

Strategic Implementation

The Fit between Innovation and Context in Introducing Pain Registration at an Internal Oncology Ward

A dissertation submitted in part-fulfillment of the requirements for the degree of Master of
Science

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This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

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This dissertation is the result of my own independent work/investigation, except where otherwise stated. Other sources are acknowledged by explicit references. A bibliography is appended.

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ABSTRACT

Background Although pain registration increases the quality of pain care, its implementation might be better (De Rond, 2001). Grol (1999) holds that an evidence-based practice calls for an evidence-based implementation. The contingency model designed by Van Linge (1998) provides options for examining the congruence between the innovation and the context, and adjusting the implementation accordingly.

Aims and Objectives Using the contingency model designed by Van Linge, the aims are to observe the course of the congruence between the innovation and the context during the implementation of pain registration at the Internal Oncology Ward of a regional hospital in the Randstad (the urban agglomeration in the Netherlands) according to a standard implementation strategy, and to gather supplementary data on the perception of the innovation by the professionals involved throughout the implementation process.

Design and Methods A case study in which a quantitative single organization experiment is supplemented by qualitative information from a focus group.

Results Although all the configurations are clearly present in both the measurements, the ward developed from being predominantly group-focused to being more aim-focused. The external focus and control that are characteristic of an aim-focused configuration go hand in hand with the flexibility and internal focus from the group-focused configuration. The explicit values layer manifests itself most emphatically in most of the configurations. This is in keeping with the impression of the innovation given in the post-measurement. Except for the aim-focused aspect, the configurations are lacking in the operationalization of the explicit values and an in-depth aspect. Although they are limited, the results of the focus group do confirm and clarify the impression of the ward obtained using the contingency model.

Conclusions The congruence between the layers of the innovation and the ward increased after the application of the standard implementation strategy. In order to increase the internal congruence on the ward, an evolutionary strategy is recommended focused on initiating fundamental learning processes to be worked out under decentralized steering.

Relevance to clinical practice The information that has been gathered on the implementation process on the ward can serve as a basis for management decisions regarding innovations in care. The contingency model can give other wards valuable information about the mode of implementation in the decision to introduce pain registration and in other innovations.

ACKNOWLEDGEMENTS

Although the topic of this study is fascinating, it was no simple task for a beginner like myself to get a handle on it. Various people played an important role in carrying out the research. I was particularly motivated by the enthusiasm of the nurses and the people in charge at the Internal Oncology Ward about effectively introducing pain registration. I had the good fortune to be able to work with colleagues who viewed me as being capable of doing this job and had my own relatives and friends who remained interested and patient up until the very end. In the rare but intensive moments with Roland van Linge and Hein Beijer, these two research supervisors considerably improved my scientific approach. I gradually came to thank God for this exercise in perseverance. The fact that I was able to process the data at home made it possible for me to enjoy the sounds of the four most important men in my life, Jaap, Abel, Giel Jon and Titus. It is time to complete these studies and use what I have learned to start moving in new directions.

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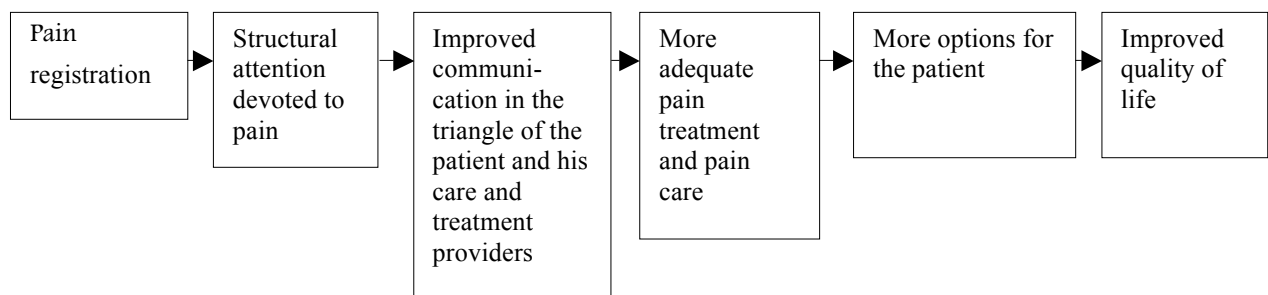
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CHAPTER ONE: INTRODUCTION

There are many studies that illustrate the potential usefulness of pain registration such as Dufault & Sullivan (2000), De Rond (2001), Fortner *et al.* (2003) and Mac Lellan (2004). Agreements about pain registration are used to structurally focus the attention of professionals on patients' pain. This has positive effects on the communication about pain between patients and the care/treatment providers as well as among the various disciplines involved (De Rond, 2001). This promotes a more adequate approach to pain and a better quality of life for the patient.

Figure 1. Usefulness of Pain Registration



Various Dutch hospitals implement pain registration using the Pain Registration Programme provided by the Pain Knowledge Centre in Rotterdam. The Pain Registration Programme (De Rond *et al.*, 2000b) provides a standard implementation plan for the registration of pain with a numerical pain scale. The registration of pain does not seem to require many new skills on the part of the nursing staff. The standard implementation plan of the Pain Knowledge Centre is effective enough on a short-term basis (De Rond *et al.*, 1999; De Rond *et al.*, 2000a). After the standard implementation pathway, issues are observed that could cause problems in the long run. De Rond describes, for example, the prejudices physicians and nurses continue to have about medication. Nurses also seem to exhibit a tendency to register pain more adequately in the morning than in the evening (De Rond *et al.*, 1999), whereas the patients themselves experience a great deal of pain in the evening and night.

Grol (1999) notes that an evidence-based practice calls for an evidence-based implementation. It is clear from the literature on the distribution of implementations in the field of health care that context factors in various stages of an implementation can influence its outcome (Kitson

et al., 1998; Van Linge, 1998; Gezondheidsraad, 2000; Hulscher *et al.*, 2000). There is support in this connection for made-to-measure implementations.

This study analyses the effects of an applied standard implementation strategy, in other words the Pain Registration Programme at the Internal Oncology Ward of the Groene Hart Hospital. The aim of the study is to work with the analysis of an implementation process in progress, so as to recognize the extent of matching between the strategy that is used and the relevant innovation and context factors. Insight into this can play an important role in developing a made-to-measure strategy every time a ward decides to introduce an innovation. The contingency model developed by Van Linge (1998) was tested in this connection with respect to its possibilities for the practice of clinical implementation.

CHAPTER TWO: LITERATURE

This literature study consists of two parts. Firstly, the theoretical framework of this study is described. Then an account is given of an analysis of twenty-five studies in the field of pain registration implementation.

Theoretical framework

In this study, the contingency model developed by Van Linge (1998) was applied to demonstrate an implementation process. This model has been used because it allows an implementation to be addressed strategically. It relates features of the context and the environment, to features of the innovation. Van Linge's contingency model was in keeping with leading theories and implementation models in the field of Dutch health care in the early twenty-first century (Hulscher *et al.* 2000; Halfens & Van Linge, 2003). The specific usability of the contingency model for nursing practice made it interesting to use for designing the study described in this dissertation.

Two implementation approaches

Implementation is nothing new. Ever since the beginning of mankind, all manner of things have been discovered and disseminated (Genesis 4: 21). How new innovations can best be put into effect continues to be an intriguing question. The Health Research and Development Council of the Netherlands (ZorgOnderzoek Nederland, 1997) defined implementation as 'the introduction of innovations and/or changes of proven worth in accordance with a given process and plan with the aim of allowing them to occupy a structural position in the professional procedures, in the function of an organization or organizations or in the health care structure'.

In day-to-day practice, this definition was shortened to 'the dissemination of changes of proven worth' (Klazinga & Van Splunteren, 2003). Van Linge (1998) used the definition formulated by Damanpour (1991):

'The implementation stage consists of all the events and actions that contribute towards changes in an innovation as well as an organization, the first use and the continued use of the innovation when it becomes a routine component of the organization.'

These differing definitions represent two contrasting approaches to implementation as distinguished by Kitson *et al.* (1998), namely the rational approach and the participation approach (Table 2). The definition formulated by The Health Research and Development Council of the Netherlands (1997) is interpreted in this connection as representing the rational approach and the one formulated by Damanpour (1991) as representing the participation approach.

It is striking that the older definition formulated by Damanpour fits in better with the culture of the twenty-first century, where according to Van Linge (1998), implementation is increasingly viewed as a collection of actions and events that turn the innovation idea into everyday reality. This might have to do with the fact that Damanpour does not confine himself to Western health care, which up until recently has had a medical and rational focus.

Table 2. Two approaches to implementation (Van Woerkom & Adolfse, 1998; based on Kitson et al, 1998)

Rational approach	Participation approach
Implementation proceeds linearly	Implementation proceeds incrementally
Clear start of the implementation	Unclear start of the implementation
Steered from above	Steered from practice
Driven by technology supply	Driven by technology demands
Often positive in regard to innovation	Neutral in regard to innovation
Lack of attention for diversity of demands in practice	Lack of attention for macro processes, chance for implementation of sub-optimal technology

According to Hulscher *et al.* (2000), examples of implementation from day-to-day practice often include elements of both approaches.

Theories on implementation

In their study on the state of affairs concerning knowledge on implementation factors, Hulscher *et al.* (2000) distinguished three types of theories, theories on individual factors, theories on social influence and theories on systems. These theories each seem to represent a part of reality. By raising awareness of these theories and assumptions, the Health Research and Development Council of the Netherlands was aiming to facilitate the making of more evidence-based choices concerning implementation strategies, including composite ones.

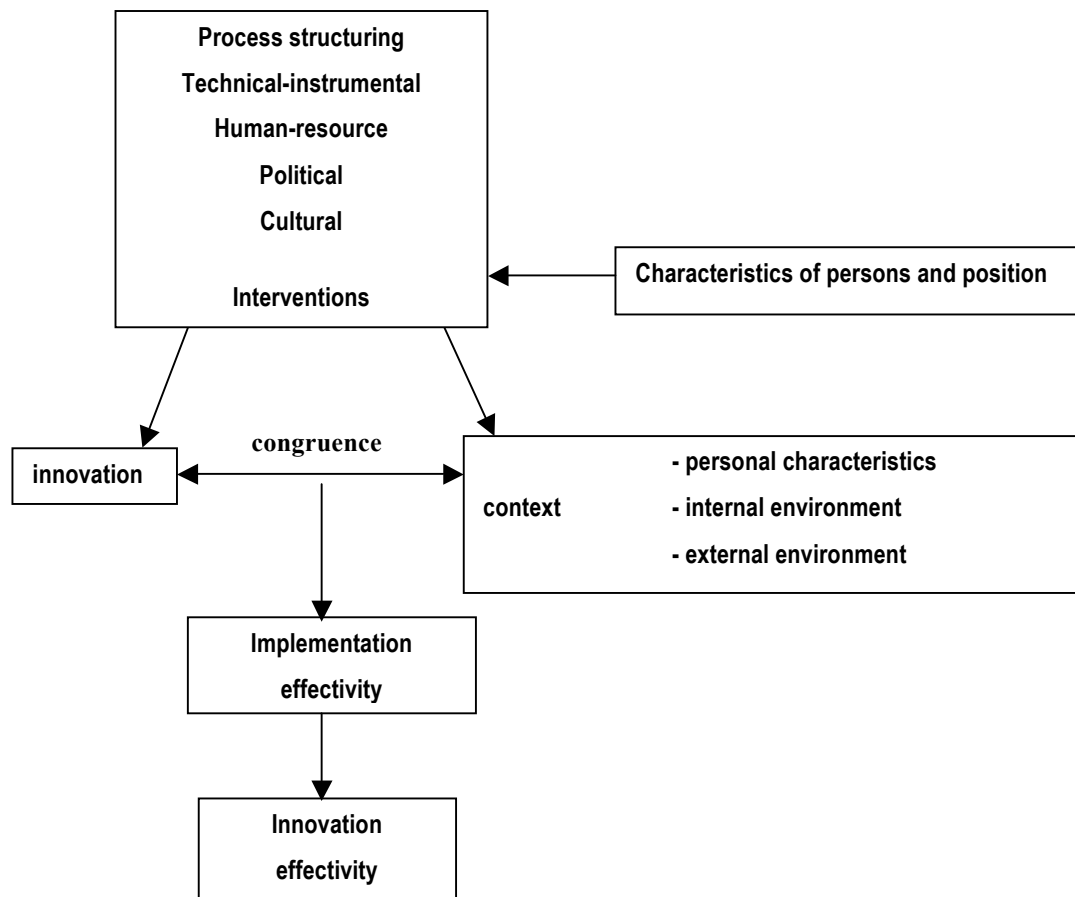
Hulscher *et al.* (2000) noted how few theories have been formulated up to now as regards the introduction of innovations in patient care. Van Linge (1998) took a first step with his contingency model, propagating a made-to-measure approach. He refers in this connection to a combination of strategies generated by various theories. The contingency model helps the user design and provide evidence for an implementation strategy. The aim of implementation is to promote the congruence between the innovation and the context, which provides solid ground for safeguarding the innovation. The influencing factors should be specified for each implementation pathway so as to be able to develop a unique introduction strategy that suits the particular ward or organization. In the following section, concepts from Van Linge's contingency model are elaborated upon.

Made-to-measure strategy for implementation

Contingency is a central concept in Van Linge's model (Figure 3). Van Linge (1998) defines contingency as 'the circumstance (characteristic of the situation) that is not certain to occur, though it is probable.' Koenen *et al.* (1992) simply call it *coincidence*. Another key concept from Van Linge's contingency model is *congruence*. If something is congruent, it is *in agreement* (Koenen *et al.*, 1992). In the Netherlands, the terms *fit* and *match* are also used in this connection (Van Linge, 1998).

Van Linge's work (1998) can lead to the conclusion that contingency factors determine the extent of congruence. Other prominent researchers in the field of implementation similarly support this made-to-measure approach (Rycroft-Malone *et al.*, 2002; Klazinga & Van Splunteren, 2003). Van Linge (1998) views the introduction context as a layered entity. The following layers are distinguished: operational processes and systems, explicit values, and basic conceptions. Incongruity can occur between or within these layers, and between the innovation and the layers. In order to give the introduction a chance to succeed, strategies are needed that can eliminate this incongruity.

Figure 3. Van Linge's Contingency Model (1998)



The following is a concise representation of the propositions in Van Linge's contingency model:

1. No best strategy exists for implementing innovations. An introductory strategy should be based upon the nature and size of the congruence between the innovation and the introduction context.
2. Incongruity between an innovation and the introduction context only emerges if the innovation requires a certain context to flourish and this context is not present.
3. The introduction context itself can be internally congruent to varying extents.
4. Introduction strategies are primarily focused on achieving certain implementation outcomes. A successful, in other words effective implementation is a necessary prerequisite for achieving the aims of the innovation.
5. Introduction strategies can be classified according to the extent to which the work is done following a process or plan, the extent to which the strategy focuses on the

congruence between the innovation and the context or the congruence within the context and the nature of the interventions that are the building blocks for the strategy.

Van Linge's contingency model (1998) is the basis for the 'Introduction of Innovations in Nursing' research line at Utrecht University. Various studies confirm and elaborate upon the model. Further research can reinforce the application of the model in actual practice.

Critical considerations with respect to the contingency model

The context of the introduction of an implementation can be referred to as complex because so many different and changing forces play a role and very probably also influence each other. An implementation pathway calls for thorough preparations in order to arrive at optimal outcomes. A model is designed to create order in complex material and therefore the extent to which the context and its possible match with the implementation strategy needs to be investigated, should be carefully considered. Context factors change and there is the risk that a suitable implementation plan might not be able to keep pace with the altered context.

Although on the basis of current knowledge on implementation it can be assumed that innovation strategies differ from one culture to another, collaboration in the field of knowledge development can be highly productive, for example collaboration between implementation strategy researchers in the Netherlands and the United Kingdom and among researchers from various universities in the Netherlands. Diversity in the approach promotes insight into the scope of the problem with respect to the effective introduction of innovations. Yet a pooling of resources with respect to knowledge can lead to an expansion that benefits both researchers and day-to-day practice alike.

International pain registration implementation

In the second part of this literature study, the international scientific literature is searched for answers to the following questions:

- a. Which strategies are used in introducing pain registration?
- b. Which factors influence the introduction of a pain measurement instrument in general and the numerical pain scale in particular?

This will allow conclusions to be drawn about which strategies and factors are important and which knowledge gaps can be observed.

Search strategy

To assess the present state of affairs as regards strategies and factors that influence the implementation of pain registration, Biomednet (up to June 2004) was used as the main catalogue. After Biomednet closed down, various data banks, CINAHL, MEDLINE, Cochrane and PsycINFO, had to be searched separately. The initial search used the terms *pain*, *measure* and *implementation*. The terms *assessment* and *management* were sometimes used instead of *measure*, and the terms *dissemination*, *utilization* and *adoption* could be used instead of *implementation*. The terms *intensity* and *strategy* were used to reduce the search results. One selection criterion was that it had to be clear from the abstract that the implementation process was described in the research report, with or without distinctive factors that influence the implementation. Further there had to be sufficient scientific evidence to support the findings. It was also important that the information was up to date and that it could be generalizable. The site of action was also important; there was a preference for research from clinical practice because it is plausible that in part, each field has its own problems and opportunities as regards implementation (Hulscher *et al.*, 2000). Use was regularly made of references from the texts that were found if the description made it appropriate to do so. In the course of selecting the studies, it was obvious that in most cases, pain registration is part of a larger pain management policy.

In an overview (Appendix 1 and Appendix 2), a distinction is drawn between descriptive and effect studies. The effect studies (Appendix 1) grant insight into the effectiveness of the implementation strategies that are used. The descriptive studies (Appendix 2) make it clear which factors influence the pain management innovations.

Addressing implementation strategies

In the diversity of interventions and strategies for change and innovation, certain structures have been distinguished by various researchers. This can make it easier to communicate about them. In this section, three approaches are cited that influence the thinking about implementation in the Netherlands.

For the description of implementation strategies, Hulscher *et al.* (2000) refer to the EPOC list (Effective Practice and Organization of Care) as being authoritative. Developed under this name by the Cochrane Collaboration Group, which reviews studies on implementations of guidelines, this EPOC list draws a distinction between professional, financial and

organizational strategies and legal measures. Hulscher *et al.* (2000) note that this list is strongly oriented towards medical professionals.

The distinction drawn by Van Linge (1998) is based upon nursing practice and cites five types of interventions. They pertain to 1) process structuring, 2) the technical instrumental approach, 3) the human resource aspect, 4) the political aspect and/or 5) the cultural aspect. A strategy often consists of various interventions. Van Linge (1998) states that knowledge of congruence is needed in choosing a suitable strategy. What is involved here is the congruence - in other words the agreement, fit or match - between the innovation and the context and the congruence within the context. Assuming a strong or weak congruence, four implementation strategies are described: 1) the adaptation strategy, 2) the transition strategy, 3) the transformation strategy and 4) the evolution strategy. The distinctions between these strategies can be drawn based on the planning or process aspects and the accompanying interventions from the five groups referred to above. Van Linge's approach is in keeping with the complexity of the Dutch health care system. The extent of applicability in actual practice will determine the value of the model to the field of nursing.

The third approach that is the Promoting Action on Research Implementation in Health Services (PARIHS) framework, developed in the United Kingdom. It proposes representing the interplay and interdependence of the numerous factors influencing the uptake of evidence into practice (Kitson *et al.*, 1998). The central elements in the framework are *evidence*, *context* and *facilitation*. The model was further developed in 2001 (Rycroft-Malone *et al.*, 2002), which confirms that this knowledge on implementation is still very much a work in progress. Detailed research on the supplementary value of this framework for the contingency model can expand the knowledge on implementation in health care. This is not however within the scope of this study.

Analysis

To gain insight into implementation strategies used in the introduction of pain registration and the factors that influence them, twenty-five studies have been analysed, four of which are descriptive (Appendix 2). The other twenty-one studies measure the effect of single or composite implementation strategies (Appendix 1). Most of the studies are from the United States. In the early 1990s, the American Agency for Health Care Policy & Research (AHCPR) published pain guidelines for clinical practice. They were soon used as a standard

for accreditation and other quality-promoting activities. Up to now, studies have pertaining to the introduction of these guidelines have regularly been published. Other studies on pain management activities have been published in Canada, Taiwan, Finland, the Netherlands and other countries. Since a great deal of knowledge in the field of pain management can still be shared on a global level, publications can be expected to appear regularly and perhaps to an increasing extent.

For the purposes of this analysis, an effort was first of all made in this study to categorize the observed interventions according to Van Linge's classification, namely process structuring, the technical instrumental approach, the human resource aspect, the political aspect and the cultural aspect. This clarifies whether these terms could serve a useful purpose in the analysis of implementation strategies. This categorization was designed to gain insight into the types of interventions used in an implementation pathway. Areas to which little or no attention has been devoted can be easily seen from this. The question remains as to which considerations the selection of a certain implementation strategy is based upon in day-to-day practice. No description was found of the extent of congruence between the innovation and the context in any of the studies.

The observed interventions are summarized below and several of them are briefly discussed under whatever section title seemed to be most appropriate.

Process structuring

In all the selected cases, there was a certain degree of process structuring. This is inherent to the fact that a research structure was used that was often designed as a product or effect evaluation.

A frequent feature of process structuring was the appointment of a work group or steering body to prepare and carry out the implementation (Dufault *et al.*, 1995; Bookbinder *et al.*, 1996; Jadlos *et al.*, 1996; Rischer & Childress, 1996; Comley and DeMeyer, 2001; Jou & Shane, 2001; Berdine, 2002). In the papers by Comley & DeMeyer (2001), Bookbinder *et al.*, (1996) and Fortner *et al.*, (2003), references are made to a *continuous quality improvement* approach. The conclusion can thus be drawn that the implementation of a pain management method does not stop after the completion of a project.

References were regularly made to research on the practice of pain care prior to the introduction. Comley & DeMeyer (2001) presented the causes of *inconsistent pain management* in a fishbone diagram. They describe the *manpower, methods, environment, machinery and materials*, thus focusing attention on the context.

The study by Comley & DeMeyer (2001) was striking because of the emphasis it puts on process structuring. In addition, interventions were carried out from all the other sub-fields. This study was nonetheless one of the few that did not observe any noticeable progress. Despite considerable pain figures and ineffective treatment, the patient satisfaction measured remains high (more than 90%). Therefore patient satisfaction might not be a good measure of the implementation success of pain registration.

Another relevant process structuring intervention was the formulation of individual plans of action by various wards or institutions (Weissman *et al.*, 2000). This could considerably increase the commitment and support. The Health Council of the Netherlands (2000) recommendations to the Dutch Minister of Health, Welfare and Sport also illustrated this by emphasizing the use of *interactive modalities*.

Discussing pain with a patient upon admission to a hospital (Closs *et al.*, 1999) could be viewed as a process structuring intervention that pertains to timing.

The Collaborative Research Utilization (CRU) approach was also described in some studies (Dufault *et al.*, 1995; Dufault & Sullivan, 2000; Janken & Dufault, 2002). Considering the particular authors and the time-frame in question, it is quite probable that these three publications are part of the same research line. Janken & Dufault (2002) noted in this connection that ‘research utilization takes time but provides the organization with a research-based rationale for new nursing practice and with data to show whether the quality-of-care problem is being resolved’. They also showed how the CRU pathway could be followed by Rogers’ steps. Rogers (1995) distinguished five steps to describe the adoption of an innovation in an organization: 1) agenda setting, 2) matching, 3) redefining / restructuring, 4) clarifying and 5) routinizing. Janken & Dufault (2002) used this to illustrate how attention for the context facilitated the adoption of the innovation in actual practice.

The technical-instrumental approach

The interventions that can be referred to as technical instrumental all pertain to the development and distribution of material. This varied from information for patients and/or staff members (Rischer & Childress, 1996; Harmer & Davies, 1998; Closs *et al.*, 1999; De Wit *et al.*, 1999; Berdine, 2002; Lai *et al.*, 2004), documentation cards and forms (Jadlos *et al.*, 1996; De Wit *et al.*, 1999; Berdine, 2002; Fortner *et al.*, 2003; Mac Lellan, 2004), decision trees (Jadlos *et al.* 1996; Rischer & Childress, 1996; Devine *et al.*, 1999; Du Pen *et al.*, 1999) to opiates (De Wit *et al.*, 1999).

Most of the strategies described contained technical-instrumental interventions. In the study by Devine *et al.* (1999), the availability of well-published guidelines was the only intervention described. It was striking in the results of this study that improvements are visible in the professional process, but not in the patient process. In the studies by De Wit *et al.* (1999) and Jadlos *et al.* (1996) as well, the greatest emphasis was similarly on the accessibility of the material, but in both studies this was combined with other types of interventions.

The human resource aspect

Twycross (2002) noted in her review that ‘Nursing education does not appear to be preparing nurses to manage pain in the clinical area. Nursing practice change as an outcome of education is influenced by organizational, administration and environmental factors.’ The influence of the context on the innovation was thus acknowledged and described. A form of education as intervention was referred to in almost all the studies except the one by Devine *et al.* (1999). Two studies described the Collaborative Research Utilization (CRU) approach. Although no references were made here to a classical form of teaching, the joint evaluation of research (as in CRU) could also be viewed as a form of education. This was in keeping with what Twycross (2002) recognized as a ‘move to problem-based learning’.

Education can be viewed as an inevitable intervention. This can easily be clarified by the fact that inadequate knowledge on the part of physicians and nurses was an important reason why pain was combated in an inadequate fashion (Jadlos *et al.*, 1996; De Rond *et al.*, 2000a; Rushton *et al.*, 2003; Gordon & Dahl, 2004). Twycross (2002) held that nurses should be competent and confident as regards pain and combating pain. This enables them to be the patient’s advocate and arrange an adequate pain policy for each individual patient. Education is needed before they can do either.

Closs *et al.* (1999) and Weissman *et al.* (2000) described less common forms of human resource interventions, like personal explanation and the possibility of working with a colleague who is a practice expert. Francke *et al.* (1997) and Closs *et al.* (1999) also emphasized the importance of repeated training courses.

Lai *et al.* (2004) examined the effect of patient education on the pain perception of cancer patients at the hospital and arrived at strikingly positive outcomes. In the study by Devine *et al.* (1999), patient education was a positive result of the distribution of guidelines among professionals.

The political aspect

It is characteristic of political interventions that power relations are influenced. Repeated references were made to two interventions that can be classified as political, namely:

- 1) The development of a pain policy for the organization (Dufault & Sullivan, 2000; Comley & DeMeyer, 2001; Berdine, 2002; Mac Lellan, 2004). With this the perspective on patients and care can be influenced. Van Linge (1998) held that in the end, the party with control over the perspective on the clients and the work is the party with the power.
- 2) The interdisciplinary approach (Bookbinder *et al.*, 1996; Jadlos *et al.*, 1996; Harmer & Davies, 1998; Dufault & Sullivan, 2000; Comley & DeMeyer, 2001; Jou & Shane, 2001; Mac Lellan, 2004). Pain management is an example of mutual dependence between disciplines. In situations of increasing dependence, power relations are apt to be exposed. Weissman *et al.* (2000) referred to management commitment as an influencing factor. Just as policy for pain, this indicates that pain was viewed as a problem by the organization. Rushton *et al.* (2003) also emphasized that support is needed from colleagues and staff as well as transmurally. Rogers (1995) called this recognition of the problem and promise of support in coping with it *agenda setting* and viewed it as the first step towards the adoption of an innovation.

The stipulation of *target indicators*, as described by Weissman *et al.* (2000) can be viewed as political pressure that can have both a positive and a negative effect.

Regularly requesting feedback from the users, mainly nurses (Jadlos *et al.*, 1996), involves them in the implementation process. This can be viewed as a political intervention. Closs *et*

al. (1999) referred to involving patients in the change. In this case, patients played a role in developing an information folder.

The study with the emphasis on political interventions was conducted by Jou & Shane (2001). Supplementing what is noted above, they emphasized that a prominent physician in a leading position and a pain management specialist in a central supportive position are factors that can determine the success of a programme. They described activities that grant responsibility for pain management to parties in positions of authority in an organization.

As regards all the studies concerned, publication is a political intervention in the sense of stating success.

The cultural aspect

Harmer & Davies (1998), Comley & DeMeyer (2001) and Fortner *et al.* (2003) selected bearers of the new culture in key positions by working with professionals who represented the ward. Closs *et al.* (1999) described a implementation being carried out by a local opinion leader.

The personal propagation of new values could be found in the studies by Closs *et al.* (1999) and Weissman *et al.* (2000). In the study by Closs *et al.* (1999) this occurred when one of the members of the implementation team worked with the staff on the ward for two weeks to *reinforce the required practice*.

Comley & DeMeyer (2001) described the role of *well-known teachers* from various disciplines. Something of the kind also occurred in the study by Lai *et al.* (2004), where patient education was provided by an oncology nurse with a Master's degree.

Fortner *et al.* (2003) were the only authors who referred to a starting meeting. Rushton *et al.* (2003) emphasized that cancer pain management was a matter for all the members of the staff on the ward.

Implementation of pain registration in acute versus chronic pain

Pain experts referred to the different approaches to chronic and acute pain (Dingemans *et al.*, 1999). In these studies it was interesting to examine which interventions were implemented

for which group (Table 4). The interventions are listed in three columns in this table, distinguished according to Van Linge's types of interventions (1998). The category of patients involved was not always clear from the studies, and some of the researchers combined data on patients from both categories. The interventions from these studies were shown in the last column. Only a very slight difference in approach could be detected in the selected studies. All five types of interventions described by Van Linge (1998) were relevant to both types of pain. In practice, interventions to implement pain registration in cases of acute pain would seem to be less complicated. The cause of acute pain is usually clear, interventions are easier to plan, and pain-reducing results can be relatively rapidly achieved. Chronic pain is far more complex (Dingemans *et al.*, 1999). In the event of chronic pain, it is only logical that more extensive attention should be devoted to the evidence and the approach. There can also be a need for a broader base and greater underlying knowledge than when dealing with acute pain, especially as it is more difficult to interpret the results of efforts to combat chronic pain. This assumption could not be demonstrated in this concise overview and requires further analysis.

Table 4. Interventions Implementing Pain Registration in Acute versus Chronic Pain

Type of intervention v	type of pain >	Acute pain	Cancer/Chronic pain	Non-specific distinguished contexts
Process structuring		- literature review (Janken & Dufault, 2002) - research roundtables (Janken & Dufault, 2002)	- action plan (Weissman <i>et al.</i>, 2000) - project evaluation (Weissman <i>et al.</i>, 2000) - decision tree& test (Du Pen <i>et al.</i>, 1999) - project team (Rischer & Childress, 1996) - statewide expansion (Rischer & Childress, 1996)	- measures (Berdine, 2002; Dufault & Sullivan, 2000) - research & standards examination (Dufault & Sullivan, 2000) - Continuous Quality Improvement circle (Comley & DeMeyer, 2001; Francke <i>et al.</i>, 1997; Bookbinder <i>et al.</i>, 1996) - flowcart for pain management (Comley & DeMeyer, 2001; Bookbinder <i>et al.</i>, 1996) - fishbone diagram (Comley & DeMeyer, 2001) - committee (Jadlos <i>et al.</i>, 1996; Gordon, 1996; Jou & Shane, 2001) - Collaborative Research Utilization (Dufault <i>et al.</i>, 1995) - Stepwise (Jou & Shane, 2001)
Technical- instrumental		- provision of material for regular pain assessment (Mac Lellan, 2004; Closs <i>et al.</i>, 1999; Devine <i>et al.</i>, 1999; Janken & Dufault, 2002) - information leaflet (Closs <i>et al.</i>, 1999; Harmer & Davies, 1998)	- booklet (Lai <i>et al.</i>, 2004) - documentation tools for staff and patients (Fortner <i>et al.</i>, 2003; De Wit <i>et al.</i>, 1999) - guidelines (Rischer & Childress, 1996; De Wit <i>et al.</i>, 1999) - availability of opioids (De Wit <i>et al.</i>, 1999)	- guidelines, tools developed/revised (Berdine, 2002; Comley & DeMeyer, 2001; Jadlos <i>et al.</i>, 1996) - critical pathways (Gordon, 1996)
Human resource		- education program (Mac Lellan, 2004, Closs <i>et al.</i>, 1999; Harmer & Davies, 1998; Janken & Dufault, 2002)	- patient education (Lai <i>et al.</i>, 2004; Rischer & Childress, 1996) - staff education (Fortner <i>et al.</i>, 2003; Weissman <i>et al.</i>, 2000; Du Pen <i>et al.</i>, 1999; Dalton <i>et al.</i>, 1998, Rischer & Childress, 1996; Rushton <i>et al.</i>, 2003; De Wit <i>et al.</i>, 1999)	- staff education (Berdine, 2002; Bouvette <i>et al.</i>, 2002; Twycross, 2002; De Rond <i>et al.</i>, 2001a; Comley & DeMeyer, 2001; Francke <i>et al.</i>, 1997; Bookbinder <i>et al.</i>, 1996; Jadlos <i>et al.</i>, 1996) - written information for physicians (De Rond <i>et al.</i>, 2001a)
Political		- development of pain policy (Mac Lellan, 2004) - interdisciplinary approach (Mac Lellan, 2004; Harmer & Davies, 1998) - coöperation with patients (Closs <i>et al.</i>, 1999)	- presentation event (Fortner <i>et al.</i>, 2003) - management commitment (Weissman <i>et al.</i>, 2000) - target indicators (Weissman <i>et al.</i>, 2000) - collaborative approach (Du Pen <i>et al.</i>, 1999; De Wit <i>et al.</i>, 1999) - management support (Rushton <i>et al.</i>, 2003)	- policy review (Berdine, 2002; Dufault & Sullivan, 2000; Comley & DeMeyer, 2001) - collaborative approach (Dufault & Sullivan, 2000; Comley & DeMeyer, 2001; Bookbinder <i>et al.</i>, 1996; Jadlos <i>et al.</i>, 1996; Gordon, 1996; Jou & Shane, 2001) - outcomes tracked to wards (Gordon, 1996) - clinical leadership (Jou & Shane, 2001)
Culture		- local opinion leader (Closs <i>et al.</i>, 1999) - individual approach (Closs <i>et al.</i>, 1999) - attention on new staff (Closs <i>et al.</i>, 1999) - workalong (Closs <i>et al.</i>, 1999) - representatives (Harmer & Davies, 1998) - pain recognised (Janken & Dufault, 2002)	- oncology nurse with Master's degree for patient education (Lai <i>et al.</i>, 2004) - representatives (Fortner <i>et al.</i>, 2003) - site visit (Weissman <i>et al.</i>, 2000) - work along (Weissman <i>et al.</i>, 2000) - everyone's business (Rushton <i>et al.</i>, 2003) - continuity of care (De Wit <i>et al.</i>, 1999)	- unit representatives (Comley & DeMeyer, 2001) - wellknown teachers (Comley & DeMeyer, 2001) - ongoing feedback from users (Jadlos <i>et al.</i>, 1996) - incorporate basic principles (Gordon, 1996)

Implementation and innovation effectiveness

It is relevant to distinguish between implementation and innovation effectiveness when interpreting the results of the studies referred to here. Implementation effectiveness can be defined as the effectiveness of the implementation as it manifests itself in the introduction of an innovation or the actual use of an innovation. Innovation effectiveness is the effectiveness of the innovation itself, such as the increase in the quality of care, the increase in patient satisfaction or the increase in efficiency (Van Linge, 1998). The selected studies included almost as many studies that evaluate the implementation as studies that have the innovation as research topic. Some studies focused on both. It would appear that a successful implementation was not a guarantee for the success of the innovation (Berdine, 2002), but it was one of the prerequisites (Bookbinder *et al.*, 1996; Closs *et al.*, 1999; Devine *et al.*, 1999).

Conclusion

Since the 1990s, an increasing amount of knowledge has been gathered and disseminated with respect to introducing a form of pain registration. These examples provide today's researchers with a source of inspiration. The knowledge can also be used in designing follow-up studies. The studies included here predominantly pertain to Western health care. Insight into how patients cope with pain in non-Western cultures can add a great deal to what is known about how to approach people experiencing pain. In Dutch hospitals where immigrant patients are treated from Africa, Asia and South America, this is certainly a substantial component of the treatment demand. The studies here pertain to the introduction of pain registration for chronic as well as acute pain, and no great differences in approach were observed between the two. Considerably more effect studies were found than descriptive studies. This might mean more attention has been devoted to the results of implementation up to now than to the implementation process.

The studies here were supported by a reasonable to good level of evidence. This was one of the conditions for inclusion, so that a certain value could be attributed to the data generated. It had been argued that the generated patient satisfaction results presented in several studies, should be viewed as supplementary and not as decisive (Comley & DeMeyer, 2001). It is difficult for patients who are being treated to critically assess the pain care. Patients were not always well informed about the options for combating pain and they were dependent on the care that is provided. The pain curve in the patient files (De Rond *et al.*, 2001a) was a useful

indicator of the implementation of pain registration. The knowledge transfer from professionals to patients was of decisive importance to a realistic registration of pain (Rischer & Childress, 1996; De Wit *et al.*, 1999; Fortner *et al.*, 2003; Lai *et al.*, 2004). In addition, the interdisciplinary approach was an indication of the effective implementation of pain registration (Jadlos *et al.*, 1996; Jou & Shane, 2001; Mac Lellan, 2004). Integrating pain registration into a continuous quality improvement cycle kept the parties involved focused on it (Bookbinder *et al.*, 1996; Comley & DeMeyer, 2001). Pain care on the ward is ideally implemented in an interactive process between the patient and the care/ treatment providers, with all of them willing to learn from each other. The managers and the organization played a facilitating role in this connection (Jadlos *et al.*, 1996; Closs *et al.*, 1999).

It is clear that the implementation strategies were generally composed of various interventions. Interventions from all five of the categories distinguished proved useful. In order to know which interventions are suitable for pain registration at a specific ward it is necessary to be familiar with the characteristics of the ward in question. Various researchers acknowledged and described how context factors influence the adoption of pain registration or pain management (Comley & DeMeyer, 2001; Janken & Dufault, 2002; Twycross, 2002). They did not state, however, how these factors could be logically taken into consideration in implementing an innovation.

CHAPTER THREE: AIM OF THE STUDY

The Pain Registration Programme (De Rond *et al.*, 2001a) provides a standard implementation plan. On a short-term basis, this implementation plan is effective enough (De Rond *et al.*, 1999; De Rond *et al.*, 2000a). It is nonetheless interesting to examine the extent to which the implementation strategy is in keeping with the congruence between the innovation and the context. De Rond notes how there continue to be prejudices about medication among physicians and nurses alike. Nurses also seem to have a tendency to register pain more adequately in the morning than in the evening (De Rond *et al.*, 1999), whereas patients are more apt to experience a great deal of pain in the evening and night. The features of the context in which pain registration is carried out are not clearly related to the features of the innovation (De Rond *et al.*, 1999), though it is clear from the literature that this can be extremely relevant to the implementation outcomes (Van Linge, 1998; Gezondheidsraad, 2000; Hulscher *et al.*, 2000).

Research questions

The aim of this case study is to investigate the congruence between the innovation and the context and the effects of the implementation strategy on the congruence at one hospital ward. The first research question is a quantitative one and measures the congruence before and after the implementation. The second research question focuses on the perception of the process by the nurses on the ward in a qualitative sense.

1. What effects does the implementation strategy have on the introduction of pain registration at the Internal Oncology Ward?
 - 1a. How congruous are the innovation and the context measured at two moments, namely during the preparatory stage and three months after the introduction of the innovation?
 - 1b. What changes can be observed in the congruence between the innovation and the context and how can they be explained?
2. How do nurses on the ward perceive the innovation and the accompanying implementation process?
 - 2a. What motivating and frustrating experiences on the part of the nurses emerge at a focus group meeting a few weeks after the start of the use of the numerical pain scale?

- 2b. What role do these experiences play in the implementation process according to the respondents?

Aim

Using Van Linge's contingency model, the aim of the study is to examine whether the congruence between the innovation and the context increases or decreases after the implementation of pain registration at the internal oncology ward of a regional hospital in the Randstad (urban agglomeration in the Netherlands). The purpose is to gain insight as regards setting up a made-to-measure¹ strategy. The knowledge and insights acquired from this can be used to provide better evidence for implementation decisions in the future. In addition, this study can also contribute towards the further development of the contingency model.

¹ Made-to-measure: The choices related to the implementation strategy are made on the grounds of an analysis of the congruence between the innovation and the context as is proposed in the contingency approach of Van Linge (1998).

CHAPTER FOUR: METHODOLOGY

This chapter addresses the steps, procedures and strategies selected to carry out the data collection and analysis. The design, intervention, population, and methods of data collection and analysis are presented, after which the reliability of the instruments used, the validity and the ethical aspects are discussed.

Study design

Characteristics of a good design are: 1) appropriateness to the research question, 2) lack of bias, 3) precision, and 4) power (Polit & Hungler, 1999). The choices made with respect to these design characteristics are discussed in this section.

Appropriateness to the research question

The first research question concerns the effects of the implementation strategy on the congruence between the innovation and the context. On one ward, the congruence between the innovation and the context was measured both before and after the implementation. In determining the congruence, the coherence was examined. This was done twice, namely at the first and second measurements. By comparing the data collected beforehand with the data collected several months after the introduction, it was possible to detect and interpret congruence differences. This made it possible to calculate the impact of the pain registration implementation on the ward. If any statements are to be made about causality, longitudinal research is called for. In this case, the approach remained confined to a preliminary and a first follow-up measurement. Conclusions ultimately were drawn regarding the results of the implementation process on one ward, a case study.

The qualitative data from the focus group were complementary to the single organization experiment designed to answer the first question. The qualitative data in this study were used to illustrate the meaning of quantitative descriptions or relations (Morse & Field, 1996)

Lack of bias

The following could be noted about bias or ‘an influence that can distort the results of a study’ (Polit & Hungler, 1999) in the design. Bias in the selection could emerge if the respondents had a different attitude towards innovation than the individuals who failed to return the questionnaire. This would affect the internal validity. In this study, the entire nursing

population of the ward was the target group in both the preliminary and follow-up measurements. Possible confounders are described in the *Precision and power* section. Possible information bias is described in the *Population* section. Since the difference in time between the preliminary and the follow-up measurement was approximately 6 months, the professional attitude towards pain registration might have changed somewhat (for example because the media or the Dutch Health Care Inspectorate devoted attention to pain measurement and control) even without the implementation strategy. It is unlikely that testing effects emerged simply because the ward was the subject of research. In other words, it is unlikely that the researcher's attention would make the research subject respond abnormally. The researcher was to regularly spend short amounts of time on the ward. The implementation activities that she initially carried out were to be taken over by nurses on the ward in the course of time as part of the continuous quality assurance. The attention of the researcher could nonetheless have influenced the attitude of the respondents.

The aim of the study was to draw conclusions about the effects of the implementation on the ward. The model worked from the assumption that these were unique situations. This is why it was impossible to produce generally valid statements about the congruence. External validity was not relevant here. However, the generalization aspect was interesting as regards the applicability of the model. In this respect it could be noted that to the best of our knowledge, the ward was an ordinary ward at the hospital. The number of patients and the personnel, the organization and the care concept did not differ markedly from the other wards. Bias in the analysis is discussed in the relevant section.

Precision and power

By power, Polit & Hungler (1999) mean 'the ability of a research design to detect relationships among variables'. Precision contributes to the power of a design. Very concretely, this means creating the conditions for a result that is as clear as possible by maximizing the differences between the groups to be measured. This was achieved by making the difference in the independent variable, in this case the measuring moment, as large as possible. The difference between the preliminary measurement and the follow-up measurement was approximately six months. Since the study took place in the framework of the training course, it had certain temporal and spatial constraints. The possibilities for conducting a follow-up study at the institution are currently being explored. In addition, carrying out the same measurements on a control group would certainly increase the value of

the study. Up to now, there has not been any practical possibility to do so. The control over external variables is crucial, if the results are to be reliable. In this study, the influence of other innovations on the ward or, for example, changes in the composition of the team could affect the congruence course. The content of the questionnaires was helpful in this respect. In addition to numerous multiple choice questions, this measuring instrument also contained several open questions pertaining to the implementation conditions. See the *Method of data collection* section as well.

Intervention

The intervention to be examined was the introduction of pain registration at the Internal Oncology Ward of a regional hospital. The standard implementation strategy for the introduction of pain registration was carried out according to the manual of the Pain Knowledge Centre (De Rond *et al.*, 2001b). This standard strategy included a wide range of interventions, as described by Van Linge (1998). These are discussed in greater detail in the *Literature* chapter. The emphasis in the standard strategy was on the education of professionals and the structuring of the process. Using intuition and experience, the interdisciplinary approach was added, starting with the preparations for the implementation. The ultimate aim of pain registration is to improve the quality of care for the patient experiencing the pain. This was done by improving the communication about pain between the patient and the care and treatment providers with the anticipated result of optimizing the pain reduction. The implementation took place in four stages: 1) inventory and preparations, 2) special training for nurses and physicians, 3) introduction of a numerical pain scale, and 4) follow-up measurement and evaluation. A work group was responsible for organizing the introduction and monitoring the pain registration implementation. The work group consisted of representatives from the medical and nursing disciplines and a physical therapist and was assisted by a nursing policy officer. The practical preparation concerned the development of information material for the patients and new staff members. The pain registration on the ward was started immediately after the special training. During the course of this study, the patient files were monitored at least once a month for the presence of the pain curve as an indication that the pain registration was being conducted. Two nurses and one internist from the work group were available for consultation every day. The ward manager adopted pain registration in the quality system of the ward.

Population

All the nurses including the head nurses of the Internal Oncology Ward at Groene Hart Hospital were requested to fill in the questionnaire for the preliminary as well as the follow-up measurement. The setting, their own ward, was quite natural for the respondents. Since the ward was the subject of the research, the possibility of respondents giving what they felt were the desired answers had to be taken into consideration. It was obvious that they were not going to be too critical about something that they themselves were part of. To address this concern, the researcher emphasized that answers were not good or bad, but were just meant to steer the implementation and safeguarding of pain registration.

Method of data collection

The congruence between the innovation and the context was recorded using two questionnaires. The first questionnaire concerned the characteristics of the ward and was divided into one version for nurses and one for head nurses. The questionnaire (February 2004) was based upon Van Linge's contingency approach (1998) and was designed in the 'Introducing Nursing Innovations' research line of the Nursing Science discipline group at Utrecht University (appendices 3 and 4). In addition to 4 open general questions, the questionnaire for nurses on the characteristics of the ward consisted of the following 12 parts:

- a) culture, 16 questions;
- b) policy aims, 13 questions;
- c) human resources practices, 13 questions;
- d) decision-making, 8 questions;
- e) sources of influence, 8 questions;
- f) political acts, 8 questions;
- i) technology, 23 questions;
- j) care concept, 8 questions;
- k) structure, 15 questions;
- l) competences, 8 questions;
- m) innovation and change, 14 questions;
- n) knowledge and learning, 8 questions.

In addition to 5 open general questions and 4 questions on the exchange of sources, the questionnaire for head nurses consisted of 14 parts. The questionnaire for head nurses included the same 12 parts as the questionnaire for nurses plus the following 4 parts:

- g) external environment, 13 questions;

- h) internal environment, 10 questions, 2 of which were open;
- i) technology, 4 extra questions;
- k) structure, an extra 10 open questions and 10 yes/no questions.

In addition to the characteristics of the ward, the characteristics of the innovation were described, from the perspective of the ward staff members. For this use was made of the innovation questionnaire from the same 'Introducing Nursing Innovations' research line of the Nursing Science discipline group at Utrecht University. This questionnaire contained 20 questions.

Most of the questions had the structure of a Likert scale. A Likert scale consists of various statements about a subject and respondents indicate the extent to which they agree or disagree with each statement. Ten to fifteen statements are recommended for a good Likert scale (Polit & Hungler, 1999). In the questionnaires described above, a minimum of 4 and a maximum of 20 statements were made about each subject. Most of the subjects consisted of 8 to 13 statements. Perhaps the subjects could be more clearly distinguished if there were at least 10 statements on each subject, although this could make the questionnaires longer, which was also a consideration. Appendices 3 and 4 contain highly-summarized versions of both the questionnaires. An example is given of each of the 14 parts of the questionnaire on characteristics of the ward (Appendix 4), and several examples are given from the innovation questionnaire (Appendix 3). The reason for this limitation is the rights of the 'Introducing Nursing Innovations' research line.

Before the questionnaires could be distributed on the ward, they had to be tested by one head nurse and one nurse from the ward. They filled in the questionnaire themselves. The questionnaires could only be distributed after they evaluated the list as 'appropriate' for the nurses of their team. After the ward manager had granted permission, both the questionnaires were presented to all the nurses and head nurses of the ward. The nurses were informed of the aim of the study by means of a letter (Appendix 5) accompanying the questionnaire. The decision was made not to collect the data anonymously, so that incomplete questionnaires could later be completed by the respondent concerned. This might have had a negative affect on the enthusiasm about filling in the questionnaire or generated desirable answers.

Focus group

In between the two quantitative measures, qualitative data was gathered on the ward during a coffee break. This meeting took place approximately 10 weeks after the actual start of the pain registration on the ward and was meant to generate feedback on the course of the implementation up until then. The meeting exhibited a number of the characteristics of a focus group (Krueger & Casey, 2000).

- 1) *There is a small group of people involved*, 7 in this case including the researcher.
- 2) *The people involved share a number of characteristic characteristics*; in this case they had been gaining some experience as professionals for the past few months in the registration of pain on the same ward.
- 3) *The participants generate qualitative data*. Upon the request of the researcher, the participants responded to questions on their experience with and perception of the implementation of pain registration on the ward. Just as in real life, there was personal interaction in the group and people influenced each other; this is what made the data collection different from individual interviews.
- 4) *The discussion in the group has a certain objective*. The questions were open-ended, prepared with a certain sequence and were logical and comprehensible for the participants (Appendix 6).
- 5) *The process makes it easier to understand the research aim*, in this case how the implementation strategy influenced characteristics on the ward and the innovation.

There is one characteristic feature of the focus group that was not satisfied, namely that the meeting is part of a series of focus group meetings so that the input diversity at the various meetings can be compared. In this study, the data were collected in the course of one 1-hour meeting in the canteen on the ward. People walked in and out during the meeting. Consensus was not the issue. People focused on understanding feelings and experiences. A tape recording was made of the meeting and this was later transcribed by the researcher.

The ward staff members were informed about the focus group meeting by their team leaders. In the end, all the participants happened to be at work on the ward that day. A selection bias was feasible. It is possible that the people who were not there had a different option but were unable or unwilling to attend the meeting. Although in processing the focus group data the aim was not to get a complete picture, valuable supplementary information was nevertheless obtained.

Method of data analysis

Missing values

SPSS (Statistical Package for the Social Sciences) version 10.1 was used for the digital processing of the quantitative data. With the exception of the open questions, the data from the questionnaires were given a numerical code. Errors were checked by comparing the data entered at least twice with the answers from the questionnaires. In addition, the frequency output of SPSS was checked. In the preliminary measurement, a total of 32 questions were found to have been left unanswered once. These missing values were spread over 5 respondents. The follow-up measurement was found to be complete. The missing values were dealt with as follows:

Question f.5: 1 x (respondent no. 3) = replaced by the value that corresponded with the answers of the respondent to questions of the same type within this subject (politics);

Questions g.1 to 13: 1 x (respondent no. 8) = not replaced because this concerned all answers for this subject (environment-external); in this case no replacement method would add value to the data;

Question i.1.2 (respondent no. 4) = average of the score of the respondent on this subject as the seven other questions (technology/uncertainty) measure the same.

Question k.2.3: 1 x (respondent no. 8) = replaced by the value that corresponded with the respondent's answers to questions of the same type within this item (structure/centralization);

Question k.3.1 + 3: 1x (respondent no. 8) = unknown for the respondent and consequently scored 1 (never);

Questions k.3.7 to 9: 1x (respondent 7) = unknown for the respondent and consequently scored 1 (never);

Question i.1 to 8: 1x (respondent no. 3) = not replaced because this pertained to all the answers to this item (competences), no replacement method would add any value to the data in this case;

Questions m.1.2 to 4: 1x (respondent no. 2) = replaced by the average value of the other respondents in the preliminary measurement for these questions (innovation pattern); this had statistical effects on the number of degrees of freedom.

Frequency distribution and spread

Since statements were ultimately made about the ward as a whole and the effects of the innovation, this can be referred to as a case study. At the same time, there were two types of respondents that could be distinguished in this group, namely nurses and head nurses. In addition, there were two types of data (innovation characteristics and ward characteristics) that could be compared in the preliminary as well as the follow-up measurements. The characteristics of this data set and the frequency distribution appeared to be relevant to the interpretation of the data. The data are presented using clustered box plots (Figure 6 and Figure 7) because this allows comparisons at two levels to be made. Using the median, the skew of the distribution can also be checked at a glance, as can the whiskers and outliers. See *Chapter 5* for an explanation of box plots.

The aim of all the data collected here was to gain insights into the configuration profile that described this ward. The data were scored per configuration at various layers (operational, explicit values and depth) as discussed in the *Theoretical framework* section in Chapter 2. The standard error of the mean (SEM) shows the spread of the sample average in the configuration profile (Figure 9).

Degree of congruence

To determine the degree of congruence between the characteristics of the innovation and the characteristics of the ward, the link between the two had to be made visible. Using a score list and collection status that went with the questionnaires, the answers for each respondent were recorded before the totals of the preliminary and follow-up measurements were presented. Van Linge's *fit analysis* was used to evaluate the degree of congruence (or agreement or match). A supplementary test was conducted using the Student t-test to see whether the differences between the average innovation and context values were based on pure chance. This was done at the operational level and values level. A two-sided test was performed because there was no reason to assume that the characteristics of the ward or of the innovation would be higher. It was assumed that the variances were not the same, especially since the N-value was low.

Course of the congruence between the innovation and the context

Once insight had been gained into the degree of congruence at both the preliminary and follow-up measurement respectively, these results were compared. The difference between

the averages of the preliminary and the follow-up measurement were presented using a second Student t-test. This analysis technique is a well-known way of determining whether the averages of two independent samples differ significantly. One condition for this is a normally distributed test variable, which was checked for using Levene's test. In addition, the test variable has to be of a quantitative nature and the independent variable of a nominal nature. In this case, the test variables were the difference between the ward or innovation characteristic scores and the layers described as presented in Figure 9, which have a ratio level. The dependent variable was the measurement moment that could be referred to as nominal. According to Baarda *et al.* (2003), another condition is that the samples both contained a minimum of 25 respondents. Although this condition was not satisfied in this situation, the test was conducted with an eye to possible distortion of the outcomes for the smaller sample size.

Focus group

The qualitative data analysis was conducted inductively and started with the formulation of themes (Polit & Hungler, 1999, Krueger & Casey, 2000). The basis for the themes was provided using quotes that recounted the essence of what was said as accurately as possible. Using properties of the configurations, the themes could be situated in the ward profile. Finally the themes were linked to the second research question about a) the nurses' experiences with the use of the numerical pain scale on the ward, and b) the role of these experiences in the implementation process. Morse & Field (1996) summarize the process of data analysis as follows: comprehending, synthesizing, theorizing and recontextualizing. Although the data sample of this qualitative part of the study was limited in size, these steps were taken with as much care as possible. The comprehending occurred during the process of monitoring the implementation on the ward, with the researcher regularly spending hours on the ward. The yield of the synthesizing is presented in the *Findings* chapter. This was the result of the researcher coding and 'cutting and pasting' the transcribed texts. The theorizing started in the *Findings* chapter with the formulation of the themes or concepts. This process was continued in the *Discussion* chapter. Lastly, the recontextualizing occurred in the *Discussion* chapter.

Reliability

With the reliability of an instrument meant 'the degree of consistency with which it measures the attribute it is supposed to be measuring' (Polit & Hungler, 1999) or that it could be

reproduced. Variables that refer to the same configuration are supposed to demonstrate congruent scores. In this case, the size of the questionnaire was extensive. To determine the internal consistency or homogeneity of the questions, use was made of Cronbach's alpha. The questions on both lists were labelled according to the configuration. Rounded off to two decimal places, the results for each configuration are shown below. The numbers in brackets indicate the questions (see Appendices 3 and 4). For each configuration, how the internal consistency could be improved by leaving out a deviant question is stated below. The number of respondents needs to be taken into consideration when interpreting these results.

- Questions from the list of *ward characteristics* that referred to a rule-oriented configuration (a.1.4 + a.2.4 + a.3.4 + a.4.4 + b.1 + b.5 + b.11 + c.1 + c.2 + c.3 + d.1 + d.2 + e.1 + e.2 + f.1 + f.2 + j.5 + j.7 + l.1 + l.2 + m.1.1 + m.2.1 + m.2.2 + n.1.1 + n.2.1): Cronbach's alpha = 0.77. The removal of one question could increase the internal consistency somewhat to a maximum of 0.80 with the removal of L.2; this question pertained to the perception of the competences on the ward.
- Questions from the list of *ward characteristics* that referred to an aim-oriented configuration (a.1.3 + a.2.3 + a.3.3 + a.4.3 + b.3 + b.4 + b.7 + c.8 + c.9 + c.10 + d.3 + d.4 + e.3 + e.4 + f.3 + f.4 + j.2 + j.4 + l.3 + l.4 + m.1.2 + m.2.3 + m.2.4 + n.1.2 + n.2.3): Cronbach's alpha = 0.79. The removal of one question could increase the internal consistency somewhat to a maximum of 0.81 with the removal of M.2.4; this question pertained to perception of the mode of change and the innovations on the ward.
- Questions from the list of *ward characteristics* that referred to a group-oriented configuration (a.1.1 + a.2.1 + a.3.1 + a.4.1 + b.6 + b.10 + b.12 + c.4 + c.5 + c.6 + d.5 + d.6 + e.5 + e.6 + f.5 + f.6 + j.3 + j.6 + l.5 + l.6 + m.1.3 + m.2.5 + m.2.6 + n.1.3 + n.2.2): Cronbach's alpha = 0.74. The removal of one question could increase the internal consistency somewhat to a maximum of 0.76 with the removal of M.1.3; this question pertained to the perception of the innovation pattern on the ward.
- Questions from the list of *ward characteristics* that referred to a development-oriented configuration (a.1.2 + a.2.2 + a.3.2 + a.4.2 + b.2 + b.8 + b.13 + c.11 + c.12 + c.13 + d.7 + d.8 + e.7 + e.8 + f.7 + f.8 + j.1 + j.8 + l.7 + l.8 + m.1.4 + m.2.7 + m.2.8 + n.1.4 + n.2.4): Cronbach's alpha = 0.79. The removal of one question could increase the internal consistency somewhat to a maximum of 0.80 with the removal of M.1.4; this question pertained to the perception of the innovation pattern on the ward.
- Questions from the list of *innovation characteristics* that referred to a rule-oriented configuration (1+5+9+13+17): Cronbach's alpha = 0.70. The removal of question 13

could increase the internal consistency to a maximum of 0.78. Question 13 pertained to the perception of the extent to which the innovation required technical / instrumental competences.

- Questions from the list of *innovation characteristics* that referred to an aim-oriented configuration (2 + 6 + 10 + 14 + 18): Cronbach's alpha = 0.31. The removal of question 2 could increase the internal consistency to a maximum of 0.47. Question 2 pertained to the perception of the extent to which the results of the innovation were fixed and concrete.
- Questions from the list of *innovation characteristics* that referred to a group-oriented configuration (3 + 7 + 11 + 15 + 19): Cronbach's alpha = 0.33. The removal of question 11 could increase the internal consistency considerably to a maximum of 0.66. Question 11 pertained to the perception of the extent to which negotiating and compromises were needed in order to be able to arrive at a decision.
- Questions from the list of *innovation characteristics* that referred to a development-oriented configuration (4 + 8 + 12 + 16 + 20): Cronbach's alpha = 0.38. The removal of question 8 could increase the internal consistency to a maximum of 0.55. Question 8 pertained to the perception of the degree of flexibility of the tasks and the task division in the innovation.

It can be concluded that the homogeneity of the questions concerning the ward characteristics was satisfactory, especially as comparisons were made at the group level (Polit & Hungler, 1999). The internal consistency of the questions concerning the innovation characteristics was extremely low. However, this does not necessarily mean that the anticipated relationship was not present (Polit & Hungler, 1999). The questions did indeed measure various characteristics of a configuration. The innovation or the ward could strongly exhibit certain characteristics and not others, at any rate not yet. Therefore in the analysis of the data the deviant variables were not eliminated but were processed as normal. In view of the contents of the deviant questions, it was striking that with respect to the ward characteristics, three out of four of the deviant questions were classified under the subject *Innovation and change* (part M from the ward characteristics questionnaire). Apparently the ward staff had a completely different perception of innovation and change than was expressed in the various parts on the other subjects in the questionnaire. These deviant scores were indicative of the staff opinions on innovation in general, perhaps without them having a clear view of what exactly innovation implied. The same seemed to be the case with respect to the subject's methodology and

standardization. Some staff members noted that they were not accustomed to the use of these terms.

Accuracy

Accuracy was an important aspect of the internal consistency. Since the nurses found certain questions difficult or were not familiar with the terms were used, they either left these questions open or, in their own words, just filled in *something*. This did not improve the accuracy of the concepts measured. In the follow-up measurement, the researcher went back to the respondent if there were any answers missing so that after an explanation had been given, the respondent could score his/her answer after all. The researcher also asked the respondents which questions they had difficulty understanding, so that an explanation could be provided the next time the questionnaires were used.

The research design contributed to the reliability of the generated data. Whatever inconsistency there might have been between the quantitative and the qualitative results could enlarge the insight into the research subject because the research population was the same. As regards the reliability of the results, it was also important to know how the questionnaires had been formulated and tested. Parts of the questionnaires were developed by various researchers (Appendix 6). The oldest parts were from the United States (1980). They included the *exchange of sources* part of the explicit values layer of the general characteristics, and the *internal environment, communication and dynamics* part of the explicit values layer of the ward characteristics (Van de Ven & Ferry, 1980). Most of the questions were relatively new though and had been developed in Dutch health care practice by Van Linge (2002) and nursing science students (Parie, 1992; Dellebeke, 1996). The instrument for measuring culture in the organization (Cameron & Quinn, 1999) was of more recent design, but was from the United States.

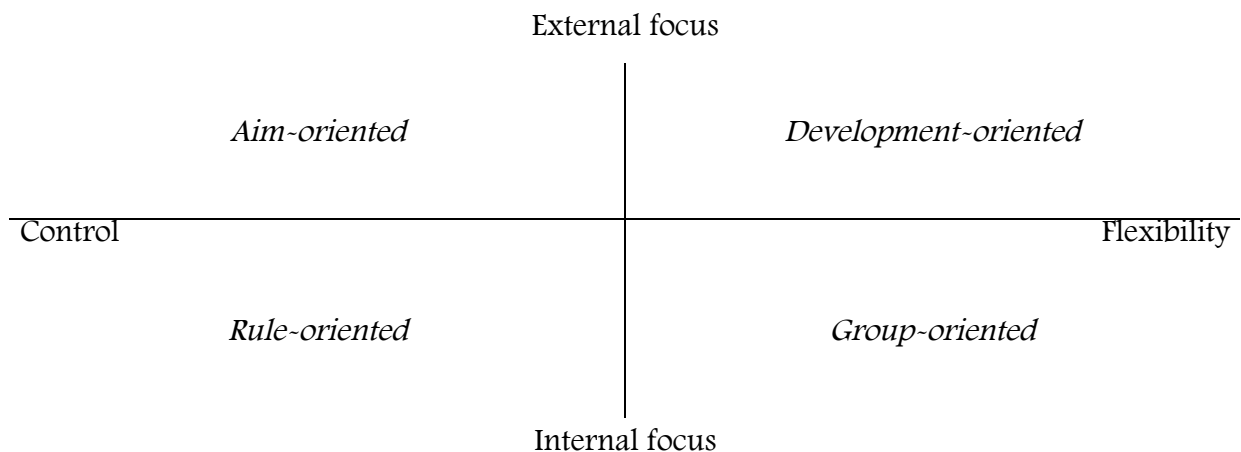
Validity

The important thing here is the validity of the data, that is whether researchers measure what they want to measure. Polit & Hungler (1999) hold that it is 'a question of degree'. The more of a basis there is, the more certainty about the validity of the data. High reliability does not guarantee validity, but good data reliability is a precondition for their validity. As regards the content validity in this case, it can be noted that the questionnaire had already been used in various implementation studies with positive results. Bouter (2003) described the relations

between context characteristics and care file characteristics in teams with high and low implementation effectiveness. Van der Laan (2002) focused on the implementation of a coaching style of leadership at nursing units in a hospital. Koppes (2004) examined whether the congruence between the innovation and the context could predict the extent to which an innovation is adopted.

The questionnaire was based on Van Linge's contingency model (1998), who based the configurations on Quinn & Rohrbaugh (1981). Groups could be distinguished with either an internal or an external focus. In addition, the extent of flexibility played a role (Quinn & Rohrbaugh, 1981). The questions could be traced back to these two dimensions (Figure 5).

Figure 5. The competing values model (after Quinn & Rohrbaugh, 1981)



Furthermore, the validity of these questionnaires remains to be seen from the present-day and future applications in the Dutch health care practice. It would be interesting to compare this measurement instrument with instruments or frameworks that are being developed, for example at Radboud University Nijmegen (Hulscher *et al.*, 2000) and in Oxford, Belfast and Alberta (Rycroft-Malone *et al.*, 2002). This validity-promoting suggestion did not fit into the scope of this study.

As regards the qualitative data collection, it can be noted that the focus group method entailed a high level of face validity. The fact that a statement by a participant could be confirmed or denied by the others in the group discussion helped to make this possible.

There was a considerable amount of non-response, 73% and 87% on the ward and innovation characteristics in the preliminary measurement. In the follow-up measurement although this has decreased it is still 67% and 63% respectively. This means caution had to be exercised in generalizing the data for the whole ward. The non-response should be as small as possible for a valid statement to be able to be made, and certainly less than half. One argument for why these data can be viewed as representative was the composition of the group of respondents. It certainly could not be called one-sided. Nurses and head nurses were included, male as well as female and of all ages, experienced nurses and trainees and nurses who were critical about the pain registration as well as nurses who were enthusiastic about it. However as these factors were not measured, no data are available on them.

Ethical aspects

In this section three major ethical principles cited by Polit & Hungler (1999) are addressed: *beneficence*, *respect for human dignity* and *justice*. As regards the principle of beneficence, it can be noted that research on the ward characteristics provided management-related insight. Decisions on further innovations and implementation strategies could be better underpinned using the measurement data. For individual nurses, the questionnaire could have initiated a consciousness-raising process. This could entail the awareness that innovations can be steered and influenced and that choices can be made regarding the implementation. The size and complexity of the questionnaire could have been responsible for whatever detrimental influence the study might have had on the attitude of the nurses and head nurses towards innovations. This could have contributed towards the idea that there is ‘no way’ implementation can be influenced.

As regards the principle of respect for human dignity, it can be noted that a letter explaining the aim of the study (Appendix 5) accompanied the questionnaires. The value of the response was indicated to convince potential respondents that their answers mattered. Prior to the study, the provisional study proposal was presented to the ward manager. She granted her permission without citing any further conditions. She herself was also part of the research population. The researcher was not connected to the ward where the study was conducted, but to a hospital-wide staff office. This enabled her to address the respondents with a certain degree of objectivity.

As regards the principle of justice, it can be added that a safeguard was provided against wrongful use of the data. After the termination of the study, the completed questionnaires, which in a number of cases had the names of the respondents filled in, were destroyed. The same held true of the sound recording of the focus group. In the digital data file, the origin of the data was not recognizable. The questions in the questionnaire were answered on a voluntary basis. Only the researcher could see who had not returned the questionnaires, and they were sent a reminder. Further it is not likely that the failure to return the questionnaire had any negative repercussions for the parties involved.

CHAPTER FIVE: FINDINGS

Introduction

The results of the study are presented in this chapter. After an overview of the response, characteristics and frequency distribution of the population, the quantitative and qualitative research results are addressed. A description is given of the congruence between the innovation and the context, as it existed at the start of the innovation plans in August 2004. It is compared with the congruence between the innovation and the context as it emerged in the winter/spring of 2005, a few months after the start of the actual application of the innovation on the ward. The changes in the congruence are described and clarified. This is supplemented by an account of the nurses' experiences with the process that were shared at the focus group meeting.

Response

At the preliminary measurement, 8 questionnaires on the ward characteristics and 4 questionnaires on the innovation characteristics were returned. At the follow-up measurement, 10 questionnaires on the ward characteristics and 11 questionnaires on the innovation characteristics were returned. The population contained 30 individuals. Most of the questionnaires were filled in by nurses on the Internal Oncology Ward. Among the respondents on the innovation characteristics in the preliminary measurement, 2 physicians involved in the implementation were included. The respondents for the ward characteristics questionnaire included 5 head nurses, 3 in the preliminary measurement and 2 in the follow-up measurement. The respondents for the innovation characteristics questionnaire also included 2 head nurses. Both of them only took part in the follow-up measurement.

General ward characteristics

The study concerned the introduction of a pain registration instrument at the Internal Oncology Ward of Groene Hart Hospital in Gouda. The patients admitted to this ward have cancer or some other, frequently chronic, disorder for which pain was an expected aspect. The diagnoses are made using various types of examinations. A characteristic of these admissions is that surgery is not part of the patients' treatment. The treatment primarily entails medication, supplemented in various cases by rules for healthy living. The information and counselling for the patients are important parts of the nursing work. The unit is more than ten

years old and there are 26 full-time nursing jobs there. There is a limited amount of personnel and patient exchange with other units.

Distribution of nurses' and head nurses' scores

During the implementation pathway the question arose as to which differences there were between the vision of the head nurses and nurses with respect to the ward and the innovation. Although this distinction was not explicitly considered in the study design, insights into this could provide starting points for the strategic approach of the follow-up. The measurement instruments used also distinguished these two types of information. The processing took place as follows. On the basis of the competing values approach formulated by Quinn & Rohrbaugh (1981), both the ward and innovation characteristics can be divided into four cultures or configuration: rule-oriented, aim-oriented, group-oriented and development-oriented (see Figure 5). Using box plots (Figure 6 and Figure 7), the distribution of the scores of the four configurations is shown. A distinction is drawn between the measuring moments (preliminary or follow-up) on the x-axis and function (nurse or head nurse) as clustered boxes on the chart. The number of respondents associated with the box on the chart is also shown on the x-axis. The y-axis shows the sum of a configuration of ward or innovation characteristics. A score in these charts is a sum of the scores of the respondent on various questionnaire variables that measure the same configuration characteristics. A score for the ward characteristics can vary from a minimum of 25 to a maximum of 125. A score for the innovation characteristics can vary from a minimum of 5 to a maximum of 25. The box contains all the values within the first and the third quarter, in other words within the 25th and 75th percentile score. The length of the box is the inter-quartile range (IQR). The T-shaped pieces on either side of most of the boxes are called whiskers. Whiskers represent the most extreme values that still fall within the 1.5 IQR. The fact that not all the boxes have whiskers can be clarified by the limited number of respondents. If scores are more than 1.5 IQR from the lowest or highest side of the box, they are included separately in the box plot and shown with an O for outlier. If a value is very extreme, more than 3 IQR from the box, it is shown with an asterisk. This occurs for example in the case of the group-oriented innovation characteristics (Figure 7).

Ward characteristics (Figure 6)

The bold line in the box plot is the median, the middle value. In the preliminary measurement, it varies from 79 for the nurses on the development-oriented ward characteristics to 86.5 on the rule-oriented ward characteristics. So 50% of the nurses had a score of 79 or higher on the

development-oriented ward characteristics. On the rule-oriented ward characteristics, 50% of the nurses scored 86.6 or higher, in which case the median is not in the middle of the box but more towards the top. There is evidence here of a negatively skewed distribution in the sense that most of the scores are relatively high. The central point is around the median. The IQR is the largest on the rule-oriented ward characteristics, which indicates that the scores here are the furthest from each other.

As regards the head nurses, the median in the preliminary measurement is between 84 on the development-oriented as well as the rule-oriented ward characteristics and 94 on the group-oriented ward characteristics. The central point for the head nurses on the group-oriented ward characteristics is also towards the top of the box, as is also the case on the aim-oriented ward characteristics. The head nurses initially scored higher than the nurses on the group-oriented as well as the aim-oriented and the development-oriented ward characteristics. The head nurses only recognized the rule-oriented ward characteristics less than the nurses. The head nurses initially experienced the ward mainly as group-oriented. There was also the least difference of opinion among the head nurses about this point, as is witnessed by the smallest IQR. The mainly rule-oriented experiences of the nurses in the preliminary measurement were partially confirmed by the head nurses in the preliminary measurement (the head nurses' score was 84 and the nurses' score 86.5), but among the head nurses other ward characteristics initially scored higher.

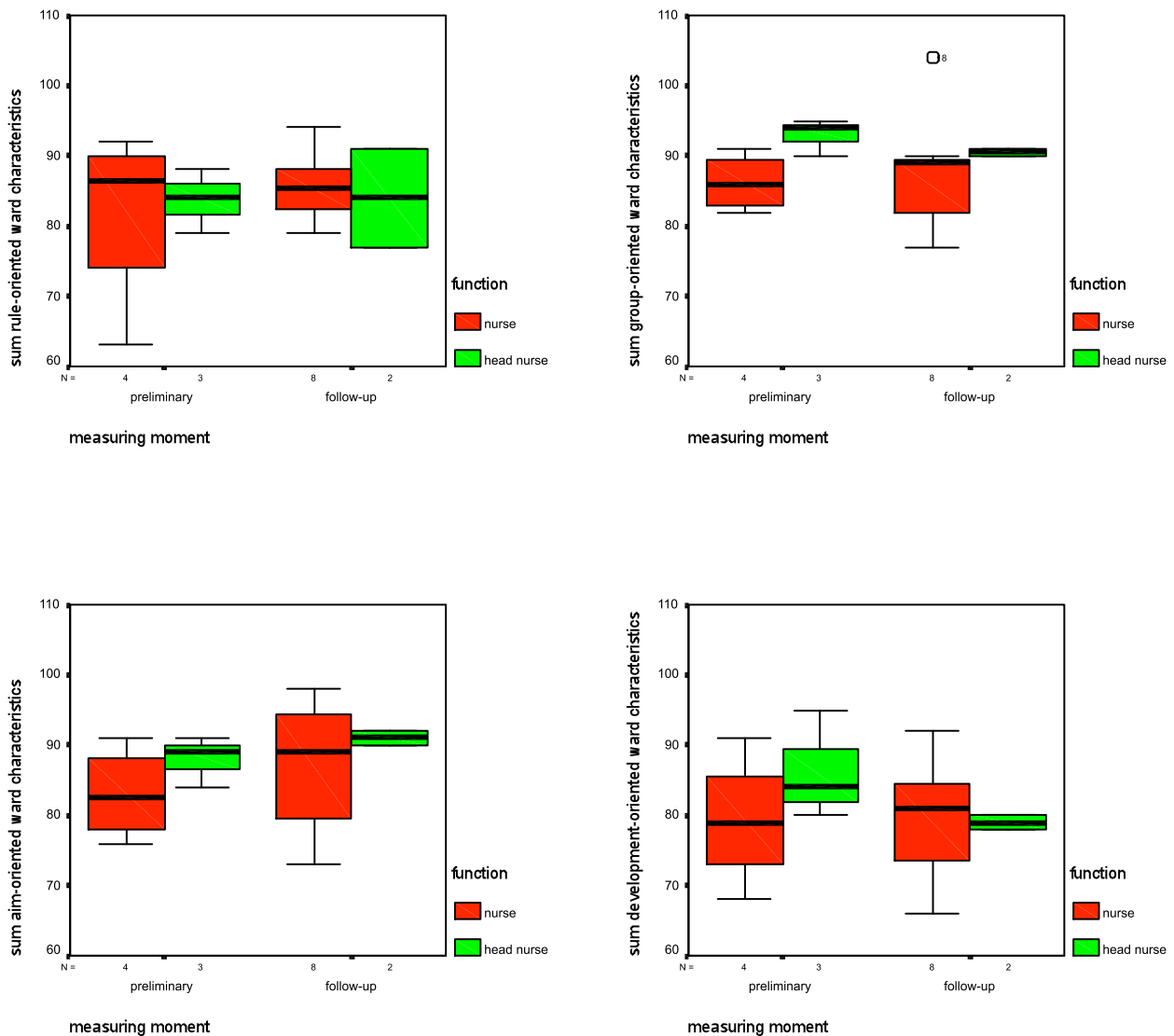
In the follow-up measurement of the nurses, the median rose from three out of four ward characteristics to 89 on the group-oriented as well as the aim-oriented ward characteristics. In the case of the nurses, the aim-oriented ward characteristics witnessed the sharpest increase, but there was more concurrence visible among the nurses on the group-oriented ward characteristics. One outlier could be found in this group (respondent no. 18) on the upper side with a value of 104. Only the median of the rule-oriented ward characteristics shows a small decrease for the nurses.

The head nurses scored the highest median (91) in the follow-up measurement for the aim-oriented ward characteristics. The aim-oriented ward characteristics were the only category that was also higher than at the preliminary measurement. The head nurses' score for the group-oriented ward characteristics was almost as high at 90.5, but it was lower than at the preliminary measurement. The head nurses' score on the rule-oriented ward characteristics

remained the same at 84, but was once again lower than the nurses' score. In the follow-up measurement, this was the score though on which there was the greatest difference of opinion on the part of the head nurses. The head nurses' score on the development-oriented ward characteristics decreased precisely where it had increased for the nurses. And indeed, in the follow-up measurement, the head nurses' score on the development-oriented ward characteristics was lower than the nurses' score. The small number of respondents was the reason for the limited spread among the head nurses.

All things considered, it appears that the implementation led to a reinforcement of the nurses' aim-oriented, development-oriented and group-oriented ward characteristics. This was barely at the expense of the rule-oriented ward characteristics, which remained virtually the same. The implementation only had positive effects for the head nurses as regards the aim-oriented ward characteristics. The rule-oriented ward characteristics remained the same, and there was a decrease in the flexibility that characterized both the group-oriented and the development-oriented configuration. Although the group-oriented score did remain high.

Figure 6. Frequency distribution of nurses and head nurses on the four different types of ward characteristics

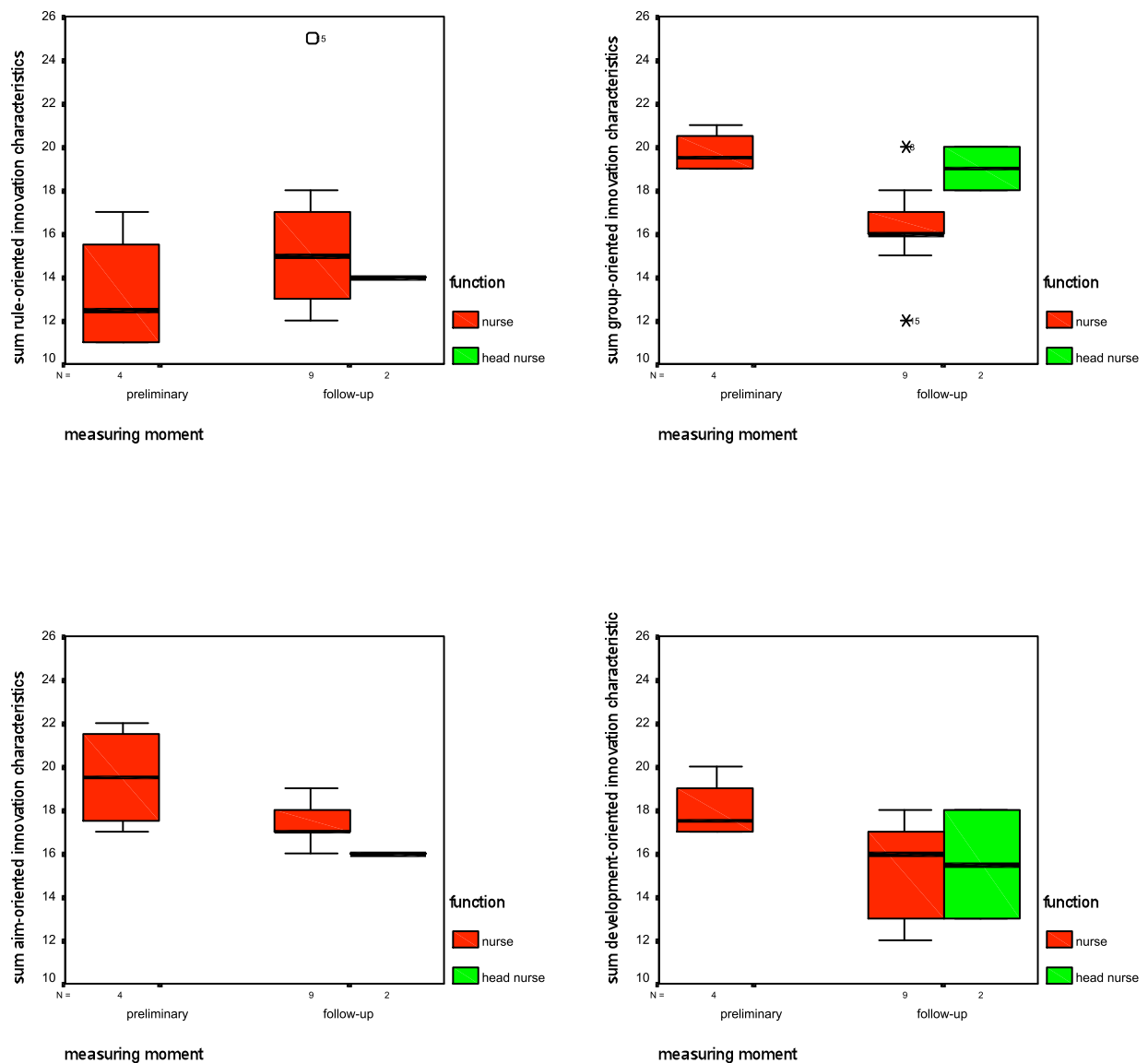


Innovation characteristics

It is immediately striking in Figure 7 that there is no box for the head nurses in the preliminary measurement. There were no head nurses among the respondents in the preliminary measurement on the innovation characteristics. The highest median of the nurses in the preliminary measurement was on the group-oriented as well as the aim-oriented innovation characteristics. On the group-oriented innovation characteristics, the IQR was the smallest and the concurrence was viewed as the highest. In the follow-up measurement, the highest median for the nurses was on the aim-oriented innovation characteristics. The IQR was small, as it was on the group-oriented innovation characteristics, but two extreme outliers

could be observed there (respondent nos. 8 and 15). Oddly enough, one of them was on the bottom side and the other one was on the top side. In this same follow-up measurement respondent number 15 scored another outlier, namely for the rule-oriented innovation characteristics and this time on the top side. This respondent apparently experienced the innovation in a different way than his or her colleagues. Since neither of the respondents were head nurses, there was no supplementary information. Only the questionnaire for head nurses included open questions, the answers to which could have provided some manner of clarification.

Figure 7. Frequency distribution of nurses and head nurses on the four types of innovation characteristics



It was also striking that the median for the nurses decreased on 3 out of 4 innovation characteristics. Only the score on the rule-oriented innovation characteristics exhibited some increase. The score on the rule-oriented innovation characteristics nonetheless remained the lowest in both of the measurements, including the head nurses in the follow-up measurement. The head nurses scored the highest in the follow-up measurement on the group-oriented innovation characteristics. The head nurses' scores can be referred to as strikingly coherent. This can easily be clarified by the fact that there were only two head nurses in the follow-up measurement on the innovation characteristics. Their opinions differed the most as regards the development-oriented characteristics of the innovation.

In summarizing, it can be stated that the nurses' scores after the implementation decreased on all the innovation characteristics except the rule-oriented ones. The scores were initially highest on the group-oriented and the aim-oriented innovation characteristics. After the implementation, the aim-oriented innovation characteristics scored the highest, although they had decreased. The rule-oriented innovation characteristics continued to score the lowest, but this score did increase and the difference between it and the other scores decreased. There was no score for the head nurses in the preliminary measurement. In the follow-up measurement, they scored the highest on the group-oriented innovation characteristics (Table 8).

Table 8. Summary of leading scores from frequency distribution

	Preliminary measurement	Follow-up measurement
Ward characteristics		
Nurses	R	G/A
Head nurses	G	A
Innovation characteristics		
Nurses	G/A	A
Head nurses	-	G

R=rule-oriented, G=group-oriented, A=aim-oriented, (D=development-oriented, was not scored)

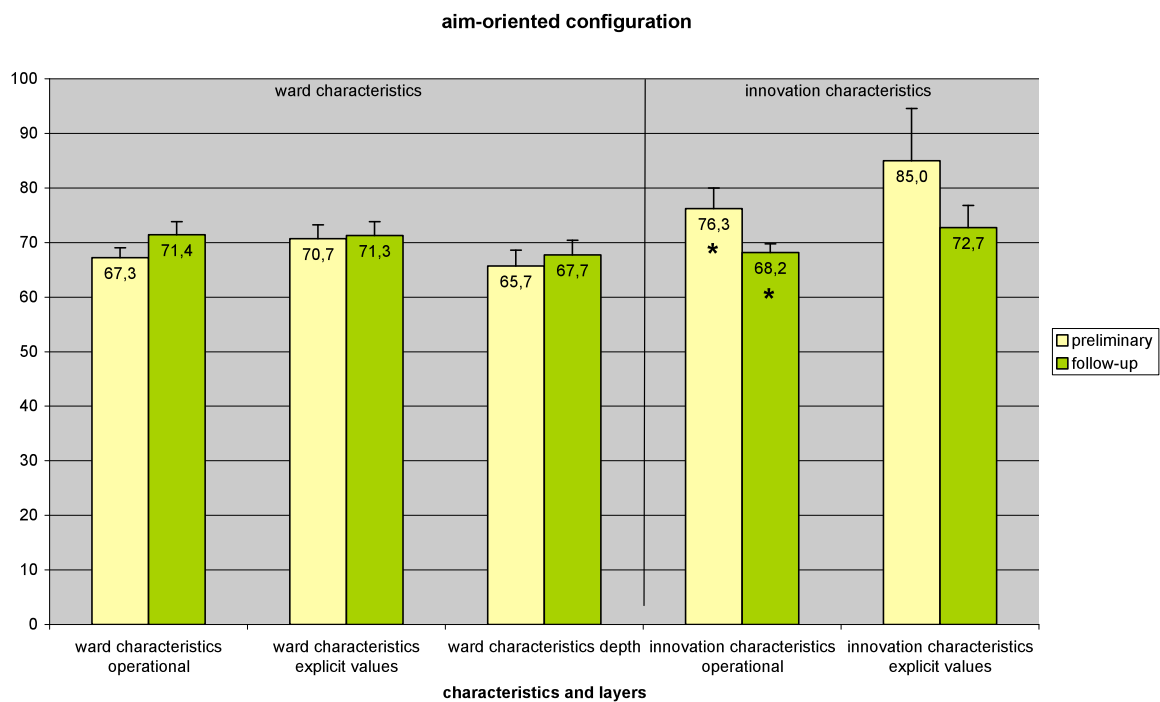
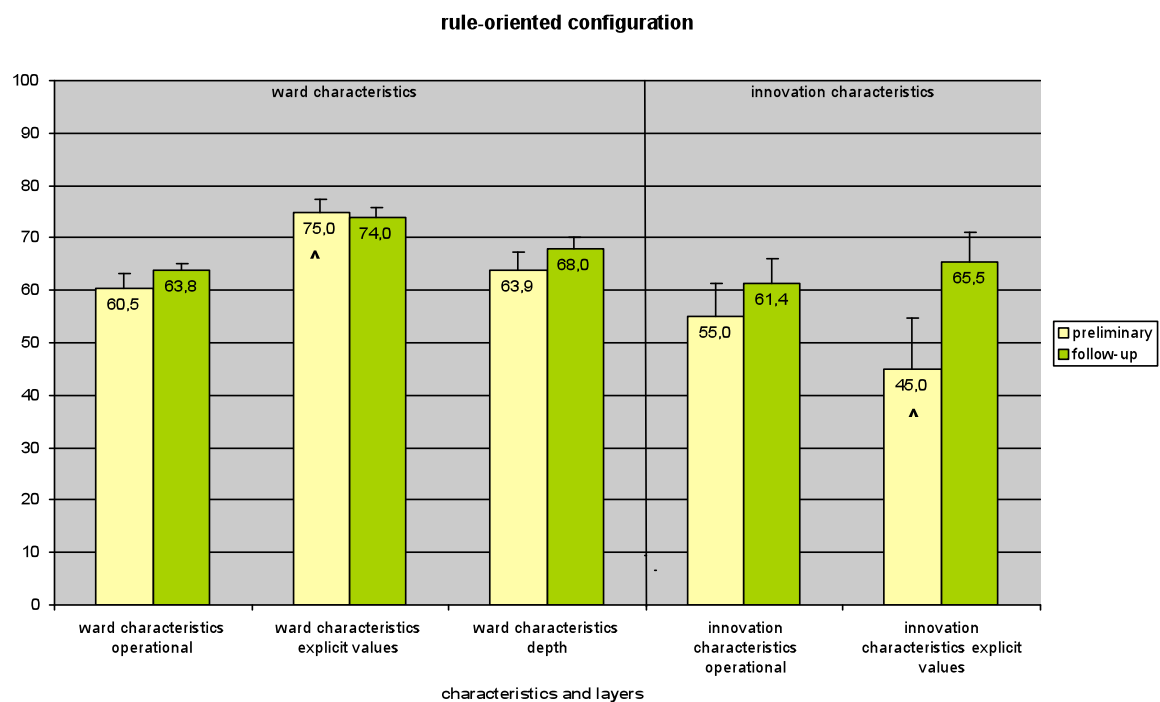
Congruence between the innovation and the context

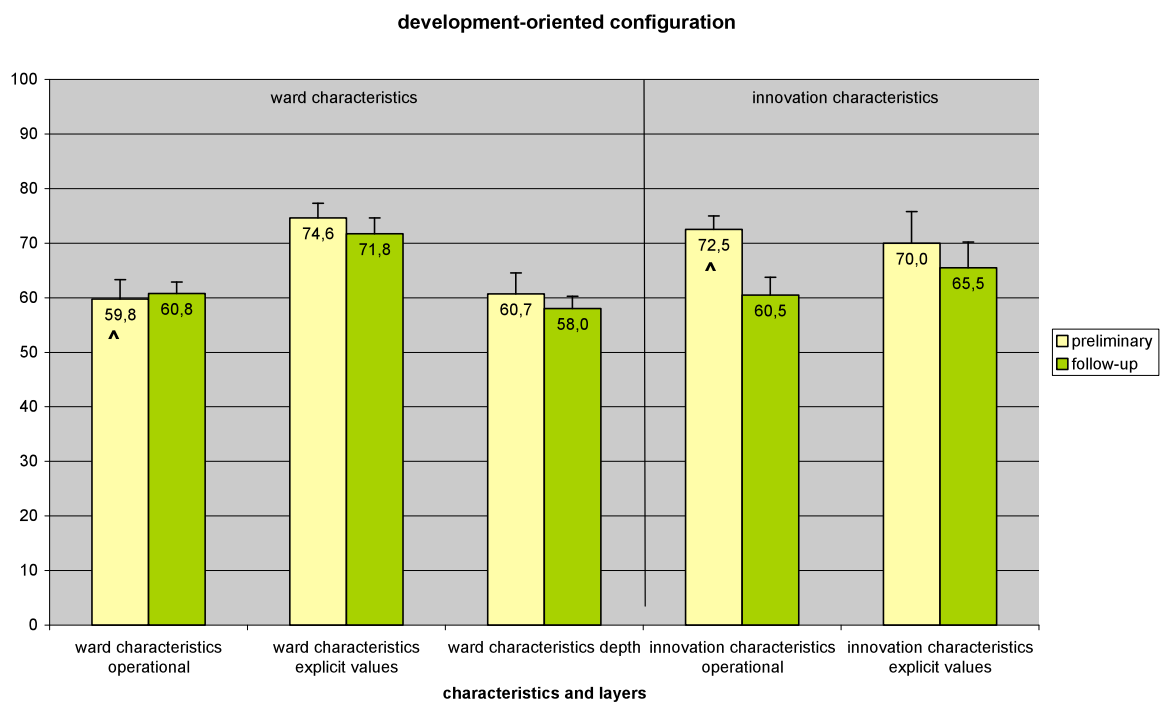
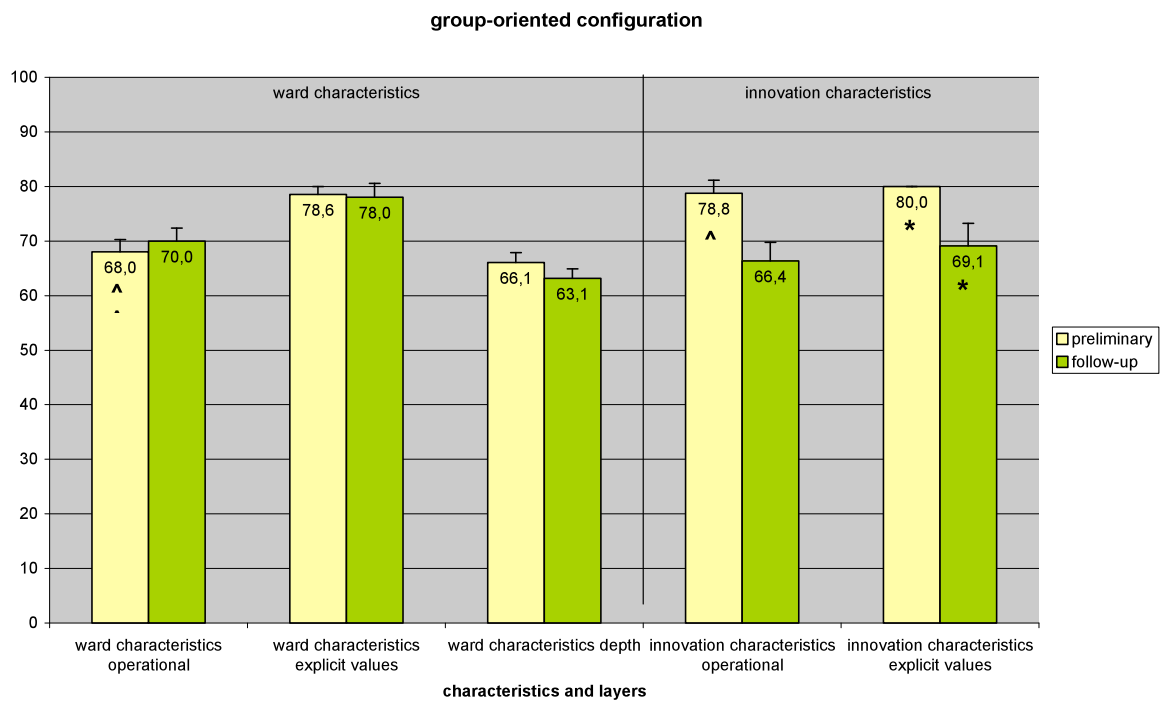
The individual respondents' scores were recorded in the collective status that was developed for the questionnaires under the responsibility of the Utrecht University Nursing Science Discipline Group. The score for each individual could be made visible, showing his or her perception of the profile of the ward and the innovation. This resulted in four charts for each individual for each measurement. Since this yielded far too many charts to be presented and discussed, the decision was made to use a ward average in the preliminary as well as the

follow-up measurement. In addition, this presentation of the data at the ward level made it easier to make comparisons, since the groups of respondents in the preliminary and follow-up measurements did not consist of exactly the same people. The decision to use a ward average eliminated the distinction between nurses and head nurses. To gain greater insight in this difference, the box plots discussed above can be consulted. The ward averages per measurement are shown in four charts that jointly constitute the configuration profile of the ward (Figure 9). The charts are in the form of a clustered histogram. Each of the four charts presents one of the configurations: rule-oriented, aim-oriented, group-oriented and development-oriented. The distinction between the preliminary and the follow-up measurement is visible in the colours of the bars. The first three clustered bars on each chart show the ward characteristics for that particular configuration. The fourth and fifth clusters show the innovation characteristics. For the ward as well as the innovation, a distinction is also drawn in the layers. For the ward, the operational, explicit values and depth layers are shown, and for the innovation only the operational and explicit values are shown on the x-axis. The depth layer of the innovation was not measured because it was considered too difficult for the respondents to understand the deepest reasons for an innovation. The y-axis has a numerical distribution that shows the percentages. This makes it possible to show the ward average of the parts of a configuration. The T-shaped symbols at the top of the charts show the size of the standard error of the mean (SEM).

A ‘fit analysis’ based on six steps, which are described after Figure 9, goes with the questionnaires that were used from the ‘Introduction of Nursing Innovation’ research line. The next chapter further discusses the findings from this analysis.

Figure 9. Configuration profile of the ward and the innovation





^ = statistical significant differences between innovation and ward

* = statistical significant differences between preliminary and follow-up measurement

1. Strength

A configuration is referred to as strong in Van Linge's configuration model if the three levels of the configuration all score 75% or higher. This was not the case in this study before or after the innovation. Nor were there any striking downward outliers. All the layers of the various configurations in the preliminary as well as the follow-up measurement scored 58% or more. In the preliminary measurement, the group-oriented configuration was the least weak, and in the follow-up measurement the congruence between the configurations further increased. Particularly at the level of the depth characteristics, the rule-oriented and aim-oriented configuration surpassed the group-oriented one. The development-oriented configuration was the least strong in these measurements, with two out of three of the values under 61% in the preliminary as well as the follow-up measurement. For the aim-oriented configuration, all the layers scored more than 65% on the preliminary measurement. On the follow-up measurement, the ward scores for this configuration exhibited a slight increase at all the layers.

2. Internal fit

We can refer to internal congruence if and when the differences between the layers of the configuration are smaller than 15%. This was the case for all the configurations in the preliminary measurement except the development-oriented one, where the difference was 15.1. With a maximum difference of 5.2%, the aim-oriented configuration was initially the one with the greatest internal congruence. After the course of the innovation, the internal congruence of the aim-oriented configuration improved and only exhibited a difference of 3.9%. With a difference of 15.1, the group-oriented configuration now falls just outside the limit of internal congruence (Table 10). It is also striking that the value of the operational layer of the ward characteristics has increased for all the configurations.

Table 10. Internal congruence; maximum difference between layers of configurations

	Preliminary measurement	Follow-up measurement
Rule-oriented configuration	14.6	10.4
Aim-oriented configuration	5.2	3.9
Group-oriented configuration	12.6	15.1
Development-oriented configuration	15.1	14

3. Fit innovation with one or more layers of the configurations

This is the case if the configuration layer scores 75% or higher and the comparable layer of the innovation scores 75% or higher. On the grounds of these criteria, only one fit can be observed in the preliminary measurement, which has already disappeared in the follow-up measurement. This fit was present in the group-oriented configuration between the explicit values of the innovation and the explicit values of the ward. In the follow-up measurement the scores of the innovation characteristics in particular exhibited a considerable reduction. This was true for the innovation characteristics in all the configurations except the rule-oriented one, where a considerable increase was visible. The scores for the rule-oriented innovation characteristics were consequently approximately the same as for the development-oriented ones. In the follow-up measurements as well, the aim-oriented and group-oriented innovation characteristics scored considerably higher than the rule-oriented and development-oriented innovation characteristics in the follow-up measurement. For the rest, it was striking in the follow-up measurement that the explicit values for the ward as well as the innovation in all the configurations scored higher than the operational characteristics.

The Student t-test was used to check whether the differences were based on chance. The significance value was 0.05. Three significant outcomes were observed, all three in the preliminary measurement. At the operational level, the difference of the group-oriented and the development-oriented configuration was statistically significant. At the level of the explicit values, this was the case with the rule-oriented configuration (Figure 11). The statistically significant findings from this Student t-test are marked with an circumflex (^) in Figure 9 and Table 11.

Table 11. *P-values of student t-test for differences between innovation and ward*

Operational layer				
Configuration	Rule-oriented	Aim-oriented	Group-oriented	Development-oriented
Preliminary measurement	0.477	0.090	0.011 [^]	0.015 [^]
Follow-up measurement	0.620	0.283	0.389	0.930

Explicit values layer				
Configuration	Rule-oriented	Aim-oriented	Group-oriented	Development-oriented
Preliminary measurement	0.047 [^]	0.242	0.431	0.484
Follow-up measurement	0.153	0.802	0.077	0.248

[^]Significant: $p < 0.05$

4. Fit between technology and the organization configuration

There is evidence of this fit if there is a strong configuration, which is the same as what the technology characteristics require. As is noted above, none of the configurations can be referred to as strong. The need for technology was initially mainly group-oriented, and after the course of the innovation, the need shifted towards predominantly aim-oriented (Table 12).

5. Fit between environment and organization configuration

This fit is there if and when there is a strong configuration which is the same as that required by the environment characteristics. The environment characteristics initially emphatically required a group-oriented configuration. In the follow-up measurement, the requirement of the environment remained predominantly group-oriented, but decreased somewhat as the aim-oriented characteristics increased (Table 12). Judging from the measurements, the ward was not yet able to meet with this requirement. None of the ward configurations scored a minimum of 75%.

Table 12. Technology and Environment Characteristics

	Preliminary measure-ment			Follow-up measure- ment		
	Score	Configura- tion	N	Score	Configura- tion	N
TECHNOLOGY						
Uncertainty	32.9	D	8	29.3	G	10
Instability	20.4	G	8	16.7	A	10
Variability	9.0	A	8	9.0	A	10
Job-dependence	18.5	G	8	17.5	A/G	10
INTERNAL ENVIRONMENT						
Communication	14.0	G	3	14.0	G	2
Dynamics	12.7	G	3	15.0	G	2
EXTERNAL ENVIRONMENT						
Complexity	16.0	G	2	16.0	G	2
Dynamics	14.5	A/G	2	14.5	A/G	2
Coerciveness	7.5	G	2	9.0	A	2

N=number of valid respondents, D=development-oriented, G=group-oriented, A=aim-oriented, (R=rule-oriented, was not scored)

6. Fits of technology and environment with innovation

There is evidence of these fits if the technology and the environment characteristics fit in with an innovation whose layers are both 75% or higher. The technology and environment characteristics mainly require a group-oriented and aim-oriented innovation. This fit was put into effect in the preliminary measurement. There was not a single innovation layer that scored higher than 75% in the follow-up measurement, although the group-oriented and aim-oriented innovation characteristics clearly scored higher in the follow-up measurement than the rule-oriented and development-oriented characteristics, with an average difference of about 5 points.

Value of the difference between the preliminary and follow-up measurement

To supplement the fit analysis referred to above, a Student t-test was carried out to show any possible statistical significance for the difference in the averages between the scores for the preliminary and follow-up measurement (Table 13). The significance value was 0.05. As regards the ward characteristics, not a single significant change could be observed. The innovation characteristics exhibited a significant change at two places, namely in the operational layer of the aim-oriented innovation characteristics and in the explicit values layer of the group-oriented innovation characteristics. The meaning of this is addressed in the *Discussion* chapter. These significant changes are indicated in the configuration profile of the ward (Figure 9) and in Table 13 with an asterisk (*).

Table 13. P-values of the Student t-test for the differences between the preliminary and follow-up measurement

	Ward characteristics operational	Ward characteristics explicit values	Ward characteristics depth	Innovation characteristics operational	Innovation characteristics explicit values
Rule-oriented configuration	0.282	0.737	0.280	0.471	0.078
Aim-oriented configuration	0.208	0.888	0.622	0.032*	0.184
Group-oriented configuration	0.555	0.866	0.272	0.056	0.025*
Development-oriented configuration	0.794	0.490	0.532	0.055	0.609

*Significant: $p < 0.05$

Experiences of the focus group

Seven nurses on the ward shared their opinion in the focus group. If references are to be made to a complete picture of the situation on a ward, more information is called for. The following themes could nonetheless be distinguished as a supplement to the quantitative information:

1. Making a concrete appeal

‘I often was not able to say how much pain a patient was feeling, that happened.’ Nurses noted that more attention was devoted to pain than in the past. ‘Well, there are just more

people who are in pain.’ The nurses felt there was more registration of pain nowadays, and that it was done in a more concrete way. The nurses felt they were already doing pretty well, pain registration had been introduced on the ward years ago, but had somehow gone out of use. One reason for that was probably the lack of an interdisciplinary approach or special training. A patient’s pain was something the nurses paid attention to, because they ‘...had become aware of the fact that if you had a pain score, you had to do something with it.’ In their contacts with the patients, the nurses were stimulated to keep them better informed. They didn’t look any further at non-oncological pain and what effects it could have. The nurses wanted to work on quality care and adequate patient information is part of it. During the consultation with the physician, the initiative for effectively combating pain often has to come from the nurses. They also regard it as their task.

2. Measured but not improved

Sometimes there was a sense of powerlessness on the part of professionals, which could be evoked by criticism of pain registration. As a result of the registration, there was insight into the intensity of the pain but there were not always ways to restrict the pain. ‘I see patients with a pain score of 8 for days on end, that can be very frustrating.’ The nurses did not look to themselves for the cause of this dilemma. Their colleagues were suspected of accepting the pain scores, and resident physicians were sometimes uncooperative. ‘Just a maintenance dosage of aspirins three times a day, that ought to be enough, because for a momentary thing, for those couple of minutes you can’t prescribe a very high dosage of anything.’ It also regularly occurs that the patient did not want anything extra for the pain so that the pain score did not go down. And the measuring itself does not always go that well. At the moment of the measurement, it sometimes seemed as if the patients momentarily forgot their pain or were unable to give an indication of how bad it was. On the other hand, the clinical environment confronted people with their pain. ‘That is why they might be focused more on their pain here, because at home they have things to do and other distractions.’ For example in the case of patients with chronic pain, there did not seem to be any prospect of reducing the pain. Especially the standard pain measurement in the evening seemed to sometimes irritate the patients, certainly if there were no changes for the better. There were also occasions when doubts arose, ‘What good does all this do?’ Professionals seemed to mainly pin their hopes on combating pain with medication. Supplementary interventions such as applying heat and cold were sometimes applied, the physical therapist was increasingly consulted for exercise, or patients were advised to watch television as a distraction. Pain was also not viewed as

relevant if it did not have anything to do with the current diagnosis. ‘After all, why is this patient here now?’ If a nurse made proposals for structural improvement related to pain management, this usually meant she herself would be having less time off since she would be asked to elaborate the proposals, and there would not be much time for that on the ward. ‘That is why I am very careful about making any suggestions, because I know it means a lot of homework for me.’

3. Accepting subjectivity

The subjectivity of the pain score came up on various occasions in the focus group. ‘No pain any more, scored 2.’ The nurses were tempted to compare one patient’s score with another’s. ‘I think it does not feel like this patient can’t give a 6 because that other patient had a 6, and a 6 is really high!’ The professional’s own pain perception also played a role, no matter whether it was someone in his forties with years of experience or a young student nurse. ‘Sometime I think if I give that one an 8...’ and ‘It has to be realistic!’ Many of the patients seemed to have a tendency to surrender responsibility. ‘Here people just give up pretty quickly, well maybe not all of them...’ A few of the nurses were looking for a kind of information that was better suited to the patients’ needs, so that the patients could formulate their own thoughts about the care and treatment. Others felt there was already enough information.

Summary

In the preliminary as well as the follow-up measurement, the ward exhibited four reasonably developed configurations (Figure 9). At both of the measurements, the aim-oriented configuration was the most internally congruent on the various layers (Table 10). In particular the aim-oriented configuration demonstrated how the differences between the innovation and the context became smaller (Figure 9 and Table 11). This score was also in keeping with the predominantly aim-oriented technology need in the follow-up measurement (Table 12). The explicit values layer was the most developed on the other three configurations as regards the ward features as well as the innovation features, but it was not congruent with the other layers of the configuration. In addition, there was a slight decrease in the value of this layer on all the configurations except the aim-oriented one (Figure 9). The environment mainly required a group-oriented configuration (Table 12). To a certain extent, it could be provided by the ward, but the group-oriented configuration was lacking a certain depth (Figure 9).

The Student t-test was used twice to calculate whether and to what extent the differences between the average scores could be based upon chance. As regards the difference between the innovation and the ward, three significant scores could be observed in the preliminary measurement. As regards the difference in the scores of the preliminary and the follow-up measurement, on two occasions a statistically significant value was observed in the innovation scores.

It was clear from the box plots that as a result of the implementation for nurses, they recognized an increasing aim-oriented, group-oriented and development-oriented approach on the ward. The head nurses observed an increasingly aim-oriented approach, which was accompanied by a decreasing score for flexibility. As a result of the implementation as regards the innovation conception on the part of the nurses, they saw an increasingly rule-oriented approach, although the score on the other configurations decreased. Among the nurses, the aim-oriented innovation features continued to have the highest scores. Among the head nurses, the group-oriented innovation features had the highest scores in the follow-up measurement.

Based on the information from the focus group, the following themes could be distinguished:

- 1) A concrete appeal was made for pain registration,
- 2) Pain registration was carried out but did not ensure less pain,
- 3) Acceptance of the subjectivity goes hand in hand with pain registration.

CHAPTER SIX: DISCUSSION

This chapter discusses the significance of the findings in Chapter Five. After addressing the response, the following subjects are focused on: the power of the configuration, the internal congruence and the congruence between the innovation and the context, and the technology and environment requirement. The choice of strategy is discussed, in which the future probable development of pain registration on this ward will become clear. The results of the focus group supplement the understanding of the implementation process on the ward. The implications of this study are briefly detailed and the chapter is closed with a general conclusion. In this connection it is important to note that the statistical significance is not the most important point in this discussion. The statistics in this study helped evaluate the changes on the ward and this is how they are referred to in the following sections. The design of the discussion is based on the contingency model. This is in keeping with the aim of the study, namely to use the contingency model to see what happens with the congruence between the innovation and the context and gain insights for strategy decisions regarding implementation in the future.

Response

Since the conclusions are drawn from the available data, they actually only pertain to this particular group of respondents. The response was maximally 37% of the population and thus cannot be viewed as representative. The data that were collected nonetheless provide valuable insight into the effects of the implementation on the ward for the respondents. When the ward is referred to in this chapter, the group of respondents is meant.

The response was not robust, certainly as regards the innovation characteristics in the preliminary measurement. A misunderstanding during the distribution might have been part of the reason for the limited response in the preliminary measurement. In the preliminary measurement, the innovation characteristic questionnaires were distributed separately from the ward characteristic questionnaires. Only 7 of the 30 people in the population received the innovation characteristic questionnaire. Since these respondents were involved in initiating the innovation, their answers probably did not concur with those of the average ward nurse. The decision was made, nonetheless, to incorporate these responses into the data analysis and take them into consideration in the interpretation. In the follow-up measurement, the

questionnaires were distributed together and more attention was also devoted to personally asking the respondents about the questionnaires.

Power of the configuration

Although none of the ward configurations were strong in this study in either the preliminary or the follow-up measurement, none of them were really weak either (Figure 9). Up to now, wards with a reasonable score on all the configurations seem to implement better than wards with markedly weak configurations or a strong configuration with a poor fit with the innovation (Van Linge, 1998). This gave the ward a reasonable basis for change. According to the competing values model (Figure 5), the course of a predominantly group-oriented in the direction of an aim-oriented configuration would seem to be indicative of an increasing external focus and control. Up to now, this barely seemed to happen at the expense of the flexibility and the internal focus. This is discussed in greater detail in the following sections.

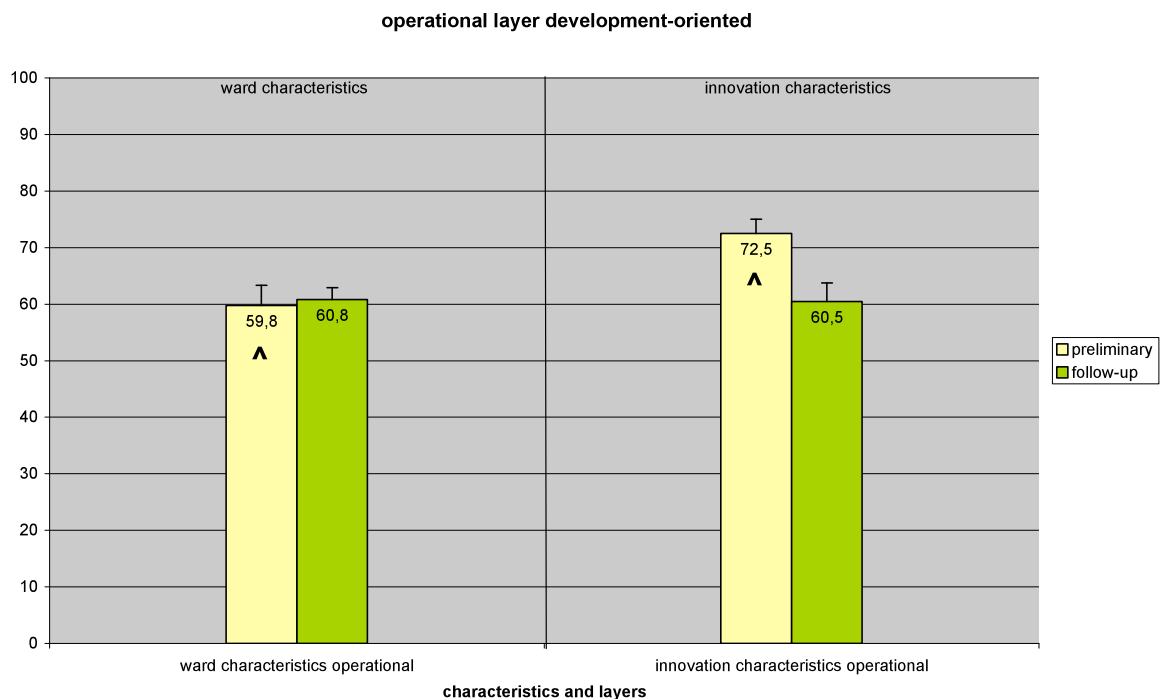
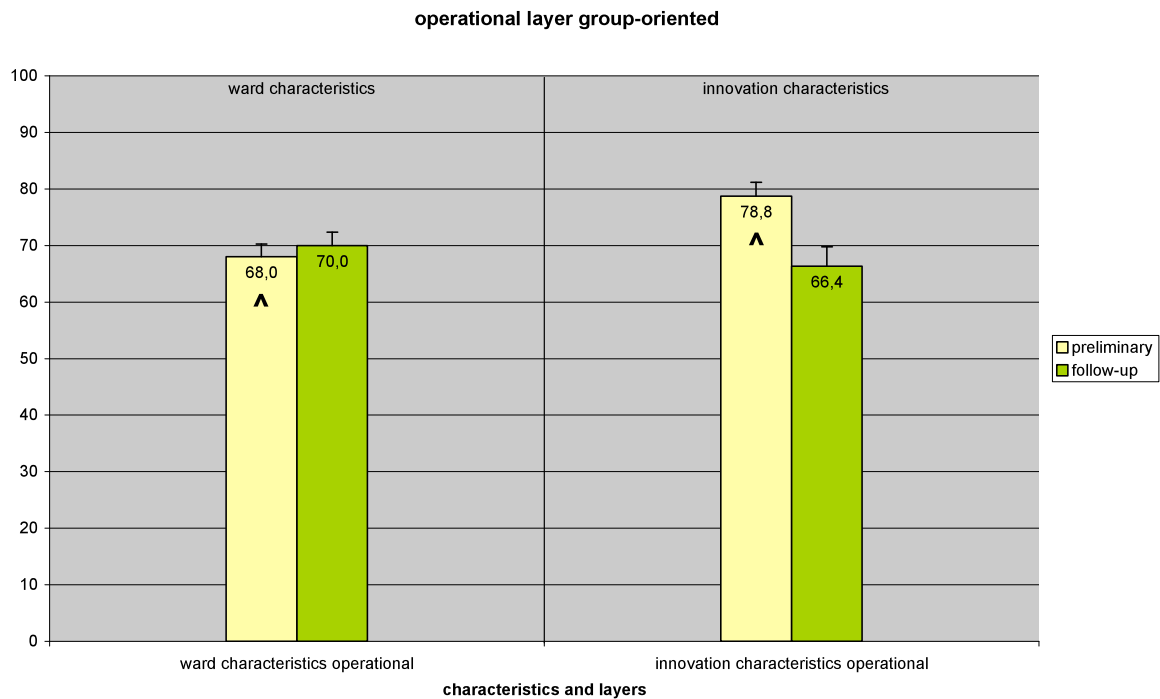
Internal congruence

In the preliminary as well as the follow-up measurement, the explicit values layer clearly scored higher than the operational layer and the depth layer for all the ward configurations except the aim-oriented configuration (Figure 9). The level of the explicit values especially represented the attitude of the staff and the policy goals of the ward. The fact that this level scored the highest on almost all the configurations could mean that the staff and management alike had a positive attitude to a wide range of innovations, but that there was not enough support for them at either the depth level or the operational level. Perhaps the conditions were not adequate for operationalizing whatever was said or promised. Nor did it fit in yet with the 'collective subconscious' that represented the depth layer of the ward. This referred to the points of departure and motivations that ultimately shaped the acts on the ward. The aim-oriented configuration exhibited the best internal congruence in both measurements (Table 10). In addition, the aim-oriented configuration was the only configuration that exhibited a rise, be it a very small one, on all three of the layers (Figure 9, 2nd chart). This indicated an extent of stability for the aim-oriented methodology on the ward. Perhaps the implementation strategy contributed towards this stability. The fact that the layers that were distinguished were congruent on the aim-oriented configuration showed that the ward was able to operationalize this aim-oriented message and that it was founded on shared points of departure. The aim-oriented configuration represented values like effectiveness, productivity, aim-orientedness and a capacity for competition.

Congruence between the innovation and the context

There was initially only one clear fit, namely between the explicit values in the innovation characteristics (80.0%) and the ward characteristics (78.6%) of the group-oriented configuration (Figure 9). This was no longer demonstrable in the follow-up measurement. In particular, the scores on the innovation characteristics exhibited a sharp fall. This held true of the innovation characteristics in all the configurations except the rule-oriented ones, which exhibited a considerable rise. One reason for the striking differences between the preliminary and the follow-up measurements on the innovation characteristics could be related to the respondents themselves. As stated in the *Response* section of this chapter, the follow-up measurement probably presents a more realistic picture of the congruence. The Student t-test confirmed the differences between the innovation and ward characteristics in the preliminary measurement (Table 11). This application of the Student t-test has an important limitation, since it can only show the significant differences. The purpose of the implementation strategy is to promote the similarities at the various levels. No statistical test was found that could test the significance of the congruence. The outcomes nonetheless indicated that at the operational level, initially the ward could not meet the innovations' need of flexibility, which have the group-oriented and the development-oriented configuration in common (Figure 5). During the implementation both innovation scores decreased considerably. This seemed to be more realistic, because this score has more congruence with the ward ones (Figure 14).

Figure 14. Preliminary and follow-up characteristics of ward and innovation on operational layer



^ = statistical significant difference between ward and innovation layers

At the explicit values level, the innovation was lacking a lot of stability and certainty characteristic for the rule-oriented configuration, in the opinion of the respondents at the time of the preliminary measurement (only 45%). During the implementation, the experiences with

the pain registration led to higher expectations of the rule-oriented characteristics of the innovation, in particular on the explicit values level, 65.6% instead of 45.0%. This score came closer to what was being provided on the ward at this level: 74.0%.

Technology and environment fit with the ward configurations

The technology need was initially mainly group-oriented (Table 12). The initial congruence between the innovation and the context of the explicit values within the group-oriented configuration were in keeping with this. After the course of the implementation, the technology need shifted towards aim-oriented (Table 12). The respondents experienced less instability and witnessed an increasing independence. The perceived uncertainty also decreased and this now allowed a group-oriented need to emerge. In this connection, the need for flexibility remained, but now the focus was internal instead of external. The assumption can be made that the implementation contributed towards this. By applying pain registration, the pain perception of the patient became clearer and consequently helped shape the treatment plan. The internal focus could be related to the attention devoted to the change on the ward. This made the nursing staff focus on the possibilities they had as an interdisciplinary team. For the time being, an effective interdisciplinary approach would still cost a great deal of energy, for example because an interdisciplinary consultation process was still being developed.

The environment characteristics tended towards a group-oriented configuration in the preliminary as well as the follow-up measurement (Table 12). A slight tendency could be observed towards more aim-oriented environment characteristics. As the two stronger configurations, the group-oriented and the aim-oriented configurations were in keeping with this. The internal and external environment factors were only scored by the head nurses, which was important in the interpretation. Since a tendency from group-oriented to aim-oriented could be observed in the technology as well as the environment, it was possible that the head nurses were lagging behind a bit in this connection. They still scored in a predominantly group-oriented way in the follow-up measurement, even though the scores were somewhat more aim-oriented than in the preliminary measurement.

Technology and environment fit with the innovation

The technology and environment characteristics initially mainly required a group-oriented innovation and then came to exhibit an increasing demand for aim-oriented innovation (Table

12). In the preliminary measurement, the group-oriented as well as the aim-oriented characteristics scored high on the innovation (Figure 9, chart 2 & 3). The technology and environment required this and were consequently in keeping with it at the start. As is explained above, this pertained to the innovation conception of the parties who played a role in the implementation. In the follow-up measurement, none of the innovation scores met with the norm of at least 75% for a strong innovation. The aim-oriented innovation characteristics nonetheless scored the highest: 68.2% for the operational characteristics and 72.7% for the explicit values. The scores of the group-oriented innovation characteristics followed the of the aim-oriented innovation characteristics, this was in accordance with the technology and environment demand.

Value of the difference between the preliminary and follow-up measurement

The Student t-test was then conducted to see whether any statistically significant changes were demonstrable in the course of the ward or the innovation characteristics (Table 13). As regards the ward characteristics, not a single significant change could be observed. The innovation characteristics exhibited a significant change at two points, namely at the operational level of the aim-oriented innovation characteristics (from 76.3% to 68.2%) and the explicit values level of the group-oriented innovation characteristics (from 80.0% to 69.1%). About the practical value of the results of this t-test should be noticed that they had the disadvantage that it was difficult to compare the groups of respondents. In both cases, there was a decrease. The ordinary staff member on the ward apparently viewed the aim-oriented innovation characteristics as being clearly less operational in the follow-up measurement than the staff members who had taken the initiative in the preliminary measurement. This also includes their ideas about the concrete results of the pain registration, the fixed division of tasks, the stipulation of the main lines of the decision-making process and whether the pain registration required the capacity to think and act in a result-oriented fashion. As regards the group-oriented innovation characteristics, the ordinary staff members on the ward also clearly saw less of the explicit values such as respect, autonomy and togetherness in the follow-up measurement than the ones who had taken the initiative for the innovation saw in the preliminary measurement. As both the scores in the follow-up measurement were in keeping though with the ward characteristics, they did not necessarily present any problems for the further implementation and safeguarding.

Choice of strategy

The standard implementation strategy adopted for the introduction of pain registration mainly exhibited characteristics of a transition strategy. This was clear in the planning approach and the human resource interventions such as special training and achievement evaluation per unit. As supplementary technical interventions, the provision of material and the agreements about standardization on the ward can be cited. The most important political intervention consisted of involving other disciplines focused on the patient with pain in the implementation process by way of participation in the work group and calling in specific knowledge on the suitable care and treatment of the patient with pain.

The profile did not exhibit any valid strong changes in the follow-up measurement. Judging from these data, the next stage of the implementation would have to be of an evolutionary nature. Unlike the transition strategy, the evolution strategy is more process-directed than plan-directed and focused on initiating fundamental learning processes in the organization. This strategy creates conditions that learning is possible under (Van Linge, 1998). It is important that the structuring of the implementation process does not unfold by means of central steering. Space has to be created for growth and development. Of course the points of departure have to be clear and goals have to be stipulated. Since the ward can cope well with an aim-oriented approach, it is only logical that plans should be carried out in sub-groups, for example per team.

Decentralized reflection can be stimulated *with* as well as *between* the teams. In view of the nature of the innovation, it would be wise to reflect regularly in the triangle of the patient and his care and treatment providers.

It seems as if the situation benefits from the presence of various configurations within the ward. Numerous interventions would consequently exert their influence and thus contribute towards the success of the implementation. It is only logical that numerous interventions will be required in order to reach the entire ward and that this will take time and energy. On the other hand though, a well considered, comprehensive approach would enhance the 'embeddedness' of the innovation on the ward.

Focus group experiences and the measured configurations

The three themes from the *Findings* chapter are discussed and related to the quantitative findings described above.

Making a concrete appeal: more attention, 'more' pain

The registration of the intensity of pain should facilitate the treatment of pain. The attention devoted to pain in the interdisciplinary process is increasing. Pain is becoming a topic that is easier to talk about. In addition, the pain on the ward seemed to be increasing because more pain was reported. It can be assumed that this was not really the case, but that patients simply mentioned their pain more often because they were so explicitly asked about it at least twice a day. This 'side effect' of pain registration is also described in the study by De Rond *et al.* (2000b) on the introduction of pain registration at five other hospitals in the Netherlands. In the end though, the idea is to turn pain that is concealed or simply not talked about into something that can be openly discussed and treated as much as possible. This makes an appeal to the various professionals involved, particularly to the nurse as the patient's advocate. In the end, this was in keeping with the increasing aim-oriented configuration score that the ward clearly had, as is evident from the measurements that were carried out. In order to be able to work in an aim-oriented fashion, it is necessary to have insight into the underlying causes and a diagnosis (Van Zelm & Eliens, 2000). An increase in the amount of information on pain, increasing attention and targeted tasks on the properties of each individual's pain, can help to cope with it. Insight into a patient's pain score can enhance the control, as is desirable in an aim-oriented configuration.

Measured but not improved: not our fault

Although it is related to the first theme, this issue is dealt with separately. A continuing high pain score frustrates the parties involved. Interventions to alleviate the pain are not always at hand. People wonder what the purpose is. Not measuring the pain means sticking your head in the sand because it does not reduce the pain. And measuring the pain makes an appeal to the nursing care and the medical treatment, as is described above. In addition to the frustration, there is also the apology of the nurses as a professional group, implicitly holding the other parties responsible. Physicians are felt to be just ignoring the pain score and writing it off as nonsense, the patients themselves do not want anything extra for the pain, the colleagues would seem to accept the pain, the ward managers are not making enough resources available for innovation. These comments do not detract anything from the responsibility of the nurse to

devote attention to the underlying reasons for the pain and to describe the experiential expertise of the patient in the field of his pain. This requires perseverance and new interventions in the field of pain registration such as the use of a pain history.

Nurses and physicians focus on the latest diagnosis. The professional who wishes to see the patient holistically cannot overlook comorbidity. Pain is something that affects all aspects of life, including basic needs such as appetite and sleeping patterns. The effects on activities that are part of daily life and the meaning of life are directly associated with them.

The problem that can be observed here seems attributable to an internal focus, which is part of the group-oriented configuration that can be clearly recognized on the ward. Professionals seem to look for excuses not to have to see a patient's pain. This enables them to automatically accept complications. This is probably because they are not alien; the complications were there before the innovation and seem to be an everyday aspect of patient care. Not accepting a patient's pain requires a flexibility of structures on the ward and creativity on the part of the nursing and other disciplines involved. New paths have to be taken, new information sought. This requires space to develop, an external focus and flexibility. In the data collected in this study, this external focus can be increasingly recognized. The flexibility was and continues to be evident in the group-oriented configuration, which had the highest score in the preliminary as well as the follow-up measurement.

Accepting subjectivity: attention devoted to the individual experiencing of pain

Making patients' personal experience a central part of the care and treatment has regularly been a topic of discussion and special training at the hospital and in society. This requires a change in how professionals think and continuous alertness. The use of a pain score can play a role in this change. It invites professionals to devote attention to individuals and to how they are willing and able to function in their environment. Combating pain challenges professionals to work together with patients, who are the experience experts. It is clear from the literature that professionals and patients alike are faced with prejudices and a lack of knowledge in the field of pain and combating pain. It is also evident from the data collected for this study that special training should entail more than just a few hours of lectures with contributions from various experts. It did not really improve the depth layer of the configurations, in the group-oriented, development-oriented and rule-oriented configuration.

Regular disciplinary and interdisciplinary reflection with regard to pain management on the ward can make a contribution in this connection.

A development-oriented attitude was evident on the part of a number of the nurses from the focus group. Up to now, the obstacles perceived in this connection included a presumed lack of material support. Some of the nurses were willing to invest a certain amount of free time, but this did not enhance their motivation. The reluctance to stick out from the crowd can be seen as a group-oriented characteristic. Although development-oriented explicit values were clearly in evidence, operationalizing them was still not something that came automatically. Interventions on behalf of the implementation might focus on the depth layer. This would mainly pertain to political and cultural interventions. For example this concerns making people conscious of existing conceptions and neutralizing political processes and practicing with creative thinking. Human resource interventions such as special training and social support can underpin the learning processes. This clearly fits into the evolution strategy, which is mainly suitable if the innovation characteristics are not congruent with the depth layer on the ward.

Implications of the study

This study shows how Van Linge's contingency model can be applied in the practice of Dutch health care. Further comparative research is called for to see whether the strategic recommendations have an effect. The results of the study have been submitted for feedback to the Pain Knowledge Centre, which formulates the standard strategy for the implementation of pain registration. A limited investment of a congruence study into the characteristics of the ward and the innovation could prevent later frustration, and save time and money. Groene Hart Hospital has since had experience with the implementation and application of a congruence stipulation. And in fact a congruence stipulation is recommended for the further dissemination of the pain registration activities. In future research, pain registration might be introduced with as suitable a strategy as possible, following the analysis of the ward characteristics. In a sequel measurement, the congruence between the ward and the innovation can then be monitored, which can be expected to improve during an appropriate implementation course. Van Linge's contingency model is becoming increasingly valuable as a result of being applied in practice. The results of this study do not warrant refuting Van Linge's points of departure. The results of repeated studies with a similar design in a wide

range of settings will be able to confirm and expand what we know about strategic implementation.

Conclusions

This study was set up using Van Linge's contingency model to see whether the congruence between the innovation and the context increased or decreased after the implementation of pain registration at the Internal Oncology Ward of a regional hospital in the Randstad (urban agglomeration of the Netherlands). This implementation course was of a standard nature and had already been carried out under the supervision of the Rotterdam Pain Knowledge Centre at a number of hospitals in the Netherlands. In the end, the statistical significance of the research results was extremely limited. Perhaps this was because in the 4 to 6 months between the preliminary and the follow-up measurement, not enough had changed for there to be a statistically significant pattern. The data do nonetheless have a certain practical relevance because they provide insight into the effects of the implementation strategy on the ward and the innovation. Insight into the course of the congruence between the innovation and the context provides support for the results that were reached and instruments for continuing and safeguarding. Supplementing the measurements with information from the focus group has confirmed and enhanced the quantitative findings.

CHAPTER SEVEN: EVALUATION

In the course of the research process, the researcher was able to take advantage of many learning moments. Starting with the organizing and implementing process that kept pace with the design of the study, new and challenging situations unfolded. They continued to occur throughout the collection and processing of the data, the carrying out of the scientific analyses and the communicating of the results. By taking on these challenges, making mistakes and completing missions, the knowledge on implementing and implementation research was expanded. At the same time, there was a growing awareness that a great deal about successful implementation still needs to be explored and discovered.

Various comments can be made from a methodological and process perspective. At the design stage, the temporal and spatial constraints were already clear. A more longitudinal approach and the introduction of a control group would have enhanced the value of the results. A choice that proved its worth was the introduction of the qualitative component. It certainly expanded the insight into the results and required a different thinking dimension.

The researcher's lack of research experience had a detrimental effect on the distribution of the questionnaires in the preliminary measurement. The mistakes that were made affected the interpretation of the data about eight months later. One thing learnt from this was that all the collected data contributed towards the process being researched and it was necessary to clearly indicate where the data came from.

Judging from the time and energy it took the respondents to fill in the questionnaires, the conditions and organizing need to be better in the future. For example, it could be worthwhile holding a number of team meetings during working hours where information is provided about the questionnaires and there is time to fill them in. The researcher could be present to answer questions. There then might be fewer *neutral* answers to the questions. During the processing of the data, the suspicion arose that if the respondents found a question too difficult, they easily opted for a neutral answer. By selecting the respondents, it would be possible to influence the similar composition of the group at the time of the preliminary and the follow-up measurement.

In the questionnaires, there were no informative open questions for the nurses. They were included in the questionnaires for the head nurses and provided greater insight into the processes on the ward. The respondents themselves indicated that anonymous questionnaires might improve the response. Since the questions pertained to their own ward, people might feel they could not speak freely.

The focus group meeting was only a reflection of the intention of focus groups as described in the theory. They were designed to function in a series, so that the information from each meeting supplements the information from the others and can be analysed as a whole (Krueger & Casey, 2000).

Van Linge's contingency model (1998) is multi-faceted and fascinating. Only by applying it could the numerous possibilities for actual practice be recognized. The model digs deeply and it a concerted effort was needed to climb up afterwards to a bird's eye view. As far as we know, this was the first occasion at the Groene Hart Hospital that the factors influencing the implementation were described using Van Linge's contingency model, and that well-founded recommendations for continuity and safeguarding could be made on the basis of these. Further, attention will have to be devoted to integrating nursing science research into the practice of a general hospital. Up to now, it seems to be viewed as a luxury rather than as a necessity for safeguarding the quality of care.

REFERENCES

- Baarda, D.B., M.P.M. de Goede & C.J. van Dijkum (2003). *Basisboek Statistiek met SPSS*. Groningen/Houten: Stenfert Kroese
- Berdine, H.J. (2002). The Fifth Vital Sign, cornerstone of a new pain management strategy. *Disease Management Health Outcomes* 10, 3, 155-165
- Bookbinder, M., N. Coyle, M. Kiss, M. Layman Goldstein, K. Holritz, H. Thaler, A. Gianella, S. Derby, M. Brown, A. Racolin, M.N. Ho & R.K. Portenoy (1996). Implementing national standards for cancer pain management: program model and evaluation. *Journal of Pain and Symptom Management* 12, 6, 334-347
- Bouter, M. (2003). *Relaties tussen kenmerken van de context en kenmerken van het zorgdossier in teams met hoge en met lage implementatie effectiviteit*. Utrecht: MScN dissertation, Utrecht University
- Bouvette, M., F. Fothergill-Buorbonnais & A. Perreault (2002). Implementation of the pain and symptom assessment record (PSAR). *Journal of Advanced Nursing* 40, 6, 685-700
- Cameron, K.S. & R.E. Quinn (1999). *Diagnosing and changing organisational culture*. Reading, MA: Addison Wesley
- Closs, S.J., M. Briggs & V.E. Everitt (1999). Implementation of research findings to reduce postoperative pain at night. *International journal of Nursing Studies* 36, 21-31
- Comley, A.L. & E. DeMeyer (2001). Assessing patient satisfaction with pain management through a continuous quality improvement effort. *Journal of Pain and Symptom Management* 21, 1, 27-40
- Dalton, J.A., J. Carlson, J.D. Mann, W. Blau, S. Bernard & R. Youngblood (1998). An examination of nursing attitudes and pain management practices. *Cancer Practice* 6, 2, 115-124
- Damanpour, F. (1991). Organizational innovation: A meta-analysis of determinants and moderators. *Academy of Management Journal*, 34, 555-590
- Dassen, T.M.N. & F.M. Keunig (1998). *Lezen en beoordelen van onderzoekspublicaties*. Baarn: Intro
- Dellebeke, A. (1996). *Perceptie van innovatiekenmerken: de operationalisering van een contingentieconcept*. Utrecht: MScN dissertation, Utrecht University.
- Devine, E.C., S.A. Bevsek, K. Brubakken, B.P. Johnson, P. Ryan, M.K. Sliefert & B. Rodgers (1999). AHCPR clinical practice guideline on surgical pain management: adoption and outcomes. *Research in Nursing & Health* 22, 119-130
- Dingemans, W.A., N.H. Groenman, M. van Kleef & F.W. Vreeling (1999). *Pijn en pijnbehandeling*. Maastricht: Nederlandse Vereniging ter Bestudering van Pijn/Samenwerkende kenniscentra voor Pijn

Dufault, M.A., C. Bielecki, E. Collins & C. Willey (1995). Changing nurses' pain assessment practice: a collaborative research utilization approach. *Journal of Advanced Nursing* 21, 634-645

Dufault, M.A. & M. Sullivan (2000). A collaborative research utilization approach to evaluate the effects of pain management standards on patient outcomes. *Journal of Professional Nursing* 16, 4, 240-250

Du Pen, S.L., A.R. Du Pen, N. Polissar, J. Hansberry, B. Miller Kraybill, M. Stillman, J. Panke, R. Everly & K. Syrjala (1999). Implementing guidelines for cancer pain management: results of a randomized controlled clinical trial. *Journal of Clinical Oncology* 17, 1, 316-370

Fortner, B.V., T.A. Okon, J. Ashley, G. Kepler, J. Chavez, K. Tauer, M. Clements-Thompson, L. Schwartzberg, G. Demarco & A.C. Houts (2003). The Zero Acceptance of Pain (ZAP) Quality Improvement Project: evaluation of pain severity, pain interference, global quality of life, and pain-related costs. *Journal of Pain and Symptom Management* 25, 4, 334-343

Francke, A.L., J.B. Luiken, A.M.E. de Schepper, H. Huijter Abu-Saad & M. Grypdonck (1997). Effects of a continuing education program on nurses' pain assessment practices. *Journal of Pain and Symptom Management* 13, 2, 90-97

Genesis 4: 21 (2004) *De Nieuwe Bijbelvertaling*. Heerenveen: Uitgeverij Jongbloed

Gezondheidsraad (2000). *Van implementeren naar leren*. The Hague: Health Council of the Netherlands, publication no. 2000/18

Gordon, D.B. (1996). Critical Pathways: a road to institutionalizing pain management. *Journal of Pain and Symptom Management* 11, 4, 252-259

Gordon, D.B. & J.L. Dahl (2004). Quality improvement challenges in pain management. *Pain* 107, 1-4

Grol, R. (1999). 'Evidence based medicine' vereist 'evidence based' implementatie. *Tijdschrift voor Gezondheidszorgonderzoek* 77, 2, 117-119

Halfens, R.J.G. & R.H. van Linge (2003). Disseminatie en implementatie van kennis in de verpleegkundige en verzorgende praktijk. In: *State Of The Art-studie Verpleging en Verzorging; Eindrapportage*. Maarssen: Elsevier/LEVV/ZonMw

Harmer, M. & K.A. Davies (1998). The effect of education, assessment and standardised prescription on postoperative pain management. *Anaesthesia* 53, 424-430

Hulscher, M., M. Wensing & R. Grol (2000). *Effectieve implementatie, theorieën en strategieën*. The Hague: Zorgonderzoek Nederland/Werkgroep Onderzoek Kwaliteit, Radboud University Nijmegen, and University of Maastricht

Jadlos, M.A., G.B. Kelman, K. Marra & A. Lanoue (1996). A pain management documentation tool. *Oncology Nursing Forum* 23, 9, 1451-1452

- Janken, J.K. & M.A. Dufault (2002). Improving the Quality of Pain Assessment Through Research Utilization. *The Online Journal of Knowledge Synthesis for Nursing*, doc. no. 2C
- Jou, D. & R. Shane (2001). Meeting the JCAHO challenge for improving pain management: the Cedars-Sinai approach. *Journal of Pharmaceutical Care in Pain & Symptom Control* 9, 3, 7-35
- Klazinga N. & P. van Splunteren (2003). Veranderend denken over implementatie In: *In Zicht, nieuwe wegen voor implementatie*. Assen: Koninklijke Van Gorcum/ZonMw
- Kitson, A.L., G. Harvey & B. McCormack (1998). Enabling the implementation of evidence-based practice: a conceptual framework. *Quality in Health Care* 7, 3, 149-158
- Koenen, M.J., J.B. Drewes & W.T. de Boer (1992). *Wolters' woordenboek Nederlands Koenen*. Groningen: Wolters-Noordhoff.
- Koppes, J. (2004). *Voorspelt de congruentie tussen de kenmerken van de innovatie en de afdelingsconfiguratie de mate van adoptie?* Utrecht: MScN dissertation, Utrecht University
- Krueger, R.A. & M.A. Casey (2000). *Focus Groups; a practical guide for applied research*. Thousands Oaks: Sage Publications
- Laan, B. van der (2002). *De implementatie van een coachende stijl van leidinggeven op verpleegunits in een ziekenhuis*. Utrecht: MScN dissertation, Utrecht University.
- Lai, Y.-H., S.-L. Guo, F.J. Keefe, S.-L. Tsai, C.-C. Chien, Y.-C. Sung & M.-L. Chen (2004). Effects of brief pain education on hospitalized cancer patients with moderate to severe pain. *Supportive Care in Cancer* 12, 645-652
- Linge, R. van (1998). *Innoveren in de gezondheidszorg*. Maarssen: Elsevier/De Tijdstroom
- Linge, R. van (2002). *Ontwikkeling van een meetinstrument*. Utrecht: intern document onderzoekslijn 'Invoering verpleegkundige innovaties'
- Mac Lellan, K. (2004). Postoperative pain: strategy for improving patient experiences. *Journal of Advanced Nursing* 46, 2, 179-185
- Morse, J.M. & P.A. Field (1996). *Nursing Research, the application of qualitative approaches*. Cheltenham: Stanley Thornes
- Parie, P. (1992). *Nursing technology and organizational structure of nursing wards in a general hospital*. Utrecht/Cardiff: MScN dissertation, Hogeschool Midden Nederland/University of Wales
- Polit, D.F. & B.P. Hungler (1999). *Nursing Research; Principles & Methods*. Philadelphia: Lippincott
- Poslowsky, I.E. (2003). *De implementatie van richtlijnen voor agressiehantering in de psychiatrie: onderzoek naar de kenmerken van innovatie en organisatie volgens de perceptie*

van gebruikers van richtlijnen voor agressiehantering op de afdelingen Psychiatrie van het Universitair Medisch Centrum Utrecht. Utrecht: MScN dissertation, Utrecht University

Quinn, R.E. & J. Rohrbaugh (1981). A competing values approach to organizational effectiveness. *Public Productivity Review* 5, 122-140

Rischer, J.B. & S.B. Childress (1996). Cancer Pain Management: pilot implementation of the AHCPR guideline in Utah. *Journal on Quality Improvement* 22, 10, 683-700

Rogers, E.M. (1995). *Diffusion of innovations*. New York: The Free Press

Rond, M.E.J. de, R. de Wit, F.S.A.M. van Dam, B.T.M. van Campen, Y.M. den Hartog, M.A. Klievink, M.B. Nieweg, A.M. Noort, M.J. Wagenaar & B.A. van Campen (1999). Daily pain assessment: value for nurses and patients. *Journal of Advanced Nursing* 29, 436-444

Rond, M.E.J. de, R. de Wit, F.S.A.M. van Dam, B.T.M. van Campen, Y.M. den Hartog & M.A. Klievink (2000a). A Pain Monitoring Program for nurses: effects on nurses' pain knowledge and attitude. *Journal of Pain and Symptom Management* 19, 457-467

Rond, M.E.J. de, R. de Wit, F.S.A.M. van Dam & M.J. Muller (2000b). A Pain Monitoring Program for nurses: effects on communication, assessment and documentation of patients' pain. *Journal of Pain and Symptom Management* 20, 424-439

Rond, M.E.J. de (2001). *Pain from zero to ten; effects of a pain monitoring program for nurses*. Amsterdam/Amersfoort: Thesis, University of Amsterdam

Rond, M. de, R. de Wit & F. van Dam (2001a). The implementation of a Pain monitoring Programme for nurses in daily clinical practice: results of a follow-up study in five hospitals. *Journal of Advanced Nursing* 35, 4, 590-598

Rond, M.E.J. de, F.S.A.M. van Dam, G. Barkmeijer, W.H. Oldenmenger & R. de Wit (2001b). *Pijn van nul tot tien: handleiding voor implementatie van pijnregistratie* Amsterdam/Rotterdam: Nederlands Kanker Instituut/Pijkenniscentrum

Rushton, P., D. Eggett & C.W. Sutherland (2003). Knowledge and attitudes about cancer pain management: a comparison of oncology and nononcology nurses. *Oncology Nursing Forum* 30, 5, 849-855

Rycroft-Malone, J., A. Kitson, G. Harvey, B. McCormack, K. Seers, A. Titchen & C. Estabrooks (2002). Ingredients for change: revisiting a conceptual framework. *Quality of Safe Health Care* 11, 174-180

Twycross, A. (2002). Educating nurses about pain management: the way forward. *Journal of Clinical Nursing* 11, 705-714

Ven, A.H. van de & D.L. Ferry (1980). *Measuring and assessing organisations*. New York: Wiley

Weissman, D.E., J. Griffie, S. Muchka & S. Matson (2000). Building an institutional commitment to pain management in long-term care facilities. *Journal of Pain and Syptom Management* 20, 1, 35-43

Wit, R. de, F. van Dam, A. Vielvoye-Kerkmeer, C. Mattern, H. Huijer Abu-Saad (1999). The treatment of chronic cancer pain in a cancer hospital in the Netherlands. *Journal of Pain and Symptom Management* 17, 5, 333-350

Woerkom, C. van & L. Adolfse (1998). Interactieve kennisontwikkeling en –benutting. *SI*, 1, 10-19

Zelm, R.T. van & A.M. Eliens (2000). *Verpleegkundige besluitvorming*. Dwingeloo: Uitgeverij KAVANAH

ZorgOnderzoek Nederland (1997). *Met het oog op toepassing. Beleidsnota Implementatie 1997-1999*. The Hague: ZON

APPENDICES