

**From improved implementation diagnostics to  
a more tailored implementation strategy**

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## **Abstract**

**Background:** Implementation diagnostic is based on a team-based analysis. Individual and subgroup characteristics within a nursing department are ignored. Including a subgroup-based analysis in the implementation diagnostic can lead to a more tailored implementation strategy.

**Aims/RQ:** This study tested the combination of team-based analysis with a subgroup-based analysis within the implementation diagnostic of the IC model of van Linge for the implementation of the guideline “education cva patients and caregivers”. The research questions were: (I) Which fits or misfits between characteristics of innovation, subgroup or team, at the neurology ward of a general hospital, come forward using the quantitative implementation diagnostics with subgroup and team analysis? (II) How do the different subgroups and team learn at the neurology department according to the team-learning questionnaire? (III) What are the differences in attitude towards the guideline between the different subgroups at the neurology department according to the questionnaire innovation attitude?

**Methods:** A cross-sectional study was conducted. All registered nurses at the neurology department were included.

**Results:** Four subgroups were defined: team, stroke, learning, - and workplace and rotation. All subgroups were in the rules-oriented configuration, except the learning, - and workplace, which was in the team-oriented configuration. All subgroups learned through pooled learning and there was no significant difference in attitude towards the guideline, between subgroups.

**Conclusions:** This study shows that including a subgroup-based analysis can be an asset within the implementation diagnostic, leading to a more tailored implementation strategy.

**Implications/recommendations:** Further research should focus on the effect of a subgroup-based analysis on the implementation outcomes and studies should be conducted to research the theory behind adding a subgroup-based analysis to the IC model. Studies should be conducted with bigger samples to show the effect of a subgroup-based analysis on implementation diagnostics.

**Key words:** Implementation, subgroups-based analysis, nursing innovations, cva, IC model

## **Samenvatting (Dutch summary)**

**Inleiding:** De implementatie diagnostiek voor het implementeren van innovaties is gebaseerd op een team-analyse. Individuele en subgroep karakteristieken worden genegeerd. Het toevoegen van een subgroep-analyse in de implementatie diagnostiek kan leiden tot een meer op maat gemaakte implementatie strategie.

**Doel/onderzoeksvraag:** Deze studie heeft de combinatie van een team,- en subgroep-analyse binnen de implementatie diagnostiek van het IC model van van Linge getest voor het implementeren van de richtlijn: “voorlichting cva patiënten en zorgdragers”.

De onderzoeksvragen waren: (I) Welke fit of misfits tussen de karakteristieken van de richtlijn, subgroepen en team komen naar voren op de neurologie afdeling met het gebruik van kwantitatieve implementatie diagnostiek met de subgroep,- en team-analyse? (II) Wat is de manier van leren van de verschillende subgroepen en team volgens de teamleren vragenlijst? (III) Wat zijn de verschillen in attitudes tussen de subgroepen tegenover de richtlijn volgens de innovatie-attitude vragenlijst?

**Methode:** Een dwarsdoorsnede studie was uitgevoerd. Alle verpleegkundigen van de afdeling waren geïncludeerd.

**Resultaten:** Vier subgroepen waren gedefinieerd: team, stroke, leerwerkplek en roulerende verpleegkundigen. Alle subgroepen zaten in de regelgerichte configuratie, behalve de leerwerkplek, deze zat in de teamgerichte configuratie. Alle subgroepen leren volgens gepoold leren en er was geen significant verschil in attitude tussen de subgroepen tegenover de richtlijn.

**Conclusie:** Deze studie toont aan dat het toevoegen van een subgroep-analyse een aanwinst kan zijn voor de implementatie diagnostiek van het IC model, leidend tot een meer op maat gemaakt implementatie strategie.

**Aanbevelingen:** Er moet onderzoek gedaan worden naar het effect van een subgroep-analyse op de implementatie uitkomsten. Tevens moet er onderzoek gedaan worden naar de theorie achter het toevoegen van een subgroep-analyse in het IC model. Studies met grotere samples zullen moeten worden uitgevoerd om het effect van een subgroep-analyse goed te testen.

**Sleutel woorden:** Implementatie, subgroep analyse, verpleegkundige innovaties, cva, IC model

## Introduction and rationale

It takes an average of 17 years for nursing innovations to reach the clinical practice (1). No wonder the implementation of innovations is a hot item.

Rogers (2003) describes an innovation as: “an idea, practice, or object that is perceived as new by an individual or other unit of adoption”. Four elements are important to spread a new idea: the innovation itself, communication channels, time, and a social system (2). To implement an innovation, an implementation strategy must be used.

A systematic review to the effectiveness of strategies to implement innovations shows that a combination of implementation strategies is more effective than a single strategy (3). The combination of strategies received more attention in recent years. Implementation strategies are the most effective when they address the most important determinants of practice for improvement in the targeted setting (4). A review of Baker (2010) showed that tailored implementation strategies could change the professional practice in a positive way, although there is not enough evidence for the most effective way of tailoring (5).

Several studies showed that misfits between innovation characteristics and characteristics of the context of implementing (persons, team, organisation, external surroundings) are powerful predictors of implementation success. In recent years, studies have been conducted to research tailored implementation strategies based on misfits between innovation and context (6) (7) (8) (9).

Patient problems get increasingly complex (10), so future research will aim at developing and testing tailored implementation strategies for complex nursing innovations. Most innovations have a hybrid and dynamic character and they demand higher standards of users and organisation (11).

In recent implementation studies (12) (13) (14) an inventory of facilitating factors for tailored implementation is made. With these factors, a theoretical based implementation framework is developed to implement innovations.

A much used theoretical framework for implementation is “the innovation contingency model (IC model)” of van Linge (15).

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### Insert Table 1

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The IC model focuses on the configuration characteristics of an organisation, the individuals, the setting and the innovation itself. This model will determine a degree of fit between these characteristics. When a (mis)fit is stated, the implementation process can start, consisting the choice for a certain implementation strategy, the development of the strategy and the execution of the strategy.

To determine a fit between innovation and the implementation context, implementation diagnostics have to be conducted.

Current diagnostics of the IC model strongly focus on team and innovation characteristics. To determine individual, team and innovation characteristics several questionnaires were developed (16). With these questionnaires a degree of internal and external fit can be determined between innovation, individuals and targeted department, the degree of team learning and the attitude towards an innovation.

To determine a degree of internal and external fits between innovation, individual and team characteristics, team learning and innovation attitude, scores of the questionnaires are analysed. A mean is taken of all scores and based on this mean an internal or external fit is determined, according to the interpretation guidelines. Although this is a potential good overview of team and innovation fit, all outliers in the scores are ignored. By taking the mean of all scores, outliers are being weakened by the average of all results. Also the individual characteristic of an outlier is hard to determine with only questionnaires. Conducting implementation diagnostics with only questionnaires gives a very static view of the individual and team characteristics and how they interact mutually.

### **Problem statement**

A consequence of team-based implementation diagnostic is that “powerful” individual outliers or subgroups are ignored. Within nursing teams, there are nurses with different skills, experiences, values and norms (17). To have an overview about the dynamics within a team, individuals with different perceptions about the innovation or team should be included in the implementation diagnostics. Subgroups should be determined containing nurses with similar ideas about innovation and implementation. Also nurses working at different units at a department can have different ideas and perceptions about an innovation (18). These subgroups can differ from the team average. To analyse subgroups within a team, the existing interpretation guideline of the quantitative questionnaires must be redefined. The questionnaires will stay identical but the interpretation guideline will be adapted. The refinement of the quantitative implementation diagnostic will combine the normal team analysis with the analysis of individuals and/or subgroups with different perception of the innovation or implementation.

A previous unsuccessful implementation of the guideline: “education cerebro vasculair accident (cva) patients and caregivers” was conducted at a neurology department (19). The current study will continue the implementation of this guideline, using the quantitative implementation diagnostics with the interpretation guideline consisting the team and subgroup analysis.

## **Objectives**

The aim of this study is to develop and test the combination of team scores with individual or subgroup scores within the implementation diagnostics of the IC model for the implementation of the guideline: “education cva patients and caregivers”. This study is part of a bigger mixed method study, with the purpose to create a more effective tailored implementation through refining the implementation diagnostics.

## **Research questions**

- Which fits or misfits between characteristics of innovation, subgroup or team, at the neurology ward of a general hospital, come forward using the quantitative implementation diagnostics with the subgroup and team analysis?
- How do the different subgroups and team learn at the neurology department according to the team-learning questionnaire?
- What are the differences in attitude towards the guideline between the different subgroups at the neurology department according to the questionnaire innovation attitude?

## **Method**

### **Design**

To answer the research question, a cross-sectional study was conducted. A cross-sectional study was chosen because the data was collected with questionnaires from a population at one specific point in time. There was no manipulation of the population environment and different subgroups within the population were compared at one certain point in time (20).

Ethics committee approval was obtained from the Medical Ethical Review Committee (in Dutch; METC) of the University Medical Centre (UMC) Utrecht. No ethical approval was needed.

### **Participants**

The study was conducted at a neurology ward in a general hospital in the Netherlands. All registered nurses (RN) who met the inclusion criteria were approached to participate in the study and included using a consecutive sampling method (21). The inclusion criteria were: RN working at the neurology department and >18 years. Exclusion criteria were: RN who worked less than two months at the neurology department, because they might not know the general process at the ward yet. For the same reasons, students, trainees and flex workers were also excluded from this study. All RN (n=31) were informed, verbally, written and by posters, about the purpose of the study and the confidentiality of their data. Participants filled in the questionnaires anonymously. The socio-demographic data that was collected were: gender, age, educational level and employment full-time or part-time.

### **Guideline “education cva patients and caregivers”**

A review conducted in 2011 stated that patients and caregivers have many unmet education needs concerning various issues that are specific to the various recovery phases after stroke (22). Following the results of this review, the previous conducted study developed a guideline for educational interventions for caregivers and patients. At the neurology department, this guideline was distributed to patients in form of leaflets.

### **Data collection**

Data were collected between January and March 2015. Socio-demographic data were given in written by the department manager. Self-reported data from RN were collected concerning departmental characteristics data, innovation characteristics data, team learning data and innovation attitude data. The neurology department was divided in three subgroups, based on the information acquired from two coordinators, practical trainer of nursing students and a member of the project group from the previous conducted study. This method of dividing is used for this study especially and is not an existing and familiar way of dividing a department into subgroups. Allocating participants in the subgroups was based on self-report of the RN.



RN ticked a box on every questionnaire in which unit they are working at least 80% of the time.

### **Implementation diagnostic questionnaires**

The perceived innovation characteristics questionnaire (WIK) ( $\alpha = 0.70-0.75$ ) and perceived department characteristics questionnaire (WAK) ( $\alpha = 0.71-0.78$ ) consist of 24 questions together and the scores are put in an interpretation plan. The scores are based on a five-point likert scale (from 'totally disagree' to 'totally agree'). The questionnaires have four subscales:

1. Team-oriented configuration
2. Development-oriented configuration,
3. Rules-oriented configuration,
4. Goal-oriented configuration (23)

The innovation attitude questionnaire (IAQ) consists of 21 questions. A five-point likert scale (from 'totally disagree' to 'totally agree') is used. The questionnaire consists of five subscales ( $\alpha = 0.76-0.87$ ), which measures the degree of: complexity; trialability; compatibility on operational level; compatibility on goals and values of the nurses and the relative advantage of the innovation (24). Criterion validity of this instrument is shown by Hafsteindottir et al. (25).

The team-learning questionnaire (TLQ) is a validated questionnaire consisting of 16 items with a 7-point likert scale (26). The outcomes of the TLS are defined in three categories: fragmented learning (score 16-68), pooled learning (score 69-80) and synergetic learning (score 81-112) ( $\alpha = 0.89$ ) (27).

### **Procedure**

#### *Stage one:*

The quantitative and qualitative study started simultaneously with establishing a project group. The aim of the project group was to determine the different subgroups at the department. A project group was formed with two coordinators, practical trainer and a RN. Two members were of the previous conducted study. The project group reached a consensus about subgrouping the department. In total four subgroups were selected. Every Friday the project group discussed progress and barriers. Two posters hang in the department about the purpose and method of the study. A presentation was given during two Fridays to inform all RN.

### *Stage two:*

From 16 of January the distribution of the questionnaires started. Questionnaires were printed and put in all inboxes of the RN. An email was sent to inform the data collection started. One coordinator kept an overview about the progress. After three weeks, because of the low respond rate, all questionnaires were printed out again and given to the RN personally. One coordinator got the task to hand out the questionnaires personally to all RN, who were working during the week or weekend. After six weeks the respond rate was still low, but equally with the previous study. In agreement with the study leader, the recruitment stopped after six weeks due to a time limit.

### *Stage three:*

After the analysis of the questionnaires, a mutual implementation intervention plan was developed as an example for future implementation combining the results of the qualitative and quantitative study. The implementation plan was presented to the project group.

### **Data analysis**

Descriptive statistics were used to describe the socio-demographic data. Frequencies and percentages were presented for discrete data, mean and standard deviation for interval data.

For the WIK and WAK questionnaires, the scores of the individual items were computed to a mean score. The mean scores were put in the interpretation table (table 2).

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Insert Table 2

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First, the scores were aggregated from an individual level to a team level. Secondly, the scores were aggregated from an individual level to a subgroup level using the split file option in SPSS.

An innovation or organisation internal fit was present if the mean scores were 4.0 or higher in one configuration. An organisation-innovation external fit was present when the mean scores are 4.0 or higher of both innovation and organisation in one configuration.

For the TLQ, the individual scores were added together to a sum of the scores. First based on a team level, secondly, on a subgroup level.

For the IAQ, the individual scores were computed to a mean score. Next, the mean scores were aggregated to subscale values. First, the subscale values were aggregated from individual level to a team level. Secondly, from an individual level to a subgroup level using the split file in SPSS. To test normality a Shapiro-Wilk test was conducted (28).

An independent Mann Whitney U-test was used to calculate differences in attitude towards the guideline between the different subgroups and to indicate a significant effect. A Mann

Whitney U-test was performed because of the small samples and the lack of some normal distributed samples (29).

All data was analysed using SPSS version 22. The statistical significance level was set at a p-value of <0.05. There was no missing data.

## Results

### Participants

The subgroups were: RN from the stroke unit, learning and work unit (lwp), RN who rotate between units (rotation) and team. Team are all units together (figure 1).

A total of 31 RN were approached. Six weeks past approaching, 14 RN returned the questionnaires (45%).

Table 3 shows the socio-demographic characteristics of the RN at the neurology department.

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Insert Figure 1

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Insert Table 3

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### Questionnaires

#### *WIK and WAK questionnaires*

##### Team

There was no internal fit for departmental characteristics. The operational features and explicit values (policy) scored the highest for the team-oriented configuration (respectively 3.86 and 3.71). The basic assumption (departmental vision) scored the highest for the rules-oriented configuration (3.5).

There was no internal fit for the innovation characteristics. The operational features and the explicit values scored the highest for the rules-oriented configuration (respectively 3.0 and 3.5), the basic assumption scored the highest for the development-oriented configuration (3.21).

### Stroke

No internal fit was achieved for departmental characteristics. The operational features, explicit values and basic assumptions scored equally high on both team-oriented and rules-oriented configurations (respectively 3.67, 3.33 and 3.67).

No internal fit was achieved for innovation characteristics. The highest score on operational features was for the rules-oriented configuration (3.33), the highest score for explicit values was for the team-oriented configuration (3.67) and the highest score for basic assumptions was for the development-oriented configuration (3.33).

### LWP

No internal fit for departmental characteristics. The highest score for operational features was for the development-oriented configuration (4.0). Both explicit values and basic assumptions scored the highest for the team-oriented configuration (respectively 4.0 and 4.0).

No internal fit was achieved for the innovation characteristics. The highest score for operation features was for the team-oriented configuration (3.67), explicit values for the rules-oriented configuration (3.67) and basic assumptions for the development-oriented configuration (3.67).

### Rotation

No internal fit for the departmental characteristics. Operational features and explicit values scored the highest for the team-oriented configuration (respectively 4.0 and 3.75). Basic assumptions scored the highest for the both team, - and rules-oriented configuration (3.5).

No internal fit for the innovation characteristics. Operational features and basic assumptions scored the highest for the rules-oriented configuration (respectively 3.0 and 3.25). Explicit values scored the highest for the result-oriented configuration (3.63).

The subgroups achieved no internal fit, so naturally no external fit was present between innovation and departmental characteristics. The decision rules of the IC model prescribe that a consensus strategy must be chosen. The purpose of the consensus strategy is configuration development.

Figure 2 and 3 show the most fitting configuration according to the decision rules of van Linge. Although there were no internal fits, the highest scoring or most fitting configurations were chosen.

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Insert Figure 2

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Insert Figure 3

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### *TLQ*

All subgroups learn through pooled learning.

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Insert Figure 4

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### *IAQ*

The scores of the IAQ were low to high. The LWP, rotation and team scored low on complexity (respectively 2.57, 2.34 and 2.54). The stroke scored low on try-out options (2.44). The scores were high for compatible targets, especially for the stroke, rotation and team (respectively 3.78, 4.14 and 3.88).

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Insert Table 4

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The Mann Whitney U-test showed no significant difference between the subgroups with respect to subscales of the innovation attitude questionnaire.

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Insert Table 5

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### **Strategy**

As an extra for the department an example implementation strategy was defined with results of this study and the results of the unpublished qualitative study of A. Mordhorst (2015). The strategy will target the refinement of the guideline and the implementation at the stroke unit. This example strategy only applies to the stroke unit. For example the LWP is in a different configuration, so naturally it needs a different strategy.

The stroke unit is in the rules-oriented configuration and the guideline needs a rules-oriented configuration, however there is no strong fit between the guideline and stroke unit. The purpose of the strategy is developing a stronger rules-oriented configuration for innovation and organisation, to establish a stronger internal and therefore external fit. The predefined strategies of van Linge show that in a rules-oriented environment a linear process is key (15). Figure 5 shows the strategy schematically.

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Insert Figure 5

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The project group consisting of nursing students and RN will refine the guideline. RN students started at the neurology department in February 2015. To combine learning and practice, the RN students will conduct the literature study for the adaption of the guideline with the guidance of neurology RN. Once the project group reaches consensus about the content of the guideline, a pilot study will be conducted to implement the guideline at the stroke unit. Table 6 shows the implementation interventions.

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Insert Table 6

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## Discussion

The main findings of this study showed that conducting implementation diagnostics including a subgroup analysis could be an asset when implementing an innovation. Although there was no explicit internal fit for one of the four configurations, the subgroup analysis made it clear that the lwp was in a different configuration than the rest of the department. This is important when implementing the guideline at the lwp at a later stage. Instead of a team-based implementation strategy, a subgroup-based strategy focuses more on the different characteristics of subgroups within a department.

The TLQ shows an “island” culture at the neurology department. There is no team-learning environment at this moment.

For IAQ, no significant difference was measured between the different subgroups and that shows an agreement in attitude towards the guideline. Main result is the high scores of the compatible targets, which means that the guideline fits in general with the patients at the neurology department.

A combination of a quantitative and qualitative implementation diagnostics is a great asset when implementing an innovation. The quantitative diagnostic gives a static but useful framework about department orientation and innovation perception. The combination of both quantitative and qualitative diagnostics gives an overview about the nurses’ perceptions, behaviour, norms and values towards innovation and implementation. These findings are in line with the review that stated that the implementation of guidelines is a form of healthcare professional behaviour change. To identify facilitators and barriers for appropriate behaviour change, this review analysed quantitative and qualitative data (30).

Using a theoretical framework with a subgroup analysis for tailored implementation is useful. The IC model shows misfits between the guideline characteristics, the department characteristics and the characteristics of different subgroups within the department. A more tailored implementation strategy can be developed for the different subgroups within a department. These findings are in line with the findings of van Butler et al. (2015). That study provides tools to: “identify vaccine hesitant population subgroups; diagnose their demand- and supply-side immunization barriers and enablers; and design evidence-informed responses to hesitancy appropriate to the subgroup setting, context and vaccine”. With that tool they developed tailored immunization programmes (TIP) for the different world health organisation (WHO) countries (31). In regards to this study, it shows that different subgroups need different approaches and strategies. The method of this study to include a subgroup-analysis is in contrast to the implementation studies, which were conducted recently. A review of Baker et al. (2015) to the most effective way of tailoring, reviewed 32 studies, which

none of the studies included a subgroup-analysis (32). Recent study shows that including a subgroup-analysis can be an asset for implementation diagnostics.

Recruitment and using questionnaires for implementation diagnostics were problematic in the daily practice. Most frequent complaints were: questionnaires were too long, too difficult, too abstract and no time. These barriers are confirmed by the low recruitment rate (48%) of the previous conducted study (19) and a study that measured clinicians recruitment rate and questionnaire completion rate prior to a Randomised Controlled Trial (RCT). The result of this study was a recruitment rate of 63%. The conclusion was that recruitment of clinicians and nurses should be optimized when using questionnaires (33).

The strength of this study is the use of a theoretical framework for implementation diagnostics. The use of validated questionnaires increases the internal validity of this study. The chosen implementation strategy, which will be conducted after this study, has active and multifaceted aspects, which are supported by the findings of Prior et al. (2008) (34).

In addition to the benefits of this study there were also some limitations. The low sample rate made it difficult to generalise the results to a larger population. Also the low sample rate can cause an unreal overview of the neurology department, because the majority of the nurses were not included. The difficulties of some RN when filling in the questionnaires could lead to response bias (35), which can lead to an analysis based on wrong answers. Also some questions referred to the previous conducted study, which could lead to wrong answers caused by recall bias (36). Also dividing the department into subgroups was based on convenience instead of theory.

This study originally started as an implementation study with a pre- posttest design. The lack of a suitable guideline changed this study in an implementation diagnostics study with a detailed implementation plan as a result. So the effect of including a subgroup-analysis on the short-term implementation outcomes was not tested in this study.

## **Conclusion**

Conducting an implementation diagnostic according to the IC model with a team and subgroups analysis shows to be promising. Outcomes of different groups and how they relate to each other, makes it easier to understand how nurses and groups interact mutually at a hospital department. A tailored implementation strategy can be more tailored when it is targeting the different groups within a department.

## **Implications and recommendations**

The current study can be used to conduct a more detailed implementation diagnostic leading to a better-tailored implementation strategy.



Future research should focus on the development of a protocolled implementation diagnostic with a combination of questionnaires with semi-structured interviews. A study should research the theory behind including a subgroup-analysis in the IC model. At this moment there is no theory available, to support the idea that a subgroup-analysis can be an asset to implementation diagnostics and the IC model. Also a study must focus on how to divide a department into subgroups: (I) dividing based on different units within a department or (II) based on the scatter of data after the data collection. An effect study must be conducted to support the hypothesis that including a subgroup analysis will increase the success of implementation.

Also research should focus on the diagnostic questionnaires, to make them more practical and easier to use in the daily practice. This should increase response.

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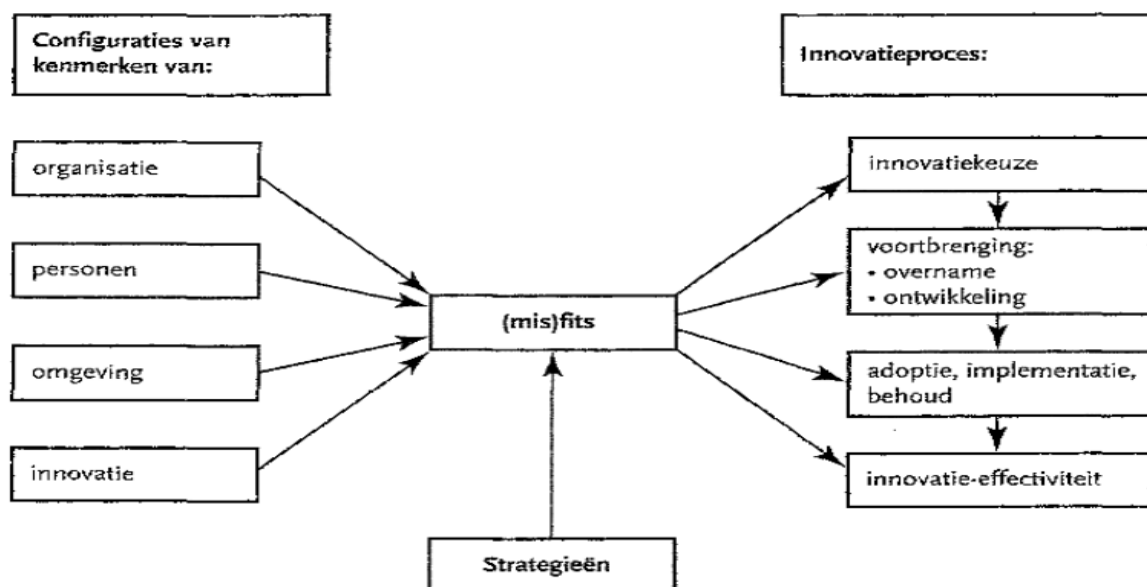
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## Tables and figures

**Table 1: contingency model of van Linge**

### *Theoretical foundation of The Innovation Contingency model of van Linge*

1. The configuration approach: emphasis the combination of the characteristics of organisation, innovation, persons, external environment or a combination of previous in relation to innovation.
2. Theories of system stratification: a distinction between three layers is made; the operational layer, the explicit values layer and the layer of basic beliefs. The stratification also applies to innovations. The three layers are recognisable within an innovation as; the operational layer, when an innovation is "in action"; the explicit values layer as the goals you want to achieve with the innovation and the layer of basic beliefs as what beliefs are underlying to an innovation. When these three layers fit, the innovation is called a configuration.
3. Strategy contingency approach with respect to change and innovation within an organisation. This approach suggests that there is not a golden standard of innovating, but that there are several possibilities which all can be effective, but under different circumstances.



### The innovation contingency model of van Linge (2006)

#### **Four configurations**

A configuration is a system with a consistent totality of characteristics. The foundation of configuration is shaped by basic beliefs. Two dimensions with both two opposites are

distinguished: relation-dimension; control versus flexibility and orientation-dimension; internal versus external orientation (37).

When the two dimensions are combined, a typology of systems based on basic beliefs is made:

1. Team-oriented configuration: flexibility and internal orientation; has values like cohesion, bonding, support and development of human potential.
2. Development-oriented configuration: flexibility and external orientation; has values like innovating, taking risks, growth and exploit opportunities.
3. Regulation-oriented configuration: control and internal oriented; has values like stability, uniformity, security and obedience.
4. Goal-oriented systems: control and external oriented; has values like expediency, productivity, purposefulness and competitiveness.

**Table 1: Theoretical foundations of the IC model**

**Table 2: interpretation table**

<b>Team oriented</b>		<b>Development oriented</b>	
<b>Innovation</b>	<b>Organisation</b>	<b>Innovation</b>	<b>Organisation</b>
3 O	15 O	4 O	16 O
7 EW	19 EW	8 EW	20 EW
11 B	23 B	12 B	24 B
<b>Rules oriented</b>		<b>Result oriented</b>	
<b>Innovation</b>	<b>Organisation</b>	<b>Innovation</b>	<b>Organisation</b>
1 O	13 O	2 O	14 O
5 EW	17 EW	6 EW	18 EW
9 B	21 B	10 B	22 B

**Table 2: Interpretation table according to van Linge. Numbers correspond with questions.  
O: operational features  
EW: explicit values  
B: basic assumptions**

**Table 3: socio-demographic data**

	<b>Team (n=31)</b>	<b>Stroke (n=10)</b>	<b>LWP (n=5)</b>	<b>Rotation (n=16)</b>
<b>Gender</b>				
Female	30 (96.8%)	10 (100%)	5 (100%)	15 (93.8%)
<b>Age (years)</b>				
Mean (SD; range)	42.3 (9.9; 28-61)	45.7 (7; 36-60)	36.8 (11.1; 29-55)	41.8 (10.8; 28-61)
<b>Educational level</b>				
Bachelor degree	19 (61.3%)	8 (80%)	3 (60%)	8 (50%)
Missing	8 (25.8%)			8 (50%)
<b>Employment</b>				
Part-time	30 (96.8%)	10 (100%)	5 (100%)	15 (93.8%)

**Table 3:** Socio-demographic characteristics of RN. Values are n (%)  
*LWP: Learning and Working Place*

**Table 4: innovation attitude questionnaire scores**

<b>Subscale</b>	<b>Mean Team (n=14)</b>	<b>Mean Stroke (n=3)</b>	<b>Mean LWP (n=3)</b>	<b>Mean Rotation (n=8)</b>
<b>Complexity</b>	2.54 (1.43-3.71)	3.05 (2.00-3.71)	2.57 (2.29-2.86)	2.34 (1.43-3.14)
<b>Comparative Advantage</b>	3.10 (2.25-4.00)	3.08* (3.00-3.25)	2.92 (2.25-3.25)	3.19 (2.25-4.00)
<b>Try out Options</b>	3.07 (1.33-4.00)	2.44 (1.33-3.67)	3.11 (2.00-4.00)	3.29* (2.00-4.00)
<b>Operational Compatibility</b>	3.46* (2.00-4.00)	3.33* (3.25-3.50)	3.50 (3.00-4.00)	3.50* (2.00-4.00)
<b>Compatible Targets</b>	3.88 (2.67-5.00)	3.78* (3.67-4.00)	3.33 (2.67-4.00)	4.13 (3.33-5.00)

**Table 4:** Team and subgroups outcomes of the innovation attitude questionnaire. Shown are the mean scores and score ranges.

\* No normal distribution according to the Shapiro-Wilk test.  
*LWP: Learning and Working Place*



**Table 5: innovation attitude scores comparison**

<b>Subscale</b>	<b>Stroke vs. LWP (p-value)</b>	<b>Stroke vs. Rotation (p-value)</b>	<b>LWP vs. Rotation (p-value)</b>
<b>Complexity</b>	0.513	0.215	0.410
<b>Comparative Advantage</b>	0.513	0.143	0.747
<b>Try out Options</b>	0.653	0.254	0.752
<b>Operational Compatibility</b>	0.369	0.278	0.107
<b>Compatible Targets</b>	0.637	0.753	0.534

**Table 5:** Subgroup comparison for innovation attitude questionnaire conducted with Mann Whitney U-test. Shown are p-values.  $\alpha = 0.10$ , two-tailed. *LWP: Learning and Working Place*

**Table 6: implementation interventions**

<b>TARGET POPULATION</b> <i><b>RN and management of the neurology department</b></i>	
<i>Describe the current situation</i>	<p><u>Quantitative</u></p> <p>No clear fit between department and innovation. The nursing team learns in subgroups and not as a whole. The guideline is not complex according the team. At the stroke unit there were enough opportunities to practice with the guideline. The lwp sees enough advantages when using the guideline and find the</p>

	<p>guideline easy to use. RN who are not rotating find the guideline low complex. The department tends to be a rules-oriented configuration, although their ambition is to be a development-oriented configuration (science-innovation centre). There is a discrepancy between actuality and vision.</p>
<p><i>Describe the desired situation</i></p>	<p>The desired situation contains a short-term goal and a long-term goal. The short-term goal is the refinement of the guideline, that it is applicable to the acute stroke unit. A pilot study must be conducted to test the usability and applicability of the guideline at the stroke unit. If this pilot study is successful, the guideline can be adapted for the entire department and be implemented.</p>
<p><i>What hinders or promotes the target group to get from A to B?</i></p>	<p>Relevant factors which are not measured with the quantitative and qualitative diagnostics are:</p> <ul style="list-style-type: none"> <li>• The ambition to be a science-innovation centre. At this moment far away from that ambition, because the implementation of different innovations at this moment is troublesome.</li> <li>• Collaboration between Nursing Science, Graduate School of Utrecht (In Dutch; Hogeschool Utrecht (HU)) and University Medical Centre Utrecht (UMCU). The collaboration requires coordination between the three settings.</li> <li>• ICT opportunities. For example; a checklist in EZIS requires coordination with the ICT department.</li> <li>• The organisation of the hospital. The organisation has to promote and stimulate innovation and implementation.</li> <li>• At this moment no involvement from the daily practice in developing a science-innovation centre.</li> </ul>
<p><i>What is needed to achieve the goals of this group? What should you look for? What you need to change or just keep?</i></p>	<ul style="list-style-type: none"> <li>• Clear day schedule and structure</li> <li>• Control from management</li> <li>• Guidance from management</li> <li>• RN should begin to see the benefit of the use of the guideline</li> </ul>

<p><i>What factors play a role?</i></p>	<ul style="list-style-type: none"> <li>• Checklist or pop-up at EZIS (medical computer system). This will increase awareness of the RN</li> <li>• A project group who will teach other RN to work with the guideline</li> <li>• Adaption of the guideline to make the guideline more applicable for the department</li> <li>• Increasing follow-up after the stroke unit, to determine the use of the guideline after the patients are discharged from the stroke unit</li> <li>• Make the guideline part of a health programme</li> <li>• Raise awareness of the importance of good education among RN</li> <li>• Training in the provision of information</li> <li>• Increasing knowledge with regard to the information needs of patients with acute stroke</li> <li>• Giving clinical classes</li> </ul>
<p><b>Strategy:</b> <b>Configuration-development for a rules-oriented department and rules-oriented innovation</b></p>	<p>In a rules-oriented configuration control is an important factor. It is important to make a clear distinction between innovation-development and implementation. The guideline at this moment is not suitable and useable for the department, so the first step will be guideline-development. In a rules-oriented configuration linear thinking is important. That is why the first step is making the guideline useable for the department and after the implementation of the guideline.</p> <p><u>Preconditions adapted guideline:</u></p> <ul style="list-style-type: none"> <li>• Targets the acute phase of patients with stroke</li> <li>• Leaflets for patients with information</li> <li>• Succinctly</li> <li>• Attractive and uncluttered appearance</li> <li>• Clear language for patients and RN</li> <li>• Describing clear steps in the guideline, so not too much information is given at once. For example: which information can be given on day 1, day 2 etc.</li> </ul> <p><u>Adaption of the guideline:</u></p>

- Bachelor nursing students will conduct a literature study to the needs of patients with an acute stroke with regards to information (knowledge deficit, coping)
- Important is sufficient guidance of the nursing students when conducting a literature study. Practical trainer and RN of the stroke unit will supervise the literature study
- The nursing students will present the result to a project group. The project group have to reach consensus about the content of the guideline in relationship to the acute phase of patients with stroke
- The project group must consist of at least two RN of the stroke unit and the practical trainer. Also the main developer of the guideline must be involved in the project group (Thóra Hafsteindóttir)
- After the consensus about the content, the project group will adapt the guideline
- The management have to clear time for the project group, to make this adaption successful
- These steps must be repeated when adapting the guideline for the other units at this department (braincare, LWP)
- During the adaptation of the guideline, a two-weekly update must be given to the rest of the team. This will increase awareness of the guideline amongst other RN. The update can be given by mail, newsletter or clinical lessons. Focus of these updates will be the progress the project groups is making
- The project groups must be approachable for questions and give feedback to the management
- When the guideline is adapted for the acute phase, it has to be presented in the work meetings. Also weekly clinical lessons will be given to teach the RN about the guideline and how to work with it.

Preconditions implementation:

- Consider culture, structure and knowledge/learning

- Culture: symbols of uniformity, predictability, propagation of core values by the management.
- Structure: standardisation of processes, direct supervision and control, task specialization (especially vertically) and function descriptions.
- Knowledge/learning: procedural learning

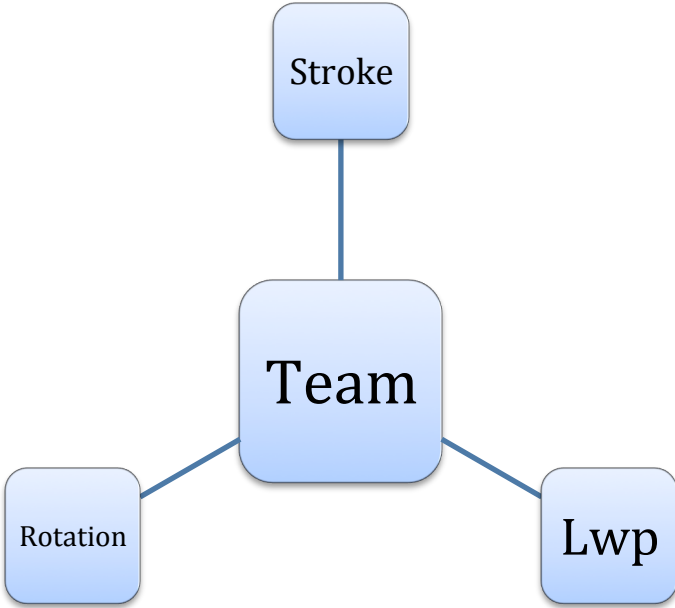
Implementing the adapted guideline:

- A clear starting date has to be determined when the pilot study is starting at the stroke unit
- Schedule fixed evaluation moments. In the start, weekly evaluation and eventually monthly. Evaluation should focus: adoption, the usability of the guideline and compatibility with the target population. Adjustments can be made after the evaluation
- The stroke unit will be the pilot unit. Patients have to be involved in the evaluation of the guideline. Was the information sufficient? What would patients change?
- Management has to supervise the use of the guideline. The focus must be: are the leaflets distributed? Ask the RN if they used the guideline.
- Approach IT for a pop-up in EZIS. In this pop-up RN have to check a box if they used the guideline.
- RN have to rapport about the use of the guideline. What information did they give? What information they have to give still?
- Management has to keep track of the use of the guideline in numbers. These numbers can be presented in weekly meetings. RN will notice the use of the guideline and the progress.
- Developing peer review for the use of the guideline
- Clear tasks specification during the implementation process. Give people responsibility and hold them to these responsibilities. Supervision from the management is needed
- Learning automatism when using the guideline. This will

	<p>help to make it a part of the daily work. This can be stimulated by working a lot with the guideline and train each other (clinical lessons, lotus patients, team meetings and bedside teaching)</p> <ul style="list-style-type: none"> <li>• Make RN who work well with the guideline superusers. They can train and inform other RN.</li> <li>• Keep track of patient satisfaction. An increase of patient satisfaction on the long term can be sign of better education.</li> </ul>
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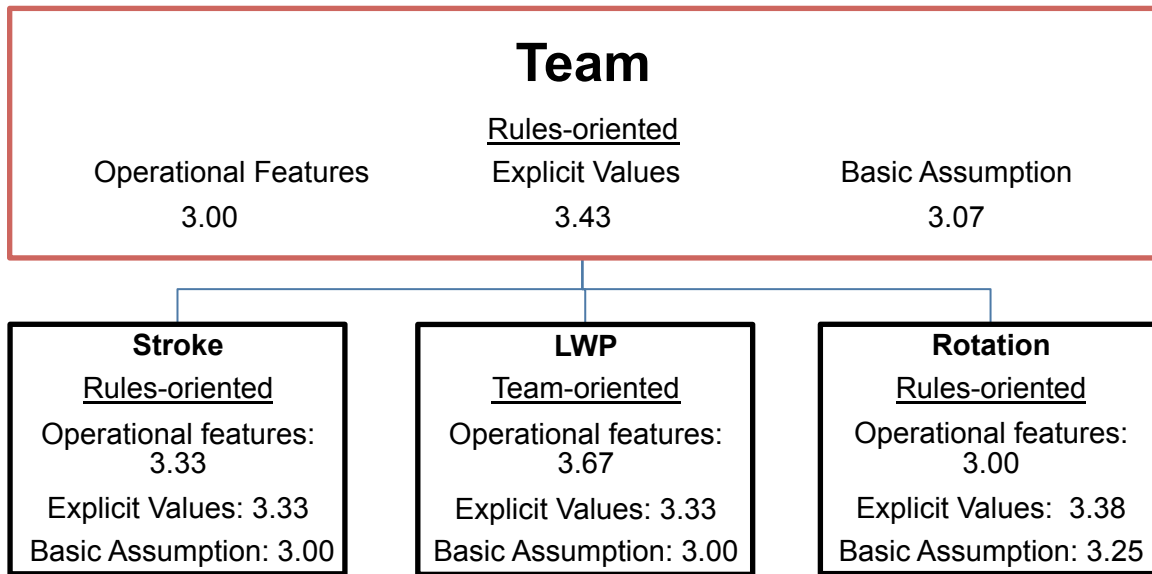
**Table 6: Implementation interventions for the implementation of the guideline “education cva patients and caregivers”**

**Figure 1: overview neurology department**



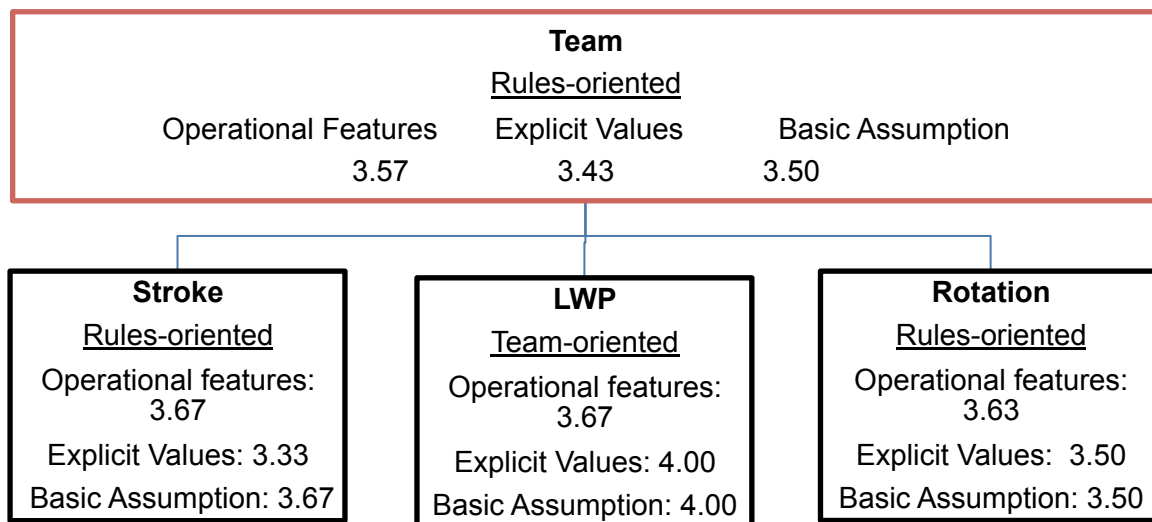
**Figure 1:** Schematic overview of the three different subgroups and team at neurology department  
Lwp: Learning and working place

**Figure 2: innovation characteristics**



**Figure 2:** Innovation characteristics according to the WIK questionnaire. Most fitting configuration is shown. Mean scores are shown.  
*LWP: Learning and Working Place*

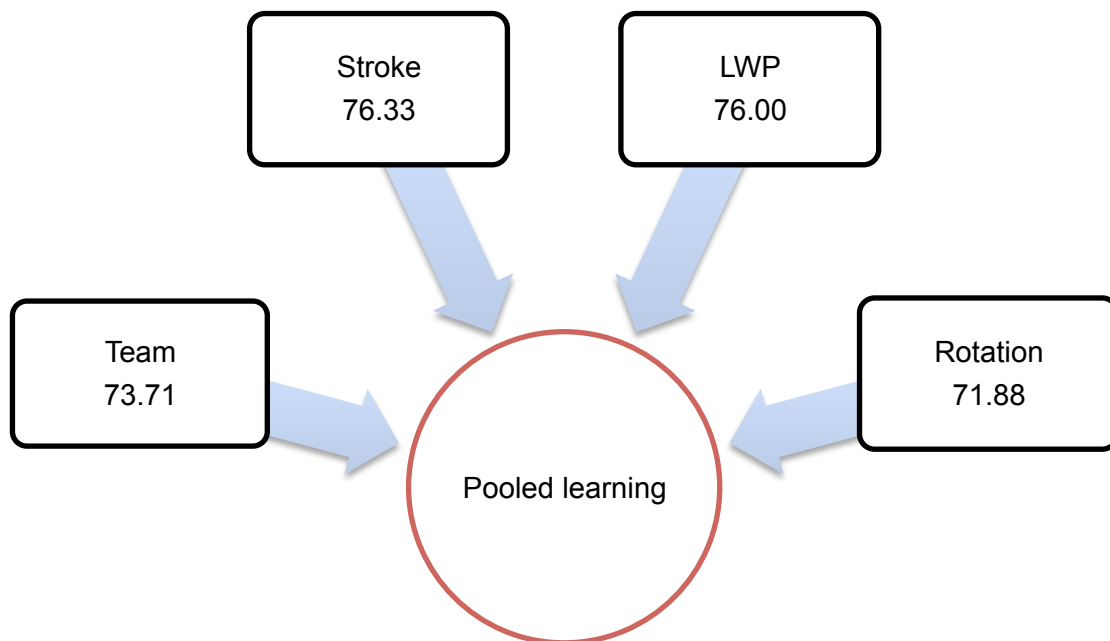
**Figure 3: department characteristics**



**Figure 3:** Department characteristics according to the WAK questionnaire. Shown the most fitting configuration. Mean scores are shown.  
*LWP: Learning and Working Place*

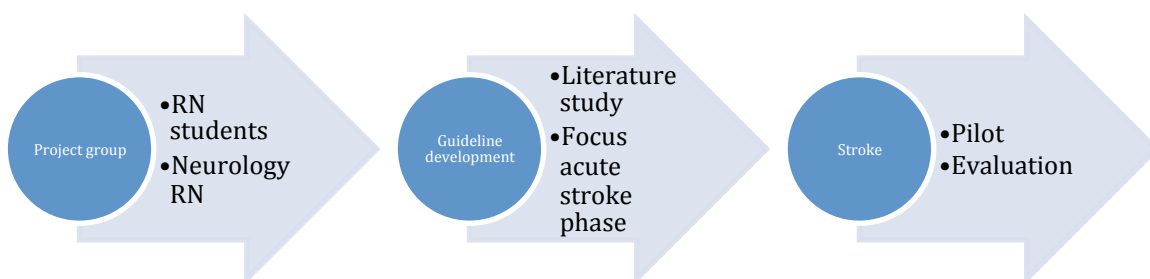


**Figure 4: team learning**



**Figure 4:** The style of learning according to the Team Learning questionnaire. Shown are the sums of scores.  
*LWP: Learning and Working Place*

**Figure 5: implementation strategy**



**Figure 5:** Schematic overview of the phases of the implementation strategy