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**THE DEVELOPMENT OF A NURSING POOL FROM A
CAPACITY COMPENSATION TOOL TO A LEARNING AND
INNOVATION PLATFORM**

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Abstract

In our contribution we will discuss how a nursing pool in a central hospital in Germany emerged and developed from a mere capacity compensation tool towards a platform for learning and innovation. In the case study we will describe the development process of the nursing pool from the perspectives of the pool management and the nurses. The study is based on qualitative empirical research over several years, using methods such as observation, interviews and storytelling. We see the contribution of our paper in discussing how innovation and learning in work systems emerge out of collective practice and reflection. We will further show how such innovative practice can be established by the means of a learning and innovation platform (Ciborra 1996; Schulz/Geithner 2010). From a theoretical perspective our study is based on actor centered and on activity theoretic views on learning and development (Lave/Wenger 1991; Brown/Duguid 2001; Engeström 1987, 2001, 2008).

Keywords: learning platform, innovation processes, expansive development, activity theory, nursing pool

1. INTRODUCTION

Currently hospitals in different countries and health care systems face major challenges (e.g. Kabene et al. 2003; Marley et al. 2003; Prybill 2003; Griffith/White 2005; Debatin et al. 2006; Ginn 2006; Klauber et al. 2007; Wicks 2007; Bandyopadhyay/Hayes 2009; Griffith 2009). In particular, they are confronted by balancing the tension between quality and costs (e.g. Dietrich 2005; Khatri et al. 2006:10). Therefore, learning, development and innovations are seen as “fundamental to organizational survival and are particularly critical to the ability of healthcare organizations to function in an increasingly competitive and dynamic environment.” (Savitz/Kaluzny 2000:367). Interaction between the main actors, physicians, administrative staff and nurses are crucial for the

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efficiency of the health system. Their knowledge, experience and motivation significantly influence the performance of hospitals (Kabene et al. 2003; World Health Organization 2000). They are in charge of improving the quality of services and patients' satisfaction – the so called socio-cultural quality of health care (Kabene et al. 2003:3, also Khatri et al. 2006).

The nursing service especially in hospitals, which we will focus on in the following article, has to deal with enormous demands: on the one hand, patients should receive the best care as possible, but on the other hand wards have to operate cost-effective and economically. Nursing staff should be utilized efficiently and management practices must be developed in order to find the appropriate balance of workforce supply and the ability of those practitioners to practice effectively and efficiently (Kabele et al. 2003:2). Therefore, one of the most important issues in care management is the needs based and flexible allocation of the nursing staff (von der Eiff 2003; von der Eiff/Stachel 2006). Another factor is the training of the nursing staff in order to meet the particular needs (World Health Organization 2003). In other words: "A properly trained and competent workforce is essential to any successful health care system." (Kabele et al. 2003:3).

In our case study we have researched learning and development in a regional clinic network of three hospitals. For the flexible allocation of nurse staff a job pool with 53 nurses was implemented in 2002. While companies usually use temporary employment agencies to fulfill their short-term staffing needs, this is rarely possible because of the high specialization and care demands of the nursing staff in hospitals. Therefore, the internal nurse staff has to be allocated flexibly and efficiently (see e.g. Robb 2004). The pool in our case study is responsible for all three hospital sites, which house a total of 1,700 beds. More than 4,700 employees work there; 1,700 of them are nurses, 330 are intensive care nurses or specialized in other fields. Altogether there are 100 different wards and 13 intensive care units (ICU). In 2008, more than 71,500 patients were treated. Each of the three hospitals covers basic areas such as surgery, internal medicine and cardiology and each of them is also specialized in certain areas such as neurology, emergency and intensive care, gynecology, or pediatrics. Each hospital also has a separate nursing management, which is not differentiated according to medical subjects. The clinic is also an academic teaching hospital for the region, has a nursing school and an in-house training center. In 2000 it was the first hospital in Germany that has been regularly accredited to the international standards of patient safety (Joint Commission International). Primarily, the nurse pool was founded to compensate short-term fluctuations in the capacity of the nursing staff due to absences caused by illness of the permanent staff on the wards. In the meantime, the pool has been developed far beyond its original intention towards a **learning and innovation platform** within the hospital. This process is reflected and discussed in this paper.

From a theoretical perspective we refer to an actor centered and on **activity theoretic views on learning and development** (Lave/Wenger 1991; Brown/Duguid 2001; Engeström 1987, 2001, 2005, 2008). Our study refers also to an *emergent understanding of innovation* (West 2002; Rogers 2003). The process of how innovation develops we see as adequately described with the *cycle of expansive learning* by Engeström (2001): Triggers for innovation and development are contradictions in daily life that lead to double bind situations. Such double binds can only be solved through change of basic assumptions (Schulz 2008) of the people involved in the situation. The expansive learning cycle we refer to in the paper shows the interrelation between learning and the emergence of innovation: The innovation creating process is inevitably linked with

learning and development of the people involved (Miettinen 2006; Ahonen/Virkkunen 2003), since they are confronted with the search for a solution and with the change of their basic assumptions and understandings.

According to the conference theme, the nurse pool development itself can be described as an innovation and learning process. Additionally the current pool practice can be seen as an innovation platform for patient care in the hospital and even beyond (West 2002; Schulz/Geithner 2010). In researching the pool over a longer period (2004-2009) of time we studied in particular the following aspects:

- What effects made innovation and development within the pool possible?
- What were contradictions and incidents that led to changes in thinking and practicing?
- How was the innovation and development process performed?
- How was the interplay between the nurse pool practice and formal structures and rules?
- What are experiences of using the nurse pool as innovation and learning platform?
- What are critical diffusion factors of implementing new practice coming out of the nurse pool in the wards?

Our study starts with the case description following the historical path of the development of the nurse pool. Subsequently the case study outcomes are interpreted in the light of the theoretic conceptions of activity theory approaches to learning and development, namely the expansive learning cycle (Engeström 2001). Such procedure represents the actual development and research process of the nurse pool where practice has always been a step ahead of theory and conceptual developments emerged out of work activity and problems (Glaser/Strauss 1998; Strauss/Corbin 1998; Gherardi 2006). We particularly count on the experience that activity theoretic research has gained in health care and hospital management processes (Kerosuo 2006; Engeström/Kerosuo/Kajamaa 2007).

2. CASE STUDY: NURSING POOL

The study is based on qualitative empirical research over several years, using methods such as observations, interviews and storytelling. The research focused on the questions aforementioned. More than 30 interviews with nurse pool staff and permanent staff were conducted to evaluate the work and the success of the pool (see Schubert 2006). Observations have simultaneously been carried out. The research is based on several site visits over the years. From time to time the pool managers were interviewed and current developments discussed. In 2009 the nurse pool development process was discussed and evaluated on site from an expert group in health care. In particular we will follow the idea of historical development and trajectories of activity (Kerosuo 2006). Below, we describe the development of the pool from a compensations tool to a learning and innovation platform.

2.1 Initial stage: the nursing pool as capacity compensation tool

In 2002, the pool was established as a recruitment pool in order (1) to reduce sick leave at the wards in all three hospitals, to exculpate the permanent staff and (2) to employ novice nurses after their graduation. In the last 10 years only a few graduates were employed directly on the wards due to a reduction of staff capacity (just as in many other countries, see e.g. Rondeau/Wagar 2001, 2002).

On the part of the clinic management no special targets besides the ones mentioned above were outlined. Furthermore, there were also no guidelines regarding the operational pool management. At the beginning one of the key tasks was to configure and revise the administrative management of the pool. Each ward of the three hospitals informed the pool management about short-term sick leaves that were then replaced by pool staff. The major challenge of the pool management was to coordinate all requirements of the wards, the dates and staff in the pool. An electronic duty-roster was developed which matches requirements of each particular ward and the shift information of the pool nurses. In addition, special skills, experiences, applications and further qualification of the pool staff were integrated. The pool staff knows the shift schedule one month in advance, but without being specifically assigned to a particular hospital ward until perhaps at very short notice on the working day. The pool management strived to obtain the best possible combination of required knowledge and skills in the wards and available pool staff. First, every employee from the pool should always be able to work in every ward, whether it was a surgical or other specialized ward. According to previous experience this requirement is rarely feasible. The pool nurses would have to be able to handle all sorts of processes of the different wards and have to possess various skills and experience to work in 100 different hospital wards. However, full flexibility of all pool staff will be illusory. The quality of work, motivation and ultimately patient safety may be affected adversely:²

“That’s true. I was already being too harshly admonished by the morning shift, because the late shift said I didn’t have the curves connected at patients’ charts. Theoretically it is wrong, but hey, oh well, things like that happen and whenever I say: ‘can you show me this or that again?’. I have to ask three or four times and ask them to explain it to me. These are such special cases, which I will forget again if I am not in that ward for a longer period of time.” (pool nurse at the early beginning of the pool)

In the first year of the nursing pool it was not yet precisely defined which tasks pool nurses could do on the wards or how they could be integrated into the work processes there. Moreover, at the beginning nurses in the wards faced pool nurses who worked only for a short time in the wards with skepticism: “What can a nurse from the pool do?”, “Is the nurse able to do the same professional job as we or should she/he only do temporary jobs?”. To counter this skepticism, and to create acceptance, pool employees on one hand did their work in the same way as the specialized ward nurses were doing. On the other hand the pool staff triggered, reflected, analyzed and assessed the work on the wards due to their multiple experiences (see below).

Initially the nursing pool in the hospital was established to compensate for short term capacity fluctuation of nursing staff. Overall, it is expressed by all interviewees that this function is fulfilled very well. From the perspective of most of the wards meanwhile, the majority of nurse pool staff does their job with a high quality of patient care. Concerning standard tasks there are hardly any qualitative differences between the nurse pool staff and the permanent ward staff.

2.2 Development: the nurse pool becomes a learning and innovation platform

The development of the nursing pool can be described in the three fields: (1) learning and development, (2) information management and communication processes and (3) teambuilding and –development.

² All quotes were translated from German language.

Ad 1) Learning and development

The care of patients is a diverse and highly demanding task. In the past 10 years in professional care more and more specialization has emerged. Procedures, medical devices and medication on the wards are different and in particular intensive care or emergency departments are very specific. The pool management became aware that the pool staff can not be able to deal with all the processes on 100 different wards. Complete staff flexibility, as intended by the hospital management, is an impractical illusion from practitioner's perspective. As a consequence, the pool management allocated all wards to eight different areas of clinical fields such as intensive care, surgery, cardiology and geriatrics, internal medicine, oncology, neurology, pediatrics, etc. at the three sites.

Based on the eight treatment fields work and training needs were derived and each pool nurse was designated to the optimal fields. Training was carried out autonomously in the pool or the nursing school of the hospital. Each pool staff is able to work in at least 10-15 wards or in six different intensive care units. Special emphasis is also placed on the training and preparation of the pool staff. New employees in the pool will receive a specific training to master the necessary knowledge and skills to practice on the wards.

Through their employment in the pool and the work on different wards pool nurses became aware of different standards and thoroughly learned new practices and structures:

“We are trained in many disciplines and I like that. I still learn a lot and can also take a lot of knowledge to other wards if they so wish.” (pool nurse).

“I get to know a lot of things like other structures, other teams and team dynamics and how it is on other wards. This is enormously enriching for me and I get to know people and can make personal contacts.” (pool nurse).

“I think I have learned a lot. I'm progressing. I see so many different things so I find out that there is always more to learn. We should not stagnate on the wards.” (pool nurse).

Furthermore the pool nurses started to exchange their experiences on an informal basis together with the pool management, e.g. knowledge from surgery wards on how to change bandages was transferred to wards for internal medicine:

“On the ward for internal medicine the work is really different than on the surgical ward. The internal medicine ward doesn't have as many different types of bandages. They do not know so much about bandages. They are more afraid of applying a bandage than me. I know this from my work on the surgical ward. The nurses sometime also ask me, 'Have you ever seen this before?'. Or they ask whether I know about some medication or something they don't know but I do.” (pool nurse).

In such situations, the pool nurses will be considered an expert and their knowledge is in demand. Knowledge and experiences are exchanged and the permanent staff on wards is learning from the pool nurses:

“That is simply the case, the pool staff are more innovative. But they need the opportunity and time to say what they would do in different or maybe even a better way. The permanent staff should say, 'I know about this in a different way. Why do you do it this way?'. The pool nurses could help the ward make progress.” (nurse, permanent staff).

In the nurse pool the experiences of nurses were regularly discussed by the nurses and the pool management. For example they analyzed why the allocations of medication for the patients were quite different on particular wards. Pros and cons were discussed in the pool and the best practices were identified. A further example is the development of standards and unification of the documentation at the hospital based on the experiences

of pool nurses. Pool staff asked on each ward about habits of documentation. The results were discussed on a pool level with the aim to simplify and unify the documentation processes at the three hospital sites:

“Yes, we can adopt a lot of things out of the nurse pool. It has to be said that the documentation processes in the hospital have been uniformly improved.” (nurse, permanent staff)

Pool nurses apply new techniques or procedures in their daily work on the wards. In other words: They communicate different ways of carrying out tasks just through acting in a different way, without instruction or explanation. The collaborating ward nurses experience such different ways of acting and subsequently reflect their own way of acting.

“I don’t want to imitate what the other nurses are doing on the wards. I say, ‘Okay, I’ve learned it differently. I do this now just like that.’ At the beginning that was a real problem that everybody from the pool said, ‘Oh, I do that just how they do it on the ward, even if it’s wrong.’, because they wanted to be accepted. But now it’s a really good thing that we say, ‘Okay, I’ll do it the way I have seen on different wards and what we regard as the best way to work.’ That’s the positive aspect.” (pool nurse)

“We developed a special useful method. We called this method “Mister X”. In a German board game called Scotland Yard, the London police search for Mister X on a London map. This Mister X is invisible while doing a job and is visible after about 10 moves and in between we don’t see Mister X. By using this method our result is to give all the wards a possibility to find out on their own, why the pool nurse works a little bit differently. After seeing, trying, discussing and practicing they are able to proclaim: we, the ward nr. 11 found out on our own to practice a new way of care. This method is more effective than verbal explanations. This method is slow and not done short term but the result is stable for the future. This is a wonderful success.” (Deputy Head of the nurse pool)

On the wards rusty structures and inflexible routines are broken down through collective acting and reflecting in action, which leads to learning and development on the wards:

“If we are involved daily in the processes inside the wards, then it is entirely logical, that we might get into a routine in many things. And in some ways we might get into a rut. When newly and well trained staff comes from the nurse pool, they might see some things in a different way. It helps us and motivates us.” (head of nurses on a ward)

Based on the experience on different wards pool nurses have farsightedness and a broader view about medical treatment processes. In other words: Secondary Diagnoses between different areas of medicine will be identified:

“We cannot replace a full time nurse but we have a wide-angle view between all fields of medicine and therefore we find out many things besides diagnoses. For example on a cardiology ward one patient had a stiff neck and nobody realized it and a pool nurse gave this information to the doctor and he asked what he should do. The nurse also was familiar with neurosurgery and remembered the phenomenon of brain pressure and how to treat the patient based on that and explained it to the doctor.” (Deputy Head of the nurse pool)

The allocation of pool nurses turned out to be more and more a strategic process of how to distribute knowledge and experience within the hospital. The hospital management after 2 years became more and more aware of the potential of the nurse pool, however always lagged one step behind practice. This is a proof for the bottom-up development process of getting the nurse pool a learning and innovation platform. Nowadays, the pool team will be increasingly accepted in order to detect mistakes and to identify contradictions in order to solve this problem and to avoid it in the future. In this way, knowledge and experience have been spread throughout the entire hospital. Overall, this

is certainly a very difficult and lengthy procedure that progresses in small steps and thus gradually goes from ward to ward.

ad 2) Information management and communication processes

In the early stages of the pool it was very difficult to match the schedules of the pool staff with the requirements of the wards. The paper-based solution was soon no longer enough: It was impossible to ensure that each of the 53 pool employees working on 100 different wards in three different hospitals could check the duty roster on the multi-page paper in the office of pool management. Therefore, an electronic roster was programmed by the pool management, which has now evolved into the interactive intranet portal for the nurse pool. The staff of the pool called the portal their “communications center”, which combines many different functions: in addition to the roster, web-forms, mailing components or Short Messaging Service on mobile phones about short-term changes are available. The aim of the portal is to create transparency for the nursing staff and to share information about wards. Information from and about the pool, pool management and internal team of experts is also available to all hospital members. Protected by a password, the pool staff has access to internal messages, forms with standing operating procedures, specific information on the procedures on the different wards and to the contact persons on the wards. Input options for overtime and feedback options are also included. The internal pool experts collect and update this information.

A very comprehensive alphabetical and context-specific clinical lexicon was also established for use in the entire hospital. Tailored to the needs regarding clinical staff, experience and information can be found in the various fields of care treatment. Among other things, the various devices, for example, respiratory equipment are provided with its operating instructions. The staff of the pool calls the lexicon its knowledge base:

“We invented an alphabetic and context-sensitive sorted encyclopedia – one can find out and search how to manage specific fields of work in the hospital – this is the right place to search how to manage a special job. This lexicon is our knowledge centre of our intranet. We reduced standard papers on the wards by putting the information in to the lexicon.” (Deputy Head of the nurse pool)

Gradually, other services and news updates were integrated, e.g. access to the training portal, an online training center, a clinic Ebay, an electronic phone book and a job portal. The web portal began as an intranet project for the nursing pool and has gradually established itself as an entire hospital-interactive portal.

ad 3) Teambuilding and -development

Pool employees, who work every day or week on a different ward, feel as if they belong nowhere. Team-building is therefore challenging since employees de facto work in different spaces and rarely see each other. In this context the pool management is important; both managers can fortunately count on a high social competence. The main point is, according to the head of the pool management, personal communication with each team member. A personal relationship can only be built through a personal interest in the work and the potential problems of each pool nurse. This personal relationship between pool management and pool employees is perceived by the other hospital staff as something special:

“Each pool nurse works every day by his- or herself on different wards. Where is the home base of these nurses – it may be the nursing pool itself, a unit without beds and patients, could it? Yes we can - we can give or build them a home. In team discussions we have found out what has happened and what the problems are in our team and in wards – our philosophy is: together we can solve them. In personal talks we find out what the difficulties are and all help to solve them. Communication with each one is most important to start a personal relationship to our nurses. It is very special for the nursing pool to nurture relationships.” (Deputy Head of the nurse pool)

Added to that, without exception, all information is available for everyone in the pool. At regular team meetings the work will be discussed and the problems on the various wards will especially be talked about. Thereby, difficulties can be identified and resolved on the wards. Both internally and externally it was and is important to strengthen the pool identity. This is achieved by a pool mascot that appears on all documents on the intranet, publications, and clothing of the pool staff. At the beginning it was difficult for the pool staff to identify with the pool, now they are proud and show it in the work on the wards. Additionally, once a year team events such as canoeing, rafting, alpine sliding, or high ropes courses take place in order to strengthen the cohesion in the pool team:

Finally, the pool manager stresses that it is also important to market the services of the nursing pool to the outside world to be perceived as competence center. These include, among other things regular articles in the clinic magazine, the website with the intranet portal, or an online magazine - all under the umbrella of the corporate identity of the pool which is visible from the outside with the mascot:

“Corporate identity is a very special fact in our team development – you can see our pool duck on every thing that has to do with the nursing pool: our nameplate, the plate on our rooms, the duck in publications, and so on. The life ring you see on the duck is an icon for our rescue help for the wards. At the beginning it was difficult to be a member of nursing pool – now most of our members are proud to be in the nursing pool and they show this fact on the wards.” (Deputy Head of the nurse pool)

2.3 The pool as standardization and training institution

At the beginning of the pool in 2002 it was not clear how this would develop and how it could be managed. New tasks and responsibilities emerged throughout the years of pool practice. The procedure has always been that out of collaboration and work practice and new demands or procedures occurred that were reflected and discussed and integrated in the pool portfolio. The nursing pool has established itself as an effective center for human-resource allocation. Disease-related shortages on the wards were significantly reduced. Pool staff assisted wards in very stressful times and overtime work by permanent staff on the wards could be also reduced.

After more than seven years the pool has become a strategic learning and development center for the entire hospital. Nowadays, the pool is recognized as the innovation centre of the hospital in terms of care and therefore it is legitimized as driving force to bring about change in organization and work practice. Innovation by the means of implementing new techniques on the different wards, creating shared standards and a shared understanding; a transfer of methods and principles between the wards; implementing new communication methods and applying new learning principles.

Since in the early years the pool was only recognized as a smoothly acting capacity compensating tool, nowadays the hospital management is more or less entirely aware of the nursing pool's meaning in terms of learning and development. Consequently the pool with its management has a strategic meaning within the hospital. The management delegates strategic tasks, concerning patient care mainly to the pool. Therefore the nurse pool is recognized as a learning and quality standardization institution. For instance the nurse pool prepares quality audits and sets and surveys the standards to be fulfilled. The nursing pool occupies an important role in the accreditation process of the hospital by collecting, systematizing and avoiding potential errors and mistakes. The pool team

creates error statistics in order to adapt job descriptions and operational plans. New care staff is only employed via the nurse pool. Only after a minimum of one year employment within the pool can the nurses change to the wards. In terms of further education or change of employees, ward nurses are trained in the pool for some time before they change to a new field. Such mid-term visiting stays in the pool even go beyond the hospital's borders. The nurse pool described in this case study represents a template for other hospitals. Therefore nurses and managers from other hospitals frequently come for visits, stays and experience exchange. Albeit the nurse pool can be seen as a success story there is still some resistance on the wards and from the care management in charge of the wards. The pool is widely accepted as novice training and capacity compensation tool but not well appreciated as a locus of standardization, quality auditing and innovation. Several wards see a competition with the pool and a loss of power and influence since they consider themselves as the only knowledge and skill basis in their field.

As one of the latest developments the nurse pool management has been assigned to organize and run a new ward for special and interdisciplinary care. The ward is intended to test out new ways of high quality care and high efficiency. The pool nurses operate the ward and directly reflect their experience with the nurse pool management. Although the hospital management supports the nurse pool and is convinced of its benefits, the nurse pool's role in terms of care innovation is not appreciated in an adequate way. This is however not subject to an underestimation of the nurse pool but rather of a lack of a general understanding of innovation in the care process.

The development of the nursing pool can be characterized as an emergent process, which is triggered by the requirements and needs of daily work practice. It is evolutionary and can be understood as an individual and organizational learning process which leads to the emergence of the **learning and innovation platform** "nursing pool". This platform can be deliberately used to develop the quality of care in the three hospitals further. Below this aspect is discussed from a learning theory perspective.

3. THEORETICAL ANALYSIS: THE NURSING POOL AS LEARNING AND DEVELOPMENT PLATFORM OUT OF AN ACTIVITY THEORETICAL PERSPECTIVE

3.1 Basic assumption: Activity theoretical based learning and development

Learning and development processes in organizations are discussed here from an actor-centered and **activity theoretical perspective** (see Lave/Wenger 1991; Brown/Duguid 2001, Engeström 1987, 2001, 2005, 2008). The social community engages a central position in these theories in terms of learning and development through joint questioning and reflecting on work practice. Contradictions are revealed and communicated. However, innovations do not necessarily arise (see West, 2002; Rogers 2003). Therefore, our study refers to an *emergent understanding of innovation* (West 2002; Rogers 2003). In other words: the generation of innovations cannot be planned in detail; innovations rather develop out of collective action and reflection (e.g. Orr 1996).

In terms of innovation two aspects can be seen as crucial and can be conceptualized as innovative capabilities of an organization: the ability to bring about new ideas and to develop them to implementable products, procedures and measurements (West 2002); and the diffusion of the concepts in work practice (Rogers 2003; Singhal/Dearing 2006).

The context or framework conditions are a key factor for the emergence of innovation. The conditions in the hospital case study enabled the pool to evolve into its current role, including the fact that the requirements of the clinic management were very general and the pool management had (and has) a lot of freedom in managing the pool. Nevertheless, the pool staff also experienced what it means if formal structures and guidelines as a framework do not fit to the real needs of the activities and work practice: In 2007 the clinical director pretended to organize the allocation of pool staff along the three clinics rather than on the eight core treatment fields. Each nurse had to then work on all wards, but only in one particular hospital. The exchange between hospitals, even if it was the same ward, e.g. surgery was no longer possible, despite enormous needs in this field. As a result, flexibility decreased in the professional use of skills by 50 percent. After three months the procedure was abandoned - the practical requirements promoted the need for the allocation based on the eight treatment fields. Flexibility is therefore much higher compared to the formal structures of the organization.

Real cooperation relations can be seen as such innovation generating contexts. Likewise, the diffusion process of new ideas and innovations is greatly influenced by the community - diffusion is essentially a social process involving interpersonal communication (see Rogers et al. 2009:419) and collective acting. Real cooperation relations could be described as *communities of practice* (Lave/Wenger 1991; Wenger 2000) or *activity systems* (Engeström 1987, 2001). Activity systems include the acting subject, the object/motive of activity, the used instruments, tools and artifacts, the specific form of division of labor and the community with their implicit or explicit rules of cooperation (Engeström 1987:78). The collective activity system is the basic unit of analysis. This system is a result of specific socio-historical conditions, and represents an ongoing inter-personal interaction mediated by various tools. Activity systems differ from each other through different objects and could be described on different levels of the organization – the organization as a whole or parts of it could be described as an activity system depending on the object.

Triggers for learning and development are contradictions in an activity system, for example, between the existing work practices and new requirements. Regarding our hospital case study, the fact whether pool staff bandages patients differently than usual on that ward, contradictions among established practice of bandaging on that ward will, emerge. Ideally, employees reflect and discuss such contradictions in a participatory process to develop joint solutions to adopt them into their work practice. Thereby, basic assumptions were questioned and the participants thought beyond the boundaries of existing practice.

Therefore, activity systems cannot be viewed as static entities (Engeström 2000a; 2000b; Miettinen 2000). These systems and their constitutive elements are constantly re-constructed in mutual interaction. As mentioned before, contradictions in and between the elements of the activity system triggers their development. From an activity theoretic view contradictions are disturbances, breaks, structural tensions or different understandings. Contradictions do not have to have inevitably negative connotations; rather contradictions point out that something is different in a positive or negative way. Contradictions can be seen as triggers for change and development of work activities (Engeström 2005). Engeström (1987, 2001; also Vygotsky 1978) describes the development of activity systems with the **cycle of expansive learning**. The cycle of expansive development can be described as follows (see figure 1):

- (1) A primary contradiction emerges through problems or interventions in the existing community that question existing practice.
- (2) Analysis of the situation leads to the result that the primary contradiction cannot be solved on the basis of existing understandings and knowledge - a double-bind situation occurs.
- (3) Activity within the community has to be redefined through questioning and changing basic understandings and current assumptions of work.
- (4) The new model of activity has to be implemented, which may cause additional contradictions depending on whether the theoretic assumptions taken in step 3 bear close examination in work practice.
- (5) A change in work practice cannot be seen as a singular action of one individual or group. As noted earlier, a further contradiction is likely to occur when the new practice is established within an organization.

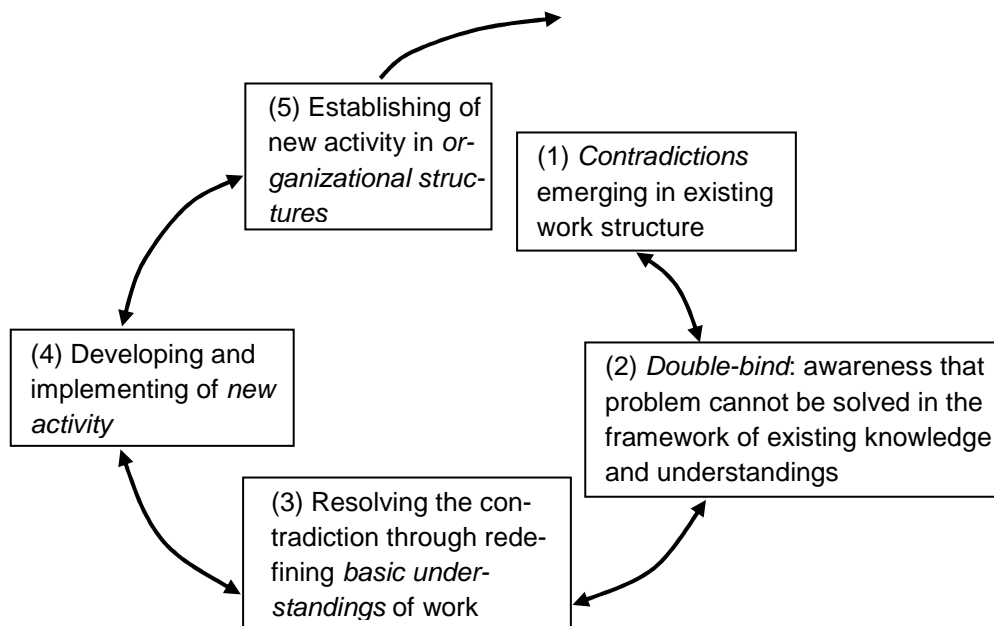


Figure 1: The expansive learning cycle (Engeström 1987; Virkkunen/Kuutti 2000)

Engeström (1987, 2001) considers this cycle of expansive learning to be a process of individual *and* collective development. In other words: employees develop their problem-solving competencies (individual learning) and moreover, work processes can be developed by the ideas of the employees (collective learning). Furthermore, learning and working are mutually interwoven. The single steps of the expansive learning cycle, however, do not have to be followed in succession. Recursive loops may occur at any point. Pool nurses can be seen as early adopters of ideas out of the nurse pool to initiate a new behavior (Rogers et al. 2009:423).

We see the process of how innovation develops as adequately described with the cycle of expansive learning by Engeström (2001). The expansive learning cycle can be seen as a description on how innovation emerge and can be triggered within organizations. Triggers for innovation and development are contradictions in daily life that lead to double bind situations. Hence one of the crucial aspects that innovation can be brought about is contradictions in the work process and the awareness of such contradictions. Such double binds can only be solved through change of basic assumptions (Schulz

2008) of the people involved in the situation. The change of background assumptions is likely to lead to innovation and new developments. According to Engeström the development of new solutions is a collective process involving the whole work system. The process of implementing new activity within an organization can be seen adequately in the diffusion process as described from Rogers (2003). However, it is likely that such innovation or learning cycles fail due to resistance of the surrounding system. Consequently the success of the innovation respective new activity depends on its communication throughout the organization, and several stages of barriers are necessary to be overcome or they can lead to failure of the innovation. Especially, the adoption of something new means the rejection of a previously existing practice (Rogers et al. 2009:422) which might lead to further contradictions.

The expansive learning cycle shows the interrelation between learning and the emergence of innovation: The innovation creating process is inevitably linked with learning and development of the people involved, since they are confronted with the search for a solution and with the change of their basic assumptions and understandings. The concept of expansive learning cycle also emphasizes the strength and power within a community resp. activity system in developing their practices. The concept can be seen as an inside-out approach of change (like the positive deviance approach, see Rogers et al. 2009)³.

3.2 The nursing pool as learning and innovation platform

Out of an activity theoretical understanding of learning and innovative development it can be deduced that employees should be able to reflect together on their work in order to resolve sustainable contradictions which might lead to innovative development. As a learning context, so-called **learning platforms** are a promising conceptualization (Ciborra 1996; Schulz 2006, Schulz/Geithner 2010). The nursing pool in the case study can be seen as such a learning platform. In learning platforms people with different experiences and backgrounds are brought together - for example, nursing staff, which is used at different wards - to discuss their experiences. It is important that all the participants on the platform share a common object of consideration (see Engeström/Blackler 2005; also West 2002). In the hospital case study this common denominator is the care of patients.

A learning platform can be construed from two levels - '*operational practice*' (primary activity) and '*reflection platform*' (secondary activity) (Schulz/Geithner 2010). The platform is institutionalized to enable and foster exchange and cooperation beyond the boundaries of one single ward, department or organization (Kerosuo 2006). It can be seen as a space and time slot for collective acting and discussing apart from daily work on a regular basis. Issues to be discussed are derived from the operational practice of the participants, e.g. different standards in bandaging or different procedures during the morning shifts. Depending on the mutual focus of the participants, the results could be an exchange of singular problems or of complex concepts on specific themes (Ciborra

³ "Positive Deviance (PD) approach is an approach to social change that enables communities to discover the wisdom they already have, and then to act on it." (Rogers et al. 2009:429). Instead of traditional change approaches which discerning the deficits in a community, prioritizing the problems and trying to implement outside solutions (ebd.), PD and expansive learning, both see the role of the expert mainly to facilitate the change process. Both are widely empirical evident; PD more in social change within communities e.g. to combat child malnutrition or curbing the trafficking of girls (see in detail Rogers et al. 2009; Sternin 2003), the expansive learning cycle more in non-economic organizations like health organizations or schools and in state-owned and private companies (see Engeström 2005).

1996; Schulz 2005). Once the platform participants are back at their workplace (e.g. different wards), questions arise in terms of what relevance the cooperation on the reflection level has for operational activities (see also figure 1). Therefore outcomes from the reflection level have to be discussed within each operational group. Ideally innovative ideas and concepts are transferred to the specific operational situation and realized in work practice.

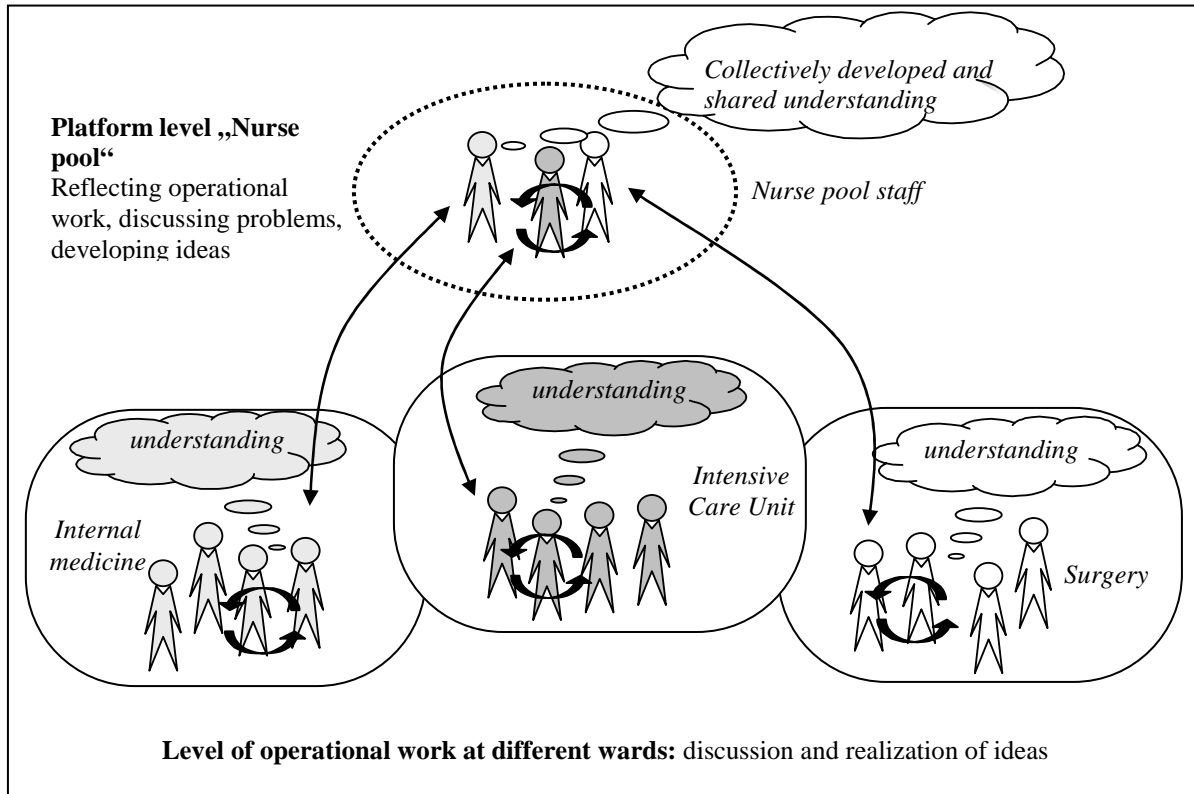


Figure 2: The platform model

The platform level can be seen as locus of learning and innovation in two ways:

- (1) The nurse pool changes and develops over time. Additional tasks are allocated from the pool and allocated to the pool. Therefore innovation of the pool itself emerges out of the practice of its members which is reflected within the pool – namely on the platform level. Such activity can be seen as reflexive (Cunliff/Easterby-Smith 2004), since the system questions itself permanently and changes its direction. Considering the nurse pool as community of practice or better yet, as several communities of practice, the development and learning process of the community goes beyond mere reproduction (Lave/Wenger 1991; Wenger 2000) but is a result of active reflection and idea development. The pool has gone through the cycle of expansive development several times. Over time a shared understanding has been developed among pool members, which facilitates the explication of contradictions within the pool and the development of new activity (Schulz 2008). The critical point with the implementation of such new activity is the role of the environment – namely the wards and possible promoters of the new ideas. In the past innovation or pool development took place mainly in fields where deficits were realized or where tasks were not covered by other institutions within the hospital.

- (2) The nurse pool is responsible for innovating certain practices on the wards. This process can be seen as the typical platform procedure. Ideas and contradictions emerge out of practice, they are discussed on the platform, solutions are developed and tried to be implemented in practice. Very often such new ways of acting provide an innovation for a single ward and therefore the diffusion process of the changed activity is of crucial importance. The nurse pool had the best experiences with the Mister X- method since the resistance on the wards is high. Over time and with increasing competencies of the pool the diffusion process has become less complicated. However a weak point in the innovation process can be seen in the platform level itself, which represents only the pool staff. Hence it should be a future challenge to integrate ward nurses on this level as well. This would ease diffusion and make accessible new sources of ideas.

As seen in the hospital case study the combination between platform and operational practice can be understood as dualism, since problems are sent to the platform where the topics are reflected and assessed. Ideas and solutions are brought about, are transferred back to the wards and are applied in daily work practice of care. Moreover, experiences of implementation can provide feedback and further discussion on the platform level.

However, one should distinguish the following characteristics between platform and operational work practice: On the platform level differing viewpoints come together and cooperation is typified through goal oriented cooperation at a conceptual stage. Discursive processes are instigated through the clarification of contrary standpoints and through the discovery of a mutual solution. At the operational level, daily work requirements dominate cooperation. Platform outcomes are neglected or thoroughly discussed in the light of their benefits for the single ward and its operational practice. Power relations and individual interests have to be taken into account. The experience of the nurse pool case study has shown that it was often more successful if new standards and methods were simply applied by the nurses rather than trying to persuade others to apply them verbally.

It is also important that on the platform-level that topics discussed are concrete enough and can be linked to the existing work practice which increases the acceptance. That means in our case study: It is not about discussing quality standards in general, but instead establishing a specific concrete procedure when changing bandages. For the successful implementation of platform ideas on the wards, it is also useful when various permanent employees alternately and regularly participate on discussions in the nurse pool.

4. CONCLUSION

Our paper outlines how innovation and learning in work systems - the nursing pool of a central hospital - emerged out of the shared experiences and practices of the nurses who belonged to the pool. We described an example of a functioning community of practice that facilitates innovation and learning. The paper shows how the innovation and development process of the nursing pool from a compensation tool to an innovation and learning platform was performed, what contradictions and incidents led to change in thinking and practicing, how the interplay between the nurse pool practice and formal structures and rules was and finally, what the critical diffusion factors were of implementing new practice coming out of the nurse pool in the wards.

The platform model incorporates the theoretical ideas of creating and improving cooperation relations and new forms of activity based on the cycle of expansive learning. From a practitioner's view such platforms can be used as learning or innovation creating devices. They can be institutionalized within one organization or beyond organizational borders (e.g. network platforms). Such platforms can be seen as favourable frameworks to bring about innovative development within existing communities or create new communities. Hence, the conceptual idea of the platform model can be applied to different contexts as shown by experiences in companies (see e.g. Schulz 2005) or networks (Schulz/Geithner 2010).

Meanwhile, the management of the hospital realized the potential of the nurse pool. However, this process of cognition always lagged behind practice – behind the realization of new ideas on the wards based on the experiences of pool nurses. Changes on the wards were already established when the hospital management noticed that. Thus, it can be also noted that the intuitive and implicit development of the work practice went ahead of adapting formal structures, provided that the required freedom for recreating are available. However, the nurse pool is established and legitimated as an innovation center of the hospital. From here, changes and innovations are triggered in the organizational and work practices out of practical experiences. Newly employed nurses start generally in the pool. Nurses who want to change their position within the hospital are trained in the pool and prepared for the different demands of the wards. Regular meetings and workshops are held to discuss the care requirements according to clinical priorities and to establish new standards. The nursing pool is an innovative learning platform now. However, it must also be emphasized that the nurse pool with its management and employees must constantly undergo self-evaluation. At regular intervals strategies, goals and procedures had to be reflected and adjusted. This must also be reported to the formal organization of the hospitals.

Learning platforms such as the considered nursing pool in our case study can be understood as an institutionalized space for reflection and reification of operational working practices. In developing a common understanding, the uncovering and resolving of contradictions are important prerequisites to enable extensive development of persons and groups involved in the organization. In addition, established practices are explicated, analyzed and standardized. The change between operational actions and their reification facilitates learning and innovative development. Formal legitimacy and support by the hospital management is just as important as the professional, methodological and social competence at the managerial level of the nursing pool, the adequate organization of the pool and the personal commitment and willingness of the pool staff.

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