

ORIGINAL RESEARCH

Team learning and innovation in nursing teams: Results of a comprehensive research project

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Abstract

Background/Objective: Noncompliance to implementation of innovations is a problem in nursing teams. In literature, team learning is proposed as a facilitator for change. Still, studies reporting the effects of team learning activities on the implementation of innovations in nursing teams are scarce. To address this gap in literature, this study explored the influence of team learning on the implementation of two innovations.

Methods: A literature and three empirical studies were performed to address the research questions of this project. Cross-sectional surveys were conducted between 2008-2011 with a sample of 1111 nurses, representing 79 nursing teams from The Netherlands and Belgium.

Results: The results of the literature review revealed research on team learning and innovation in nursing is limited. Team learning included processes to gather, process, and store information from different innovations within the nursing team. The prevalence of team-learning activities was contributed or hindered by individual and contextual factors. Principal component analyses of a 26-item team learning activities scale revealed a five-factor model, explaining 78% of the variance. Team-composition explained 33% of team learning. Analyses on the influence of contextual factors yielded three models that explained 76%, 81% and 83% of the variance in team learning. Positive relationships were detected between team learning activities handling production-oriented information and implementation-effectiveness of an incremental innovation. In addition, team learning activities regarding development-oriented information positively affected the implementation of a radical innovation.

Conclusions: Nursing teams undertake different team learning activities to process different types of information that cross over within the nursing team. The way the nursing team is composed had a minor effect on the prevalence of team learning activities in nursing teams. Contextual factors had a major effect on the prevalence of team learning activities. Team learning activities related to the production of nursing care had a positive effect on the implementation of an incremental innovation. Team learning activities related with the development of nursing care of the team positively affected the implementation of a radical innovation.

Implications for practice and policy: Throughout team learning nursing teams can enhance their implementation-effectiveness on innovations and increase patient safety and the quality of provided nursing managers and nursing teams

can develop effective team learning processes that enable nursing teams to improve implementation-effectiveness of different types of innovations.

1 Introduction

Researchers defined the capability of teams to produce and develop as a hallmark of effective teams within the 21st century. In health-care organizations nursing teams are omnipresent. Besides the production of nursing care, nursing teams are expected to adapt to changes by the implementation of innovations^[1-3]. Studies, however, report serious problems in the compliance of nursing teams towards innovations as clinical guidelines and protocols. In result, nursing teams produce nursing care that does not meet up to standards of quality and patient-safety^[4, 5] (Moreover, Zeitz & McCutcheon^[6] reported strong perseverance of nursing teams towards routines and rituals. This paper reports a contingency perspective on team learning and the implementation of innovations in nursing teams and contributes to theory and practice through two complementary propositions. First, this study presents team learning as a facilitator for the implementation of innovations in nursing teams. Second, it synthesizes contingency perspectives on team learning and innovation. Based on this contingency perspective, this study analyses the fit between team learning and implementation-effectiveness of two contrasting innovations in nursing teams. This study provides realistic implications for nursing practices. In addition, it uncovers new directions for future theory development on team learning and innovations in nursing teams that subsume the different team learning processes and different types of innovations as important elements of analysis.

1.1 Background

In origin, nursing teams were set up to regulate and ensure production of nursing care. Nowadays nursing teams are called on to be innovative and adaptive to the changing environment^[2, 5, 7]. Organizational learning and education research studies express the role of teams in organizations and propose team-learning activities as facilitators for implementation of innovations^[8-10]. Also contemporary theoretical models on implementation of innovations in nursing team include the concept of learning, however, ignore the role of teams and focus on individual learning only 11-13^[16-18]. Recently, interventions and research on implementation of innovations in nursing teams shifted their focus towards the nursing teams themselves^[2, 14, 15]. Still, studies on the impact of team learning on the implementation of innovations in nursing teams were limited. In literature existed a paucity of empirical research on team learning and innovation in nursing, as well as, a shortage of evidence on factors that contributed or hindered nurses to exploit team-learning activities.

Nurses in teams can collaborate in team learning-activities as experimenting, using feed-back for improvement or challenging one another for new viewpoints^[2, 7, 16-18]. A number of theoretical studies express teams in organizations must learn in order to change what they are doing and propose team-learning activities as facilitators for change^[2, 13, 15, 16, 19]. For example, the implementation of a new guideline on hand-hygiene enforces individual nurses in teams to learn in order to change knowledge, skills and to alter attitudes^[6, 19, 20]. Senge^[21] was first to advocate the importance of team-learning activities in teams and suggests a relationship between team learning and change in organizations. Edmondson^[22] studied team-learning activities in health care teams during the implementation of innovations. Nurses in teams use team-learning activities, as experimenting, giving one another feedback on interventions and helping each other, to change routines^[22-24].

In the perspective of the social-constructivism on learning, team learning in work-based teams originates from collaborative learning^[9, 25]. Team members in interdependent teams with durable tasks undertake collaborative activities to gather and process information. Teams learn by undertaking activities, e.g. asking questions, reflecting on results or discussing errors^[9]. In addition, team learning is delineated as the process of social interaction between team members to enhance shared understanding in teams^[27]. The prevalence of team learning activities is influence by individual and contextual factors^[28].

Argyris and Schön^[29] and Edmondson^[16] used concrete activities of team members to define team learning. Team-learning involves the activities nurses undertake in their team to gather, process and store information that addresses

learning task. Edmondson et al. ^[9] reported team learning as a continuing process of activities in nursing teams and urged the use of a contingency perspective to understand team learning. Gnyawali and Stewart ^[30] presented a contingency perspective on organizational and team learning describing the fit between team learning activities and the environmental conditions teams encountered at a particular point in time. Placing team learning in a contingency perspective suggests a fit between team learning processes and different learning tasks in teams which influence the overall performances of the team ^[7, 30]. In the contingency perspective an optimal configuration is when the team learning activities are contingent on the various types of information needed by the team ^[30, 31]. The contingency perspective in this paper integrates team learning, its' influencing factors and implementation of innovations in an input-process-output model.

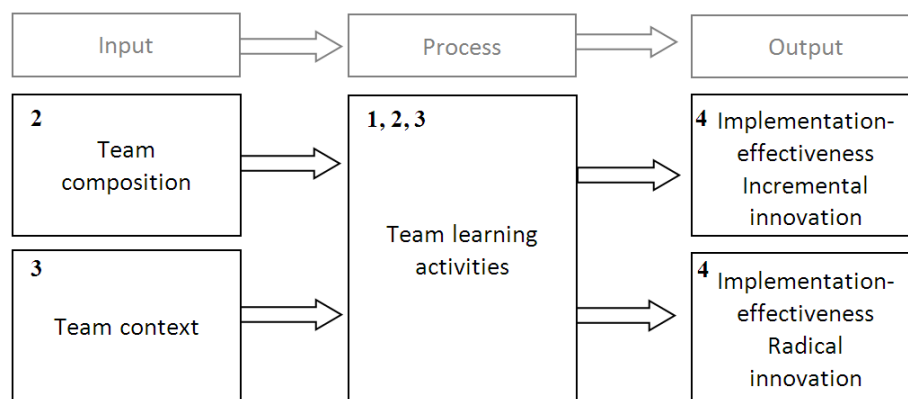
1.2 Aims

Team learning in nursing teams, the factors that contribute or hinder the prevalence of team-learning and the relation between team learning and implementation of innovations in nursing teams are unclear. This study aims to explore team-learning activities in nursing teams and examine the relation between team-learning processes and implementation of innovations in nursing teams. To address the aims this study considers four research questions:

- Research Question 1: How does team learning reveal in nursing teams?
- Research Question 2: How is the relationship between team learning and team composition in nursing teams?
- Research Question 3: How is the relation between team learning and contextual factors in nursing teams?
- Research Question 4: How is the relation between team learning and implementation of innovations in nursing teams?

2 Method

To address the research questions the study included three empirical studies with a cross-sectional design. The first empirical study addressed research question 1 (how does team learning reveal in nursing teams?) and research question 2 (how is the relationship between team learning and team composition in nursing teams?). The second empirical study concentrated on research question 3 (how is the relation between team learning and contextual factors in nursing teams?) and explored the effect of the second input factor in the research model. The third empirical study handled research question 4 (how is the relation between team learning and implementation of innovations in nursing teams?) and focused on the output of team-learning activities on the compliance of nursing teams on implemented innovations.



Note: 1 = empirical study 1 (research question 1 and 2), 2 = empirical study 2 (research question 3), 3 = empirical study 3 (research question 4).

Figure 1. Conceptual model with overview of the empirical studies

In the empirical studies, a multicentre cross-sectional design was used to gather self-reported data from individuals in nursing teams, using structured questionnaires. Data were collected between November 2008 and March 2011. Convenience sampling created data (N = 1111) from a diversity of nursing teams (n=79) in mental health care, education, community, and university hospitals. To include a wide variety of nursing teams, teams came from health care organizations and Bachelor of nursing schools in The Netherlands and Belgium that participated in an academic service partnership on learning and innovation in nursing. To study the relationship between team learning and implementation of innovations we selected nursing teams (n = 14) that finished the implementation of the Nutritional Risk Screening-2002 and nursing teams (n = 16) that finished the implementation of the Neuman Systems Model in two mental health institutions in The Netherlands.

All respondents completed a bouquet of instruments in a structured questionnaire. Team Learning was measured by Offenbeek's Team Learning Activities Scale [32]. With this instrument, team members indicate their perception of the frequency of 26 team-learning activities in their team [18, 32, 33]. Team composition was conceptualized in global and specific team properties [34, 35]. The global team properties represented the overall characteristics, such as field of practice, type of nursing care, and team size. Specific team properties expressed characteristics of individual team nurses [34, 35]. Context was defined as the 'team learning environment' and the 'team configuration' [7, 24]. 'Team learning environment' was assessed using a 12-item questionnaire (α .96) constructed by Van Wetten et al. [24]. The items represented three items on shared goals, two items on positive attitude towards teamwork, four items on psychological safety and two items on openness. 'Team configuration' was measured using the 24-item Observed Team Configuration Scale of Van Linge [7]. This instrument represents the four basic team configurations as defined by Van Linge [7] using four subscales with six items each [7, 21, 22]: (1) the 'regulation-oriented team configuration' (α .87), (2) the 'goal-oriented team configuration' (α .76), (3) the 'team-oriented team configuration' (α .91), and (4) the 'development-oriented team configuration' (α .89). To determine the implementation-effectiveness of both innovations, we evaluated both knowledge and use of an incremental and a radical innovation. An intervention fidelity scale was developed to evaluate the knowledge and use of the incremental innovation. The scale included 10 items related to knowledge of the protocol (Cr. α : 0.81) and 10 items related to the use of the nutrition protocol in daily practice (Cr. α : 0.85). To assess the implementation-effectiveness of a radical innovation, we used the Lowry-Jopp Neuman Model Evaluation Instrument (LJNMEI) [36]. The LJNMEI contained 41 items on the knowledge (Cr. α : 0.91) and 49 items on the use of NSM in daily nursing practice (Cr. α : 0.96). Team members indicated all items on a Likert scale ranging from 1 - 5 (from 'never' to 'very often').

2.1 Data aggregation

Where the constructs in the contingency perspective were seen as team-level variables, data were aggregated from the individual to the team level. All 1111 individual cases were aggregated to 79 teams-level cases, by taking the sum of the mean scores of all items to compute the scales and subscales [33, 34]. Within-group agreement and homogeneity of individual-level data were tested before aggregation [33, 34]. The intraclass correlation (ICC) analyses of the team learning and context variables used in this study resulted in ICC1 values between .11 and .19. Analyses of ICC2 resulted in values between .72 and .79. The results of these analyses legitimized the aggregation to team-level variables [33, 34, 37].

2.2 Data analysis

The Statistical Package for the Social Sciences® version 18.0 was used to perform analyses (SPSS, Inc., Chicago, IL, USA). Statistics were generated to summarize team learning, team composition, contextual and implementation-effectiveness variables. In congruence with the systems approach to contingency theory, the fit was analysed using correlation and multiple regression analyses [38, 39]. Relationships between variables were explored using the Pearson product-moment correlation coefficient [38]. All significant relationships were studied using univariate linear regression analysis with implementation-effectiveness as the dependent variable. We completed the analysis with stepwise multiple regression analysis. All reported regression models were tested on the assumptions for linear regression with the tolerance test and the variance inflation factor (VIF). Tolerance of reported regression models varied between 0.367 and 0.682, the VIF of the regression models varied between 1.024-3.285. All tests were conducted at the 5% level of significance.

3 Results of the research project

In the first empirical study the nature of team learning in nursing team was explored by principal component analyses of Offenbeek's team-learning activities scale, resulting in a five-factor model explaining 78% of the variance on the team-learning scale (see Table 1) ^[40]. Team-learning activities were clustered in factors on gathering, processing, and storing of relevant information to address learning tasks in the team. The factor 'processing information' was responsible for 49.7% of the explained variance on the team-learning activities scale. Items in this factor represented the actual dissemination, interpretation and application of information in the team. Factors on gathering and storing information related to different learning tasks that handled production or development-oriented information. In the nursing teams, the prevalence of team-learning activities was most intense in the factors on processing information and storing production-oriented information. Low prevalence of team-learning activities was detected in the factor gathering production-oriented information. The second part of this empirical study addressed the influence of team composition. Results indicated the way the nursing team was composed had a minor influence on the prevalence of team-learning activities. Team composition showed a minor effect (R^2 33%; table 2) of team composition on the prevalence of team learning activities in nursing teams. Important items were being a team in a community hospital (positive effect), mid-term team longevity (negative effect) and low percentage female nurses (negative effect).

Table 1. Summary results of principal components analysis using varimax rotation, intraclass correlation analyses and Cronbachs' alpha for team learning (N = 79)

Statistics	Factors				
	1	2	3	4	5
Eigenvalues	1.1	2.0	12.9	2.7	1.5
Percent of variance	4.3	7.6	49.7	10.5	5.7
ICC1	.11	.18	.20	.19	.17
ICC2	.79	.65	.81	.83	.73
Cronbachs' alpha	.87	.86	.95	.87	.83

Note.: 1 = gathering production oriented information; 2 = gathering developmental oriented information; 3 = processing information; 4 = storage and retrieval production-oriented information; 5 = storage and retrieval development-oriented information

Table 2. Summary results relation between team learning (dependent) and team composition items using multivariate Regression (Stepwise) analyses.

Item	R^2	<i>B</i>	β	<i>p</i>
Constant		82.26		< .0005
Community hospital team		6.38	0.385	
Team longevity between 7-13 yrs		-4.75	-0.313	.001
Percentage female nurses in team < 71%	0.33			

The second empirical study concentrated on the fourth research question and explored the relation between team learning and contextual factors in nursing teams ^[41]. Context was defined in one variable representing the overall environment for learning and four variables characterizing the basic configurations of organizational characteristics of nursing teams. Because an interrelation between all contextual variables was expected, multiple regression models were tested for multicollinearity by regression commonality analysis to detect the unique and common contribution of each independent variable in the regression model.

Analysis in this study indicated a minor effect of team learning environment in the prevalence of team-learning activities in nursing teams. Results indicated that contextual factors such as: (1) strengthening stimulation of the psychological safety, (2) openness, (3) shared goals, and (4) an open, external-oriented view enhanced the prevalence of team-learning

activities in nursing teams. Multiple regressions yielded three models that explain 76%, 81%, and 83% of the variance in team learning (see Table 3). Regression commonality analyses showed the importance of interrelationships between the contextual factors.

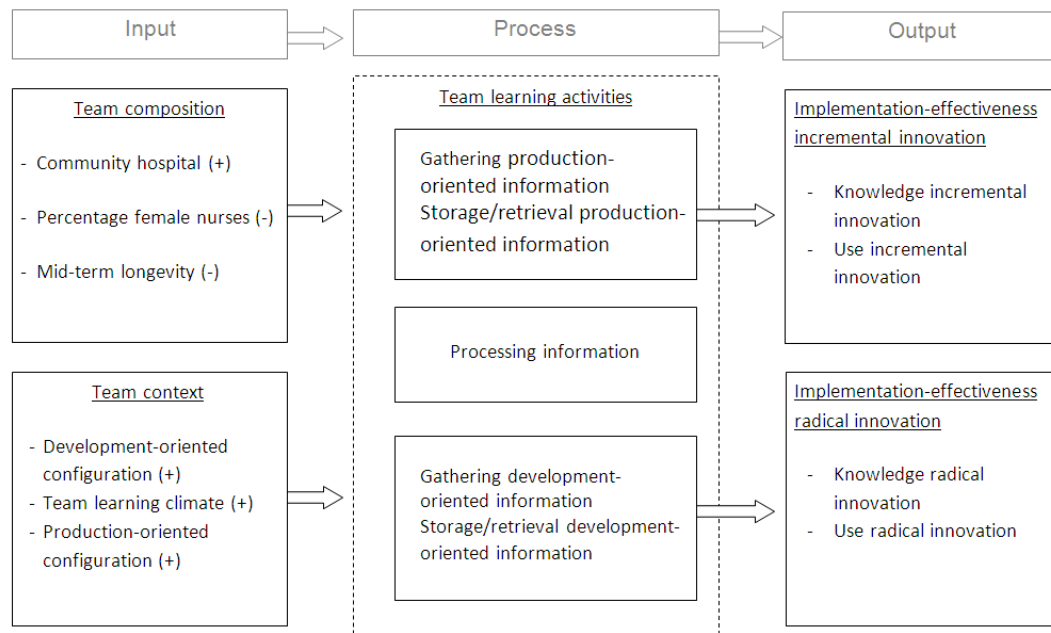


Figure 2. Results research project in conceptual model

Table 3. Summary results and relationships between team learning (dependent) and contextual factors using regression (Stepwise) analyses

	R^2	B	β	p
Model 1 (Constant)		14.507		.001
Development-oriented configuration		3.369	.871	.000
	.759			
Model 2 (constant)		11.184		.005
Development-oriented configuration		2.062	.533	.000
Team learning environment		.720	.408	.000
	.811			
Model 3 (constant)		8.281		.037
Development-oriented configuration		1.489	.533	.000
Team learning environment		.781	.408	.000
Regulation-oriented configuration		.607	.177	.009
	.828			

The third empirical study handled the fourth research question and analysed the relation between team learning and the compliance of nursing teams on two contrasting innovations^[42]. Result in this study indicated team-learning activities that handled information on the production of nursing care affected the implementation-effectiveness of an incremental

innovation (see Table 4). The implementation of a radical innovation was effected by team-learning activities that were related to handling of information about the development of the provided nursing care.

Table 4. Results of multiple regression analyses (stepwise) for team learning and implementation-effectiveness

Multiple regression analyses (stepwise), dependent = ‘Knowledge’ of production-oriented innovation (n=14)				
	R^2	B	β	P
Model 1 (Constant)		.136		.476
Gathering production-oriented information		1.361	.663	.010
	.439			
Multiple regression analyses (stepwise), dependent = ‘Use’ of production-oriented innovation (n=14)				
	R^2	B	β	P
Model (Constant)		.263		.002
Gathering production-oriented information		.297	.623	.001
Storage & retrieval of production-oriented information		.586	.534	.002
	.826			
Multiple regression analyses (stepwise), dependent = ‘Knowledge’ of development oriented innovation(n=16)				
	R^2	B	β	P
Model 1 (Constant)		.425		.000
Gathering development-oriented information		.236	.574	.001
Storage & retrieval of development-oriented information		.205	.468	.006
	.729			
Multiple regression analyses (stepwise), dependent = ‘Use’ of development oriented innovation(n=16)				
	R^2	B	β	P
Model (Constant)		.425		.000
Gathering development-oriented information		.236	.574	.001
Storage & retrieval of development-oriented information		.206	.468	.006
	.797			

Overall, results of the empirical studies presented team learning as a facilitator for the implementation of innovations in nursing teams ^[40-42] (see Figure 2). Moreover, the use of the contingency perspective synthesised team learning, its’ influencing factors and implementation-effectiveness. In the contingency perspective, the ‘fit’ was optimal when the configuration of team-learning activities in a team were contingent upon the information needed by the team in order to implement innovations.

4 Discussion

To interpret the results of this research project several considerations need to be taken into account. Most important observation is that team learning in nursing teams was defined as a concept on team-level, constructed by the activities that team members undertake to process the necessary information to produce and innovate their products. In addition, team learning was conceptualised in 26 team-learning activities ^[8, 18, 40]. Team-learning activities, e.g. team-learning activities as seeking and giving help and advice, asking questions, seeking feedback or challenging one’s viewpoints were clustered in processes of team learning as gathering, processing and storing/reuse of information. This conceptualisation of team

learning is congruent with earlier research, wherein concrete activities of team members build up to team learning processes^[8, 18]. Still, the definition limited team-learning to information handling only^[9, 27].

A second important consideration in this research project is the transfer of the perspective of ambidexterity from organizational to the team-level. Kang and Snell^[31] introduced ambidextrous learning in teams and stated that production- and development-oriented processes in teams actualized production-oriented and development-oriented team-learning processes. Information related to accomplish daily production processes led to production-oriented learning processes. The information that is needed to develop and innovate practices in the nursing team resulted in developmental-oriented learning processes^[7, 9, 18]. Results in this research project underlined the ambidextrous character of team learning in nursing teams, whereas nurses in teams undertook different team-learning processes to handle different types of information that cross-over in the nursing team. Until now, scholars described team learning as a linear process of different phases, e.g. gathering, processing and storing information^[8-10]. Cornell et al.^[3] studied how nursing team act and reported a chaotic structure of the tasks that nurses exploit during their shifts with an intense crossover of information. Results of this research project underlined the continuous crossing-over of information nursing teams, deriving out of the various information needs of the multitasking nurses in the team. Overall, nurses in team exploit different team-learning activities to gather, process, store and reuse the information that is needed to handle production-oriented and development-oriented information in the nursing team.

In a third important consideration in this research project, the input factors in the contingency perspective were divided in team composition and team context variables. To start, it has to be concluded that the reported results in this research project incompletely explain the relation between team composition and team learning. Possibly, a more defined conceptualization of team composition is necessary to detect relations with team learning. The minor effect of team composition on the prevalence of team learning activities, however, is reported in a number of studies^[9, 18, 33]. Possibly, team composition is a less dominant determinant of team learning in mono-disciplinary teams as in project or project-based learning teams where the function is to solve problems from a multi-disciplinary perspective.

A fourth important consideration is about the definition of context as a multifactorial construct wherein the independent variables interrelated and created a specific configuration^[7, 22, 23]. Scholars and researchers stated context as an important determinant for team learning and conceptualized context in variables as learning climate or the overall team climate^[9, 24]. In this research project, one contextual variable represented the overall environment for team learning and four variables characterized basic configurations of organizational characteristics of nursing teams. This way, both learning climate and teams' organizational characteristics were included. The results of this research project underscored the importance of the context nurses in teams perceive. Congruent with the literature, a context based on psychological safety, openness and team characteristics as having external orientation and flexibility was most facilitating to the prevalence of team-learning activities in nursing teams^[7, 16, 22]. The prevalence of team-learning activities and context seem connected, due to the fact the construct of team learning is based in the social-constructivism^[16, 27]. Individual nurses can learn by negotiating ideas and construct new knowledge, skills or alter attitudes in collaboration with other nurses in a social context. Still, to express team-learning activities individual nurses have to perceive a context wherein they feel safe to unfold their uncertainties, start asking questions and enter learning stages^[16, 24]. Moreover, the prevalence of team-learning activities benefitted of a structural regulation of the team learning processes^[16]. This observation underlined the importance of having a infrastructure in nursing teams that facilitates team-learning processes. The facilitation of the nursing teams, however, originates in their history of production-oriented teams. In nursing teams, an infrastructure ascertains the continuity of handling production-oriented information^[3, 20]. Still, infrastructures on handling development-oriented information are scarce in nursing teams. Edmondson^[16] and Cornell et al.^[3] described the context of nursing teams in health organizations is characterized by an overflow of chancing work designs and an internal focus on production. Instead of supportive contextual elements as openness and willingness to share information, the processes of defensive reasoning were dominant in contexts of health care and nursing teams. Creating a supportive context for team learning seems difficult if nursing teams are driven towards production and control. Even without team structures backing the developmental-orientation in

the included nursing teams, the results of this research project re-express the importance of a supportive context that is characterised by openness, safety, flexibility and external orientation.

The fifth consideration addresses the relation between the team-learning processes and the implementation-effectiveness of two different types of innovations. Two important observations can be made on the third empirical study. First, it synthesized the contingency perspectives on team learning and innovation and implied a fit between different team learning processes and implementation of different types of innovations. Second, it presented team learning influenced the implementation-effectiveness of innovations in nursing teams. In this contingency perspective, the optimal 'fit' was when the configuration of team learning activities in a team was contingent upon the various types of information needed by the teams^[30, 31]. In the contingency perspective, the team-learning processes on handling production-oriented information related to the implementation-effectiveness of an incremental innovation. In addition, team-learning processes that link to handling development-oriented information related to the implementation-effectiveness of a radical innovation. Gnyawali & Stewart^[30] presented a contingency perspective wherein four types, e.g. reinventive, formative, adjustive and operative learning were related to two different learning processes, e.g. interactive and informational learning processes. The informational learning processes were the result of the exchange of information in team meetings dedicated to collect, share, distribute and store information. The interactive learning processes triggered intra-team interactions between team members to exchange information, over cross boundaries of the own team and create new knowledge or knowledge on newness. The interactive learning processes overlay with the development-oriented learning processes as defined in the results of this research project. In addition, the informational learning processes connect to the production-oriented team-learning processes in this doctoral thesis.

Overall, results of this research project refined how specific team-learning processes 'fit' with implementation-effectiveness of different innovations. Combining team learning and implementation-effectiveness in nursing teams in a contingency framework, however, was relatively new and not yet reported. The contingency framework used in this study refined the process-output part of the overall conceptual framework and provided empiric evidence for the crucial role that team-learning activities have on the implementation of innovations in nursing teams.

5 Conclusions

This research project promoted the compliance of nursing teams on innovations by exploring a conceptual model on team-learning activities and implementation of innovations in nursing teams. Nursing teams are undergoing a transformation from production-oriented teams into ambidextrous teams that simultaneously produce, as well as, innovate the nursing care they provide. To perform as an ambidextrous team, nurses in teams execute team-learning activities to gather, process and store the information that is needed to perform both production-oriented and innovation-oriented tasks. Team learning enhances the compliance of nursing teams on incremental and radical innovations. The way a nursing team is composed has a minor, whereas the context of the nursing teams has a major influence on the prevalence of team learning activities.

6 Implications

The results of this research project indicate pathways for nursing teams to enhance team learning and perform their ambidextrous function. This research project has implications to the way nurses are educated, to practices of nursing teams during implementation of innovations and towards further research.

Results of the study indicate personal characteristics of nurses to be incorporated in the curricula of nursing studies. The personal characteristics reflected in individual nurses that have the skills to combine learning and working in a team and were focused on continuous improvement. In nursing education, students should find possibilities to develop the personal characteristics and get prepared on the real world of nursing practice. One pathway is the integration of team-based

education strategies in nursing education. Educational strategies based on team learning are well development in education^[41]. For example, educating nursing students to handle hand-hygiene should incorporate practical training, as well as latest knowledge on hand-hygiene. This way, one combines the production-oriented and development-oriented information on hand-hygiene in the education. Nursing education wherein students learn in team-based contexts, combined with attendance on the development of personal skills will lead up to students that are well prepared for clinical practice.

The findings of this research project provide a rationale for managers to enhance team learning in clinical practice by creating infrastructures that support both productive, as well as developmental learning tasks in teams. To enhance team learning in nursing teams, management and nurses should strengthen the facilitation of a development-oriented team configuration and an intense team-learning environment. Upcoming examples in clinical practice are team-learning based initiatives as journal clubs and evidence based practice meetings. Moreover, this research project expresses the importance of situating team learning as a key variable in the process of implementation of innovations. Nursing teams can develop effective team-learning processes that enable nursing teams to improve implementation-effectiveness of different types of innovations.

Although important steps are made in understanding team learning and innovation implementation in nursing teams, further research is indicated to the important questions that remain. First, future research should focus on understanding the effects of individual and team characteristics and their influences on the prevalence of team-learning activities in nursing teams over time. Therefore, the concepts of individual learning and team learning should be connected^[18, 38]. In addition, the conceptualization of compliance towards implemented innovations should be clarified. Researchers increasingly start to report practices and characteristics that enhance health care organizations to cope with implementation of innovations^[2, 45]. Gearing et al.^[46] proposed the application of fidelity in the conceptualization of effective implementation. The concept of implementation fidelity reflects how well an innovation is implemented in comparison with the original design. Using fidelity improves and objectivises data collection in implementation research. Applying fidelity in research includes detailed study of (1) the adherence of the users of the innovation, (2) the frequency of implementation strategies, (3) the quality of implementation strategies and (4) the participants' responsiveness to the content of the innovation and (5) the effects on target populations (patients).

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