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ORIGINAL PRACTICE DEVELOPMENT AND RESEARCH

'How did it come to this?' Causal network analysis in practice and service development

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Abstract

Background: Practice development has been widely used to support change in healthcare for more than 20 years (McCormack et al., 2006), a result there is a growing body of knowledge which, describes the process and context together with the factors that influence the outcomes of such developments. Learning from failure in practice and service development is fundamental if we are to identify and understand what factors can influence success. Too often the analysis of failure has been subjective and has relied upon anecdotal accounts. This article explains the use of the methodology developed by Miles and Huberman (1994) to inductively map how variables and factors interact to produce a particular outcome. Causal Network Analysis (CNA) is useful in exploring the factors, which can influence developments, as well as exploring what triggered the success or failure of a particular development.

Aim: This paper seeks to describe the use of CNA as a method of systematically analysing why some developments succeed while others fail.

Design: CNA represents a method of analysing prospectively or retrospectively data derived from semi-structured interviews, observation or secondary data. Two approaches to the use of CNA are described here. The first approach relates to retrospectively analysing the iterative development of a hospital palliative care service using secondary data from referrals received over a three-month period. The second approach relates to the use of 'real time' CNA while planning and implementing two integrated community nursing teams within a Primary Care Trust in the UK.

Results and discussion: These examples illustrate how CNA can be used to identify variables which can influence how a development is implemented and how services develop iteratively over time. CNA allows individuals to identify those factors over which they may be able to exert some influence. This enables practitioners and others to identify how developments in practice can be effectively facilitated and implemented to produce the desired improvements in patient care. Additionally, CNA allows for the presentation and synthesis of large volumes of data into an easy to present and understandable form. This in itself may prove useful when managing a complex development in order to track progress and identify next steps. CNA is a useful adjunct to practice development evaluation, in that it enables and facilitates critical reflection on the process of developing practice and the identification of how a particular outcome occurred. The approach to CNA described in this paper is founded on social constructivism but can be used alongside other evaluation approaches, such as those associated with critical social theory.

Conclusion: While CNA has been used as an approach to analysing narrative data, the use of the method to analyse practice and service development represents a valuable tool to identify why some developments succeed while others fail.

Implications for practice:

- Not every development in practice will be successful. In order to learn from failure practitioners need a system to analyse why a development was not successful
- CNA provides a relatively straightforward way of analysing why some developments succeed while others fail
- Identifying the possible causes of failure allows for the identification of potential solutions and enables practitioners to navigate various organisational and inter-personal factors which can influence a practice development project
- CNA is a useful method of mapping developments and may assist practitioners to examine the process of developing practice as well as to identify how outcomes were achieved

Keywords: Methods, analysis, outcomes, service development, practice development

Introduction

Practice development has been widely used to support change in health care for more than 20 years (McCormack et al., 2006) and as a result there is a growing body of knowledge, which describes the process and context together with the factors, which influence the outcomes of such developments. Practice development is a term used to describe a variety of approaches used by practitioners to facilitate the development of clinical practice. Unsworth (2000) describes how the attributes of practice development include the implementation of new ways of working which lead to a direct measurable improvement in the care or service delivered to the client; changes which lead to the development of effective services and the maintenance or expansion of the organisation's work. Practice development has been used by individual practitioners and organisations to implement change (Lamont et al., 2009). Despite the empirical work to date on practice development, the implementation of such change needs much greater exploration if we are to ever really understand why some developments are adopted and others fail.

While the concept of learning from failure is not well developed in practice development, it is seen as an essential component of organisational learning in the field of change and innovation (Cannon and Edmondson, 2001). Although more commonplace in the discipline of organisational change and innovation, there are those who believe that learning from failure is somewhat subjective and relies heavily on anecdotal evidence (Peters, 1987). Despite these limitations, learning can occur from major failures and can also arise from seemingly small failures or problems arising from misunderstandings and interpersonal conflicts. Perhaps one reason for the apparent reluctance to learn from failure could be the psychological impact, which the failure of an innovative project can have on the individual, or team who was leading it (Shepherd and Kuratko, 2009). However, analysis of why an innovation or development has failed may allow the individual to understand how to approach the development differently or how to manage future projects more successfully.

Another common aspect of organisational development in which learning from failure is espoused as important is that of service development. There is a widely held view that services undergo an iterative development from their initial inception onwards and that they are in a constant state of change (Rathmell, 1974; Langread et al., 1986; Gronroos, 1990).

Given the importance of learning from successful and unsuccessful developments in practice, this paper aims to describe the use of Causal Network Analysis (CNA) as a data collection and analysis methodology to review an unsuccessful development in primary care. The paper also details how

this approach has been used in the ongoing development of a palliative care service. Its use in both of these areas will be described and illustrated with practical examples.

The notion of causal relationships or causality owes its origins to the positivist tradition. Causality is classically referred to as the relationship between an initial event (the cause) and another event (the effect) (Tittle, 2011). There are a number of types of causation but probabilistic causation seeks to determine the probability of A causing B. However, it is widely accepted that probabilistic causation rarely exists in the social world. Rather, causation in the social context is the relationship between a set of factors (causes) and a phenomenon (effect) (Pearl, 2000). The process of CNA described in this paper is based on social constructivism. In a constructivist orientated version of systems theory, causality is a 'matter for an observer' that is causality is observed and socially constructed by the observer (Wan Poe Yu Ze, 2011). Luhmann (2002, p 94) describes how in the social world 'causality is a judgement, an observation of an observer, a coupling of causes and effects'. Clearly there are strengths and limitations to such an approach. Firstly, if an individual constructs a causal relationship, then it is difficult to determine whether such a relationship does, in reality, exist. However, a key strength to this approach is that the classical view of A causing B, is supplemented with the notion that several causes may interact to produce a certain effect or outcome. Such social constructions are heavily context dependent and as a result the same factors may not interact to produce an effect in a different context. This makes the generalisation of the relationship impossible although it could be transferable in a similar context.

Whilst the notion of CNA may appear alien to many practitioners, variants of this approach are widely used within healthcare across the world. Root Cause Analysis (RCA) and Why-Because Analysis (WBA) are used extensively to analyse how several factors influence each other to produce a particular outcome (Dunn, 2003 and Saunders, 2012). These techniques are widely used to examine incidents, accidents and patient safety concerns.

Causal Network Analysis

Miles and Huberman (1994, p 153) describe how 'a causal network is a display of the most important independent and dependent variables in a field of study together with the relationship between them'. Approaches to building causal networks can be regarded as inductive or deductive (Miles and Huberman, 1994). Within the inductive approach the individual constructing the causal network discovers recurrent phenomena and identifies relations among them. As this work progresses the local causal map emerges in a piecemeal manner with names and labels clustering into probable causes and the effects. The deductive approach involves the individual starting with a theory or a preliminary causal network and using this to test the theory against what had happened in the particular situation being examined.

Classically, the criterion of necessity is used to judge whether a causal relationship exists between two events; that event A was necessary to produce event B. The criterion of necessity in such causal relationships is tested using the counterfactual argument e.g. if not A then not B – that is if A had not occurred then B would not have occurred (Trabasso and Sperry, 1985). However, the traditional notion of a causal relationship has been criticised because multiple factors often combine to produce a particular effect or outcomes. Guba and Lincoln (1989, p 97) 'reject the traditional concept of causality and replace it with a different human construction, that of mutual simultaneous shaping'. They argue that the conventional view of causality is flawed, for among other reasons, the impossibility of divesting causality from the influences of human experience. All decisions about cause and effect are dependent upon making a judgement that it was a particular cause which produced that particular effect. Multiple factors often play a part in an effect and it is therefore not always possible to say that A caused B.

The alternative view of mutual simultaneous shaping, where everything influences everything else, is particularly useful when reviewing the process of developing practice or services. As a result, several elements may be implicated in a particular action or outcome. The issue of directionality, often referred to as temporal precedence in the conventional sciences (Miles and Huberman, 1994), no longer exists as a particular element and may or may not produce an action or outcome depending upon the setting in which the phenomenon occurs. All of the elements involved in simultaneous shaping contribute to an outcome or action and are therefore regarded as contingently necessary as part of a synergistic relationship. Therefore, to produce a particular effect, an element needs to occur within a particular situation (context) and is often tied into other elements being present at the same time. Lincoln and Guba (1985, p 155) state that 'each element is activated in its own way by virtue of the particular configuration of all other elements… present at that time in that place'.

For example, we could hypothesise that the merger of organisations (*the cause*) stalls the development of practice (*the effect*). However, this would add little to our understanding of why this occurs, but may simply explain how one factor influences another within a particular organisational context. In addition, practitioners seeking to develop their practice may feel powerless in such circumstances as they may feel that there is little they can do to alter this situation. In reality multiple factors influence each other to produce an outcome (in this example temporary cessation of a development). These factors may include changed organisational priorities, manager uncertainty, job insecurity, state of flux and the need for re-approval. Individual practitioners can influence some of these factors or managers in the organisation and this may allow for the continuation of the development even during an organisational change or merger.

The identification of whether mutual simultaneous shaping is occurring in a situation requires the individual reviewing the process of the particular development working with key stakeholders to identify interactive shapers, elements and outcomes or actions which may be linked. Finally, it is important to acknowledge that the particular pattern of elements that give rise to a particular situation are unique and may never exist in that form again and, as a result, it is impossible to imply either predictability or control (Guba and Lincoln, 1989). Rather, that it is possible to determine that a particular event or factor may have a positive or negative influence given the same contextual circumstances in the future.

The use of diagrams allows the evaluator to compare large volumes of data easily and the accompanying narrative enables complex issues to be assimilated and understood by the reader (Nash, 2006).

Constructing a causal network
The construction of causal networks related to practice or service developments will utilise case summaries. Case summaries may arise from each stakeholder writing a summary of the development from their own perspective and the use of secondary data such as records of meetings. These case summaries are then used to determine possible causal linkages and to start to construct the story (narrative), which will provide the final explanation about the causal network. The individual analysing the case summaries produced by participants should identify 'events' which are either antecedents to the development, part of the process of developing practice or outcomes of the development. At the same time 'states' which relate to how events made individuals feel are also mapped. Characteristically, events are placed into boxes on a causal network and states are placed in oval shapes. The individual analysing the case summaries then identifies which states and events are linked together either in a causal relationship or as part of a number of factors which simultaneously work to shape an event.

One of the main components of CNA is the checking of causal inferences with individuals who were involved in the original development. Once the events and states are identified and initial causal relationships identified the individual undertaking the analysis should return to the key stakeholders in order to check out assumptions and to gain further insight into how factors influence on another. Following the stakeholders' comments, changes should be made to the event state networks, particularly those related to the chronological order in which events occurred. Each event state network should have an agreed narrative, which serves to tell the story of the development.

The next stage involves the generation of the causal network variable list. This stage precedes the drawing of the final causal network. The drawing up of the variable list should be relatively easy because of the existence of the event state networks. The variable list consists of those factors which are antecedents to the development, those that are intervening (or process) factors and those which relate to outcomes. Using the variable list, the final causal network can be drawn and the associated narrative produced to describe the events as they occurred.

Where there is more than one series of events being studied, as in the case of the use of CNA within service development, a cross case comparison should be undertaken. Miles and Huberman (1994) describe how cross case CNA is a powerful way to move from case specific explanations, to findings that aid discovery or reinforce constructs. The basic operations related to cross case comparison are similar to those used within single CNA. The first phase is to construct individual networks for each case. Once this is completed, comparative analysis of all cases can occur starting with an initial examination of the factors estimated to be the most influential. During this comparative analysis, causal streams are identified and compared, to identify whether they match with streams in other cases. On some occasions it may be possible to identify similar causal streams across all of the cases. An example of a cross case CNA is given later in relation to service development within palliative care.

Results

Example 1: Retrospective Causal Network Analysis
As highlighted earlier, CNA can also be used to review how services have developed iteratively over time. Often the individual practitioners who develop and work in a service, shape the way in which the service operates over a period of time. Practitioners are likely to exert greater influence on services which are not modelled on national policy and which can be shaped by the founder or key team members. An example of this is how palliative care services have been developed in some parts of the United Kingdom. Hospital palliative care teams are a common feature within hospitals around the world, having been developed in the 1970s (O'Neill, O'Connor and Latimer, 1992). Higginson et al. (2002, p 98) defines such a team as 'two or more healthcare workers, at least one of whom has specialist training or works principally in palliative care'.

Since the 1990s, for example, there has been a rapid expansion of hospital-based specialist palliative care teams. A common feature of hospital teams is their multi-professional composition and their presence within an acute setting. The Hospital Specialist Palliative Care Team (HSPCT) was launched in 2002 as a multi-professional advisory service for patients, relatives and staff working in secondary care settings in Aberdeen. However, as noted by Manfredi et al. (2000), a palliative team working in a curative environment may be first to pose the question 'is this patient dying?' In addition, the transition from acute to palliative care may be difficult for staff according to Middlewood, Gardener and Gardener (2001).

A systematic review of literature on the effectiveness of hospital palliative care teams was undertaken by Higginson et al. in 2002 and 2003, showing that there was a small, but positive

benefit to their work, although the evidence was limited and it remains unclear which service model is the most effective. The review reported that 20% of hospital bed days in the United Kingdom are accounted for in end of life care. The findings highlighted challenges faced by hospital palliative care teams in staffing and leadership, clinical responsibility and communication.

After six years of operation, the team wanted to review the reasons why people are referred to the HSPCT as a basis for service review and development. Therefore, the team decided to analyse the reasons for referral to the team over a three-month period, using a review of HSPCT records.

Every patient referred to the HSPCT has a record created that exists in addition to his or her hospital record. This HSPCT record contains the referral form itself, the name, age, address, ward, consultant, set referral criteria that the referrer can tick as well as an open narrative box. It provides space to record review visits, progress and date/reason for discharge from the team.

Initially, the team considered using a descriptive qualitative approach to analyse the records, with data coded, themed and displayed (Miles and Huberman, 1994). However, as the work began, it became apparent that it did not capture the essence of the work of the HSPCT, it did not show the patient's story and was overly reductionist. It did not allow the 'what is happening here' question to be answered. Therefore, at an early review meeting, it was agreed to use a CNA approach to enable these issues to be addressed.

The approach adopted allowed for the detail of the referral and the practitioner's reactions and feelings towards it to be recorded using event state networks. Each referral was analysed in this way. Cross case comparison was then undertaken to identify themes which occurred in several referrals and this was eventually constructed into a causal network which identifies the pathway for a successful and an unsuccessful referral to the hospital palliative care service.

Initially, the approach was used with five patient records and it was apparent that an inductive approach would enable the story of the patient's journey following referral to the team to be seen at a glance. Event state networks were created to represent case summaries. As there were six people working on this project, it was important that everyone was clear about how to draw event-state networks. This was especially true, as only one member of the team had encountered CNA before. This involved stopping regularly and crosschecking each other's networks to ensure consistency. This replaced the need for member checking.

The team decided that a retrospective review of three months would provide sufficient data to allow exploration of the reasons why clinicians referred patients to the HSPCT. It was also hoped that such analysis would enable an exploration of the team's actions in response to these referrals. The total number of referrals in the three month period was 181. Event state networks were drawn for 175 cases, as six records were incomplete, giving a large body of data for further analysis and construction of the causal network.

From the event state networks, a list of antecedent, intervening and outcome variables were compiled. These were listed on sheets of flip-chart paper and posted on a wall, creating a meta-matrix. This gave the team a greater opportunity to examine the variables, undertake cross case comparison and identify the explanatory elements to them. Then, two event state network summaries were created, highlighting the two main outcomes of a referral, namely a resolved and unresolved referral. This is shown in Figure 1 along with the accompanying narrative in Box 1. The first one highlights the antecedent and intervening variables that lead to a resolved referral, while the second highlights those variables that lead to an unresolved outcome.

This process, recognising the mutual simultaneous shaping, guided the creation of the causal network in Figure 2 along with the accompanying narrative in Box 2.

The results that were obtained have provided the team with a clearer idea of the reasons why patients are referred to the HSPCT, but more importantly, the process of creating the causal network facilitated reflection on practice for the members of the HSPCT.

The initial analysis of the data, for example, has made us realise that we were making unhelpful assumptions about the appropriateness of referrals and how we were viewing the 'non-specialist' referrals that were made by the general wards. The discipline of identifying the intervening variables gave us a clearer understanding of why some referrals remain unresolved. This has allowed us to consider the impact of the intervention of the HSPCT on these variables.

One of the limitations of this approach is the time that this project has taken to complete. By necessity, it was worked on sporadically and this made it challenging to keep the momentum going.

Figure 1. Event State Network – retrospective CNA
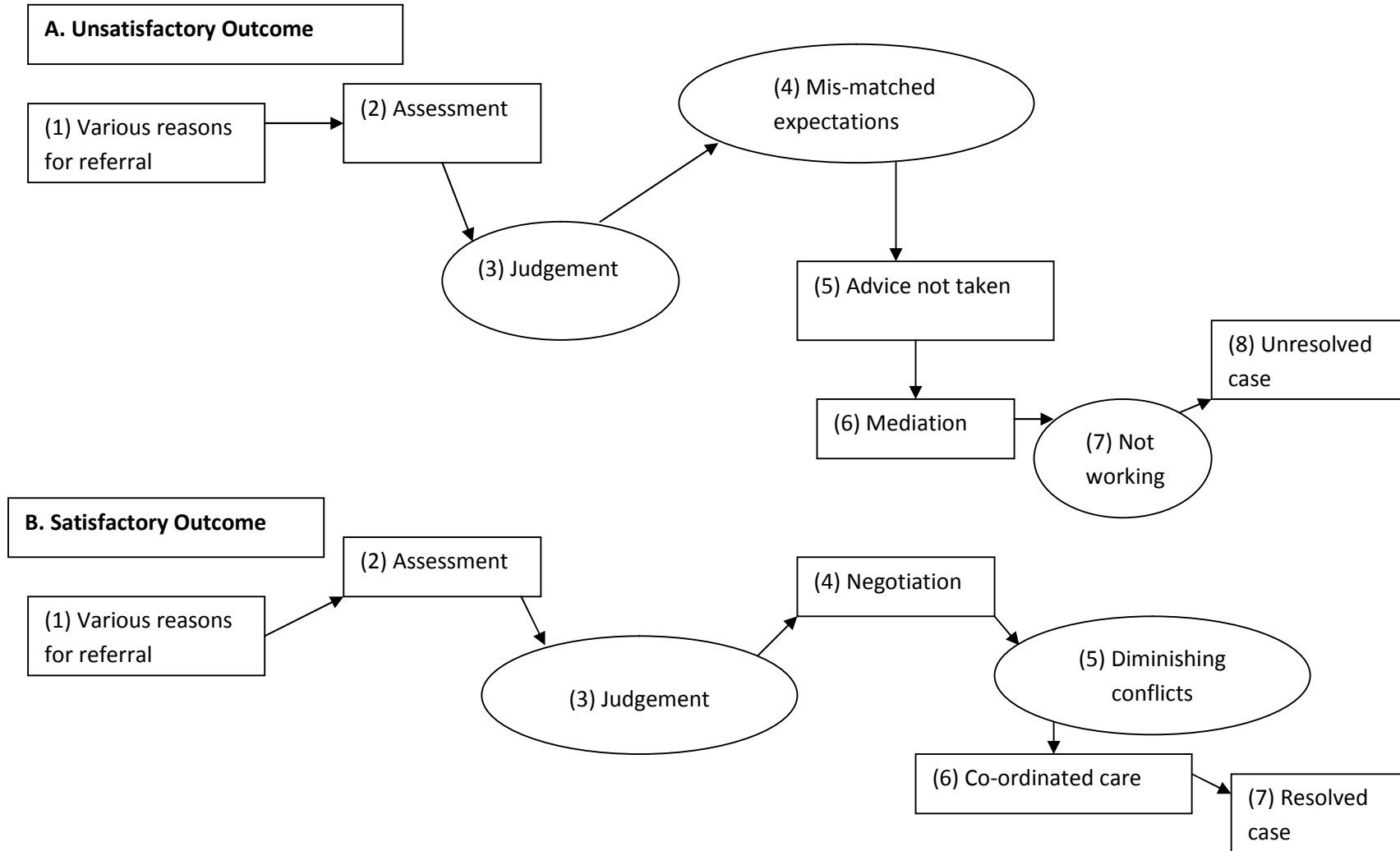
Box 1. Event State Network - summary narrative

An unsatisfactory outcome starts with various reasons for referral (1) and it doesn't matter what they are. The patient is assessed (2) and we as a team make some sort of judgement (3) about what is happening. We run into problems when we identify that there are mismatched expectations (4) or conflict between the team and ward or team, ward and patient. We can find examples in our meta-matrix of when people die where they should not, or patients undergoing treatment or investigations when we don't think they should or when distressed symptoms remain uncontrolled because of interventions that they are having.

We as a specialist team, introduce mismatched expectations by judging that a patient has no specialist needs, refusing to take over the patient's care or contradicting the nursing and/or medical management of the patient. A couple of things that appear to lead to conflict include a young patient or a patient who is not co-operating with care which is perceived to be to their detriment and interfering with their treatment plan.

When we fail to deal with this conflict, when advice is not taken (5), when staff become distressed, powerlessness, and our attempts at ongoing dialogue and negotiation (6) do not work(7), we end up with an unresolved case and an (8) unsatisfactory outcome.

A satisfactory outcome starts with a variety of reasons for referral (1) and recommendations from the team, following an assessment (2). In this situation, the judgement made by the team (3) coincides with the ward's request for help. This can be either a fairly straightforward situation when the patient/ward/family are asking for something that the team can deliver; the situation is confused and the team can help to clarify the situation or there is conflict and different people with different aims and the team negotiate (4) and diminish the conflict – an agreed plan (5). In doing those things, there are a number of positive effects – confidence, the power to act and intervene, allows the multi-disciplinary team to act with one voice and we end up with more co-ordinated care (6) and a resolved case and satisfactory outcome (7). Examples include that the patient dies where they should die, when they should e.g. treatment withdrawal etc. in an un-distressed way, and sometimes it is the team's input or giving the ward the permission to do this or taking responsibility for the patient's care by moving them to an alternative location.

Figure 2. Causal Network – retrospective CNA example
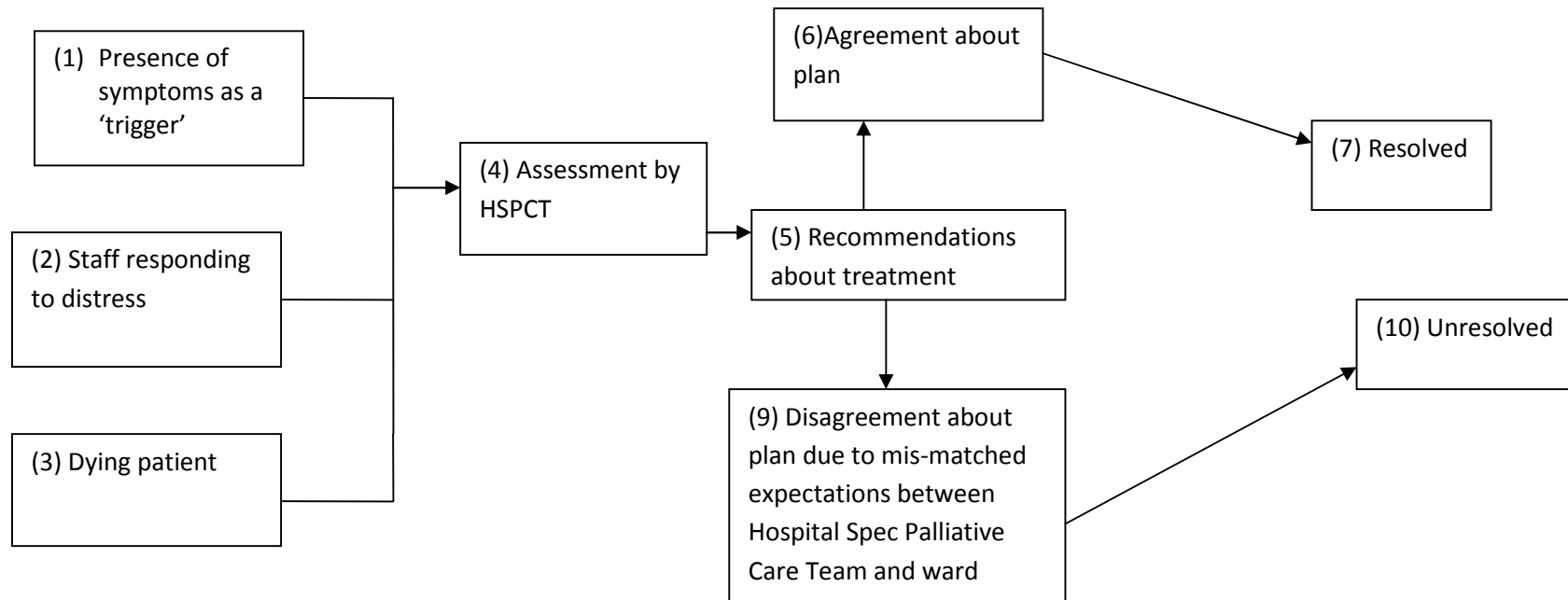
Box 2. Causal Network – narrative

The reasons why patients are referred to the palliative care team fall into five categories. It may be that the patient is young (1); that it is a patient who is declining or refusing treatment (2); that the patient has pain or the presence of symptoms that the ward is having difficulty in treating (3); The ward team may be uncertain how to respond to the distress evident in a patient or relative (4), or that the patient is dying (5).

On receipt of a referral, the ward visit to undertake an assessment of the patient, speaking to staff and reviewing case notes (6). The outcome of this assessment will be a series of recommendations (7) relating to treatment, location or transfer of the patient. This might involve symptom management advice, changed to prescribed medication, or a recommendation for transfer to the specialist palliative care unit. This can result in two different outcomes. When there is a shared agreement between the HSPCT, ward, patient and family about the recommended plan (8), the outcome would be a resolved referral (9). However, another outcome from the recommendations (7) may be a disagreement due to mismatched expectations between the HSPCT, ward, patient or family (10). This will lead to an unresolved referral and a sense of dissatisfaction about the original purpose of the referral (11).

Example 2: Real time causal network analysis
This second example serves to illustrate the use of real time CNA with data being collected, analysed and acted upon during the implementation of the change in practice.

Since the 1990s there has been a growing trend towards the development of integrated working in primary care teams, in the United Kingdom (RCN, 2002; Fear and de Renzier Brett, 2007). This has been driven in part by government policy related to chronic disease management, integrated health and social care and improvements in child protection. However, most projects, which have sought to develop integrated working in primary care teams, have had multiple drivers including a desire to maximise resources, improving performance and addressing staffing and funding shortfalls (Goodman, 2000). While some development aimed at blurring role boundaries succeeded (Fear and de Renzier Brett, 2007) others have been less successful because of conflict, issues with commitment, poor articulation of objectives and concerns about role erosion (Furne, Ross and Rink, 2001).

The development of integrated working in primary care provides an excellent illustration of how CNA may be utilised to identify how such developments in practice are implemented and to examine why some of these developments succeed while others fail. The causal network presented here is taken from a larger study of factors, which influence the development of nursing practice (Unsworth, 2002). The causal networks were constructed using data from semi-structured interviews with a practice development nurse within a Primary Care Trust. Primary Care Trusts are responsible for the delivery of Family Health, General Practitioner and community nursing services in England. The research participant was responsible for leading the development of integrated working across the Primary Care Trust and at the time of data collection was working with several teams.

The initial event state networks were constructed using data from semi-structured interviews. During these interviews subjects are asked to describe the origins of the development, the specific driving and restraining forces and other areas of tension. Following each interview a draft event state network was developed and sent to the participant for checking. Between interviews, data were collected using critical incident reporting. To facilitate the reporting of events and emotional

states, the participant was provided with a hand held dictation machine, tapes and specific guidelines about what should be recorded. There are a number of benefits to using critical incidents, not least the fact that the participant was asked to record thoughts and feelings about factors, which influenced the development of integrated working as they were happening. This allows for the analysis of issues which might not otherwise be included as the participant could have resolved them before the next scheduled interview (Sauer and Anderson, 1992). In addition, a series of four interviews were conducted during the lifetime of the development and eventually a full event state network was constructed.

Figure 3 shows the event state network for the development of integrated working and Box 3 provides the accompanying narrative. The event state network illustrates the origins of each of the integrated working projects, which were initiated in the Trust. Two different routes were identified using the event state network. Route A was initiated by the Trust in response to staffing shortages and a desire to address the populations health needs in a different way. As can be seen from the event state network, this methodology fails to succeed because of a lack of commitment amongst staff or because staff decide to pursue the development of an integrated team as a reaction to threats from outside organisations. In contrast, Route B relates to the initiation of the notion of an integrated team in response to a poor working relationship between the attached nursing staff and the general practice. The work of the facilitator appears to assist in helping the team to resolve some of these relationship issues and in the end the team start working together on a single project.

Figure 3. Event-State Network
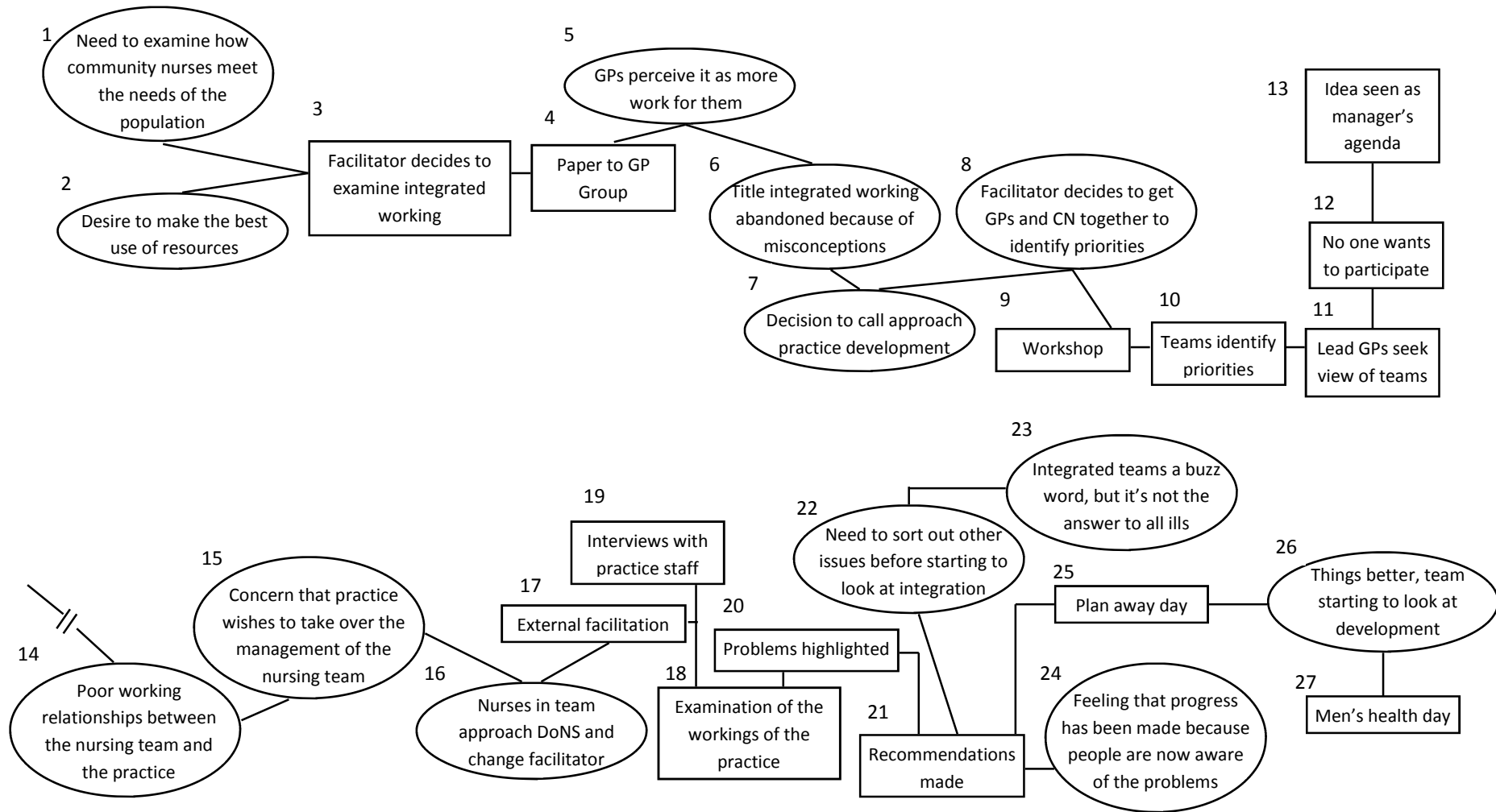
Box 3. Event State Network – narrative

The manager decided that because of staffing problems there was a need to examine how the community nurses were working in terms of meeting the overall needs of the population (1). This decision was taken upon the basis that there was unlikely to be any new resources for additional staff. As a result, it was necessary to make the best use of its existing resources (2) by breaking down some of the barriers between the different nursing disciplines. The facilitator decided to examine integrated working (3).

As a starting point, she presented a paper to a local General Practitioner (GP) Group (4). At the meeting the facilitator received a very negative reaction to her proposals as the development of integrated working is likely to result in more work for GPs (5). Following the meeting she decided to abandon the title integrated working (6) and press ahead with the notion of a practice development (7). However, this term is also open to misinterpretation as it is used in General Practice to indicate the development of the actual practice or its premises. To progress the development, the facilitator decided to get the community nursing staff and the GPs from the locality together to identify priority areas (8). This meeting took the form of a half day workshop (9) where teams worked together to identify priorities (10). Unfortunately, the meeting was interrupted by someone becoming ill and it ended abruptly with no clear action plan.

The facilitator asked the lead GPs to canvass views (11). After a few weeks it became clear that none of the teams wanted to participate (12) as the whole notion of integration was seen as a management agenda (13).

Another Practice which came forward had particularly poor working relationships between the GP Practice and the nursing staff (14). The nurses had expressed concern that the Practice wanted to take over the running of the nursing team (15). As this concern increased, the Director of Nursing and the facilitator were approached (16) about what was felt to be a seriously deteriorating position. The Director of Nursing decided to seek external facilitation (17) for the Practice and the team. The facilitators undertook to examine the workings of the Practice (18) through observation and interviews (19) with staff. Following the data collection the external facilitators presented the data, highlighting several problems (20) within the Practice. Recommendations were made (21) relating to how working relationships could be improved. The Practice was informed that it needed to sort out several other issues before it could look at integrated working (22). Clearly, the GPs felt that integrated working was the answer to all their ills (23). The nursing staff were delighted with the outcome of the external facilitation because they felt that everyone was now aware of the issues within the Practice (24).

A few months later the Trust organised a staff development away weekend for staff from the Practice (25). As a result of this and continued work, the nursing staff and GPs felt that things had become much better within the Practice (26). The nursing team had started to look at some developments (27) with the practice nurses, health visitors and district nurses working on a joint men's health day.

From the completed event state network a causal network (Figure 2) can be developed. The causal network shows the variables, which simultaneously shape other variables or outcomes. The causal network is also accompanied by a narrative (Box 2) that details how the developments were initiated and progressed towards the final outcome. Figure 2 illustrates how the development of integrated nursing teams had several different drivers and while some groups sign up for facilitation others decide against this. While some small scale developments do happen these eventually dissipate over time. To some extent this will be related to the antecedent variables which drove the developments in the first place. In this example the antecedents were inevitably perceived as negative arising from anxieties, threats, lack of resources and poor working relationships.

The final causal network (Figure 4) represents a simplified view of the variables, which interact to produce a particular outcome. The causal network is constructed from the event state network, which includes feelings and states. Data is further analysed to identify those factors or variables, which interact to produce the final outcome.

Figure 4. Causal Network
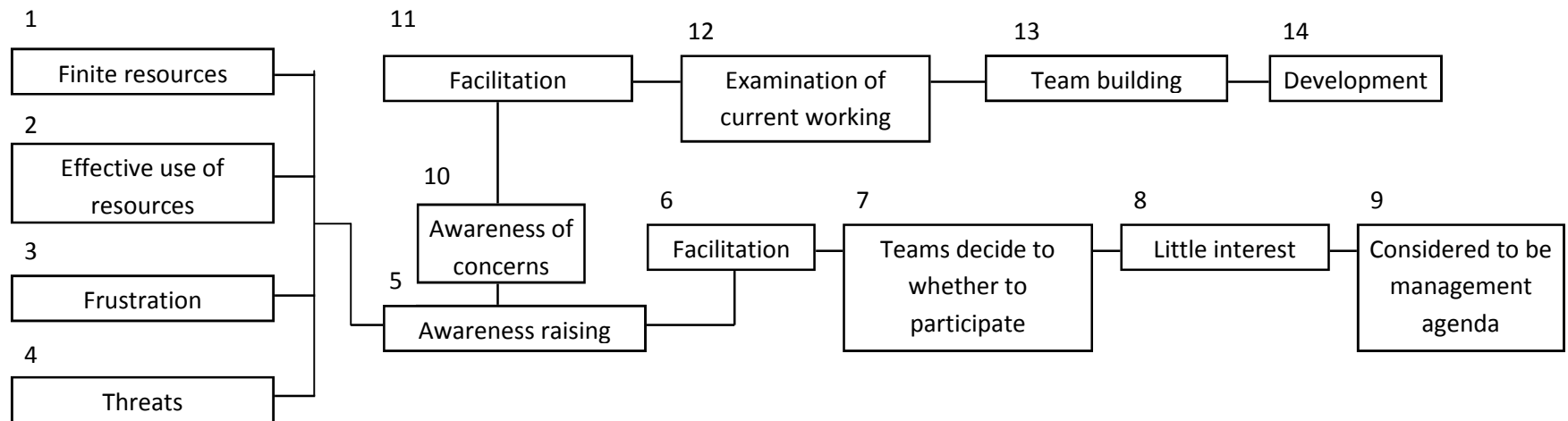
Box 4. Causal Network – narrative

Finite resources (1) and rising demands led to a decision to examine integrated working to ensure the best use of resources (2). This was coupled with previous frustration (3) at managers' failures to allow service development. While individual practitioners felt threatened by the proposed integration (4), some practitioners were interested in examining new ways of working and closer co-operation between disciplines. All of these factors led to an increased awareness (5) either of a desire to move forward or of concerns about team functioning. Following an awareness raising session, during which the whole philosophy of integrated working was debated, Practices were asked to sign up. After the awareness raising session, some practices signed up and were offered facilitation (6) while others did not. After the facilitated event the teams make a decision about whether or not to participate further (7). There is little interest in pursuing this (8) as it is perceived as a management agenda (9).

At one practice there were concerns about the relationship between GPs and community nursing staff (10) and the team have assistance from facilitators (11). In-depth examination of working practice is undertaken and an action plan developed (12). Following this the team have some team building (13) and during these the nursing staff decide to work together on developing a Men's Health day as a joint development (14).

The two different approaches to the development of integrated community nursing teams are interesting. While both teams receive facilitation, one of the developments is seen as a management agenda to address inadequate staffing. Despite the facilitation and support this project is unsuccessful as staff viewed the purpose and intent of the development with suspicion.

The other approach relates to focusing the team on a clear project designed to improve patient care by closer working and co-operation between team members. Following facilitation the team work to develop and run a men's health event with all team members making a contribution. This development originates from the team itself and its clear patient focus may have played a significant role in the successful outcome.

The benefits of CNA of practice developments are numerous. Firstly, it can be used as a data analysis method to assist researchers to identify and examine how factors influence the development of practice. Secondly, during the construction of the event state network, particularly if this process involves the checking of the draft network by individuals directly involved in the development, it is possible to identify factors, which may be stalling the progress of a development. Constructed networks allow participants to identify barriers and factors, which can influence the development of practice. Such factors may include high-level organisational support, harnessing opinion leaders and the negative impact of conflict and medical dominance. Being aware of the influence of these factors could enable the team to avoid subsequent problems in future developments. Finally, the networks provide a succinct overview of the progress of a development and can be useful in explaining the amount of effort put into trying to implement an unsuccessful project as well as providing a possible rationale for success or failure.

Discussion

CNA presents an opportunity to systematically and rigorously analyse how a development has been or was implemented or to explore how a service operates. As an approach CNA can be 'live' with data being recorded in real time as events happen or retrospective with data being collected sometime after the event. Real time CNA in practice development allows for the identification of

factors, which may facilitate or hinder progress with the development. This enables practitioners to consider how to progress the development to the next stage and to identify how future developments in practice may be handled differently to enable successful implementation. It is envisaged that this approach will be particularly useful when piloting changes or when introducing small scale change originating from staff within the organisation which may then be subject to wider implementation. Real time CNA allows for simultaneous data collection, analysis with subsequent reflection and adaptation of plans for implementation. In addition, CNA may also be used retrospectively. Retrospective CNA is a useful method of analysing why a particular development did not succeed or as a research approach it can be used to study the process of developing practice.

While CNA has a number of advantages the method is not without its limitations irrespective of the approach adopted. In real time CNA the method can be very time consuming and it may produce data of limited value if the development proves easy to implement or follows closely the pre-determined implementation plan whereas, retrospective CNA is heavily dependent upon secondary data sources. These may not provide a full account of the events, which influenced the development of a service or clinical practice. Another significant limitation of the method is that the data in the form of the diagrams cannot be separated from the accompanying narratives making presentation of the findings difficult and cumbersome.

In common with most methods of data analysis, CNA is reductionist in nature. This is clearly illustrated by the progression between event state networks and the final causal networks in each of the examples in this paper. While this reductionist approach is useful in circumstances where there is a volume of data or when comparing several similar developments much of the detail about individual events, how they unfolded and the influence they exerted is lost. Depending upon the purpose of the analysis individuals may find the event state networks to be more useful when considering what went wrong with a particular development and how this could have been handled differently.

McCormack (2010) has described how the future of practice development is reliant upon multiple perspectives complementing each other and how the transformation of healthcare will not be assisted by competition between methodologies and methods. CAN is a useful method of critically reflecting and analysing the process of practice development. As an approach it could easily sit alongside the Praxis evaluation method (Wilson, Hardy and Brown, 2008). The Praxis evaluation method has a basis in critical social theory and as such it is reliant upon self-reflective knowledge and taking a critical stance towards social reality and the institutions within society (Leonardo, 2004). Within the Praxis model of practice development evaluation CAN could be a particularly useful method to assist with the reflexive process promoting insight and increased understanding of how the process operated, barrier and facilitators and in exploring the culture and political / organisational context in which the development occurred.

Conclusion

This paper has described the use of CNA as a way of learning from practice and service development. CNA as an approach is a systematic and rigorous method of reviewing how change was implemented or how a service has developed. CNA as a method can add to our understanding of why some developments fail as well as how a service can develop iteratively over a period of time.

Being aware of influencing factors may help an individual, team or organisation avoid future failures and offer an opportunity to reflect on how change was approached and how services currently operate.

CNA can act as a useful adjunct to other evaluation methods by facilitating reflexive analysis of the process of developing practice and enabling practitioners to identify what went well and what they as individuals, could do differently when implementing future developments.

References

Cannon, M. and Edmondson, A. (2001) Confronting failure: antecedents and consequences of shared beliefs about failure in organisational work groups. *Journal of Organizational Behaviour.* Vol. 22. No. 2. pp 161-171.

Dunn, D. (2003) Incident reports – correcting processes and reducing errors. AORN. Vol. 78. No. 2. pp 212, 214-216, 219-220.

Fear, T. and de Renzier Brett, H. (2007) Developing Interprofessional working in Primary Care. *Practice Development in Healthcare,* Vol. 6. No. 2. pp 107-118.

Furne, A., Ross, F., Rink, E. (2001) The integrated nursing team in primary care: views and experience of participants exploring ownership, objectives and team orientation. *Primary Healthcare Research and Development.* Vol. 2. No. 3. pp 187-195.

Goodman, C. (2000) Integrated nursing teams: in whose interest? *Primary Healthcare Research and Development.* Vol. 1. No. 4. pp 207-215.

Gronroos, C. (1990) *Service Management and Marketing.* Lexington MA: Lexington Books.

Guba, E.G. and Lincoln, Y.S. (1989) *Fourth Generation Evaluation.* Newbury Park, California: Sage.

Higginson, I., Finlay, I., Goodwin, D., Cook, A., Hood, K., Edwards, A., Douglas, H. and Normand, C. (2002) Do hospital-based palliative teams improve care for patients or families at the end of life? *Journal of Pain and Symptom Management*. Vol. 23. No. 2. pp 96–106.

Lamont, S., Walker, P. and Brunero, S. (2009) 'Teaching an old dog new tricks' A Practice Development approach to organizational change in mental health. *Practice Development in Healthcare.* Vol. 8. No. 2. pp 65-76.

Langread, E., Reffait, P. and Eiglier, P. (1986) Developing New Services. *In* Venkatesan, M., Schmalensee, D.M. and C. Marshall, C. (Eds.) (1986) *Creativity in Service Marketing – What's New? What works? What's developing?* Chicago: American Marketing Association. pp 120-128.

Leonardo, Z. (2004) Critical social theory and transformative knowledge: the functions of criticism in quality education. *Educational Researcher*. Vol. 33. No. 6. pp 11-18.

Lincoln, Y.S. and Guba, E.G. (1985) *Naturalistic Inquiry.* Beverly Hills, California: Sage.

Luhmann, N. (2002) *Einfulning in die systemtheorie.* Cited by Wan Poe Yu Ze (2011) *Reframing the Social.* Ashgate: London.

Manfredi, P., Morrison, R., Morris, J., Goldhirsh, S., Carter, J., Meier, D. (2000) Palliative care consultations: how do they impact the care of hospitalised patients? *Journal of Pain and Symptom Management.* Vol. 20. No. 3. pp 166–173.

McCormack, B. (2010) Clinical practice development. *Journal of Research in Nursing.* Vol. 15. No. 2. pp 189-192.

McCormack, B., Dewar, B., Wright, J., Garbett, R., Harvey, G., Ballantine, K. (2006) *A Realist Synthesis of Evidence Related to Practice Development.* Edinburgh: NHS Education for Scotland.

Middlewood, S., Gardner, G. and Gardner, A. (2001) Dying in hospital: medical failure or natural outcome? *Journal of Pain and Symptom Management.* Vol. 22. No. 6. pp 1035-1041.

Miles, M.B. and Huberman, A.M. (1994) *Qualitative data analysis* (*2nd Ed.*) Thousand Oaks, California: Sage.

Nash, R. (2006) The use and application of causal network methodology in peripheral areas of Scotland. *Annals of Tourism Research.* Vol. 33. No. 4. pp 918-938.

O'Neill, W., O'Connor, P. and Latimer, E. (1992) Hospital palliative care services: three models in three countries. *Journal of Pain and Symptom Management.* Vol. 13. No. 7. pp 406–413.

Pearl, J. (2000) *Causality: Models, Reasoning and Inference.* Cambridge University Press: Cambridge.

Peters, T. (1987) *Thriving on Chaos*. Harper and Row: New York.

Rathmell, J.R. (1974) *Marketing in the Service Sector.* Cambridge: Winthrope.

Royal College of Nursing (2002) *District Nursing – Changing and Challenging: A Framework for the 21st Century.* London: RCN.

Sauer, J. and Anderson, N. (1992) How we misread the psychology of innovation. *Leadership and Organizational Development Journal.* Vol. 13. No. 2. pp 17-21.

Saunders, J. (2012) *Introduction to Why-Because Analysis.* Retrieved from: http://www.rvs.uni-bielefield.de/research/WBA/WBA_Introduction.pdf. (Last accessed 8th April 2012)

Shepherd, D.A. and Kuratko, D.F. (2009) The death of an innovative project: how grief recovery enhances learning. *Business Horizons.* Vol. 52. No. 5. pp 451-458.

Tittle, P. (2011) *Critical Thinking: An Appeal to Reason.* Taylor Francis: London.

Trabasso, T. and Sperry, L. (1985) Causal relatedness and the importance of story events. *Journal of Memory and Language.* Vol. 24. No. 5. pp 595-611.

Unsworth, J. (2000) Practice development: a concept analysis. *Journal of Nursing Management.* Vol. 8. No. 6. pp 317-326.

Unsworth, J. (2002) *Make or Break: Factors Influencing the Development of Nursing Practice in the UK National Health Service.* PhD thesis, Aberdeen: The Robert Gordon University.

Wilson, V., Hardy, S and Brown, B. (2008) *An exploration of practice development evaluation: unearthing praxis. In* Manley, K., McCormack, B. and Wilson, V. (Eds) (2008) *International Practice Development in Nursing and Healthcare.* Blackwell: London. pp 126-146.

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A commentary on this paper by Colin McDuff follows on the next page.

COMMENTARY

"How did it come to this? – causal network analysis in practice and service development"

Colin Macduff

The question posed in this paper's title will resonate with many health and social care practitioners (and academics) trying to make sense of their involvements in particular developments. The need to derive meaning from our work runs deep, and in busy workplace environments there is the danger that cumulative, unresolved perplexity can lead to resigned passivity or more overt disengagement. At the macro level, there is also a need for organisations and professional disciplines to: (i) understand context, processes and outcomes from specific initiatives, and (ii) begin to learn across cases why things happen as they do. As someone who has spent many years studying specific policy to practice developments (Macduff, 2007), I still find it striking how infrequently we undertake cross case analyses to ask: *how did it come to this*?

For all these reasons, the present paper is a very welcome and timely contribution. It is also particularly useful because it very clearly presents relevant CNA examples of contrasting nature and scope. This allows the reader to understand how it could be applied in different ways in different contexts. As this follows on from a very clear explanation of the rationale and underpinnings of this type of approach to CNA, we have a paper that successfully balances depth and breadth.

Like all valuable papers, it also invites curiosity from the reader. Firstly, it made me wonder about previous use of CNA within nursing and health service studies. From my rather cursory search it seems that it has not been extensively applied, despite Miles and Huberman's (1994) book being more generally influential on a generation of qualitative researchers. Rather, given CNA's origins in educational evaluation research, it seems easier to find its deployment in this context and also in social work.

The second set of questions it raised for me relate to the marginal benefit of CNA compared to other possible approaches to understanding how and why things happen. To look at the final CNA diagrams without the accompanying narrative (and preceding event state work), it would be easy for health care staff to question whether the same outcome might not have been achieved through a less time consuming root cause analysis process, such as the use of a Fishbone or Ishikawa diagram as in Lean Kaizen methods. However the authors not only recognise the time aspect as a limitation, but in my view provide some good insights that underline the extra depth a CNA process may provide. For example, the systematic creation of event state networks for 175 cases and subsequent recognition of characteristic patterns across them, gives a sense of how some factors would begin to assume more weight than others in terms of building a narrative around cause and effect. Moreover, the inclusion of the individuals' feelings as state factors would seem to give more depth and authenticity, despite the acknowledged reductionism later in the process.

However there will always need to be trade-offs between practical usage of such an approach in certain contexts and the comprehensive analysis that would be ideal from an academic perspective. In regard to the latter it could be argued that the examples do not go far enough in their incorporation of all relevant stakeholder perspectives. For example the narratives from individual referrers and families involved in the palliative care service example may have led to production of a different CNA diagram. In this regard the authors point out the limitations of their extensive use of secondary data sources, but there is also an underlying tension about how multiple individual constructions relating to one development can reasonably be orchestrated and synthesised into a causal network.

Moreover, the second example from the world of primary care hints at another difficulty for CNA when predicated on constructivist epistemology – the issue of whether all actors' constructions should be treated as having equal relevance and value or whether some should be privileged in terms of their weighting in the final explanatory diagram and narrative. This is highlighted when differential power is an issue, as would seem the case with the GPs in the given example.

One of the strengths of the paper is its recognition of underpinning paradigms and its willingness to consider how CNA might be used when a different set of fundamental assumptions are in play, such as critical social theory. This would be a good basis for development in a further paper, and I would suggest that the authors could also consider how a CNA approach might sit when underpinned by realist views of the world. At a basic level the portrayal of events in boxes as distinct from states bounded by ovals might seem to accord with a critical realist way of seeing the world.

However these are more academic preoccupations. I suspect the test of the CNA approach for many health and social care practitioners, will be whether its process and outcomes yield relief from puzzlement in a way that provides a basis for useful progression. This paper very clearly sets out how the approach can be used to these ends and thus deserves further consideration by readers and authors in practice and service development.

References

Macduff, C. (2007) *An Analysis of the Development of Family Health Nursing in Scotland through Policy and Practice 1998-2006.* The Robert Gordon University. Retrieved from: https://openair.rgu.ac.uk/handle/10059/89(Last accessed 3 May 2012)

Miles, M.B. and Huberman, A.M. (1994) *Qualitative Data Analysis. 2nd Edition.* Thousand Oaks, California: Sage.

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