meaningful for front line staff as well	Text coded to **Collective Action (Contextual Integration)** – refers to what is involved and the resources provided (DVD, training and guidance). Underlined text double coded to **cognitive participation** – consideration of other groups that need to be engaged with
Facilitator	Okay so it's got two real advantages there, it's going to get over the problem you have about not being able to travel, not being able to go out and do the capacity building and training because it hands it to you right on the plate, as you see it. And also it's going to be very meaningful for front line staff, and if I remember [name] you found that interesting. You had a comment about that…	
GP*	Yeah I think this was mine here, so as a GP I really liked the fact that there was a resource available to me as a front line member of staff, a resource available to me	Text coded to **Coherence** – reflects that this is a new way of working

	which answers a lot of the questions that I have about using interpreters in my practice and how that might work. So I found that very helpful.	(**Differentiation**); recognises the benefits (**Internalisation**).
Facilitator	So that's a real positive for you about this particular training initiative. Okay and who else has comments here that they'd like to read out to us and remind us about? There's quite a few here.	
Interpreter*	Yeah I think that one there [name] that you pointed to is my one and as an interpreter I felt that this package was particularly relevant because it gives special attention to the Irish context and I feel that that's very important for me in my role as an interpreter. And that you know for interpreters working in Ireland that its just very useful, I don't think this has been done before.	Text coded to **Coherence (Differentiation)** – seen as a new way of working. Text underlined double coded to **Collective Action (Contextual Integration)** – this refers to Irish context.

Challenges

On-going telephone and email contact ensured that difficulties and tensions were quickly surfaced, particularly when theory was being applied to fieldwork. Training at month 20 began with an intensive de-briefing, where in-country teams were encouraged to freely discuss their concerns and challenges arising from using NPT. These focused on two, related, concerns. There was a continued lack of confidence in their knowledge of NPT itself and of being able to correctly map issues and data generated in the field to the NPT constructs. However, the use of visual methods of collecting and displaying data generated during the interactive group exercises, as exemplified in PLA approaches,[31] meant that the trainers could quickly identify a high degree of fidelity in the assignment of data to NPT constructs, thus reassuring the team of their knowledge development (Figure 4).

INSERT FIGURE 4 HERE

The second major issue reflected the disciplinary and epistemological differences within the research team. Some researchers were used to policy-related research, where the application of theory to data and the use of approaches such as Framework Analysis[49] were familiar. Others came from a sociological or anthropological background and were more comfortable with an inductive data-driven approach to analysis. This led to understandable concerns that data might be 'flattened' and shoe-horned into the NPT framework. To alleviate this concern, the trainers paid particular attention to the identification and recognition of coding which lay outside the NPT constructs, for example in relation to power dynamics between different stakeholders. A final concern was whether construct application and data generation, in the field, was linear or whether there were 'feedback loops'. For example, the research team considered the question of whether engaging in the work of implementing a G/TI could increase participants understanding or 'coherence' in relation to that G/TI? Training, therefore, continuously emphasised the lack of linearity in the process of applying theory to both data collection and analysis and encouraged the researchers to think through how this would affect data collection in the field.

Discussion

Principal findings and their relation to other work

We have described our approach to applying a mid-level sociological theory – Normalisation Process Theory – to a multi-site cross-country research study, RESTORE. In our endeavour to use NPT to shape our overall implementation journey, including data collection as well as analysis, we had to develop iterative and flexible training to support our multi-disciplinary, cross-national project team. While this presented challenges, we believe it also strengthened and added value to our work, ensuring it was designed, implemented and analysed in a robust and consistent manner across all five countries in which empirical data collection was conducted.

A multi-disciplinary, multi-national team inevitably has differences in terms of understanding the process of qualitative research and the use of theory. Professional and cultural perspectives impact on both individual and collective comfort (both in terms of country and professional discipline) with the concept of using theory to inform the design and conduct of a largely qualitative, implementation study. For example, researchers used to a more inductive approach to data analysis were initially cautious of an approach that applied theory to data analysis. The design of a robust programme of training, which acknowledged and discussed these perspectives during the course of the training, was challenging but also allowed the team to reach a shared understanding of what the study was trying to achieve. The benefits of surfacing these tensions became apparent as the training moved to the process of data analysis.

From our experience of developing training for using NPT, we have developed a series of generic recommendations that can be applied to other studies seeking to use theory in health services research (Table 3).

Table 3. Recommendations for the future development of training to support the use of theory in health services research

1. The application of theory to study design and fieldwork is not linear and training must acknowledge this
2. Experiential learning and the use of interactive, participatory and visual approaches are an important learning device.
3. Training can be most effective when it focuses on the high level constructs of a theory.
4. Different disciplinary backgrounds must be acknowledged and welcomed.
5. Space is required in the training programme to acknowledge and address researcher concerns.
6. Training in the application of theory can support the development and robustness of qualitative coding, especially for multi-site studies.

A key recommendation is to acknowledge, from the beginning of training, that theory is not linear or sequential. This is often a challenge when applying theory to fieldwork; for example, Michie and colleagues have developed their Behaviour Change model as a wheel, in order to address any pre-conceived conceptions of 'linearity'.[50] The model of candidacy has also been criticised for an apparent linearity that is not found when applied in the field.[51 52] The nature and speed of fieldwork means it is important for researchers to be familiar with all constructs of a selected theory, in order to fully appreciate the theoretical relevance of the data as it is generated. Thus, training needs to both acknowledge and affirm the complexities of temporal order in prospective fieldwork and ensure that researchers are familiar with all the components of a theory early enough in the research study to ensure confidence when moving into fieldwork.

Team learning and understanding develops more rapidly and deeply by using participatory and experiential approaches to learning.[31] In our work, interactive exercises with visual methods of collecting data, role play and non-specific 'light' examples were all effective approaches to supporting learning and understanding. We strongly recommend this approach in the development of training for any complex theory that requires new users to develop an understanding of a range of

components. The second advantage of using multiple interactive exercises is as a means to check on research team's 'theoretical fidelity' when analysing the data generated in the field.

Theoretical frameworks are often complex, with constructs which can themselves be broken down to ever smaller sub-constructs. This level of complexity can be daunting for researchers new to the theory being used and can lead to difficulties when coding data. Our experience suggests that a focus on the high level constructs of a theory works best in the early stages of training. Once teams have grasped and understood those, they can intuitively develop a deeper understanding of the underlying sub-components.

Throughout our training programme, we allowed ample time for concerns to be raised and discussed and for the team to develop solutions. An advantage of the time spent of training was apparent, however, later in the project as we moved onto coding the qualitative data generated across multiple sites. By then, the time spent in early training ensured that the team had a much clearer and consistent view of the constructs and their meaning, leading to a consistency and robustness in coding and analysis.

Conclusion

Overall, we found the prospective application of NPT to our work to be invaluable but, at times, challenging. We believe that these issues were not unique to the use of NPT, but could arise with the use of other theories, especially in large multi-site and cross-country projects. The development of a complementary package of training to support the use of our chosen theory ensured that our work was consistently and robustly informed by theory at all stages of the project, from design through data collection to analysis. This approach can, and should, be adopted by future research teams carrying out theoretically-informed implementation studies.

Competing interests

The authors declare that there are no competing interests.

Authors contributions

All authors (COD, FM, CD, MO'RdeB, TdeB, NB, CL, AS, MP, MvdM, EvWB, KG, LC, CP, ET, FvdDM, MV, WS, AMcF made substantial contributions to the design and development of RESTORE and it's training programme, to the collection of data or to the analysis and interpretation of the data. Training materials were developed by COD, FM, CD and AMcF, with input from MO'RdeB and TdeB. COD wrote the first draft of the paper and led substantive re-drafting, supported by FM, CD and AMcF; all authors listed above were involved in revising and commenting on later drafts of the manuscript. All authors have given their final approval to this version.

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Consent to use data

Ethical approval to use data generated during training was obtained from the National University of Ireland, Galway. All members of the RESTORE team agreed to their evaluation comments being used in this paper.

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Data Sharing

No additional data available. Training materials are available as described in the Supplementary Files.

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Figure 1. The three stages of RESTORE

Figure 2. Stages of NPT training and alignment with RESTORE fieldwork

Figure 3. NPT 'light' training material

Figure 4. Example of a visual data mapping exercise

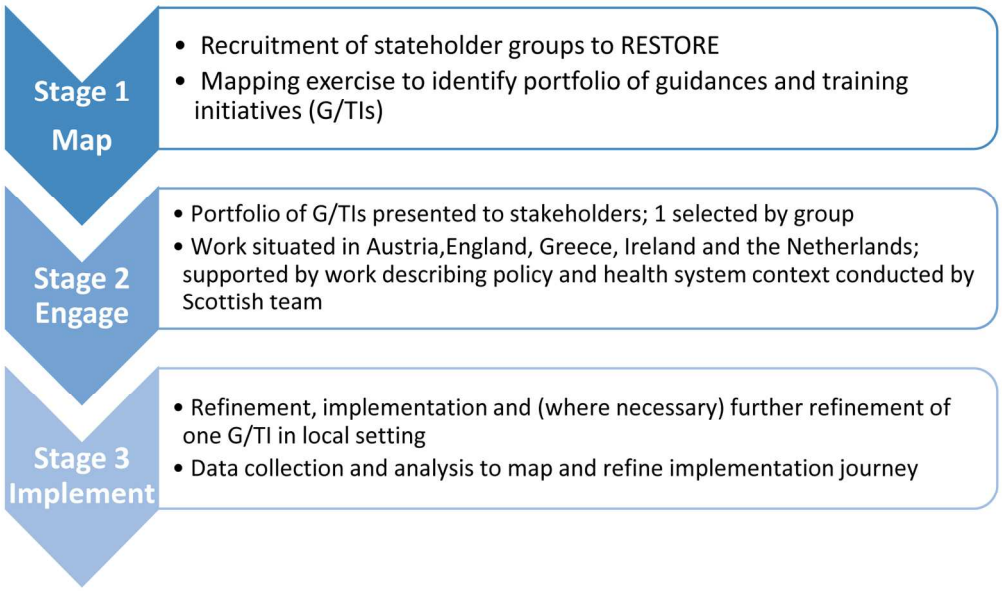

Figure 1. The three stages of RESTORE

154x91mm (300 x 300 DPI)

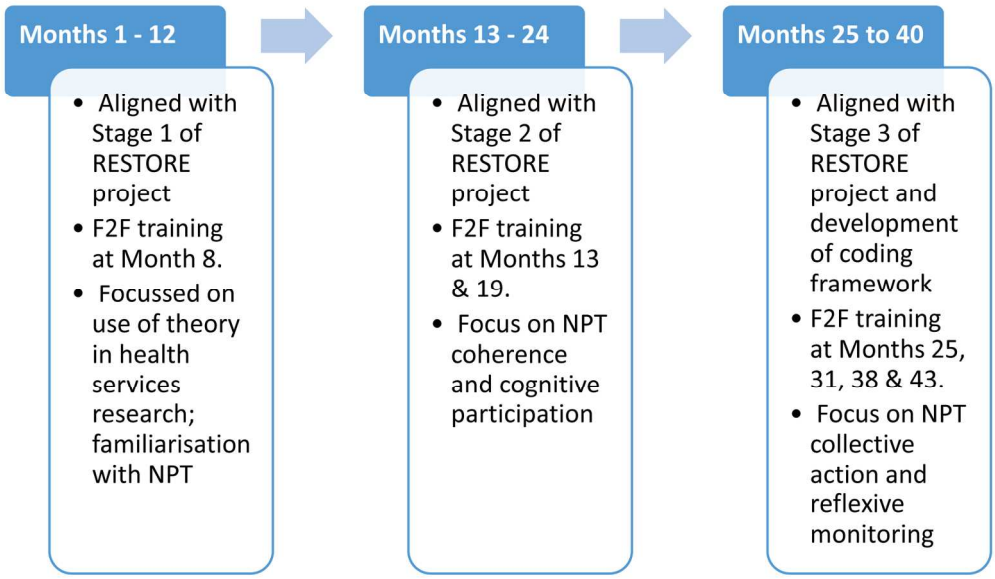

Figure 2. Stages of NPT training and alignment with RESTORE fieldwork

154x90mm (300 x 300 DPI)

Question: Do we think a circus tent can become a normalised venue for accommodation for our next RESTORE team meeting?

In addressing this question, consider the following NPT sensitising questions:

Does this make sense to the team as a whole and to individuals within the team? (Coherence)
What work needs to be done to get everyone in the team to engage with the idea? (Cognitive participation)
Who needs to do what to put this into action? What resources do we need? (Collective action)
How will we know if it worked in practice? (Reflexive monitoring)

Figure 3. NPT "light" training material

149x132mm (300 x 300 DPI)

Each "sticky" notelet corresponds to an item of verbal data identified from the interative role play discussion

Figure 4. Example of a visual data mapping exercise

160x129mm (300 x 300 DPI)

Supplementary File 1. RESTORE team backgrounds and NPT experience

Country	Professional background	Experience of NPT	Country	Professional background	Experience of NPT
Austria			**Ireland**		
RESTORE Applicant	Academic general practitioner	New to NPT	RESTORE Applicant	Social scientist	Experienced in use of NPT; part of original group who developed NPT; using NPT in several projects
Researcher	Social scientist	New to NPT	Researcher	Social/cultural anthropologist	Familiar with NPM; New to NPT
			Researcher	Social/cultural anthropologist	New to NPT
England			**Netherlands**		
RESTORE Applicant	Academic general practitioner	Experienced in use of NPT; part of original group who developed NPT	RESTORE Applicant	Academic general practitioner	New to NPT
Researcher	Social anthropologist	New to NPT	RESTORE Applicant	Academic general practitioner	New to NPT
Researcher	Social scientist	New to NPT	Researcher	Academic general practitioner	New to NPT
			Researcher	Social/cultural anthropologist	New to NPT
Greece			**Scotland**		
RESTORE Applicant	Academic general practitioner; Primary health care services researcher	New to NPT	RESTORE Applicant	Health services research	Experienced in use of NPT; part of NIHR NPT user group; using NPT in several projects
Researcher	Public health researcher	New to NPT	RESTORE Applicant	Academic general practitioner	Experienced in use of NPT; part of original group who developed NPT; using NPT in

Researcher	Lecturer in social work	New to NPT	Researcher	Sociologist	several projects New to NPT

Supplementary File 2. NPT training programme

Training	Session & Duration	Content
Early project training (Months 1 to 12)		
Month 8 November 2011	Training Session 1. (2.5 hours)	**Introduction to NPT.** Development of NPT from ehealth research. Overview of NPT and its four main constructs.
	Training Session 2. (4.5 hours)	**Using NPT in RESTORE.** Example of using NPT in a qualitative study on use of interpreters in primary care. Using NPT in RESTORE – focus on constructs of coherence and cognitive participation Participatory Exercise 1: Team asked to think about the issues arising from implementation of paid interpreters in primary care.
Mid-project training (Months 13 to 24)		
Month 13 April 2012	Training Session 3. (2.0 hours)	**Using NPT in RESTORE.** Focus of NPT constructs coherence and cognitive participation. Participatory Exercise 2: NPT "light" non-RESTORE exercise
	Training Session 4. (2.0 hours)	Focus of NPT constructs coherence and cognitive participation. Participatory Exercise 3: NPT RESTORE exercise
Month 20 November 2012	Training Session 5 (2.0 hours)	**Addressing anxieties.** Roundtable discussion of arising concerns. Review of why NPT being used and its role in the project.
	Training Session 6 (2.0 hours)	**Using NPT in RESTORE.** Participatory Exercise 4: NPT RESTORE exercise
Later training sessions (Months 25 to 48)		
Month 25 April 2013	Training session 7 (2.5 hours)	**Coding using NPT.** Preparatory work of coding data extract; face-to-face discussion of coding decisions at Consortium training. Participatory Exercise 5: Discussion of coded extract of RESTORE data.
Month 31 October 2013	Training session 8 (1.5 hours)	**Addressing anxieties.** Roundtable discussion of progress with respect to using NPT

		in fieldwork and in coding.
	Training session 9 (3 hours)	**Coding using NPT.** Team reviewed coding exercise conducted in-between face-to-face meetings; discussed Irish data transcript coded by AMacF; and discussed team coding "dilemmas".
Month 38 May 2014	Training session 10 (3 hours)	**Coding using NPT.** Focused on reviewing where each country team was in relation to NPT coding; connections between fieldwork and NPT; identifying and discussing coding dilemmas.
Month 43 October 2014	Training session 11	Final discussion and clarification of coding framework.

Supplementary File 3. Participatory exercises

Month 8, Participatory Exercise 1	Consider the following scenario: Your health organisation is about to introduce paid interpreters into the primary care consultation. What NPT-informed questions might you ask to assess how well this is implemented into practice? Participants were directed to the NPT toolkit, with its 16 questions, to help them "think this through"
Month 13, Participatory Exercise 2	NPT "light": An exercise designed to get the research team thinking about coherence (understanding) and cognitive participation (participation). Using interactive small group work, the team focussed on an example entitle "Circus tent". Teams were asked to consider if a circus tent could become normalised as team accommodation for future Consortium meetings. While the team debated this, the NPT trainers observed the questions, took notes and assigned these to NPT categories. E.g. Is this something new to me? (Coherence - Differentiation) Do you think this will be helpful to the team? (Coherence – Internalisation) Will everyone agree that this is reasonable? (Cognitive participation - Legitimation) How many of the team buy into this idea? (Cognitive participation = Enrolment)
Month 13, Participatory Exercise 3	NPT RESTORE exercise: Teams asked to consider the issues that might arise when implementing paid interpreters in primary care. Half of the team were assigned roles (GP, nurse, interpreter, migrant patient) and role-played a discussion about using interpreters; other half of team watched, noting key questions and issues that arose, then assigned these to NPT constructs. N.B. The exercise was designed to focus on the constructs of coherence and cognitive participation; however, teams also had to pay attention to collective action and reflexive monitoring.
Month 20, Participatory Exercise 4	NPT RESTORE exercise: Teams given the G/TI selected by the Irish team. Asked to role play as a practice team with roles assigned to address the question "What levels and barriers will you encounter as you try to implement this guidance in practice?". Project members took turns at either role playing or noting NPT issue and assigning them to constructs.
Month 25, Participatory Exercise 5	NPT RESTORE exercise: Teams pre-circulated a short extract from a training DVD developed by the PLA trainers in which the Irish team role-played a training session with stakeholders. Teams were asked to code the qualitative extract to the main NPT construct. Three external researchers expert in the use of NPT also asked to code the extract, as

well as RESTORE NPT training team. Coding collated and presented, paragraph by paragraph, to team at face-to-face meeting.

Supplementary File 4. Location of NPT presentations on Slideshare

NPT Unpicked for the RESTORE project (http://www.slideshare.net/KateODonnell6/npt-unpicked-for-restore-project-57742520).

NPT training session 2 for RESTORE (http://www.slideshare.net/KateODonnell6/npt-training-session-2-for-restore)

NPT in RESTORE (http://www.slideshare.net/KateODonnell6/npt-in-restore)

NPT Coding exercise for RESTORE (http://www.slideshare.net/KateODonnell6/npt-coding-exercise-for-restore-57743364

O'Donnell et al.

Supporting the use of theory in cross-country health services research: Normalisation Process Theory as an example

Reporting Checklist.

Checklist used: Smith L, Rosenzweig L, Schmidt M. Best practices in the reporting of participatory action research: Embracing both the forest and the trees. The Counseling Psychologist 2010;**38**(8):1115-38

Guidelines for the reporting of participatory action research (PAR).

Criteria from Smith et al	As reported in O'Donnell et al
Organisational structure of the paper	We have based the organizational structure of our paper on the guidance issued by BMJ Open. We have, therefore, reported using the structure of Introduction, Methods, Results, Discussion. While we have sought to match the content of each section to the general expectations of the BMJ Open audience, the Methods section contains a more descriptive account on the way that the training programme evolved and developed in response to the needs of the research team. Again, the discussion section moves beyond a conventional discussion and is the place where we include our generic recommendations which, we believe, could be applied to the development of training in the use of other theoretical frameworks.
Key elements of the project	Please note: in the application of this checklist, the term 'project' is taken to apply to the training programme in the use of NPT (hereafter described as the 'NPT training programme', which is the subject of this paper. Where necessary, we also refer to RESTORE, which was the FP7 funded research project that the NPT training programme was designed to support. We hope this

	distinction is clear in our responses below.
How was the project initiated?	The NPT training programme was initiated in response to the needs of the RESTORE research team, to support them in their understanding and use of the theoretical framework being used. This is described in the paper as follows: **Introduction, Page 7:** Research teams must be comfortable and aligned with the use of the selected theory and in agreement about the meaning and application of its individual components or constructs. Such challenges are enhanced when teams are working in different settings, countries and across language as construct understanding and implementation are likely to be both culturally and context-dependent. This mirrors challenges identified in conducting qualitative research across different settings.[26] These challenges faced the EU-funded RESTORE project, a multi-site implementation study across six European countries (Box 1).[27] Focussed on cross-cultural communication in primary care, the design and analysis of RESTORE was underpinned throughout by a recognised theoretical framework - Normalisation Process Theory (NPT). However, the application of theory to a research study was a new concept for many members of the team. As a result, we had to develop a training programme to familiarise and support the team in this process.
What was the project's timeframe?	The RESTORE project was a 48-month project (see Figure 1); the NPT training programme was initiated at month 8 and ran in tandem with the project. This is described on Page 12 and illustrated in Figure 2: **Methods, Page 12: Application of theory to the RESTORE study** As described previously, the RESTORE project was designed in three, inter-related stages (Figure 1). Although not entirely linear, the study was designed to broadly align to the four constructs of NPT (Figure 2). Stage 1 focused on familiarisation, first on the broad need to apply theory to RESTORE and then, with NPT itself. Stage 2 mapped to coherence and cognitive participation; Stage 3 mapped to collective action and reflexive monitoring. This structure then influenced the design of the training for the team, which is now described in detail.
Who were the participants and/or co-researchers?	The participants were the 19 members of the RESTORE research team. They were also the co-researchers in the design, application and evaluation of the NPT training programme. The team consisted of the senior academics who wrote the RESTORE funding application and the researchers who were employed on RESTORE. The team was multi-professional and multi-disciplinary, consisting of academic general practitioners/family doctors, anthropologists, social

	scientists and health services/primary care researchers. The composition of the team is described in the **abstract**, in **Methods page 9** and more fully in **Supplementary File 1**. **Abstract: Participants:** RESTORE research team consisting 8 project applicants, all senior primary care academics; 10 researchers. Professional backgrounds included 7 academic general practitioners; 4 social/cultural anthropologists; 4 sociologists; 3 health services/primary care researchers. **Methods, Page 9: The RESTORE Team** The research team included research and clinical disciplines, with a wide range of expertise and knowledge of the chosen theoretical framework (Supplementary File 1). Three country teams (Austria, Greece and the Netherlands) had no experience of using NPT. Four team members (MacFarlane, Mair, Dowrick and O'Donnell) had extensive experience of using NPT[33-36] including applying NPT prospectively to complex interventions.[29 37-39] These four team members thus formed the NPT trainers group, leading the development and delivery of the training reported here.
What was the extent of their participation and the nature of their roles?	Four members of the team were experienced in the application of NPT to research projects and so took on the role of NPT programme trainers. The other members of the team were fully engaged in th training programme, by participating in the NPT training programme and second, by their feedback and reflection on the process. Importantly, it was their feedback on the training that led to the continual development and evolution of the training programme. This is reported at various points of the paper, including: **Methods, Pages 13 – 17:** See paper for text. **Results, Pages 17 – 19:** See paper for text. **Discussion, Page 22:** Throughout our training programme, we allowed ample time for concerns to be raised and discussed and for the team to develop solutions. An advantage of the time spent of training was apparent, however, later in the project as we moved onto coding the qualitative data generated across multiple sites. By then, the time spent in early training ensured that the team had a much clearer and consistent view of the constructs and their meaning, leading to a consistency and robustness in coding and analysis.

What was the process within and/or methodology of the project?	The methodology of the work was informed by Participatory Learning and Action (PLA), mirroring the use of PLA in the wider RESTORE project itself. Throughout, we collected qualitative data from the RESTORE team on their views of the training sessions, analysed these data thematically and used the findings to inform the design of later training sessions. This is described in the paper: **Methods, Page 14:** This approach, however, proved too prescriptive and over-whelming for team members trying to assimilate knowledge about applying theory to research (see Results). This led to several important modifications in the development of the training. In consultation with our PLA experts (MO'RdeB and TdeB), we incorporated more PLA-informed exercises and approaches into the training.[42] Consequently, later sessions had one or at most two short didactic presentations, with the remaining time spent on participatory exercises. The training content was aligned more closely to the temporal arrangement of the project itself and linked to the over-arching constructs of NPT. Thus, we focused principally on sense-making (coherence) and engagement work (cognitive participation) first, before turning to the actual work undertaken (collective action) and, finally, monitoring and appraisal work (reflexive monitoring) (Figure 2). **Methods, Pages 16-17: Evaluation of the NPT training content** Face-to-face training was evaluated qualitatively at the end of each training day. Methods included: written lists of the 3 most positive and 3 most negative features of the training; speed evaluation where each participant was given two minutes to verbally record which aspects of training had, or had not, been effective for them; scoring elements of the training on a Likert scale (e.g. from 1 = very poor to 5 = very good). These data were collected either as short written comments or recorded on a digital recorder. Trainers reviewed the feedback thematically and used it to inform subsequent training sessions. Additional evaluation was conducted approximately three weeks after the first session, when the team were emailed a short set of questions asking what had worked well; what had not worked well; and what they wanted from future training sessions. The results of the evaluations were summarised and fed back at RESTORE Consortium meetings providing researchers with a further opportunity to comment on whether they believed all the key issues or suggestions regarding training had been captured and addressed.
What were the project outcomes and/or	Training outcomes were increased confidence and comfort amongst the RESTORE research team

emergent actions?	in (i) the use of theory in health services research projects; (ii) understanding of NPT.
What comes next (if the project is on-going)?	The RESTORE project is now finished. We hope, however, that this paper and our generic recommendations can be used to support training for other health service research projects whether they are using NPT or another theoretical framework. See **Discussion, Page 21.**
Consider charts, guidelines, tables, graphics to convey part or all of the project design	We have illustrated our data with a number of Figures and Illustrations.
Convey the experiences of the co-researchers	
Pay attention to who is writing the article and how their voices and experiences are represented	Although the lead author (COD) was one of the trainers, the paper has actively involved all members of the team. Therefore, we believe that all the voices of the RESTORE team are represented in this work.
Pay attention to who is *not* writing the article and how their voices and experiences are represented	See above.
What were the personal outcomes of the project?	A principal aim was to increase individuals' knowledge, expertise and confidence both in the use of theory in health services research projects more generally, and in the use of NPT in particular. We believe that we evidence that these personal outcomes were met. In addition, the team's level of understanding and confidence had the unintended consequence of aiding later processes within the RESTORE project such as cross-country qualitative data coding and analysis.
Address the challenges, pitfalls, and limitations of the project	
What were they?	We have discussed the general strengths and limitations of the project in the discussion: **Discussion, Page 23: Strengths and Limitations** This training programme in the use of a mid-level theory was developed for a multi-disciplinary team working across 6 European countries; thus, it also had to pay careful attention to both language and cultural differences across the RESTORE research team. The evaluation and careful

	monitoring of both the development and delivery of the training is a clear strength of this work. That the training programme was acceptable to such a diverse group is another strength. Weaknesses include the small group of researchers involved, although the team did include a range of disciplinary and research backgrounds. The training was focused on the use of only one theoretical framework – NPT – but we believe that the lessons learned from this and the recommendations arising from the work are applicable to other theoretical frameworks.
How were they managed?	A particular challenge in the training programme was managing th different levels of knowledge an expertise within the team. One important lesson was the need to build in time for critical reflection and discussion of the process – this is discussed within the Results section. **Results, Page 18:** Interactive exercises and role play designed to focus on coherence and cognitive participation also spontaneously picked up issues relating to collective action (who would actually do the work; how would it be funded) and reflexive monitoring (how would teams know if professional interpreters had an impact). This served as an important reminder that, even when NPT sensitising questions from researchers were designed to focus on sense-making and engagement, other issues would naturally emerge in the discussion, emphasising the lack of linearity in the application of theory to data generation. On-going telephone and email contact ensured that difficulties and tensions were quickly surfaced, particularly when theory was being applied to fieldwork. Training at month 20 began with an intensive de-briefing, where in-country teams were encouraged to freely discuss their concerns and challenges arising from using NPT. These focussed on two, related, concerns. There was a continued lack of confidence in their knowledge of NPT itself and of being able to correctly map issues and data generated in the field to the NPT constructs. However, the use of visual methods of collecting and displaying data generated during the interactive group exercises, as exemplified in PLA approaches,[42] meant that the trainers could quickly identify a high degree of fidelity in the assignment of data to NPT constructs, thus reassuring the team of their knowledge development (Figure 4).
What can we learn?	We believe that a key message from our work is the set of generic recommendations which could be applied to other training programmes seeking to support the use of theory in health services research projects. These are detailed in the **Discussion, pages 21 – 23.**

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Supporting the use of theory in cross-country health services research using Normalisation Process Theory as an example: A participatory qualitative approach

Reporting Checklist.

Checklist used: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care* 2007;19(6):349-57. doi: 10.1093/intqhc/mzm042

Criteria from Tong et al	As reported in O'Donnell et al
Domain 1: Research team and reflexivity.	
Personal Characteristics	
1. Interviewer/facilitator. Which author/s conducted the interview or focus group?	Training and qualitative evaluation of training led by Catherine O'Donnell and Anne MacFarlane, assisted by Christopher Dowrick, Frances Mair and Mary O'Reilly de Brun.
2. Credentials What were the researcher's credentials? E.g. PhD, MD.	Catherine O'Donnell (COD): BSc (Hons), PhD, MPH. Anne MacFarlane (AMcF): BA, MA, PhD. Christopher Dowrick (CD): BA, MSc, MD, CQSW, FRCGP, FFPHM. Frances Mair (FM): MBChB, MD, FRCGP, DRCOG. Mary O'Reilly de Brun (MORdeB): BA.Th, M.Th.
3. Occupation What was their occupation at the time of the study?	Catherine O'Donnell (COD): Professor of Primary Care Research & Development

	Anne MacFarlane (AMcF): Professor of Primary Healthcare Research. Christopher Dowrick (CD): Professor of Primary Medical Care. Frances Mair (FM): Professor of Primary Care Research. Mary O'Reilly de Brun (MORdeB): Research Fellow.
4. Gender. Was the researcher male or female?	NPT training team consisted of four females; one male.
5. Experience and training. What experience or training did the researcher have?	O'Donnell, MacFarlane, Mair, Dowrick are experienced, senior primary care academics. All four have led substantive programmes of research, using quantitative and qualitative methodologies, exploring a range of primary care issues. All have extensive experience of using NPT including applying NPT prospectively to complex interventions. These four team members thus formed the NPT trainers group, leading the development and delivery of the training reported here. Mary O'Reilly de Brun is an experienced researcher in the use of Participatory Learning in Action.
Relationship with participants	In answering these questions, I have regarded 'participants' as the members of the research team who were the focus of the training.
6. Relationship established Was a relationship established prior to study commencement?	Throughout the project, there was a close working relationship across the entire team of 18 individuals. Regular meetings of the project team, coupled with the training described in this paper, resulted in a strong-knot groups with high levels of confidence in each other. This also engendered a powerful sense of community within the team, which crossed county location, disciplinary background, and level of seniority.
7. Participant knowledge of the interviewer. What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	The NPT trainers, who led on the evaluation, were part of the full RESTORE team. Thus the other members of the RESTORE research team knew NPT trainers well. The purpose of obtaining evaluation feedback was explained to the team and all consented to their feedback being used both to inform future training, and to being used in future publications.
8. Interviewer characteristics. What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	Reasons for collecting evaluation feedback from the research team was explained, and re-iterated, at each training session. The research team knew that the NPT trainers group (COD, AMacF, CD and FM) were interested in developing future training for use with other research groups.
Domain 2: study design	
Theoretical framework	

9. Methodological orientation and Theory. What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	The methodological approach was that of Participatory Learning and Action, a participatory and democratic approach to the generation and analysis of data. The theoretical framework used was Normalisation Process Theory. This is a mid-range sociological theory concerned with the work that individuals and organisations have to carry out in order to embed and normalise new, complex ways of working into routine practice. NPT operates through four principal constructs or areas of work: coherence (sense-making work); cognitive participation (engagement work); collective action (enacting work); and reflexive monitoring (appraisal work), each with its own set of sub-constructs
Participant selection	
10. Sampling How were participants selected? e.g. purposive, convenience, consecutive, snowball	There was no participant sampling; all 18 members of the RESTORE team participated in the NPT training and in the evaluation of that training.
11. Method of approach How were participants approached? e.g. face-to-face, telephone, mail, email	N/A.
12. Sample size How many participants were in the study?	N/A.
13. Non-participation How many people refused to participate or dropped out? Reasons?	All members of the RESTORE team participated in the training and evaluation of that training; there were no drop-outs.
Setting	
14. Setting of data collection Where was the data collected? e.g. home, clinic, workplace	Data on the evaluation of the training were collected at each face-to-face RESTORE Consortium meeting. These meetings were held in the participating institutions across the 6 RESTORE countries: Austria, England, Greece, Ireland, the Netherlands and Scotland.
15. Presence of non-participants Was anyone else present besides the participants and researchers?	No.
16. Description of sample What are the	The RESTORE research team consisting of 8 project applicants, all senior primary care academics;

important characteristics of the sample? e.g. demographic data, date	and 10 researchers. Professional backgrounds included general practitioners/family doctors; social/cultural anthropologists; sociologists; health services/primary care researchers.
Data collection	
17. Interview guide Were questions, prompts, guides provided by the authors? Was it pilot tested?	Data were collected from the RESTORE team in a number of ways – all consistent with the methodological approach on Participatory Learning in Action. As described the paper methods included: written lists of the 3 most positive and 3 most negative features of the training; speed evaluation where each participant was given two minutes to verbally record which aspects of training had, or had not, been effective for them; scoring elements of the training on a Likert scale (e.g. from 1 = very poor to 5 = very good). These data were collected either as short written comments or recorded on a digital recorder. Additional evaluation was conducted approximately three weeks after the first session, when the team were emailed a short set of questions asking what had worked well; what had not worked well; and what they wanted from future training sessions.
18. Repeat interviews Were repeat interviews carried out? If yes, how many?	No
19. Audio/visual recording Did the research use audio or visual recording to collect the data?	Some feedback was recorded on a digital recorder.
20. Field notes Were field notes made during and/or after the interview or focus group?	No
21. Duration What was the duration of the interviews or focus group?	N/A
22. Data saturation Was data saturation discussed?	N/A
23. Transcripts returned Were transcripts returned to participants for comment and/or correction?	N/A. Evaluation comments were collated and feedback to the team at the next face-to-face meeting to permit discussion and clarification.

Domain 3: analysis and findings	
Data analysis	
24. Number of data coders How many data coders coded the data?	All the evaluation feedback was reviewed by the four members of the training team and the findings summarised into 'what worked', 'what didn't work' and 'what the team would like to do next'.
25. Description of the coding tree Did authors provide a description of the coding tree?	N/A
26. Derivation of themes Were themes identified in advance or derived from the data?	N/A
27. Software What software, if applicable, was used to manage the data?	No software was used
28. Participant checking Did participants provide feedback on the findings?	Evaluation feedback was presented back to the team for discussion and clarification.
Reporting	
29. Quotations presented Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? e.g. participant number	Yes – quotations have a descriptor that is non-identifiable of individuals.
30. Data and findings consistent Was there consistency between the data presented and the findings?	Yes.
31. Clarity of major themes Were major themes clearly presented in the findings?	N/A
32. Clarity of minor themes Is there a description of diverse cases or discussion of minor themes?	N/A.

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Supporting the use of theory in cross-country health services research: A participatory qualitative approach using Normalisation Process Theory as an example

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Supporting the use of theory in cross-country health services research: A participatory qualitative approach using Normalisation Process Theory as an example

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Abstract

Objectives: To describe and reflect on the process of designing and delivering a training programme supporting the use of theory, in this case Normalisation Process Theory (NPT), in a multi-site cross-country health services research study.

Design: Participatory research approach utilising qualitative methods.

Setting: Six European primary care settings involving research teams from Austria, England, Greece, Ireland, The Netherlands and Scotland.

Participants: RESTORE research team consisting of 8 project applicants, all senior primary care academics; and 10 researchers. Professional backgrounds included general practitioners/family doctors; social/cultural anthropologists; sociologists; health services/primary care researchers.

Primary outcome measures: Views of all research team members (n=18) were assessed using qualitative evaluation methods, analysed qualitatively by the trainers after each session.

Results: Most of the team had no experience of using NPT and many had not applied theory to prospective, qualitative research projects. Early training proved didactic and overloaded participants with information. Drawing on RESTORE's methodological approach of Participatory Learning and Action, workshops using role play, experiential interactive exercises and light-hearted examples not directly related to the study subject matter were developed. Evaluation showed the study team quickly grew in knowledge and confidence in applying theory to fieldwork.

Recommendations applicable to other studies include: accepting that theory application is not a linear process; that time is needed to address researcher concerns with the process; and that experiential, interactive learning is a key device in building conceptual and practical knowledge. An unanticipated benefit was the smooth transition to cross-country qualitative coding of study data.

Conclusion A structured programme of training enhanced and supported the prospective application of a theory, NPT, to our work, but raised challenges. These were not unique to NPT, but

could arise with the application of any theory, especially in large multi-site, international projects. The lessons learned are applicable to other theoretically-informed studies.

Keywords

Theory; Health services research; Training; Normalisation Process Theory.

Strengths and Limitations

- The training programme was developed to support the use of a mid-level theory in 6 European countries with different primary care systems and cultures.
- Training development, delivery and evaluation engaged with a multidisciplinary team of clinical and non-clinical researchers encompassing multiple professional disciplines.
- Evaluation and careful monitoring of the training alerted us to delivery challenges and facilitated the development of a participatory approach to learning.
- The group of researchers involved in the design and feedback evaluation was relatively small.
- Training focused on one theory – Normalisation Process Theory – but has resulted in a set of generic recommendations.

Introduction

Bridging the research to practice gap is a recognised problem in health services research.[1 2] One important solution is to underpin such research with strong theoretical approaches.[1 3 4] Advantages include providing a framework that is generalizable across settings and individuals; incremental generation of knowledge; and a guide for analysis.[3 5 6] Theory can also enhance our understanding of the barriers to research translation and implementation and alert us to the context into which new interventions and services are placed. [6-9] However, many interventions and services are implemented with little or no attention to theory.[3 5] When theories are used, they often guide analysis rather than inform the design and conduct of the overall study.[5 10 11] This may be due, in part, to recognised challenges in applying theory to health services research.

Challenges in using theory in health services research

The first challenge is a lack of conceptual clarity as to what a 'theory' is. MacDonald describes theory as "an organized, heuristic, coherent, and systematic articulation of a set of statements related to significant questions ……. providing a generalizable form of understanding".[12] There are three recognised levels of 'theory'. Grand theory is abstract and broadly applicable across different areas and subjects.[6 12 13]. The next level – mid-range or 'big theory' – is less abstract, addressing specific phenomena and concepts that can be incorporated into testable propositions or questions and inform intervention development.[6 12] The third level, programme theory, is often considered as 'small' theory, specifying particular components of an intervention in logic models and explicitly linking a programme's processes and inputs to its intended outcomes.[6 14]

The second challenge is to decide which theory best informs the work being conducted. For example, theory can focus on: explaining individual behaviours and responses (e.g. Theory of Planned Behaviour); understanding organisational responses (e.g. Diffusion of Innovation); dissemination (e.g. Streams of Policy Process); or implementation (e.g. Promoting Action on

Research Implementation in Health Services or PARIHS).[15] While theoretical choice is informed by the research, the disciplinary composition and background of the research team is also influential.[16] [17] Health services research is often multidisciplinary and draws on many fields including sociology, psychology, biostatistics, health economics and clinical disciplines. This requires teams to understand and respect each other's theoretical and paradigmatic positions.[3] The final challenge is a lack of guidance in applying theory to studies.[7] [18]

The application of theory in practice

Consideration has been given to how research teams could apply theory in practice. For example, the Reach, Effectiveness, Adoption, Implementation and Maintenance (RE-AIM) framework was developed for use in the evaluation of public health programmes and interventions but is now widely applied.[19] [20] RE-AIM focuses researchers' attention on: population reach; the intervention's adoption, implementation and effectiveness; and, finally, on its maintenance in practice.[20] The developers of Re-AIM have released training and support for other researchers (http://www.re-aim.hnfe.vt.edu/). However, even with such training available, it is not always applied consistently. Gaglio identified 71 papers published between 1999-2010 that used RE-AIM;[20] of these, 'reach' was the most frequently reported dimension, with 'maintenance' reported least often. There was also variation in the reporting of the individual components of each construct. Most reporting was quantitative, with little qualitative research to explore how components were used or understood.

Similar results were reported for the PARIHS framework, which describes several interacting components including clinical and patient experience; local context; culture and leadership; and facilitation.[21] Again, there was variation in its use across studies, with a lack of detail on the application of different sub-components to fieldwork.[18] [22] Two other reviews examined the application of the Knowledge to Action (KTA) Framework[23] and Normalisation Process Theory[24] to implementation studies. In both, the authors found stability in the application of the high level

constructs across studies but, again, variation in researchers' attention to the sub-constructs of each. This lack of 'theory fidelity' has been raised in other fields, notably health promotion.[23 25]

Translating the constructs of a chosen theory into interventions can be challenging, especially when applied across multiple research sites.[5 7 23] Research teams must be comfortable and aligned with the use of the selected theory and in agreement about the meaning and application of its individual components or constructs. Such challenges are enhanced when teams are working in different settings, countries and across cultural and language boundaries as construct understanding and implementation are likely to be both culturally and context-dependent. This mirrors challenges identified in conducting qualitative research across different settings.[26] These challenges faced the EU-funded RESTORE project, a multi-site implementation study across six European countries (Box 1).[27] Focused on cross-cultural communication in primary care, the design and analysis of RESTORE was underpinned throughout by a recognised mid-level, sociological theory - Normalisation Process Theory (NPT). However, the application of theory to a research study was a new concept for many members of the team. As a result, we had to develop a training programme to familiarise and support the team in this process.

The aim of this paper is to describe and reflect on the process of designing training in the use of theory in a multi-site cross-country research project. We discuss the challenges this brought, as well as the benefits. Finally, we make recommendations that could be applied to other theoretically-driven health services research located in multiple settings, regardless of the theory selected.

Box 1. Description of the RESTORE project and its underpinning theory, Normalisation Process Theory.[27]

RESTORE (REsearch into implementation STrategies to support patients of different ORigins and language background) was focused on the implementation of guidance and training initiatives to support cross-cultural consultations in primary care for vulnerable migrant populations: asylum seekers and refugees; migrants in low paid employment; and undocumented migrants.[27 28] Funded by the EU FP7 Programme, RESTORE aimed to bridge the research-practice gap by collecting empirical data on the selection, co-design and implementation of such interventions in five European primary care settings: Austria, England, Greece, Ireland, and the Netherlands. A sixth partner, Scotland, focused on the role of the policy environment and health systems of participating countries.[29]

RESTORE used a participatory research approach – Participatory Learning and Action (PLA) – as its over-arching methodological approach, generating rich, in-depth qualitative data.[27 30 31] This involved a range of stakeholders including primary care practitioners, migrant service users, community interpreters and policy makers. To shape the study approach, facilitate data collection and guide the analysis, a robust theoretical approach was essential. For this, we selected Normalisation Process Theory (NPT), a mid-range sociological theory concerned with the work that individuals and organisations have to carry out in order to embed and normalise new, complex ways of working into routine practice.[32 33] NPT operates through four principal constructs or areas of work: coherence (sense-making work); cognitive participation (engagement work); collective action (enacting work); and reflexive monitoring (appraisal work), each with its own set of sub-constructs. NPT has been applied to a range of studies,[24] including guideline implementation,[34 35] treatment burden in chronic disease[36-38] and evaluating models of care.[8 39]

Methods

RESTORE study design

RESTORE was designed and implemented in three stages over 48 months (Figure 1).[27]. Stage 1 identified and recruited key stakeholders in each country, including migrants, community interpreters, primary care practitioners and local policy-makers. An extensive mapping exercise was conducted by each in-country RESTORE team to identify guidance and training initiatives (G/TIs) supporting inter-cultural communication in primary care and to assess their initial suitability for implementation [40]. Stage 2 focused on engaging with local stakeholders to review the identified G/TIs and democratically select one for implementation by considering the implementation potential of each G/TI.[41] In Stage 3, the selected G/TI was refined by local stakeholders supported by the in-country RESTORE team, implemented by the stakeholders and RESTORE team, monitored and, where necessary, further refined to improve the chances of sustaining it in routine practice.

INSERT FIGURE 1 HERE.

Although not entirely linear, the study was designed to broadly align to the four constructs of NPT (Figure 2). Stage 1 focused on familiarisation, first on the broad need to apply theory to RESTORE and then, with NPT itself. Stage 2 mapped to coherence and cognitive participation; Stage 3 mapped to collective action and reflexive monitoring. This structure then influenced the design of the training for the team, which is described below.

INSERT FIGURE 2 HERE.

The RESTORE Team

The research team of 18 included research and clinical disciplines, with a wide range of expertise and knowledge of the chosen theoretical approach (Supplementary File 1). Three country teams (Austria, Greece and the Netherlands) had no experience of using NPT. Four team members (MacFarlane,

Mair, Dowrick and O'Donnell) had extensive experience of using NPT[39 42-44] including applying NPT prospectively to complex interventions.[29 45-47] These four team members thus formed the NPT trainers group, leading the development and delivery of the training reported here.

Description of the training programme

Face-to-face training sessions each lasted one day. Training content was initially developed by the NPT trainers based on our knowledge of the content that needed to be covered. As time progressed, however, the content was developed based on feedback and evaluation from the RESTORE team members. Here we briefly describe the content of the training sessions. More detailed description of the training sessions and the participatory exercises are contained in Supplementary Files 2 and 3; the short presentations can be accessed on Slideshare (see Supplementary File 4 for links).

Early project training (Months 1 to 12).

Training began at Month 8, after the RESTORE researchers had been appointed in each country. In the first session, the rationale for using theory to shape and inform research study design, data collection and analysis was presented. NPT, the theory chosen to underpin RESTORE, was then introduced using previous studies as examples as well as the on-line NPT toolkit (http://www.normalizationprocess.org/). Following this, an interactive group exercise helped the research team to consider what issues might arise during the implementation of professional interpreters in primary care. To prompt discussion and improve understanding, the team used a set of 16 NPT-informed questions developed by the NPT trainers along with TdeB. These questions were also being used to guide the early stages of data analysis in the project (Table 1).[31 41]

Table 1. NPT constructs and sub-constructs as applied to RESTORE[31 41]

Coherence	Cognitive Participation	Collective Action	Reflexive Monitoring
Can stakeholders make sense of the intervention?	**Can stakeholders get others involved in implementing the intervention?**	**What needs to be done to make the intervention work in practice?**	**Can the intervention be monitored and evaluated?**
Differentiation:	**Enrolment:**	**Interactional workability:**	**Systematisation:**
Do stakeholders see this as a new way working?	Do the stakeholders believe they are the correct people to drive forward the implementation?	Does the intervention make it easier or harder to complete tasks?	Will stakeholders be able to judge the effectiveness of the intervention?
Individual specification:	**Initiation:**	**Skill set workability:**	**Individual appraisal:**
Do individuals understand what tasks the intervention requires of them?	Are they willing and able to engage others in the implementation?	Do those implementing the intervention have the correct skills and training for the job?	How will individuals judge the effectiveness of the intervention?
Communal specification:	**Activation:**	**Relational integration:**	**Communal appraisal:**
Do all those involved agree about the purpose of the intervention?	Can stakeholders identify what tasks and activities are required to sustain the intervention?	Do those involved in the implementation have confidence in the new way of working?	How will stakeholders collectively judge the effectiveness of the intervention?
Internalisation:	**Legitimation:**	**Contextual integration:**	**Reconfiguration:**
Do all the stakeholders grasp the potential benefits and value of the intervention?	Do they believe it is appropriate for them to be involved in the intervention?	Do local and national resources and policies support the implementation?	Will stakeholders be able to modify the intervention based on evaluation and experience?

Mid-project training (Months 13 to 24).

At month 13, we focused on the NPT constructs of coherence (sense-making) and cognitive participation (engagement). Learning from early training, we first used a non-RESTORE 'light' example with a humorous exercise which all the team could relate to – namely, could you contemplate staying in a circus tent at a future RESTORE team meeting? (Figure 3)

INSERT FIGURE 3 HERE

Following this, a RESTORE specific role play was employed to think through the issues of using professional interpreters in a primary care setting; this example drew on team members' own experiences of working with interpreters. Although this was designed to focus the discussion on issues relating to coherence and cognitive participation, issues relating to collective action and reflexive monitoring also arose (see Results).

By month 20, when the next face-to-face training took place, the in-country teams were preparing to commence fieldwork with their stakeholders (Stage 2 of RESTORE). Teams were given another opportunity to participate in an interactive role play. For this, a G/TI selected by one of the in-country RESTORE teams in collaboration with their stakeholders was used; some members of the RESTORE team were asked to role play the kind of discussions they might encounter in their fieldwork. The issues and questions that arose during this were recorded and mapped to the four NPT constructs by the other team members, using large wall charts and stickie notelets. The resultant mapping was then reviewed by the NPT trainers and discussed by the group.

Later training sessions (Months 25 to 40).

By month 25, teams were conducting fieldwork and moving into Stage 3, where the chosen G/TI would be fully adapted, implemented and the result of that implementation monitored. (This process and the results are reported in two recent RESTORE project papers.[41 48]) Teams were now

generating qualitative data about that process, which required the development of a coding framework broadly applicable across all the participating sites. Thus, training focused both on the constructs of collective action and reflexive monitoring and on the process of analysis.

To begin training in analysis, an anonymised extract of data generated from RESTORE fieldwork in Ireland was selected. This was pre-circulated to the teams for coding to the four constructs and, if possible, to the sub-constructs. In addition to team coding, the extract was sent to the trainers and to three recognised external experts in NPT. Coded data were collated and presented at the Consortium training at Month 25.

Training sessions at Months 38 and 43 continued to focus on analysis. Teams were asked to review extracts of data or to bring examples of coding dilemmas with them. Coding dilemmas included examples of data that researchers were concerned were being miscoded; data that did not appear to fit into the NPT framework; and data that appeared to be particular to only one site. Evaluation at the end of these later sessions allowed the NPT trainers to clarify the team's understanding of the coding process and to address any on-going concerns through teleconferences or email.

Non face-to-face support

Several mechanisms were put into place to support teams in-between face-to-face sessions, including buddy groups (linking teams experienced in theory use with less experienced teams); telephone and video conferences; email feedback on issues and problems. Later in the project, telephone and video conferences were also used to support data analysis, promoting consistency in the application of theory to analysis across the participating countries.

Outside the formal training sessions, we uploaded NPT relevant information such as key papers and links to the NPT Toolkit website (www.normalizationprocess.org) to a shared folder accessible by all the research team to serve as a resource whenever required.

Evaluation of the NPT training content

Face-to-face training was evaluated qualitatively at the end of each training day. Everyone present at the training days (generally all 18 members of the research team) participated in each evaluation; no one refused to participate. Methods included: written lists of the 3 most positive and 3 most negative features of the training; speed evaluation where each participant was given two minutes to verbally record which aspects of training had, or had not, been effective for them; scoring elements of the training on a Likert scale (e.g. from 1 = very poor to 5 = very good). These data were collected either as short written comments or recorded on a digital recorder. Additional evaluation was conducted approximately three weeks after the first session, when the team were emailed a short set of questions asking what had worked well; what had not worked well; and what they wanted from future training sessions. All the evaluation feedback was reviewed by the four members of the training team and the findings summarised into 'what worked', 'what didn't work' and 'what the team would like to do next'. The results of the evaluations were then summarised and presented back to the full team at the next face-to-face RESTORE Consortium meeting, providing the team with a further opportunity to comment on whether they believed all the key issues or suggestions regarding training had been captured and addressed.

Results

Early project training (Months 1 to 12).

Team evaluation indicated that the content of the first training sessions (Sessions 1 and 2, Supplementary File 2) was too didactic and prescriptive. The team felt overwhelmed trying to assimilate general knowledge about the application of theory to research along with NPT-specific information. The early use of the 16 NPT sensitising questions (Table 1) was not well liked by some researchers used to more inductive methods of working in qualitative projects. Others, particularly

the clinicians, found this approach helpful as they tried to develop their understanding of the theory's different constructs.

> *The 16 questions of the [NPT] toolkit gave us a better insight into what was meant by terms like 'sense-making' 'participation' 'action' and 'monitoring'. (Buddy report from Dutch and English teams).*

Mid-project training (Months 13 to 24).

As a result of team feedback on the didactic nature of the first sessions, the NPT trainers adopted a more PLA-focused style for the mid-project training sessions. This also reflected the methodological approach of the RESTORE project in the field, as described elsewhere.[27 31] Consequently, later sessions had one or at most two short didactic presentations, with the remaining time spent on participatory exercises. The mid-project training content was aligned more closely to the temporal arrangement of the project itself and linked to the over-arching constructs of NPT. Thus, we focused principally on sense-making (coherence) and engagement work (cognitive participation) first, before turning to the actual work undertaken (collective action) and, finally, monitoring and appraisal work (reflexive monitoring) (Figure 2).

The use of a 'light' humorous exercise, the circus tent (Figure 3), where the team could concentrate on the content of the theory without worrying about how it applied to future fieldwork evaluated well. Exercises using practical examples grounded in the fieldwork they would have to conduct during the course of the project were also helpful.

> *Exercises helped a lot! Very comfortable now! (Anonymous response in written evaluation feedback)*
>
> *Worked well. I'm beginning to see sense. The use of PLA methods/ techniques really helps grasping NPT and made it digestible! (Anonymous response in written evaluation feedback)*

Interactive exercises and role play designed to focus on coherence and cognitive participation also spontaneously picked up issues relating to collective action (who would actually do the work; how would it be funded) and reflexive monitoring (how would teams know if professional interpreters had an impact). This served as an important reminder that, even when NPT sensitising questions from researchers were designed to focus on sense-making and engagement, other issues would naturally emerge in the discussion, emphasising the lack of linearity in the application of theory to data generation. This was reflected in feedback obtained from two of the in-country teams.

> *Coherence and cognitive participation refer, in the main, to processes before any implementation work has occurred. However, we did note that the theory is fluid and not fixed or linear, so this means that the experience of doing the implementation work (collective action) and reflecting on that work (reflexive monitoring) could influence coherence and cognitive participation over time….. An 'aha!' moment occurred when we distilled the thinking in the group around the difference between cognitive participation and collective action as 'thinking about the doing' and 'doing the doing' (Buddy Report from Greek and Irish teams).*

Later training sessions (Months 25 to 40).

Training conducted later in the project steadily moved from using theory to inform the collection of data in the field to using theory to underpin analysis of data. Face-to-face training session at Months 25 and 31 focused mainly on coding data extracts and on round-table discussion of the approach being taken. Prior to meeting at month 25, teams received an extract of data generated by the Irish team (Box 2); teams were asked to code this to the main constructs and, if possible, sub-constructs of NPT. Coding was then compared at the training session in Month 25.

Box 2. Background to data generation by Irish team.

MORdeB and TdeB developed training materials to support the RESTORE researchers use the methods of PLA in their fieldwork. One of these was a DVD in which researchers in Ireland role-played a discussion amongst health care professionals, policy makers, migrants' representatives and interpreters about the implementation of a training initiative to support the use of trained interpreters in primary care consultations in Ireland. Researchers were assigned these roles; the facilitator was one of RESTORE's PLA experts. The role play was filmed and the dialogue transcribed to allow teams to review and develop experience in applying NPT to coding data. This PLA training will be described more fully in future publications.

Table 2 shows examples of coding from two of the in-country teams, along with the final coding agreed by the whole RESTORE team. The first coding extract was selected because the data focused mainly on the construct of coherence, i.e. developing an understanding of the rationale for using interpreters in practice and the benefits of that. Overall, there was a high level of agreement between the team in their data coding, particularly when coding to the high-level constructs of NPT. Each in-country team showed a good degree of consistency in coding to the construct of Coherence, with some coding in particular to the sub-constructs of Differentiation ('seeing interpreters as a new way of working') and Internalisation ('articulating the benefits of working with interpreters'). The Dutch team also coded this portion of transcript to the construct Cognitive Participation, suggesting that the conversation was also discussing the need to enrol others into working with interpreters (Table 2). Face-to-face discussion at Month 25 led to a shared understanding and agreement that – where data was referring to both understanding the use of interpreters ***and*** considering who should be involved – then it was appropriate to double code data to both Coherence and Cognitive Participation. Likewise, where resources were referred to, for example the provision of training and DVD materials, text could be coded to Collective Action (Contextual Integration). Such discussions both helped the team refine their understanding of NPT, but also resulted in a robust coding framework which could be used across all country teams.

This process continued at later training meetings, at months 31 and 38 supplemented by telephone and video conferences, where coding of data was compared and differences in interpretation discussed. To facilitate this process, each country team nominated one person to lead on coding qualitative data generated in that country, who then worked with the leads in the other countries to review and discuss coding. Examples of coding were discussed and memos relating to data coding circulated across the team, ensuring consistency of meaning and interpretation in relation to coding data. The final coding frame was then reviewed and discussed at a final training meeting involving all members of the RESTORE team which took place at month 43.

Table 2. Coding example from a transcript: coding by in-country team and final coding after discussion

Speaker	Text	NPT Coding
Coding from Irish Team.		
Facilitator	So when we began this, this morning [name] as the policy person you made a very interesting comment and you started the whole ball rolling with this didn't you?	
Policy maker*	Yeah, I suppose just reflecting on where we are at, at the moment within the health organisation is that we have a ban on travel and there's an embargo on education and training initiatives.	Coded this text to **Coherence (Internalisation)–** understands the initiative; sees benefit in it.
	So something like this that provides a DVD, training and guidance is a major plus. It's something that's really going to tick the boxes for us whilst be very meaningful for front line staff as well	Underlined text double coded to **Collective Action (Contextual Integration)** due to mention of training.
Facilitator	Okay so it's got two real advantages there, it's going to get over the problem you have about not being able to travel, not being able to go out and do the capacity building and training because it hands it to you right on the plate, as you see it. And also it's going to be very meaningful for front line staff, and if I remember [name] you found that interesting. You had a comment about that…	
GP*	Yeah I think this was mine here, so as a GP I really liked the fact that there was a resource available to me as a front line member of staff, a resource available to me which answers a lot of the questions that I have about using interpreters in my practice and how that might work. So I found that very helpful.	Coded text to **Coherence (Internalisation)** – sees benefit in this initiative. Underlined text double coded to **Coherence (Differentiation)** as this seems to be a new way of working.
Facilitator	So that's a real positive for you about this particular training initiative. Okay and who else has comments here that they'd like to read out to us and remind us about? There's quite a few here.	

Interpreter*	Yeah I think that one there [name] that you pointed to is my one and as an interpreter I felt that this package was particularly relevant because it gives special attention to the Irish context and I feel that that's very important for me in my role as an interpreter. And that you know for interpreters working in Ireland that its just very useful, I don't think this has been done before.	Text coded to Coherence – understands initiative and sees benefit of it. Underlined text double coded to **Coherence (Differentiation)** as this seems to be a new way of working.
Coding from Dutch Team		
Facilitator	So when we began this, this morning [name] as the policy person you made a very interesting comment and you started the whole ball rolling with this didn't you?	
Policy maker*	Yeah, I suppose just reflecting on where we are at, at the moment within the health organisation is that we have a ban on travel and there's an embargo on education and training initiatives. So something like this that provides a DVD, training and guidance is a major plus. It's something that's really going to tick the boxes for us whilst be very meaningful for front line staff as well	Text coded to **Coherence.** Underlined text double coded to **Cognitive Participation**, as need to engage frontline staff.
Facilitator	Okay so it's got two real advantages there, it's going to get over the problem you have about not being able to travel, not being able to go out and do the capacity building and training because it hands it to you right on the plate, as you see it. And also it's going to be very meaningful for front line staff, and if I remember [name] you found that interesting. You had a comment about that…	
GP*	Yeah I think this was mine here, so as a GP I really liked the fact that there was a resource available to me as a front line member of staff, a resource available to me which answers a lot of the questions that I have about using interpreters in my practice and how that might work. So I found that very helpful.	Text coded to **Cognitive Participation** as this was interpreted by Dutch team as focusing on the individual's willingness to engage with interpreters.
Facilitator	So that's a real positive for you about this particular training initiative. Okay and who else has comments here that they'd like to read out to us and remind us about? There's quite a few here.	

Interpreter*	Yeah I think that one there [name] that you pointed to is my one and as an interpreter I felt that this package was particularly relevant because it gives special attention to the Irish context and I feel that that's very important for me in my role as an interpreter. And that you know for interpreters working in Ireland that its just very useful, I don't think this has been done before.	First part coded to **Coherence** – focused on understanding and a new way of working. Underlined text double coded to **Cognitive Participation** – focused on buy-in and engagement with interpreters.
Final coding after face-to-face discussion		
Facilitator	So when we began this, this morning [name] as the policy person you made a very interesting comment and you started the whole ball rolling with this didn't you?	
Policy maker*	Yeah, I suppose just reflecting on where we are at, at the moment within the health organisation is that we have a ban on travel and there's an embargo on education and training initiatives.	Text coded to **Coherence** – trying to make sense of the training initiative; what makes it a new way or working.
	So something like this that provides a DVD, training and guidance is a major plus. It's something that's really going to tick the boxes for us whilst be very meaningful for front line staff as well	Text coded to **Collective Action (Contextual Integration)** – refers to what is involved and the resources provided (DVD, training and guidance). Underlined text double coded to **cognitive participation** – consideration of other groups that need to be engaged with
Facilitator	Okay so it's got two real advantages there, it's going to get over the problem you have about not being able to travel, not being able to go out and do the capacity building and training because it hands it to you right on the plate, as you see it. And also it's going to be very meaningful for front line staff, and if I remember [name] you found that interesting. You had a comment about that…	
GP*	Yeah I think this was mine here, so as a GP I really liked the fact that there was a resource available to me as a front line member of staff, a resource available to me	Text coded to **Coherence** – reflects that this is a new way of working

	which answers a lot of the questions that I have about using interpreters in my practice and how that might work. So I found that very helpful.	(**Differentiation**); recognises the benefits (**Internalisation**).
Facilitator	So that's a real positive for you about this particular training initiative. Okay and who else has comments here that they'd like to read out to us and remind us about? There's quite a few here.	
Interpreter*	Yeah I think that one there [name] that you pointed to is my one and as an interpreter I felt that this package was particularly relevant because it gives special attention to the Irish context and I feel that that's very important for me in my role as an interpreter. And that you know for interpreters working in Ireland that its just very useful, I don't think this has been done before.	Text coded to **Coherence (Differentiation)** – seen as a new way of working. Text underlined double coded to **Collective Action (Contextual Integration)** – this refers to Irish context.

Challenges

On-going telephone and email contact ensured that difficulties and tensions were quickly surfaced, particularly when theory was being applied to fieldwork. Training at month 20 began with an intensive de-briefing, where in-country teams were encouraged to freely discuss their concerns and challenges arising from using NPT. These focused on two, related, concerns. There was a continued lack of confidence in their knowledge of NPT itself and of being able to correctly map issues and data generated in the field to the NPT constructs. However, the use of visual methods of collecting and displaying data generated during the interactive group exercises, as exemplified in PLA approaches,[31] meant that the trainers could quickly identify a high degree of fidelity in the assignment of data to NPT constructs, thus reassuring the team of their knowledge development (Figure 4).

INSERT FIGURE 4 HERE

The second major issue reflected the disciplinary and epistemological differences within the research team. Some researchers were used to policy-related research, where the application of theory to data and the use of approaches such as Framework Analysis[49] were familiar. Others came from a sociological or anthropological background and were more comfortable with an inductive data-driven approach to analysis. This led to understandable concerns that data might be 'flattened' and shoe-horned into the NPT framework. To alleviate this concern, the trainers paid particular attention to the identification and recognition of coding which lay outside the NPT constructs, for example in relation to power dynamics between different stakeholders. A final concern was whether construct application and data generation, in the field, was linear or whether there were 'feedback loops'. For example, the research team considered the question of whether engaging in the work of implementing a G/TI could increase participants understanding or 'coherence' in relation to that G/TI? Training, therefore, continuously emphasised the lack of linearity in the process of applying theory to both data collection and analysis and encouraged the researchers to think through how this would affect data collection in the field.

Discussion

Principal findings and their relation to other work

We have described our approach to applying a mid-level sociological theory – Normalisation Process Theory – to a multi-site cross-country research study, RESTORE. In our endeavour to use NPT to shape our overall implementation journey, including data collection as well as analysis, we had to develop iterative and flexible training to support our multi-disciplinary, cross-national project team. While this presented challenges, we believe it also strengthened and added value to our work, ensuring it was designed, implemented and analysed in a robust and consistent manner across all five countries in which empirical data collection was conducted.

A multi-disciplinary, multi-national team inevitably has differences in terms of understanding the process of qualitative research and the use of theory. Professional and cultural perspectives impact on both individual and collective comfort (both in terms of country and professional discipline) with the concept of using theory to inform the design and conduct of a largely qualitative, implementation study. For example, researchers used to a more inductive approach to data analysis were initially cautious of an approach that applied theory to data analysis. The design of a robust programme of training, which acknowledged and discussed these perspectives during the course of the training, was challenging but also allowed the team to reach a shared understanding of what the study was trying to achieve. The benefits of surfacing these tensions became apparent as the training moved to the process of data analysis.

From our experience of developing training for using NPT, we have developed a series of generic recommendations that can be applied to other studies seeking to use theory in health services research (Table 3).

Table 3. Recommendations for the future development of training to support the use of theory in health services research

1. The application of theory to study design and fieldwork is not linear and training must acknowledge this
2. Experiential learning and the use of interactive, participatory and visual approaches are an important learning device.
3. Training can be most effective when it focuses on the high level constructs of a theory.
4. Different disciplinary backgrounds must be acknowledged and welcomed.
5. Space is required in the training programme to acknowledge and address researcher concerns.
6. Training in the application of theory can support the development and robustness of qualitative coding, especially for multi-site studies.

A key recommendation is to acknowledge, from the beginning of training, that theory is not linear or sequential. This is often a challenge when applying theory to fieldwork; for example, Michie and colleagues have developed their Behaviour Change model as a wheel, in order to address any pre-conceived conceptions of 'linearity'.[50] The model of candidacy has also been criticised for an apparent linearity that is not found when applied in the field.[51 52] The nature and speed of fieldwork means it is important for researchers to be familiar with all constructs of a selected theory, in order to fully appreciate the theoretical relevance of the data as it is generated. Thus, training needs to both acknowledge and affirm the complexities of temporal order in prospective fieldwork and ensure that researchers are familiar with all the components of a theory early enough in the research study to ensure confidence when moving into fieldwork.

Team learning and understanding develops more rapidly and deeply by using participatory and experiential approaches to learning.[31] In our work, interactive exercises with visual methods of collecting data, role play and non-specific 'light' examples were all effective approaches to supporting learning and understanding. We strongly recommend this approach in the development of training for any complex theory that requires new users to develop an understanding of a range of

components. The second advantage of using multiple interactive exercises is as a means to check on research team's 'theoretical fidelity' when analysing the data generated in the field.

Theoretical frameworks are often complex, with constructs which can themselves be broken down to ever smaller sub-constructs. This level of complexity can be daunting for researchers new to the theory being used and can lead to difficulties when coding data. Our experience suggests that a focus on the high level constructs of a theory works best in the early stages of training. Once teams have grasped and understood those, they can intuitively develop a deeper understanding of the underlying sub-components.

Throughout our training programme, we allowed ample time for concerns to be raised and discussed and for the team to develop solutions. An advantage of the time spent of training was apparent, however, later in the project as we moved onto coding the qualitative data generated across multiple sites. By then, the time spent in early training ensured that the team had a much clearer and consistent view of the constructs and their meaning, leading to a consistency and robustness in coding and analysis.

Limitations of the study

The study is based on the experiences of a single team during one, albeit large multi-site, project. However, the team did represent a diverse range of professional and disciplinary backgrounds, and cultures operating within European primary care settings. The training was focused on the use of only one theoretical framework – NPT – but we believe that the lessons learned from this and the recommendations arising from the work are applicable to other theoretical frameworks. Finally, although a participatory, qualitative approach was used throughout, we did not have the time within the project to conduct a more in-depth qualitative exploration of the views and experiences of the research team as they applied our chosen theory to the fieldwork.

Conclusion

Overall, we found the prospective application of NPT to our work to be invaluable but, at times, challenging. We believe that these issues were not unique to the use of NPT, but could arise with the use of other theories, especially in large multi-site and cross-country projects. The development of a complementary package of training to support the use of our chosen theory ensured that our work was consistently and robustly informed by theory at all stages of the project, from design through data collection to analysis. This approach can, and should, be adopted by future research teams carrying out theoretically-informed implementation studies.

Competing interests

The authors declare that there are no competing interests.

Authors contributions

All authors (COD, FM, CD, MO'RdeB, TdeB, NB, CL, AS, MP, MvdM, EvWB, KG, LC, CP, ET, FvdDM, MV, WS, AMcF made substantial contributions to the design and development of RESTORE and it's training programme, to the collection of data or to the analysis and interpretation of the data. Training materials were developed by COD, FM, CD and AMcF, with input from MO'RdeB and TdeB. COD wrote the first draft of the paper and led substantive re-drafting, supported by FM, CD and AMcF; all authors listed above were involved in revising and commenting on later drafts of the manuscript. All authors have given their final approval to this version.

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Consent to use data

Ethical approval to use data generated during training was obtained from the National University of Ireland, Galway. All members of the RESTORE team agreed to their evaluation comments being used in this paper.

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Data Sharing

No additional data available. Training materials are available as described in the Supplementary Files.

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Figure 1. The three stages of RESTORE

Figure 2. Stages of NPT training and alignment with RESTORE fieldwork

Figure 3. NPT 'light' training material

Figure 4. Example of a visual data mapping exercise

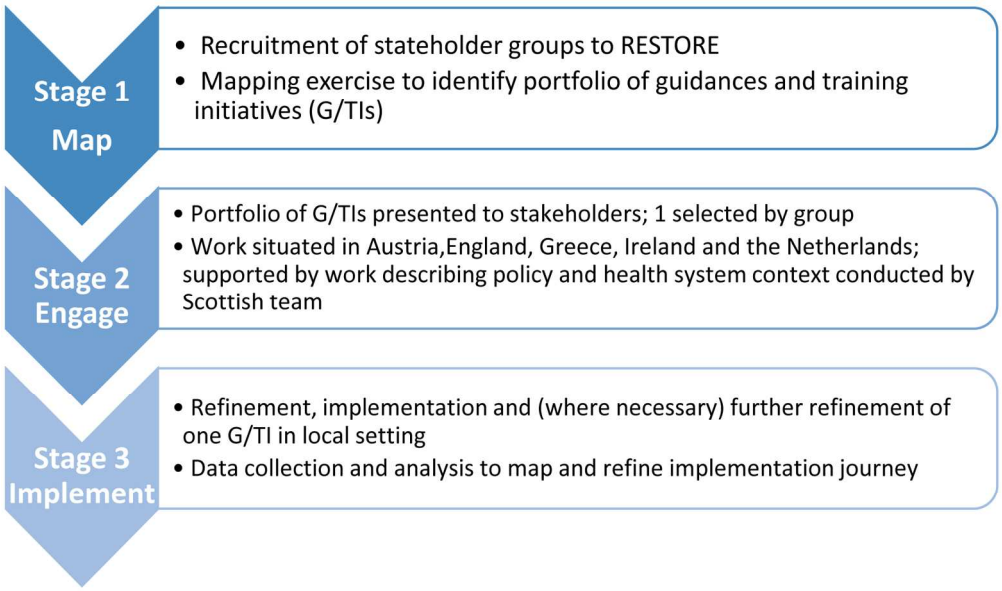

Figure 1. The three stages of RESTORE

154x91mm (300 x 300 DPI)

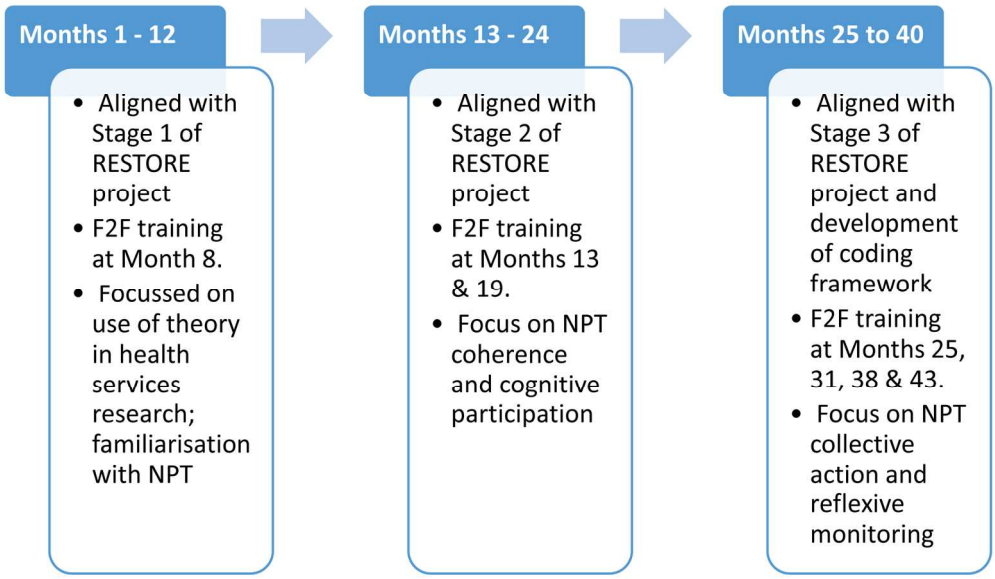

Figure 2. Stages of NPT training and alignment with RESTORE fieldwork

154x90mm (300 x 300 DPI)

Question: Do we think a circus tent can become a normalised venue for accommodation for our next RESTORE team meeting?

In addressing this question, consider the following NPT sensitising questions:

Does this make sense to the team as a whole and to individuals within the team? (Coherence)
What work needs to be done to get everyone in the team to engage with the idea? (Cognitive participation)
Who needs to do what to put this into action? What resources do we need? (Collective action)
How will we know if it worked in practice? (Reflexive monitoring)

Figure 3. NPT "light" training material

149x132mm (300 x 300 DPI)

Each "sticky" notelet corresponds to an item of verbal data identified from the interative role play discussion

Figure 4. Example of a visual data mapping exercise

160x129mm (300 x 300 DPI)

Supplementary File 1. RESTORE team backgrounds and NPT experience

Country	Professional background	Experience of NPT	Country	Professional background	Experience of NPT
Austria			**Ireland**		
RESTORE Applicant	Academic general practitioner	New to NPT	RESTORE Applicant	Social scientist	Experienced in use of NPT; part of original group who developed NPT; using NPT in several projects
Researcher	Social scientist	New to NPT	Researcher	Social/cultural anthropologist	Familiar with NPM; New to NPT
			Researcher	Social/cultural anthropologist	New to NPT
England			**Netherlands**		
RESTORE Applicant	Academic general practitioner	Experienced in use of NPT; part of original group who developed NPT	RESTORE Applicant	Academic general practitioner	New to NPT
Researcher	Social anthropologist	New to NPT	RESTORE Applicant	Academic general practitioner	New to NPT
Researcher	Social scientist	New to NPT	Researcher	Academic general practitioner	New to NPT
			Researcher	Social/cultural anthropologist	New to NPT
Greece			**Scotland**		
RESTORE Applicant	Academic general practitioner; Primary health care services researcher	New to NPT	RESTORE Applicant	Health services research	Experienced in use of NPT; part of NIHR NPT user group; using NPT in several projects
Researcher	Public health researcher	New to NPT	RESTORE Applicant	Academic general practitioner	Experienced in use of NPT; part of original group who developed NPT; using NPT in

Researcher	Lecturer in social work	New to NPT	Researcher	Sociologist	several projects New to NPT

Supplementary File 2. NPT training programme

Training	Session & Duration	Content
Early project training (Months 1 to 12)		
Month 8 November 2011	Training Session 1. (2.5 hours)	**Introduction to NPT.** Development of NPT from ehealth research. Overview of NPT and its four main constructs.
	Training Session 2. (4.5 hours)	**Using NPT in RESTORE.** Example of using NPT in a qualitative study on use of interpreters in primary care. Using NPT in RESTORE – focus on constructs of coherence and cognitive participation Participatory Exercise 1: Team asked to think about the issues arising from implementation of paid interpreters in primary care.
Mid-project training (Months 13 to 24)		
Month 13 April 2012	Training Session 3. (2.0 hours)	**Using NPT in RESTORE.** Focus of NPT constructs coherence and cognitive participation. Participatory Exercise 2: NPT "light" non-RESTORE exercise
	Training Session 4. (2.0 hours)	Focus of NPT constructs coherence and cognitive participation. Participatory Exercise 3: NPT RESTORE exercise
Month 20 November 2012	Training Session 5 (2.0 hours)	**Addressing anxieties.** Roundtable discussion of arising concerns. Review of why NPT being used and its role in the project.
	Training Session 6 (2.0 hours)	**Using NPT in RESTORE.** Participatory Exercise 4: NPT RESTORE exercise
Later training sessions (Months 25 to 48)		
Month 25 April 2013	Training session 7 (2.5 hours)	**Coding using NPT.** Preparatory work of coding data extract; face-to-face discussion of coding decisions at Consortium training. Participatory Exercise 5: Discussion of coded extract of RESTORE data.
Month 31 October 2013	Training session 8 (1.5 hours)	**Addressing anxieties.** Roundtable discussion of progress with respect to using NPT

		in fieldwork and in coding.
	Training session 9 (3 hours)	**Coding using NPT.** Team reviewed coding exercise conducted in-between face-to-face meetings; discussed Irish data transcript coded by AMacF; and discussed team coding "dilemmas".
Month 38 May 2014	Training session 10 (3 hours)	**Coding using NPT.** Focused on reviewing where each country team was in relation to NPT coding; connections between fieldwork and NPT; identifying and discussing coding dilemmas.
Month 43 October 2014	Training session 11	Final discussion and clarification of coding framework.

Supplementary File 3. Participatory exercises

Month 8, Participatory Exercise 1	Consider the following scenario: Your health organisation is about to introduce paid interpreters into the primary care consultation. What NPT-informed questions might you ask to assess how well this is implemented into practice? Participants were directed to the NPT toolkit, with its 16 questions, to help them "think this through"
Month 13, Participatory Exercise 2	NPT "light": An exercise designed to get the research team thinking about coherence (understanding) and cognitive participation (participation). Using interactive small group work, the team focussed on an example entitle "Circus tent". Teams were asked to consider if a circus tent could become normalised as team accommodation for future Consortium meetings. While the team debated this, the NPT trainers observed the questions, took notes and assigned these to NPT categories. E.g. Is this something new to me? (Coherence - Differentiation) Do you think this will be helpful to the team? (Coherence – Internalisation) Will everyone agree that this is reasonable? (Cognitive participation - Legitimation) How many of the team buy into this idea? (Cognitive participation = Enrolment)
Month 13, Participatory Exercise 3	NPT RESTORE exercise: Teams asked to consider the issues that might arise when implementing paid interpreters in primary care. Half of the team were assigned roles (GP, nurse, interpreter, migrant patient) and role-played a discussion about using interpreters; other half of team watched, noting key questions and issues that arose, then assigned these to NPT constructs. N.B. The exercise was designed to focus on the constructs of coherence and cognitive participation; however, teams also had to pay attention to collective action and reflexive monitoring.
Month 20, Participatory Exercise 4	NPT RESTORE exercise: Teams given the G/TI selected by the Irish team. Asked to role play as a practice team with roles assigned to address the question "What levels and barriers will you encounter as you try to implement this guidance in practice?". Project members took turns at either role playing or noting NPT issue and assigning them to constructs.
Month 25, Participatory Exercise 5	NPT RESTORE exercise: Teams pre-circulated a short extract from a training DVD developed by the PLA trainers in which the Irish team role-played a training session with stakeholders. Teams were asked to code the qualitative extract to the main NPT construct. Three external researchers expert in the use of NPT also asked to code the extract, as

well as RESTORE NPT training team. Coding collated and presented, paragraph by paragraph, to team at face-to-face meeting.

Supplementary File 4. Location of NPT presentations on Slideshare

NPT Unpicked for the RESTORE project (http://www.slideshare.net/KateODonnell6/npt-unpicked-for-restore-project-57742520).

NPT training session 2 for RESTORE (http://www.slideshare.net/KateODonnell6/npt-training-session-2-for-restore)

NPT in RESTORE (http://www.slideshare.net/KateODonnell6/npt-in-restore)

NPT Coding exercise for RESTORE (http://www.slideshare.net/KateODonnell6/npt-coding-exercise-for-restore-57743364

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Supporting the use of theory in cross-country health services research: Normalisation Process Theory as an example

Reporting Checklist.

Checklist used: Smith L, Rosenzweig L, Schmidt M. Best practices in the reporting of participatory action research: Embracing both the forest and the trees. The Counseling Psychologist 2010;**38**(8):1115-38

Guidelines for the reporting of participatory action research (PAR).

Criteria from Smith et al	As reported in O'Donnell et al
Organisational structure of the paper	We have based the organizational structure of our paper on the guidance issued by BMJ Open. We have, therefore, reported using the structure of Introduction, Methods, Results, Discussion. While we have sought to match the content of each section to the general expectations of the BMJ Open audience, the Methods section contains a more descriptive account on the way that the training programme evolved and developed in response to the needs of the research team. Again, the discussion section moves beyond a conventional discussion and is the place where we include our generic recommendations which, we believe, could be applied to the development of training in the use of other theoretical frameworks.
Key elements of the project	Please note: in the application of this checklist, the term 'project' is taken to apply to the training programme in the use of NPT (hereafter described as the 'NPT training programme', which is the subject of this paper. Where necessary, we also refer to RESTORE, which was the FP7 funded research project that the NPT training programme was designed to support. We hope this

	distinction is clear in our responses below.
How was the project initiated?	The NPT training programme was initiated in response to the needs of the RESTORE research team, to support them in their understanding and use of the theoretical framework being used. This is described in the paper as follows: **Introduction, Page 7:** Research teams must be comfortable and aligned with the use of the selected theory and in agreement about the meaning and application of its individual components or constructs. Such challenges are enhanced when teams are working in different settings, countries and across language as construct understanding and implementation are likely to be both culturally and context-dependent. This mirrors challenges identified in conducting qualitative research across different settings.[26] These challenges faced the EU-funded RESTORE project, a multi-site implementation study across six European countries (Box 1).[27] Focussed on cross-cultural communication in primary care, the design and analysis of RESTORE was underpinned throughout by a recognised theoretical framework - Normalisation Process Theory (NPT). However, the application of theory to a research study was a new concept for many members of the team. As a result, we had to develop a training programme to familiarise and support the team in this process.
What was the project's timeframe?	The RESTORE project was a 48-month project (see Figure 1); the NPT training programme was initiated at month 8 and ran in tandem with the project. This is described on Page 12 and illustrated in Figure 2: **Methods, Page 12: Application of theory to the RESTORE study** As described previously, the RESTORE project was designed in three, inter-related stages (Figure 1). Although not entirely linear, the study was designed to broadly align to the four constructs of NPT (Figure 2). Stage 1 focused on familiarisation, first on the broad need to apply theory to RESTORE and then, with NPT itself. Stage 2 mapped to coherence and cognitive participation; Stage 3 mapped to collective action and reflexive monitoring. This structure then influenced the design of the training for the team, which is now described in detail.
Who were the participants and/or co-researchers?	The participants were the 19 members of the RESTORE research team. They were also the co-researchers in the design, application and evaluation of the NPT training programme. The team consisted of the senior academics who wrote the RESTORE funding application and the researchers who were employed on RESTORE. The team was multi-professional and multi-disciplinary, consisting of academic general practitioners/family doctors, anthropologists, social

	scientists and health services/primary care researchers. The composition of the team is described in the **abstract**, in **Methods page 9** and more fully in **Supplementary File 1**. **Abstract: Participants:** RESTORE research team consisting 8 project applicants, all senior primary care academics; 10 researchers. Professional backgrounds included 7 academic general practitioners; 4 social/cultural anthropologists; 4 sociologists; 3 health services/primary care researchers. **Methods, Page 9: The RESTORE Team** The research team included research and clinical disciplines, with a wide range of expertise and knowledge of the chosen theoretical framework (Supplementary File 1). Three country teams (Austria, Greece and the Netherlands) had no experience of using NPT. Four team members (MacFarlane, Mair, Dowrick and O'Donnell) had extensive experience of using NPT[33-36] including applying NPT prospectively to complex interventions.[29 37-39] These four team members thus formed the NPT trainers group, leading the development and delivery of the training reported here.
What was the extent of their participation and the nature of their roles?	Four members of the team were experienced in the application of NPT to research projects and so took on the role of NPT programme trainers. The other members of the team were fully engaged in th training programme, first by participating in the NPT training programme and second, by their feedback and reflection on the process. Importantly, it was their feedback on the training that led to the continual development and evolution of the training programme. This is reported at various points of the paper, including: **Methods, Pages 13 – 17:** See paper for text. **Results, Pages 17 – 19:** See paper for text. **Discussion, Page 22:** Throughout our training programme, we allowed ample time for concerns to be raised and discussed and for the team to develop solutions. An advantage of the time spent of training was apparent, however, later in the project as we moved onto coding the qualitative data generated across multiple sites. By then, the time spent in early training ensured that the team had a much clearer and consistent view of the constructs and their meaning, leading to a consistency and robustness in coding and analysis.

What was the process within and/or methodology of the project?	The methodology of the work was informed by Participatory Learning and Action (PLA), mirroring the use of PLA in the wider RESTORE project itself. Throughout, we collected qualitative data from the RESTORE team on their views of the training sessions, analysed these data thematically and used the findings to inform the design of later training sessions. This is described in the paper: **Methods, Page 14:** This approach, however, proved too prescriptive and over-whelming for team members trying to assimilate knowledge about applying theory to research (see Results). This led to several important modifications in the development of the training. In consultation with our PLA experts (MO'RdeB and TdeB), we incorporated more PLA-informed exercises and approaches into the training.[42] Consequently, later sessions had one or at most two short didactic presentations, with the remaining time spent on participatory exercises. The training content was aligned more closely to the temporal arrangement of the project itself and linked to the over-arching constructs of NPT. Thus, we focused principally on sense-making (coherence) and engagement work (cognitive participation) first, before turning to the actual work undertaken (collective action) and, finally, monitoring and appraisal work (reflexive monitoring) (Figure 2). **Methods, Pages 16-17: Evaluation of the NPT training content** Face-to-face training was evaluated qualitatively at the end of each training day. Methods included: written lists of the 3 most positive and 3 most negative features of the training; speed evaluation where each participant was given two minutes to verbally record which aspects of training had, or had not, been effective for them; scoring elements of the training on a Likert scale (e.g. from 1 = very poor to 5 = very good). These data were collected either as short written comments or recorded on a digital recorder. Trainers reviewed the feedback thematically and used it to inform subsequent training sessions. Additional evaluation was conducted approximately three weeks after the first session, when the team were emailed a short set of questions asking what had worked well; what had not worked well; and what they wanted from future training sessions. The results of the evaluations were summarised and fed back at RESTORE Consortium meetings providing researchers with a further opportunity to comment on whether they believed all the key issues or suggestions regarding training had been captured and addressed.
What were the project outcomes and/or	Training outcomes were increased confidence and comfort amongst the RESTORE research team

emergent actions?	in (i) the use of theory in health services research projects; (ii) understanding of NPT.
What comes next (if the project is on-going)?	The RESTORE project is now finished. We hope, however, that this paper and our generic recommendations can be used to support training for other health service research projects whether they are using NPT or another theoretical framework. See **Discussion, Page 21.**
Consider charts, guidelines, tables, graphics to convey part or all of the project design	We have illustrated our data with a number of Figures and Illustrations.
Convey the experiences of the co-researchers	
Pay attention to who is writing the article and how their voices and experiences are represented	Although the lead author (COD) was one of the trainers, the paper has actively involved all members of the team. Therefore, we believe that all the voices of the RESTORE team are represented in this work.
Pay attention to who is *not* writing the article and how their voices and experiences are represented	See above.
What were the personal outcomes of the project?	A principal aim was to increase individuals' knowledge, expertise and confidence both in the use of theory in health services research projects more generally, and in the use of NPT in particular. We believe that we evidence that these personal outcomes were met. In addition, the team's level of understanding and confidence had the unintended consequence of aiding later processes within the RESTORE project such as cross-country qualitative data coding and analysis.
Address the challenges, pitfalls, and limitations of the project	
What were they?	We have discussed the general strengths and limitations of the project in the discussion: **Discussion, Page 23: Strengths and Limitations** This training programme in the use of a mid-level theory was developed for a multi-disciplinary team working across 6 European countries; thus, it also had to pay careful attention to both language and cultural differences across the RESTORE research team. The evaluation and careful

	monitoring of both the development and delivery of the training is a clear strength of this work. That the training programme was acceptable to such a diverse group is another strength. Weaknesses include the small group of researchers involved, although the team did include a range of disciplinary and research backgrounds. The training was focused on the use of only one theoretical framework – NPT – but we believe that the lessons learned from this and the recommendations arising from the work are applicable to other theoretical frameworks.
How were they managed?	A particular challenge in the training programme was managing th different levels of knowledge an expertise within the team. One important lesson was the need to build in time for critical reflection and discussion of the process – this is discussed within the Results section. **Results, Page 18:** Interactive exercises and role play designed to focus on coherence and cognitive participation also spontaneously picked up issues relating to collective action (who would actually do the work; how would it be funded) and reflexive monitoring (how would teams know if professional interpreters had an impact). This served as an important reminder that, even when NPT sensitising questions from researchers were designed to focus on sense-making and engagement, other issues would naturally emerge in the discussion, emphasising the lack of linearity in the application of theory to data generation. On-going telephone and email contact ensured that difficulties and tensions were quickly surfaced, particularly when theory was being applied to fieldwork. Training at month 20 began with an intensive de-briefing, where in-country teams were encouraged to freely discuss their concerns and challenges arising from using NPT. These focussed on two, related, concerns. There was a continued lack of confidence in their knowledge of NPT itself and of being able to correctly map issues and data generated in the field to the NPT constructs. However, the use of visual methods of collecting and displaying data generated during the interactive group exercises, as exemplified in PLA approaches,[42] meant that the trainers could quickly identify a high degree of fidelity in the assignment of data to NPT constructs, thus reassuring the team of their knowledge development (Figure 4).
What can we learn?	We believe that a key message from our work is the set of generic recommendations which could be applied to other training programmes seeking to support the use of theory in health services research projects. These are detailed in the **Discussion, pages 21 – 23.**

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Supporting the use of theory in cross-country health services research using Normalisation Process Theory as an example: A participatory qualitative approach

Reporting Checklist.

Checklist used: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care* 2007;19(6):349-57. doi: 10.1093/intqhc/mzm042

Criteria from Tong et al	As reported in O'Donnell et al
Domain 1: Research team and reflexivity.	
Personal Characteristics	
1. Interviewer/facilitator. Which author/s conducted the interview or focus group?	Training and qualitative evaluation of training led by Catherine O'Donnell and Anne MacFarlane, assisted by Christopher Dowrick, Frances Mair and Mary O'Reilly de Brun.
2. Credentials What were the researcher's credentials? E.g. PhD, MD.	Catherine O'Donnell (COD): BSc (Hons), PhD, MPH. Anne MacFarlane (AMcF): BA, MA, PhD. Christopher Dowrick (CD): BA, MSc, MD, CQSW, FRCGP, FFPHM. Frances Mair (FM): MBChB, MD, FRCGP, DRCOG. Mary O'Reilly de Brun (MORdeB): BA.Th, M.Th.
3. Occupation What was their occupation at the time of the study?	Catherine O'Donnell (COD): Professor of Primary Care Research & Development

	Anne MacFarlane (AMcF): Professor of Primary Healthcare Research. Christopher Dowrick (CD): Professor of Primary Medical Care. Frances Mair (FM): Professor of Primary Care Research. Mary O'Reilly de Brun (MORdeB): Research Fellow.
4. Gender. Was the researcher male or female?	NPT training team consisted of four females; one male.
5. Experience and training. What experience or training did the researcher have?	O'Donnell, MacFarlane, Mair, Dowrick are experienced, senior primary care academics. All four have led substantive programmes of research, using quantitative and qualitative methodologies, exploring a range of primary care issues. All have extensive experience of using NPT including applying NPT prospectively to complex interventions. These four team members thus formed the NPT trainers group, leading the development and delivery of the training reported here. Mary O'Reilly de Brun is an experienced researcher in the use of Participatory Learning in Action.
Relationship with participants	In answering these questions, I have regarded 'participants' as the members of the research team who were the focus of the training.
6. Relationship established Was a relationship established prior to study commencement?	Throughout the project, there was a close working relationship across the entire team of 18 individuals. Regular meetings of the project team, coupled with the training described in this paper, resulted in a strong-knot groups with high levels of confidence in each other. This also engendered a powerful sense of community within the team, which crossed county location, disciplinary background, and level of seniority.
7. Participant knowledge of the interviewer. What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	The NPT trainers, who led on the evaluation, were part of the full RESTORE team. Thus the other members of the RESTORE research team knew NPT trainers well. The purpose of obtaining evaluation feedback was explained to the team and all consented to their feedback being used both to inform future training, and to being used in future publications.
8. Interviewer characteristics. What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	Reasons for collecting evaluation feedback from the research team was explained, and re-iterated, at each training session. The research team knew that the NPT trainers group (COD, AMacF, CD and FM) were interested in developing future training for use with other research groups.
Domain 2: study design	
Theoretical framework	

9. Methodological orientation and Theory. What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	The methodological approach was that of Participatory Learning and Action, a participatory and democratic approach to the generation and analysis of data. The theoretical framework used was Normalisation Process Theory. This is a mid-range sociological theory concerned with the work that individuals and organisations have to carry out in order to embed and normalise new, complex ways of working into routine practice. NPT operates through four principal constructs or areas of work: coherence (sense-making work); cognitive participation (engagement work); collective action (enacting work); and reflexive monitoring (appraisal work), each with its own set of sub-constructs
Participant selection	
10. Sampling How were participants selected? e.g. purposive, convenience, consecutive, snowball	There was no participant sampling; all 18 members of the RESTORE team participated in the NPT training and in the evaluation of that training.
11. Method of approach How were participants approached? e.g. face-to-face, telephone, mail, email	N/A.
12. Sample size How many participants were in the study?	N/A.
13. Non-participation How many people refused to participate or dropped out? Reasons?	All members of the RESTORE team participated in the training and evaluation of that training; there were no drop-outs.
Setting	
14. Setting of data collection Where was the data collected? e.g. home, clinic, workplace	Data on the evaluation of the training were collected at each face-to-face RESTORE Consortium meeting. These meetings were held in the participating institutions across the 6 RESTORE countries: Austria, England, Greece, Ireland, the Netherlands and Scotland.
15. Presence of non-participants Was anyone else present besides the participants and researchers?	No.
16. Description of sample What are the	The RESTORE research team consisting of 8 project applicants, all senior primary care academics;

important characteristics of the sample? e.g. demographic data, date	and 10 researchers. Professional backgrounds included general practitioners/family doctors; social/cultural anthropologists; sociologists; health services/primary care researchers.
Data collection	
17. Interview guide Were questions, prompts, guides provided by the authors? Was it pilot tested?	Data were collected from the RESTORE team in a number of ways – all consistent with the methodological approach on Participatory Learning in Action. As described the paper methods included: written lists of the 3 most positive and 3 most negative features of the training; speed evaluation where each participant was given two minutes to verbally record which aspects of training had, or had not, been effective for them; scoring elements of the training on a Likert scale (e.g. from 1 = very poor to 5 = very good). These data were collected either as short written comments or recorded on a digital recorder. Additional evaluation was conducted approximately three weeks after the first session, when the team were emailed a short set of questions asking what had worked well; what had not worked well; and what they wanted from future training sessions.
18. Repeat interviews Were repeat interviews carried out? If yes, how many?	No
19. Audio/visual recording Did the research use audio or visual recording to collect the data?	Some feedback was recorded on a digital recorder.
20. Field notes Were field notes made during and/or after the interview or focus group?	No
21. Duration What was the duration of the interviews or focus group?	N/A
22. Data saturation Was data saturation discussed?	N/A
23. Transcripts returned Were transcripts returned to participants for comment and/or correction?	N/A. Evaluation comments were collated and feedback to the team at the next face-to-face meeting to permit discussion and clarification.

Domain 3: analysis and findings	
Data analysis	
24. Number of data coders How many data coders coded the data?	All the evaluation feedback was reviewed by the four members of the training team and the findings summarised into 'what worked', 'what didn't work' and 'what the team would like to do next'.
25. Description of the coding tree Did authors provide a description of the coding tree?	N/A
26. Derivation of themes Were themes identified in advance or derived from the data?	N/A
27. Software What software, if applicable, was used to manage the data?	No software was used
28. Participant checking Did participants provide feedback on the findings?	Evaluation feedback was presented back to the team for discussion and clarification.
Reporting	
29. Quotations presented Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? e.g. participant number	Yes – quotations have a descriptor that is non-identifiable of individuals.
30. Data and findings consistent Was there consistency between the data presented and the findings?	Yes.
31. Clarity of major themes Were major themes clearly presented in the findings?	N/A
32. Clarity of minor themes Is there a description of diverse cases or discussion of minor themes?	N/A.
