Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Lean task boards in healthcare, an improvement tool for tidying up the local chaos and promote professionalism

Yngve Antonsen (yngve.antonsen@uit.no)
UiT Norges arktiske universitet https://orcid.org/0000-0002-2030-4007
Geir Bye
NORCE Norwegian Research Centre AS

Research article

Keywords: Lean, Lean task board, Healthcare, Learning, Management, Action learning, Routines

Posted Date: September 12th, 2019

DOI: https://doi.org/10.21203/rs.2.14372/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Abstract

Background: A growing number of public healthcare organisations are now implementing the lean task board as a qualitative improvement tool to help solve problems and reduce wasteful work tasks. The task board itself helps line managers and employees to manage, collaborate and prioritize as it can present tasks that are upcoming, in progress or finished. With this focus, the presented paper's research question is: How do managers' and employees' use of the lean task board promote learning for improvement in the municipal healthcare sector?

Method: Qualitative case study data from a Norwegian municipality including 750 internal self-recorded logs from task board sessions from six different units and 25 semi-structured interviews of managers and employees. The data were organised based on content and recoded by comparing the codes and finding abstract theoretical patterns.

Results: The task board works for line managers to make employees responsible for forwarding ideas, solutions and implementation of new actions. Line managers and employees used the task boards to systemise work through establishing new routines and focus on improving tidiness at work. The task boards were also used as a project management system to track progress in purchasing of diverse equipment and initiatives to improve the units' facilities. Line managers and employees also set professionalism on the agenda, discussing and improving both daily attitude, work environment and user's well-being. Senior management with a long-term strategy, support for line managers, and allocation of resources was essential to the implementation of the task boards.

Conclusion: The implications from the study are that the lean task board is well suited to promote learning processes that tidy up chaos in local healthcare organisations. Drawing upon action learning theory, the study explains the learning challenges of using the lean task board in municipalities' healthcare systems, as the method promotes finding experience-based solutions that do not involve critical reflection and use of theory. The task board has limitations as a method for improving services between healthcare units and for solving difficult problems. In light of the findings further investigation is still required to elicit how municipalities organize improvement through lean methods.

Background

The public sector in the Nordic countries faces an aging population combined with demands for better content and quality in their healthcare services [1]. A growing number of public healthcare organisations are now implementing the lean task board as a tool to help solve problems [2]. Lean is a collective term for specialist tools and techniques where employees and managers, based on their own experience, aim to reduce wasteful work tasks and enhance effectiveness [3]. The lean task board is a tool for line managers and employees to prioritize and improve work practices and to accomplish shared objectives in municipalities. It is a visual tool that helps departments or organizations to present tasks that are

upcoming, in progress or finished. The tasks are shown on 'cards' and can be arranged either as few columns drawn on a board or visualised at multiple levels of organization.

The use of lean task board may promote improvement and empowerment [4] that is in line with in-organisational action learning theory [5] that explains how learning from employees and managers creates a base for identifying, creating and implementing better work practices [6, 7]. Action learning means to 'tackle important organisational or social challenges and learn from their attempts to improve practice' [8]. However, it is challenging to go from action learning to actually implementing new organisational practices as organizing naturally reduces variety and stability [9]. To utilize action learning, both employees and managers need to take action and initiate organisational learning [10], which is defined as 'changes in organizational practices (including routines and procedures, structures, technologies, systems and so on) that are mediated through individual learning or problem-solving processes' [11].

According to a review by de Souzas [12], we lack studies that have a critical perspective on the use of lean tools in healthcare. There is also a lack of qualitative case studies that investigate how lean tools, such as the lean task board are implemented and used [13]. In addition, we need to understand how the use of these tools may promote action learning among line managers and employees that will result in new practices [2]. This qualitative case study of a medium-sized Norwegian municipality was based on the following research question: How do managers' and employees' use of the lean task board promote learning for improvement in the municipal healthcare sector?

This article starts with a literature section describing municipalities' challenges both from the New Public Management (NPM) reforms and from implementing lean. We then present our analytical framework that is the theory of action learning in organisations. The Methods section describes the case, data collection and analysis. We present findings in the Results section. The Discussion section elaborates on the use of lean task boards for action learning in the public healthcare sector. We summarise our main findings in the Conclusion.

The context: NPM in municipalities healthcare

Healthcare services is complex organisations that operate 24/7 with demands to improve quality and efficiency. Norwegian municipalities healthcare sector is organized and lead by professionals [14]. Public organisations' traditions for management with rules and bureaucracy may hinder line managers and employees' participation in processes aimed at improving organizational practices. In addition, the NPM reforms in Norway have resulted in reinforced fragmentation, decentralization and downsizing of organizational structures [14]. NPM emphasises efficiency, quality and standardisation of services [15]. The model is said to facilitate unbiased, impartial and fair distribution of services [14]. The NPM reforms have introduced more managerial tasks and performance management that give the line managers a more administrative and distant leadership role in the healthcare sector [16]. Thus, the professional judgements, concerns, deliberations and know-how are marginalised, and decisions have largely been based on formalised criteria, classifications and service statements [17].

The NPM reforms are criticised as not being flexible enough to take into account rapidly changing needs and contextual influences on, for example, care burdens [17] The reforms have also created a range of problems and a silo mentality in municipalities [17]. Different units have developed their own routines and work independently of the rest of the organisation [18]. Implementing new welfare technology, for example, in healthcare can create better practices but requires co-operation from human resource departments, information technology departments and several units in healthcare to establish common routines [19]. In sum, the NPM reforms have increased the need for learning horizontally in healthcare units in municipalities.

Lean in public sector

The lean method is a well-known normative total quality management system developed by the Toyota Motor Corporation for bringing a culture of continuous improvement to organisations. [20]. Radnor and Walley [21] argue that lean may be useful for creating low-cost improvement and efficiency in the service context in the public sector. Success in using lean is dependent on the development of structures, mindsets and systems that contribute to a continuous improvement culture [21].

However, lean implementations have yielded varying results, and this may be because the public sector delivers service based on capacity with limited possibilities to influence demand [21]. A review study of empirical evidence from healthcare revealed that lean practices does not involve the whole organisation, but was limited to small success stories where one or two tools have been implemented [13]. One challenge is the transformation from idea and concept into local practice where research has shown that the implementation process and use of lean varies [22, 23]. Research reveals that management commitment, allocation of resources [24] and strategic capabilities increase the effect of using lean in public healthcare organisations [23]. Managers matter because leadership includes setting aside time for improvement work and the facilitating of individual and collective efforts to work towards shared objectives and visions [25].

Suarez Barraza, Smith and Dahlgaard-Park [20] have documented how the use of a lean tool in the Spanish public sector have significantly improved organisation, resulting in better order at work areas, saved space and resources and reduced time of response to requests from citizens. Employees and managers both contributed to identifying low-cost changes and were committed in their efforts to change practices. Barriers for using lean methods were the lack of a constant strategy which resulted in traditional public management ‘firefighting’ and the lack of operationalisation and institutionalisation of lean in strategic, operational and public management systems, which decreased the focus on the improvement of work. Also, line managers who did not support the lean initiative made it difficult to find solutions across classical organisational barriers [20]. Thus, the use of lean task boards in municipalities may not solve horizontal coordination and wicked problems resulting from the NPM reforms [13].

Action learning in organisations—an analytical framework

Action learning describes the process where individuals are encouraged and supported to reflect on their experiences together with peers, which is aimed at improving their actions [7]. In the process, reflection is used to make tacit knowledge more explicit and to solve problems in the workplace [26]. Individuals can also work together with change proposals to improve their actions in the organization [27]. Action learning in municipalities demands space and time for collective reflective learning between managers and employees [28]. Lean uses the participants' actions and experience as a starting point, and learning from these processes can be a method that promotes action learning in the organisation.

We describe the process of action learning based on a modified version of Tiller's reflective learning stairway model [29]. The purpose of the model is to create an analytic tool to investigate the level of learning that employees and line managers initiate from using lean task boards. Learning can start on all levels in this theoretical model, and it is possible to go up or down or even skip steps in the process. The results of any level of action learning at work may result in following the established practices and reveal barriers to new actions [7] or creating new practices or new routines.

SET IN FIGURE 1 ACTION LEARNING STAIRWAY HERE

Each step in the action learning stairway includes the following learning processes:

- In professional work, reflexivity is a part of action or concurrent with individual action- reflection after action [30]. Loose talk about individual work experiences among colleagues creates a potential for action learning.
- Experiences need to be block sorted, categorized and systemized to identify main patterns in the organization to promote action learning progress and to avoid ending up in an experience talk loop [29]. Block sorting and systemizing of experiences involves dialog and discussions, and this learning is experience-based.
- Connecting experiences to theory and new concepts may uncover challenges, patterns, power relations or social differences [29]. The process gives a deeper understanding of the practice in the organization and creates potential for action learning.
- Critical reflection can be stimulated from action learning [7]. Critical reflection does not have to focus on the how-to of action but on investigating why we act as we do and the consequences of our actions [31]. Critical reflection involves trying to 'uncover and investigate our paradigmatic, prescriptive and causal assumptions that inform how we practice' [32]. Critical reflection in organisations touches on power relations and political contexts that can utilize new solutions to problems, such as wicked problems, or on the contrary, reveal conflicts and problems that cannot be solved [7].

New practices can be developed and implemented based on single-loop learning, which is described as simple adjustments to routines without thorough analysis, or double-loop learning, which involves total adjustments based on assessment of strategies and values [33]. Pedler and Abbot [27] distinguish between type 1 or type 2 actions. They argue that type 1 actions solve our normal work tasks, while type 2

actions involve changing a system or implementing new practices. Continuing type 1 actions involves little risk and does not involve the improvement of work. Type 2 actions are risky as they can contribute to mistakes.

The participants in these processes will limit or increase the possibilities for action learning from experiences from three levels: the individual employee, the unit and the entire organisation.Action learning among employees and line managers in single units limits the possibility to share experiences and produce system change across the whole organization [27]. The inclusion and support from line managers, senior managers and participants from other units and sectors increase potential to discuss issues such as new changes across organizational boundaries.

The literature review indicates that the use of the lean task board could increase experience sharing that may result in type 1 or single-loop learning inside units, while solving wicked problems would demand connecting experiences to theory and critical reflection that result in double-loop learning or type 2 actions.

Methods

In this case study, we analysed qualitative data to develop analytical generalizations of the use of lean in the Norwegian municipal healthcare sector [34].The data were from one municipality with 20,000–25,000 inhabitants above the Arctic Circle that has deficits. Norway has received top ratings on socio-economic factors, such as democracy, co-determination [35], education and competence development in working life [36].

The second author of this paper and an external researcher collected interview data over a three-year period (2015 to 2017). An open-ended semi-structured guide [37] was used to investigate the experiences with the use of lean task boards (Additional file 1). The interviews lasted from 30 to 60 minutes, and all were taped and transcribed. The informants came from various levels in the organisations, and all had experience, or made decisions, related to the implementation of task boards in the municipalities. The HR manager, two line managers and two members of the internal project team were interviewed two or three times during the project to capture changes in the implementation process. In addition, employees concerned with or involved in implementing lean task boards in different units were interviewed. A total of 25 interviews were conducted.

The target of the qualitative analysis was to capture the perceived interpretative realities of the actors. The first author of the paper categorized the data and discussed the findings with the second author. The data software NVivo 11 was used to organize and code the transcript data. First, the data were interpreted inductively by sorting all similar statements together with broad-brush or bucket coding [38]. To determine overarching themes, the process included coding whole sentences and sequences based on their content. We used process memos to write down researcher reflections with the purpose of generating ideas for categorising the data [39]. After the initial bucket coding, the material was recoded by merging similar codes or deleting codes with few statements.

Next, the first author sorted the categories to reveal relations in NVivo 11 by comparing the codes and finding abstract theoretical patterns in the data [39]. The codes that were qualified contained statements that were used frequently and that explained actions and processes that the informants found important. Both researchers then used a large whiteboard as a creative visual tool for finding and qualifying an explanatory relation among the categories [34].As the two researchers found consensus, this triangulation strengthened the inter-rater reliability of the analytical work.

After the interview data analysis, the municipality provided internal self-recorded logs from task board sessions from six different units. The data from the recordings described sessions, problems discussed and solved and who was responsible for following up the processes (see Table 1).

Table 1 Overview of unit use of lean task boards

Unit and duration of lean task board use	Number of sessions	Problems discussed	Problems solved	Problems in progress	Problems not solved
Day centre for developmental disability (2016–2017)	58	261	255	5	1
Home care service (2016–2017)	34	116	112	4	0
Nursing centre A (2015–2017)	26	101	49	51	1
Nursing centre B 2015–2017)	40	125	111	13	1
Auxiliary centre for youth and kids (2017)	20	90	74	15	1
Health centre (2017 Sept.–Nov.)	12	33	15	17	1
Total	190	726	616	105	5

The analysis of the qualitative interview data offered theoretical ideas for looking at patterns in the internal registration. Both researchers sorted similar sessions into substantive categories [39] based on what kind of reflection and learning processes they contributed to, for example, establishing new routines, tidiness, organising work, purchasing and improvement of the facilities. We then aggregated theoretical categories that further explained the data [39]: these are systemising, management and professionalism. The registration, together with the analysis of the qualitative data, gave us a deeper understanding about using lean task boards. The qualitative interview data was more positive about the value of lean task boards for action learning than opinions expressed in the recordings. A weakness in the recorded task board sessions is the high number of short descriptions and lack of precision. As the units had solved so many problems, there is a concern that self-assessment resulted in the overreporting of positive results.

Results

Senior management's intentions of using task boards to create continuous improvement

In 2010, the case municipality initiated a management development program for all managers about how to stimulate action learning processes in units. Senior management hired an external national consultant company to present, deliver and train key personnel in using the task board. The municipality first started with lean value stream mapping [40] to identify challenges and possibilities in 35 different work flows. After identifying and initiating quick-fix improvements, the senior management then ordered the implementation of the lean task boards for the improvement of work inside single units.

In the implementation phase, the task board method was adapted with some changes to make the boards easier to use in the municipality. The task board was also renamed to 'continuous improvement' in the municipality. The task board became the strategy and method to plan, do and implement other projects, and the new name made it more relevant for the municipality's ambition to be a learning organization. By the end of 2015, the municipality had seven task boards in use, and through 2016 this number increased to 30 and by September 2017 the municipality had introduced a total of 49 task boards, 25 of which were in the healthcare sector.

There are now 22 units that use the task boards regularly and write down lists for improvement. As such, over fifty percent of the units do not use the task board regularly for a variety of reasons.The senior management spoke positively about the implementation process as illustrated in the following quotations in Table 2.

Table 2 Senior management's expectations for lean task boards

If we look at it in the simple manner, then there is the improvement board that is the drive/hub in the improvement process (senior management).	The improvement board is the most important meeting point between management and employees. It is through this meeting point that you talk about continuous improvement and make staff responsible. The methodology rolls through the meetings (senior management).	I spend more time at other meetings and have a better time doing other tasks. You have to show employees that you believe in the board and use it regularly. If you do not follow up on the action list, people will see that it is not beneficial to take action and then it ends their interest. I have delegated the responsibility, but I like to keep doing the task board meetings as a leader every month to be visible (line manager).

The quotations highlight an expectation from senior management that the task board methodology would help line managers to establish improvement and change on the agenda in their daily work. Senior

management funded two internal project leaders with the responsibility for giving support to line managers in using the task board. According to our contacts, the internal project team gave essential support and supervision to line managers and employees in their use of the task board.

Systemizing work, management and being professionalism

Line managers that used the task board regularly expressed that it was a concrete method to carry out improvement work during stressful workdays. Throughout the week, employees and line managers wrote down and reported problems and issues they wanted to solve. For each weekly session, the participants then picked from one to four of these recorded problems to solve. Line managers argued that using the task board gave opportunities to acknowledge the ideas from employees and to delegate the responsibility for improvement to employees and make them accountable for change.

The analysis of the self-recorded sessions reveals the task board sessions across the units were about systemizing work, management and professionalism. In Table 3, we present our findings, including substantive categories and theoretical categories.

SET IN TABLE 3 HERE

The solutions from the lean processes included giving a message, simple purchase of needed equipment or the need of the employees to work according to established routines or establishing new routines. There were small variations among the units, where some reported working more on routines and tidiness or purchasing, while others worked more on organising work and professionalism. The trend is that the systemising of work is the major part of the material, with professionalism the least considered factor.

Systemising work

Suggestions and solutions about systemising work is characterised as implementing new routines and tidiness. Line managers and employees plan to introduce new practices or set a focus on following established routines in every part of their work, for example, the handling of laundry, reports, planning and messages. All employees in the units are responsible for effecting the new routines.

Tidiness is more about systems and easier access to necessary equipment in, for example, the users' room and medical lockers. The study participants expressed that the results from these streamlining processes resulted in more effective work. The quotes in Table 4 express this.

Table 4 Tidiness

You move the handcuffs into the nursery rooms, and this reduces the walking distance for those employed, and make such processes easier. You do not think about this daily, but when you clean the rooms, you have things available. Small things, of course, but nothing helps before putting it in a system (line manager).	They proved to save time, so they can spend more time together with the kids for play and interaction (senior manager).	At the technical aids centre, they did a process to systemize the aids, so, after that, less time was used to find the aid. So much faster in and out time. It benefits the users (senior manager).

In sum, the line managers and employees expressed that the processes resulted in better order and work flow. Better cleaning and cleanliness were also discussed and related problems solved. The result of these systemising processes is improved service quality for the users. The need for routines and tidiness may also be connected to a need for employees to be more professional in solving their work tasks.

Management

The category ‘organising work’ captures issues, such as improving work, distribution of the work force and better service for the users. Such discussions also included quality improvement, for example, the handling of medicine for users. These processes involves reflections that systemize experiences to improve the daily practice and organizational routines of managers and employees.

The category 'purchasing and improving the facilities’ captures all kinds of new equipment or much needed purchasing that were on the agenda in the task board sessions. The task includes a wide range of things that are missing or broken to new things that will improve the work or the quality off the service delivered to the users. Also, purchasing of groceries for the units was on the agenda. Employees also discussed how they could improve the rooms and maintenance of facilities on the agenda. All these subjects we coded as management based on employees who themselves sorted their own experiences to work on improving the daily organising of work and the facilities.

Professionalism

Professionalism involves sessions about the daily attitude among employees and projects for users. Daily attitude involved experience sharing about inappropriate behaviour by employees related to users or relatives. Poor communication and solving daily work tasks, such as writing the obligatory reports, were also discussed. The use of task boards also improved the economy in the units. For example, a unit had gone from big deficits to balancing their budget after using the lean task board. After discussions, the healthcare unit reduced both overtime work by fifty percent and sickness absenteeism among employees. The following quotes in table 5 illustrates how sickness absenteeism and values also may be discussed between line managers and employees in other units.

Table 5 Professionalism

We define goals to work for with self-assessment where the employees consider if they have contributed. We describe who will solve what and when (preparation). Employees make plans for implementation and create sickness absence statistics. We focus on improvement regularly. When you have the goals and the history on the board, it makes the message very clear. We have reduced sick leave from 20% to 10–12% (line manager).	Yesterday, we had a great reflection round on our values, because people do not fully commit to them. We wanted to reflect on some values using the task board. But now, when we start, they say they want other values, and it is clear that they will get other values. Now, we will work on the new values (line manager).

The line managers expressed that they were satisfied with the new changes, and this produced a generally more positive work environment among employees. Some line managers found that they could change their own leadership performance as they were able to delegate responsibility and more easily follow up improvement from employees. Using the task board created expectations among employees that there would be changes initiated in practice that the line managers should support. However, being professional involves critical reflection that was seldom captured in the task board sessions.

Employees also discussed new activities for user's well-being in the task board sessions. The discussions were about following established routines such as life mapping history, having cakes on Sunday or helping the users to make dinner. In sum, being professional is also about solving planned tasks and following established routines to increase quality.

Systemizing, management and professionalism create potential but not necessarily action learning

The use of task boards did not inspire line managers and employees to monitor and pay attention to practices that where challenging across units. All the units created their own routines and changes, and they possibly increased a variety of practices and fragmentation within the municipality's healthcare sector. The new effective practices and routines in each unit did, however, result in organizational 'slack' that in the future could be utilized to identify and reflect on new practices. These ideas were expressed in the statements by participants shown in Table 6.

Table 6 Potential for action learning

When we improve our systems, people start to reflect on their work. It has not been systematically done properly before. Now it is so that when you have a challenge, they can dedicate it to the board, you can say 'we can solve this' not in a month or so but in a week (line manager).	Discussions about our need for a new coffee pot, can train employees on subjects like how to make better routines for the drug trolley. Employees take the step further with experience. The process depends on how leaders manage to set professional subjects on the board agenda. It is about training and awareness. As a leader, I want the board sessions to include discussions that are more professional. I see that some managers are not there yet (senior management).	Having a tool gives better management. You have something to begin with, you ask questions about the culture and you get hold of things and get positive experiences. Then, you'll start up with big things. Here the board works, it structures practices (senior management).

The findings indicate that after identifying and implementing new effective organizational practice, the participants acquire knowledge that gives a potential for deeper reflective learning and critical reflection. However, the use of the task board in units has not resulted in action learning processes across units. There were no examples in our data suggesting that the use of the task boards solved wicked problems within or between units. This is also supported by the fact that line managers and the lean support team were thinking about using service design methods to map and change working processes.

Discussion

The study revealed that the senior managers had an expectation about the task board being a tool for line managers in setting learning and improvement work on the agenda. Senior managers that believed in the idea of lean thinking were a driving force in implementing and following up the task board, a finding supported by Savolainen and Haikonen [24]. The findings also confirmed that line managers and employees need an internal support team that helps them in competence building and gaining needed advice for using the task board in practice.

The line managers that used the task board to set improvement work on the agenda, acknowledged the ideas from employees and delegated the responsibility for improvement to employees and made them accountable for change. Line managers are key sources for implementing lean in our case, a finding also documented by Rahbek Gjerdrum Pedersen and Huniche [3].

The line managers and their employees used the task boards for improving tidiness and work routines in the healthcare units. The task board also functioned as a project management system where management and work issues, such as distribution of work, daily purchasing, daily attitudes, work

environment and user's well-being, are all on the agenda. The use of the task board also involves reflection about the possibilities for better organization of employees for solving the daily work tasks inside the units. Employees first identified quick-fix problems that improved the effectiveness, order and quality of the service, as documented in [20, 21]. Line managers and employees gained valuable experience from starting to follow existing routines or implementing new routines and this led to establishing a continuous improvement culture in the units.

The need for systemising work and daily management may have come down to the healthcare units' need for rotation among employees to the different users 24/7. The healthcare units also used some temporary staff because of a high rate of absenteeism. The need for routines, management and discussions of professionalism are connected. To follow or adjust routines, there is need for stability and professional employees, and the line managers used the task boards to address professionalism in the form of employees' behaviour and quality for the users. These improvements seem in line with lean's operational focus aiming for efficiency, flow and quality [3]. The lean task board promotes an operational focus on systemizing, management and professionalism in the healthcare units.

The analyses reveal that the level of action learning and the new implemented changes in the organisation are based on 'loose talk about experiences' and that 'experiences are block sorted and systemized'. The reflections may be characterized as 'productive-oriented' [41], as they are about solving and improving details in our daily work tasks in the form of type 1 learning [27] or what Van Woerkom [26] calls 'narrow learners'. Employees' reflections based on experiences provides small incremental improvement that we characterise as single-loop learning, which has also been found in studies from Finnish companies [24]. As such, lean did not promote learning processes that involve theory and critical reflection. The twenty minute long task board sessions that included several problems to be discussed also limited the time that was needed to actually engage in critical reflections.

After employees and line managers make simple improvements and systemize routines and tidiness, there is potential for action learning. However, intra-organisational learning from employees' experiences, which streamlines work in the organization, will not necessarily produce new creative solutions. Also, focusing on positive effective solutions from employees and line managers may camouflage and reject other learning possibilities and critical thinking in the organisation [42].

In our case, the task board was not designed for working on intra-organizational development across units, although there where such ambitions from senior management. A reason for the lack of cross unit processes may be that the lean task board was translated into the case as a copied tool from lean, keeping the lean philosophy out of the processes [23]. Using tools in single units seemed easier than implementing lean philosophy across the whole municipality. Lack of reflection and suggestions about system improvements may also come down to the complexity of public service or that the organization lacks basic stability in form of employees [21]. The NPM reforms have created wicked problems within and between units, and to solve these, there is need to address potential solutions from different positions and units in the organisation. Addressing wicked problems inside the organisation may

demand other tools and other approaches. Also, if the use of lean only focuses on systemizing experiences, this neglects the possibility to learn from theory developed from research about municipalities or other organisations.

Conclusion

Various approaches have been used for investigating the effect of lean in healthcare, for example, the transformation from idea to practice [23] and the effect on patient flow or organization studies that focus on the strategic planning [12]. This article has an operational focus investigating the research question: How do managers' and employees' use of the lean task board promote learning for improvement in the municipal healthcare sector?

The study reveals that the line managers and employees used the task board to set aside regular time and space for improvement, even in busy work environments. The task boards are helpful for line managers as a project management system to keep track of progress in experience-based learning that improves work and quality. Line managers that are pressed for time to initiate improvement work [16] use the lean task board regularly to initiate learning processes that optimize work through routines, tidiness, purchasing and improving the facilities, organising work, daily attitude, work environment and users' well-being. The task board works well for making employees responsible for ideas, solutions and implementations of new actions that promote more systemized work, management and professionalism. Thus, the employee-driven processes reduce 'hassle and annoyance' and improve routines and effectiveness and, as such, create more stable work conditions in single units, as was also found by Radnor and Walley [21].

This study's use of action learning theory revealed that employees write ideas for improvement based on loose talk about experiences and then block sort and systemize their experiences and come up with new ideas to be implemented. Even though the senior managers and line managers attended a common management program aiming at enhancing action learning in the organization, the use of the lean task board did not promote action learning where experiences were connected to theory and promoted critical reflections. There were no data that indicated that the group process involved promoting different views. Task board sessions were limited to 20 minutes, and this may have been an obstacle to action learning.

The level of organizational learning from using the lean task boards was characterised as type 1 [27] or single-loop learning [33] inside the units. Although we found that the use of the task board method was spread across units, new ideas and routines from the sessions were not spread to other units. Line managers and employees expressed that, as they got more experience in using the task board, its use did improve the level of discussions and processes. Also, although systemizing work, better daily management and professionalism may give a foundation for more and deeper action learning later [21], such processes were not evident in the analysis of the material in this study.

This case study has natural limitations as we only studied one municipality [34]. However, the study indicates that units that have order, routines and stable work conditions in their everyday practice will

gain limited benefits from using the lean task board for the improvement of work, as it primarily systemized work and promoted single-loop learning in the municipality studied. Thus, we argue that the task board method has limitations as a means for promoting double-loop learning that needs input from theory and critical reflection.

The challenge of municipal healthcare is that the NPM reforms have created fragmentation and the need for the improvement of processes across units [14]. The wicked problems resulting from the reforms in the Nordic municipalities cannot be solved by using the lean task boards as a single strategy for development. A strategy focusing on using task boards inside single units may strengthen fragmentation and in the long term hamper the development of the organization. As such, how the municipalities organize improvement through lean or other methods needs to be further investigated by researchers.

Abbreviation

NPM - New Public Management

Declarations

Ethics approval and consent to participate

The study is approved by the Data Protection Official for Research in Norway that is NSD - Norwegian Centre for Research Data, Co/ University of Bergen, Harald Hårfagres gate 29, N–5007 Bergen, Norway. Email:nsd@nsd.no, Tel: 00 47 55 58 21 17.

The reference number for the project Employee-driven innovation in the municipalities—from theory to practice is: 44921 - Medarbeiderdrevet innovasjon i kommunen: fra prosjekt til praksis.

The NSD - Norwegian Centre for Research Data procedure accepts verbally informed consent to participate in studies that do not collect and storage sensitive personal data. For the consent to be valid, it has to be voluntary, explicit and informed. All the participants were given individually a written request for informant consent in the research project (Additional file 2) and a verbal presentation of the study and the handling of data anonymity. All the participants agreed verbally and voluntarily to participate. The municipality, in were our participants worked, was a contracted partner in the application for funding and in carrying out the study.

Consent for publication

“Not applicable”

Availability of data and materials

The datasets generated and/or analysed during the current study are not publicly available due to demands for informant anonymity. The dataset, in Norwegian, are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

Funding

The project “Employee-driven innovation in the municipalities—from theory to practice was funded by the Regional Research Fund—North and Regional Research Fund Vest, The Research council of Norway. The funding was essential in the design of the study and data collection. The funding ended and played no part in the analysis, and interpretation of data and in writing the manuscript.

The publication charges for this article have been funded by a grant from the publication fund of UiT The Arctic University of Norway.

Authors’ contributions

- YA made substantial contributions to conception and design of the paper, analysis and interpretation of data;
- YA drafted the manuscript;
- YA given final approval of the version to be published. YA have participated sufficiently in the work to take public responsibility for appropriate portions of the content; and
- YA agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.
- GB made substantial contributions to acquisition of data, and interpretation of data;
- GB been involved in revising the manuscript critically for important intellectual content;
- GB given final approval of the version to be published. GB have participated sufficiently in the work to take public responsibility for appropriate portions of the content; and
- GB agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

All authors have read and approved the manuscript.

Acknowledgements

The authors want to thank associate professor Toril Ringholm (PhD) for conducting some of the interviews during the study.

References

1.Helse-og omsorgsdepartmenet: *Morgendagens omsorg (St. meld. nr. 29 (2012–2013).* In.*;* 2013.

2.Madsen DØ, Risvik S, Stenheim T: *The diffusion of Lean in the Norwegian municipality sector: An exploratory survey. Cogent Business & Management* 2017, *4(*1):1411067.

3.Rahbek Gjerdrum Pedersen E, Huniche M: *Determinants of lean success and failure in the Danish public sector: a negotiated order perspective. International Journal of Public Sector Management* 2011, *24(*5):403–420.

4.Vidal M: *Lean production, worker empowerment, and job satisfaction: A qualitative analysis and critique. Critical Sociology* 2007, *33(*1–2):247–278.

5.Cressey P: *Collective reflection and learning: From formal to reflective participation.* In: *Productive reflection at work - Learning for changing organizations* edn. Edited by Boud D, Cressey P, Docherty P. London: Routledge; 2006: 54 - 66.

6.Fenwick T: *Understanding relations of individual collective learning in work: A review of research Management Learning* 2008, *2008(*39):227- 243.

7.Vince R, Abbey G, Bell D, Langenham M: *Finding Critical Action Learning Through Paradox: The role of action learning in the suppression and stimulation of critical reflection. Management learning* 2018, *49(*1):86–106.

8.Pedler M, Abbott C: *Facilitating action learning: a practitioner's guide:* McGraw-Hill Education (UK); 2013.

9.Weick K, Westley F: *Organizational learning: affirming an oxymoron.* In: *Handbook of Organization Studies.* edn. Edited by Clegg S, Hardy C, Nord W. Thousand Oaks, CA: Sage Publications; 1996: 440–458.

10.Høyrup S: *Reflection as a core process in organisational learning. Journal of Workplace Learning* 2004, *16(*8):442–454.

11.Ellström P-E: *Integrating learning and work: Problems and Prospects. Human Resource Development Quarterly* 2001, *12(*4):421–435.

12.Brandao de Souza L: *Trends and approaches in lean healthcare. Leadership in health services* 2009, *22(*2):121–139.

13.Hallam C, Contreras C: *Lean healthcare: scale, scope and sustainability. International Journal of Health Care Quality Assurance* 2018, *31*:00–00.

14.Christensen T, Lægreid P: *NPM and beyond–leadership, culture, and demography. International Review of Administrative Sciences* 2008, *74 (*1):7–23.

15.De Vries M, Nemec J: *Public sector reform: an overview of recent literature and research on NPM and alternative paths. International Journal of Public Sector Management* 2013, *26(*1):4–16.

16.Kristiansen M, Westeren KI, Obstfelder A, Lotherington AT: *Coping with increased managerial tasks: tensions and dilemmas in nursing leadership. Journal of Research in Nursing* 2016, *21(*7):492–502.

17.Vabø M: *Reformtrender og endringsparadokser.* In: *Velferdens organisering.* edn. Edited by Vabø M, Vabo S. Oslo: Universitetsforlaget; 2014.

18.Lægreid P, Roness PG, Rubecksen K: *Performance management in practice: The Norwegian way. Financial Accountability & Management* 2006, *22(*3):251–270.

19.Cascio WF, Montealegre R: *How technology is changing work and organizations. Annual Review of Organizational Psychology and Organizational Behavior* 2016, *3:*349–375.

20.Suarez Barraza MF, Smith T, Mi Dahlgaard-Park S: *Lean-kaizen public service: an empirical approach in Spanish local governments. The TQM Journal* 2009, *21(*2):143–167.

21.Radnor Z, Walley P: *Learning to walk before we try to run: adapting lean for the public sector. Public money and management* 2008, *28(*1):13–20.

22.Røvik KA: *From fashion to virus: An alternative theory of organizations' handling of management ideas. Organization Studies* 2011, *32(*5):631–653.

23.Andersen H, Røvik KA: *Lost in translation: a case-study of the travel of lean thinking in a hospital. BMC health services research* 2015, *15(*1):401.

24.Savolainen T, Haikonen A: *Dynamics of organizational learning and continuous improvement in six sigma implementation. The TQM Magazine* 2007, *19(*1):6–17.

25.Yukl G: *Effective leadership behavior: What we know and what questions need more attention. The Academy of Management Perspectives* 2012, *26(*4):66–85.

26.van Woerkom M: *The concept of critical reflection and its implications for human resource development. Advances in Developing Human Resources* 2004, *6(*2 Mai):178–192.

27.Pedler M, Abbott C: *Lean and learning: action learning for service improvement. Leadership in Health Services* 2008, *21(*2):87–98.

28.Garvin DA, Edmondson AC, Gino F: *Is yours a learning organization? Harvard business review* 2008, *86(*3):109.

29.Tiller T, Helgesen S: *Bedre leder. Lederutvikling gjennom reflektert erfaring:* Cappelen Damm Høyskoleforlaget; 2011.

30.Schön DA: *The reflective practitioner - How professionals think in action.* London: Ashgate; 1991.

31.Mezirow J: *How critical reflection triggers transformative learning. Fostering critical reflection in adulthood* 1990, *1:*20.

32.Brookfield S: *Engaging critical reflection in corporate America. Transformative learning in practice: Insights from community, workplace and higher education* 2009:125–135.

33.Argyris C, Schön DA: *Organizational Learning II: Theory, method, and practice.* Reading, Mass.: Addison-Wesley; 1996.

34.Yin R, K: *Case Study Research: Designs and Methods,* vol. 5, 4. edn. Thousand Oakes, California: Sage; 2009.

35.Nergaard K: *Trade Unions in Norway: Coordinated Wage Bargaining and Workplace Level Co-determination:* Friedrich-Ebert-Stiftung, Department for Central and Eastern Europe; 2014.

36.OECD: *OECD Reviews of innovation policy: Norway 2017.* 2017.

37.Kvale S: *Doing interviews.* Thousand Oaks: Sage; 2008.

38.Bazeley P: *Qualitative Data Analysis with NVivo.* London: Sage Publications; 2007.

39.Maxwell JA: *Qualitative research design: An interactive approach,* vol. 41. Thousand Oaks: Sage publications; 2012.

40.Rother M, Shook J: *Learning to see: value stream mapping to add value and eliminate muda:* Lean Enterprise Institute; 2003.

41.Nicolini D, Sher M, Childerstone S, Gorli M: *In search of the "structure that reflects": Promoting organizational reflection practices in a UK Health authority.* In: *Organizing reflection.* edn. Edited by Reynolds M. London: Routledge; 2004: 81–104.

42.Hackman JR: *The perils of positivity. Journal of Organizational Behavior* 2009, *30:*309–319.

Table 3

Table 3 Analysis from documents and interviews

Central subjects from document analysis	Substantive categories	Theoretical categories
- Improving the systems of laundry, medicament delivery, week plans, reports, messages, order sheets, teeth care cards, nonconformity, procedures for fire watch, infection control routines, ordering taxi for users, cleaning users' hearing aid, diapers.	Routines	Systemising work
- Tidiness in linen closets, desks, rooms, medical lockers, medical cards, refrigerator, laundry, garbage room, rinse cups before setting them in the dishwasher, systemise loose-leaf binder. - Cleaning wheelchairs, toilettes, electric shavers, floors.	Tidiness	
- New medicine cabinet, PC to medicine room, laptop, dishcloth, silk sheets. - Dining table chairs, boots, microwave, chair weight, plastic boxes, order lunch, tubs for foot baths, tool basket, missing lights, cups, rucksack, equipment for cleaning, Spotify, dishwasher, refrigerator. - Paint the house and mailbox, fix doors.	Purchasing and improving the facilities	Management
- Daily routines need to be improved, Providing the services that we are assigned, need more activities for our users, personnel meetings to include temporary staff, better breaks during work, move lunchtime for users, distribute personnel to morning shift, need a common definition of quality in service, too many medicine bias cases.	Organising work	
- Communication when we leave users, do not take more work clothes than needed, talking at work, use of cell phones during work, handling relatives, write reports after user visits, loud talking about users.	Daily attitude and work environment	Professionalism
- Life history mapping, cake on Sundays, social and physical	Users	

activities, help to make dinner, trips.		

Figures

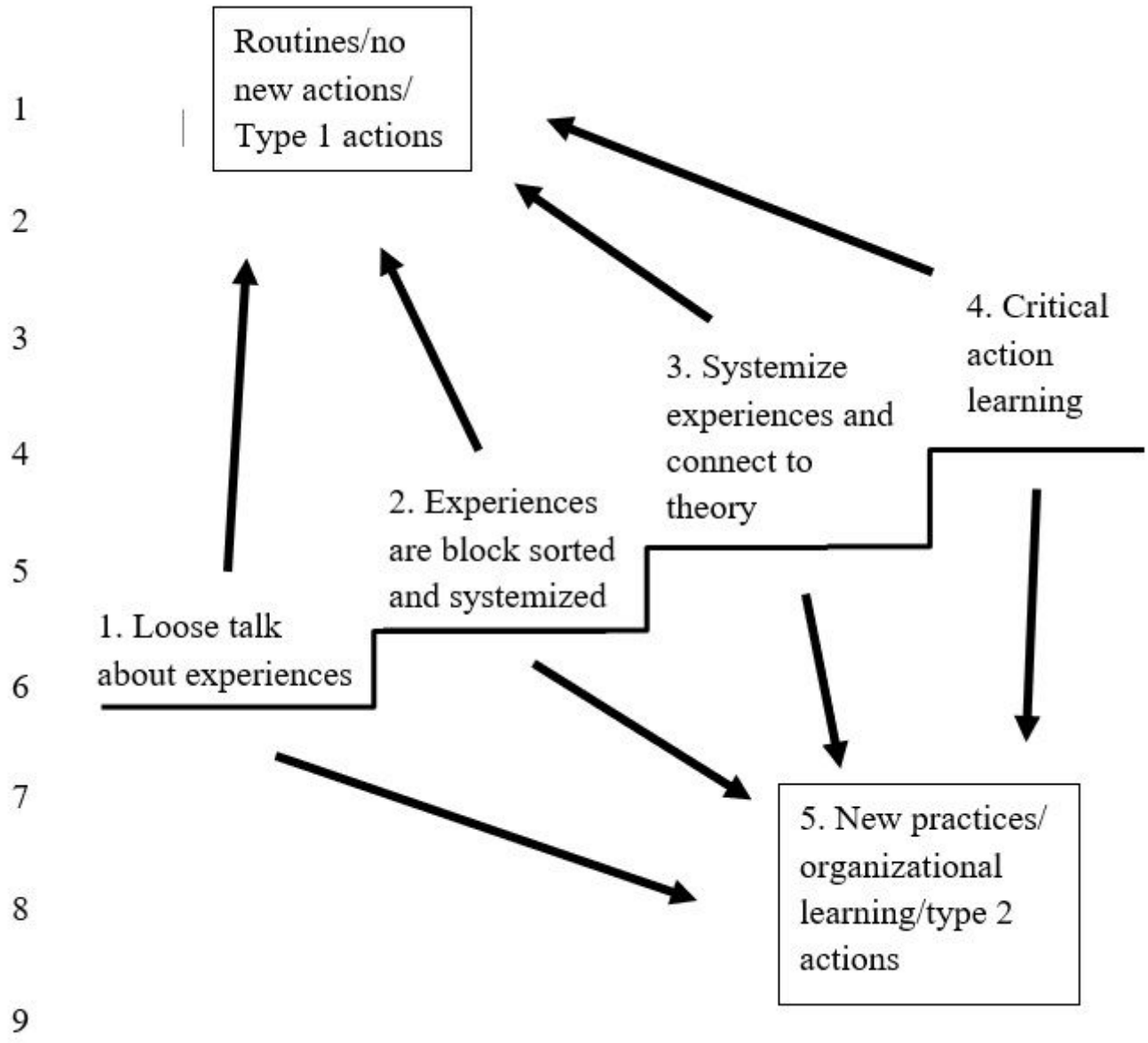

Figure 1

Action learning stairway