

Case Managers' Assessment of the Value of Managing Reports in a Deviation Management System – an Exploratory Study

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Deviation management systems are important formal channels for learning from experience feedback in organizations. Learning presupposes that the cases reported are successfully managed through several steps. Case managers, who typically are line managers, play an important role in ensuring learning. For this reason, it is important to organize the process of case management in a way that makes it easy and motivating for case managers to perform this task. In this paper we ask: What are the characteristics of cases that case managers find it most valuable to manage? Overall, the results suggest that cases with safety and/or security elements are seen as highly valuable by case managers. These cases are also significantly more clearly described than other types of cases. Overall, the results indicate that cases related to the core tasks of the case manager, e.g., safety and security tasks, are seen as more valuable. Other types of cases seem to receive a less systematic, more variable assessment. Based on the results obtained in this study, there is an opportunity for improved case management and learning from experience feedback by taking into consideration the core tasks of the case managers, when allocating the cases to be managed.

Keywords: Deviation management system, Organizational learning, Case managers, Value of case management, Exploratory study

1. Introduction

Deviation management systems are important formal channels for learning from experience feedback in organizations. These systems are applied to support organizations in continuous improvement of systems and processes. A deviation management system should facilitate timely recording of data critical to systems and processes in the organization. It should further promote timely and sound responses to the risks implied by the reported cases, to ensure that the risk level in the organization at any time are within acceptable limits. This implies that the deviation management system should contribute to prevent unwanted events from recurring (Johnson, 2003; Margaryan, Littlejohn, Stanton, 2017).

Cases are reported into deviation management systems by people working in the organization. The reporting of experiences (i.e., cases) into deviation management systems is

fundamental for organizational learning. Unless cases are reported, learning will be limited to the persons who experienced the situation. IAEA (2022, p.23) underlines that management “is responsible for encouraging employees to raise concerns and maintain a low threshold for issue reporting, including cases related to human performance and equipment failure (IAEA, 2022). Under-reporting of cases is considered as one of the key factors that may contribute to challenge an organization’s possibility for learning from its experiences. This topic has been addressed by Drupsteen et al. (2011) and ESReDA (2015).

Another key prerequisite for learning from the cases reported into the deviation management system is that the cases are successfully managed. For this reason, *case managers* play an important role in ensuring organizational learning from experience feedback.

This paper describes an exploratory study. The purpose of the study was to contribute to the understanding of the characteristics of cases that case managers find most valuable to manage. Contributing to understanding of these characteristics may facilitate the design of case management processes and contribute to improve organizations' possibilities for learning from experience feedback.

2. Case management and organizational learning

The role as *case manager* vis-à-vis a deviation management system is typically held by line managers (Townsend, Bos-Nehles, Jiang, 2021). During the last decades, academic researchers, practitioners, and public policy has shown an increasing interest to this management level (*ibid.*). Line managers usually have a substantial area of responsibility that include day-to-day management of people, management of operational costs, providing technical expertise, allocating and monitoring work, dealing with customers, and for ensuring a safe and reliable working environment.

Within the constraints of their organizations, case managers govern the timeline of case management, as well as the quality of the case management process, which contains the following steps: reading and analysis of the case, planning of corrective actions, implementing corrective actions, as well as monitoring and evaluating the impact of these actions (*ibid.*). Two known challenges associated with case management is that case managers may not have sufficient competence and/or time for case management (ESReDA, 2015).

For this reason, it is important to organize the process of case management in a way that makes it easier and more motivating for case managers to manage cases to promote the likelihood for successful organizational learning from experience feedback in an organization.

The relationship between tasks and motivation may be addressed from the perspective of the "Job Characteristics theory" (Hackman and Oldham, 1976, 1980). This theory describes the relationship between job characteristics and individual responses to work. The theory identifies and describes five core job characteristics: *skill variety*, *task identity*, *task*

significance, *autonomy*, and *feedback*. These characteristics are theorized to impact experienced meaningfulness, experienced responsibility for outcomes, and knowledge of actual results.

According to Hackman and Oldham (1976), meaningfulness of work is fundamental to intrinsic motivation. It is derived from the following job characteristics: *Skill variety*, i.e., using an appropriate variety of your skills and talents; *Task identity*, i.e., the degree to which the job requires the jobholders to identify and complete a workpiece with a visible outcome, and *Task significance*, i.e., being able to identify the task as contributing to something wider, to society or a group over and beyond the self (*ibid.*).

In the present study, we use the concept core task to signify tasks, which constitute the core elements of an employee's role, reflecting skill variety, task identity and task significance in the model by Hackman and Oldham (1976).

Several theories of organizational learning have been proposed by various scholars over the years. These theories highlight the importance of continuous learning and improvement in organizations and provide frameworks for understanding the processes and mechanisms by which learning occurs.

One of the most influential theories for organizational learning, is "Single-and double-loop learning" developed by Argyris and Schön (1978). Single-loop learning can be described as a modification of actions according to the difference between expected and reached outcomes. It is focused on the operative level. Here, small fixes and adjustments are made to remove the symptoms of shortcomings, while root causes may still be present in the organization. In the context of deviation management systems, single-loop learning is useful in maintaining existing processes and making, what Argyris (1999) referred to as *incremental improvements*.

Double-loop learning addresses the underlying causes behind an unwanted event or action. In double-loop learning, the purpose is to understand the underlying assumptions and patterns behind the actions and behavior. It is focused on the tactical level of the organization. Double-loop learning can help organizations to understand why an event occurred in the first place and to make fundamental changes to processes, and by this preventing them from

happening again (Argyris, 1999). Both single-loop and double-loop learning are essential for organizations to learn. By combining both types of learning, organizations can continuously improve their performance and innovate in response to changing circumstances.

It has been suggested that for cases to be managed properly, it is important to ensure that the cases are clearly described, allowing case managers to readily understand their content. In his influential book "How to Solve It" (1945), Pólya describes the difference between *well-defined* and *ill-defined* problems, which can be linked to clarity in case descriptions: A well-defined problem is a clear and unambiguous statement of the problem. Ill-defined problems lack clarity and structure, and require problem solvers to first understand the problem, then define the problem more clearly, and finally determine the best approach for a solution. The importance of clear case descriptions is further underlined by, e.g. Bredehoeft and O'Hara (2009) and by the IAEA (2018).

3. Introducing the Case Study and The Research Hypotheses

The present study was carried out in a research organization with approximately 300 employees. The organization performs research within the area of technology and natural science, which e.g., involves the use of chemical agents that may cause risk to the health and safety of the employees, as well as to the environment.

In the case organization, the role as *case manager* is generally allocated to line managers. The organization is ISO certified and having a deviation management system is a requirement. All employees have received training in how to record cases in the deviation management system. In addition, case managers have received training in how to manage cases. At the time of the study, the deviation management system had been running for approximately one year and contained 396 cases.

For all employees in the case organization maintaining safety and security is important. This may be considered as part of the *core tasks* for all line managers in the organization, even if they approach the task differently, depending on their specific area of responsibility. It was then hypothesized that managing tasks with safety

and/or security elements would be conceived highly valuable, as compared to the management of other type of tasks, based on Hackman and Oldham (1976, 1980).

It was further hypothesized that cases with clearly described content would be conceived as being more valuable to manage, than cases where the description is more unclear, based on Pólya (1945).

Finally, it was hypothesized that cases in which the case managers proposed actions, as part of the case management process, would be seen as more valuable than in cases with no actions. It was expected that identification of actions would require a more thorough consideration of the factors that caused the event reported, and thus require that case manager to engage in more double-loop learning (Argyris and Schön, 1978), than when no actions were specified.

4. Method

The present study was exploratory in nature. It used a mixed methods approach. Mixed methods involve integrating quantitative and qualitative approaches to generating new knowledge (Stange et al., 2006). Both quantitative and qualitative data is documented as part of a case management process. Data was analyzed statistically using R (R Core Team, 2021).

The study was based data from a deviation management system in the case organization (see section 3). At the time of the study the deviation management system had been in operation around a year and contained 396 cases. The study is based on a subset of 141 out of the 396 cases, handled by a total of 31 unique case managers. The subset constituted all cases in the deviation management system that had been closed, i.e., where case management had been completed. As part of the closing process, case managers had rated the value of managing the specific case on a scale ranging from 1 to 4, where 1 represents the minimum score (no value) and 4 represents the maximum score (very high value). The value assessment was used as a variable in the present study and referred to as *case management value*. To mitigate the impact variability in various case managers' conceptualization of the response scale, the value scores were for the purpose of this study decomposed into two overall groups: *Low*

value covering scores 1 and 2, and high value covering scores 3 and 4.

In addition to case management value, the study comprised the variable case type. The case type reflected to four types of cases that could be recorded in the deviation management system:

- *Improvement*: Suggestions for improvements
- *Incident*: Unwanted event that has happened
- *Near miss*: Unwanted event that almost happened or which under somewhat changed conditions could have happened.
- *Positive feedback*: Positive feedback from stakeholders and employees

The variable safety/security element reflected if a case contained safety and/or security elements were conceptualized as features that threatened or could potentially threaten humans, environment, technology, or materials. They included, e.g., misplacement of substance, tailgating, unclear competence requirements for safety-critical tasks, etc. Cases without safety and/or security elements largely contained features associated with the work area or environment, e.g., office temperature, food offer in the canteen, and water leakages. This variable was developed based on analyses of the 141 case descriptions providing in free text format.

The variable clarity of case descriptions roughly separated the case descriptions in two groups: clear description and unclear description. To be categorized as “clear”, the case description should distinctly account for what the report concerned, and where the reported problem was located. In addition, the motivation for the reported case, and what the person wanted to achieve with the report, should also be specified. Lastly, to be included in this category, we considered if the actions taken – if any - clearly reflected the problem addressed in the case description, as a verification that the case manager had understood the case.

In addition to this, a set of variables reflecting case managers rating of the case was applied: *actual and potential severity* (the severity ratings might refer to any aspect of severity, e.g., economy, reputation etc., in addition to safety and/or security), *type of consequence*: HSE consequences (if an event led or could have led to an injury to an employee) and/or *quality*

consequences. And finally, the number of days spent on case management was used.

5. Results

The distribution of the four types of cases in the dataset, i.e., improvement proposal, incident, near miss, and positive feedback, is shown in Table 1.

Table 1 Distribution of the case types.

Case Types	Frequency	Percent
Improvement proposal	59	41.8%
Incident	43	30.5%
Near miss	31	22%
Positive feedback	8	5.7%
Total	141	100%

Table 1 shows that improvement proposals are the most frequently reported case types (41.8%), followed by incidents (30.5%), near miss (22%) and positive feedback (5.7%).

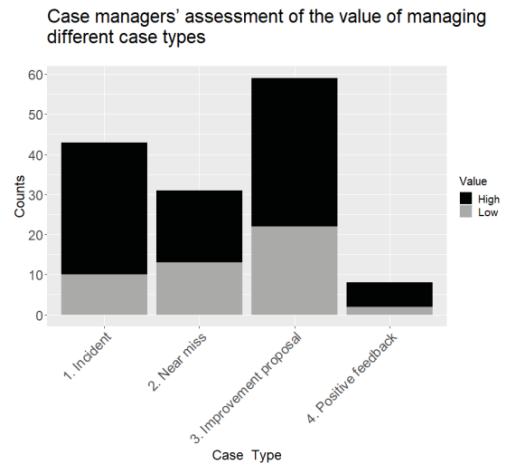


Fig. 1. Case managers' assessments of case management value distributed across different case types.

The distribution of case managers' assessment of the value of case management across the four different case types contained in the data set is illustrated in Figure 1. Figure 1 shows the ratio between high and low assessments of case management value for all case types favor the high value assessment. The ratio difference is most substantial for incidents, where 77% of the

cases were associated with high case management value. It should be noted that an almost identical distribution was found for *positive feedback*, but the number of cases in this category was very low, and the reliability of the finding uncertain.

The average time spent on case management of the 141 cases was 60 days, ranging between 1 and 702 days – the latter was a case originally recorded in the former deviation management system and transferred into the new system, as it was not completed before transitioning to the new system.

A chi-square test of independence was performed to examine the relation between case managers' assessment of the value of the case management and the presence or absence of safety and/or security elements in cases. A significant difference was found, $\chi^2(1, N = 141) = 8.17, p < .005^*$ (see Figure 2).

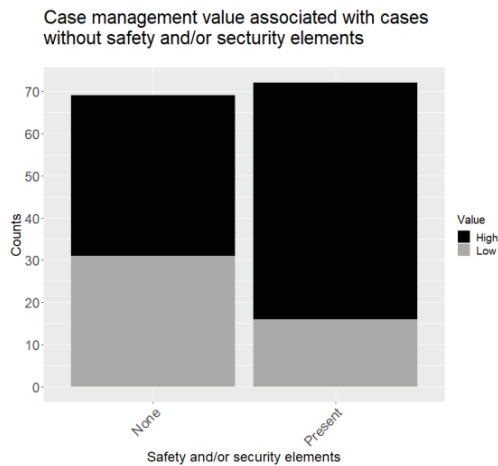


Fig. 2. Case managers' assessment of case management value across cases with or without safety and/or security elements.

No significant relationship was found between the case description clarity of the cases and the case management value, $\chi^2(1, N = 141) = 1.12, p = .29$. However, a significant relationship was found between case description clarity of the cases and cases with and/or without safety and/or security elements, $\chi^2(1, N = 141) = 4.51, p < .05$. This result showed that case description clarity was significantly higher in cases with safety and/or security elements, as compared to in cases without safety and/or security elements.

To determine if the case management value score might be substantially impacted by the assessments of specific case managers, the distribution of cases across the 31 case managers was assessed. The result showed that one case manager was responsible for managing around 30% of the cases. This case manager had the role of HSE manager. The remaining 30 managers had in average handled 3.27 cases, ranging from 1 to 19 cases. The remaining group consisted of line managers.

A chi-square test of independence was performed to examine the relation between the HSE manager's ratings of case management value and the line managers' assessments (see figure 3). The relation between these variables was significant, $\chi^2(1, N = 141) = 13.12, p < 0.000^*$. The HSE manager rated the value of case management higher than the line managers.

Also, when the relation between the case managers' assessment of the case management value and the presence or absence of safety and/or security elements in the cases was assessed based on data from the *line manager only*, a significant difference was found, $\chi^2(1, N = 141) = 5.18, p < .0235^*$.

Comparisons between the HSE manager and the line managers across the available variables, i.e., *actual and potential severity, number of days absent, HSE consequences, quality consequences*, and the *number of days spent on case management*, did not reveal any significant differences.

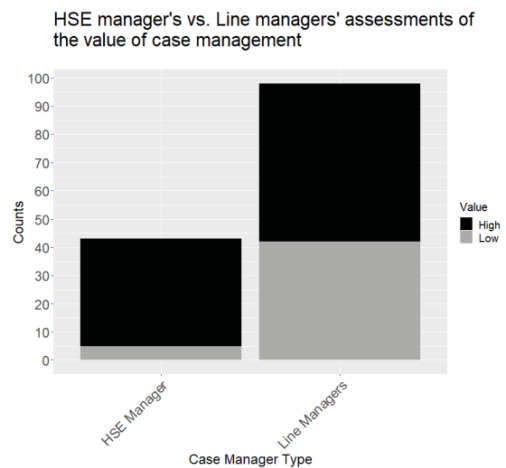


Fig. 3. Assessments of the value of case management across the HSE Manager and the Line Managers.

The use of actions i.e., specific tasks performed for making the organization more robust against unwanted events, as part of case management, was hypothesized to be associated with the case managers’ assessments of case management value. The distribution of cases in which actions had been used across case types is shown in Table 2.

Table 2. Distribution of cases in which actions had been used, across case types.

Case Types	Frequency	Percent
Improvement proposal	20	47%
Incident	14	33%
Near miss	7	15%
Positive feedback	2	5%
Total	43	100%

When comparing the HSE manager and the line managers, a significant difference was found between the two groups with respect to the use of actions, $\chi^2(1, N = 141) = 7.99, p < .005$. Line managers used significantly more actions than the HSE manager in their case management. The distribution is shown in Table 3.

Table 3: HSE manager’s and Line Managers use of actions when managing cases.

	Action	No action
HSE Manager	6	37
Line Managers	37	61

Furthermore, it was interesting to investigate whether the case managers rated the case management value differently if actions were linked to the case or not. A chi-square test of independence was performed to examine the relation between the case management value and the use of actions as part of the case management process. No difference was found, $\chi^2(1, N = 141) = 0.06, p = .7959$.

Cases with safety and/or security elements and actions (Both) vs. cases without safety and/or security elements and without actions (None)

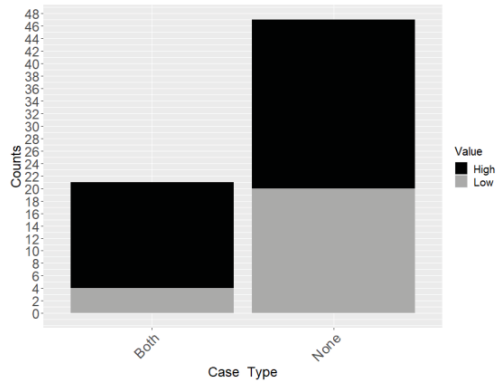


Fig. 5. Comparing case management value with safety and/or security elements in which actions had or had not been used.

The distribution of case management value scores across cases with/without safety and/or security elements and with/without actions used during case management is shown in Figure 5. According to our hypothesis, cases with safety and/or security elements in which actions were used as part of the case management process, were expected to be associated with high case management value scores. However, no significant difference was found between the groups of cases in which actions had and had not been applied, $\chi^2(1, N = 68) = 3.51, p = .061$.

5. Discussion

In this study, we proposed three hypotheses. Firstly, we hypothesized that cases with safety and/or security elements would be associated with higher case management value scores. Secondly, we hypothesized that cases, which were clearly described, would also be associated with higher case management value scores, and finally, we hypothesized that cases with actions linked will generally be associated with higher case management value scores than cases without actions.

Regarding the first hypothesis, the results suggest that case managers found it most valuable to manage cases that contained safety and/or security elements, as compared to cases without such elements. This result may reflect that line managers (and thus case managers) in the case organization have the upholding of safety and security as a part of their core tasks (see above).

Cases without safety and/or security elements tended to reflect more general work environment aspects, such as adjustment of temperature in offices, fixing pipes in the toilets, updating details in process descriptions, ensuring that paper is delivered next to the printer, etc. This type of cases might generally not be seen as highly urgent.

An unexpected finding was that the HSE manager had managed around 30% of the cases, and that assessment of the value of case management by the HSE manager was significantly higher, than the assessment by case managers from the line organization. Due to the unexpectedness of the finding, we contacted the HSE manager to discuss this result. One likely reason identified by the HSE manager was that managing cases generally contribute directly to the manager's core tasks: the cases mostly addressed HSE issues, which the HSE manager was in any case responsible for solving. This finding agrees with the theory of Hackman and Oldham (1976), which claim that perceived meaningfulness, consisting of skill variety, task identity and task significance, is essential for intrinsic motivation for performing the core tasks.

It should also be noted that no relationship was found between case management value and the actual or potential severity of the cases, as rated by the case managers during the case management process. One likely explanation to this, given the results previously discussed, is that severity does not exclusively concern safety or security-related aspect of key concern to the line managers.

Regarding the second hypothesis, which was developed based on Pólya (1945), implied that cases containing safety and/or security elements were generally more clearly described than other cases. However, there was no significant relationship between the clarity of case description and the case managers valuing of cases. This might suggest that employees reporting cases put more effort into writing the case descriptions containing safety or security issues, because safety and security are of key importance to all employees in the case organization. It may further suggest that even though clear descriptions are important, the case content will still have a stronger impact on case managers' value assessment.

Regarding the third hypothesis, no significant relationship was found between case

managers value assessments and whether or not actions were used as part of the case management process. One could expect that cases in which the case manager spends extra time and proposes actions, in principle should be assessed with a higher value than cases where no actions were identified. Based on learning theory (Argyris and Schön, 1978), it is expected that cases with established actions are more likely to help organizations to identify and correct deviations from their established processes. When a case contains a suggested action to prevent a similar event from recurring, there is theoretically a greater possibility for a feedback loop to take place than with cases that do not have actions linked. With learning theories in mind, one would therefore expect that cases associated with actions would receive a higher score on value by the case managers. A possible explanation to this finding is that the suggested actions tended to address symptoms, rather than root causes, but this topic was not explored as part of the present study. Another unexpected finding was that the HSE manager used actions significantly less than did case managers from the line management. The HSE manager suggested that sending a case to a HSE manager often in itself constituted an action, as the cases received by the HSE manager often reflected straightforward HSE issue to be solved (e.g., increasing temperature in offices).

Overall, the outcomes of the study suggest that cases addressing aspects of the core tasks of case managers (e.g., in the case organization: safety and/or security elements) are more highly valued by case managers than other type of cases.

6. Conclusion

The results of the study suggest an opportunity for making case management easier and more motivating for case managers. It points to the usefulness of considering the core tasks of case managers when defining schemes for allocation of cases to be managed. This may imply, e.g., that some cases might better be routed for case management to other employees than line managers, e.g., to employees having the role as *process owners* in an organization or are responsible for particular systems.

Ensuring that cases are transferred to the case managers based on the managers' core tasks, can be expected to contribute to increase the cases managers' motivation for case management. The

reason is that the case manager in parallel with managing the case will also work to improve aspects of issue that are critical to his or her own main area of responsibility in the organization. In addition, case management addressing the core tasks of a case manager might also be assumed to be perceived as easier to manage. A key reason for this is that employees can be expected to be generally highly knowledgeable, experienced and skilled in relation to handling of their core tasks and factors impacting their core tasks.

The study may be biased several ways. It was based on a dataset with no or very limited recordings of a range of factors that might impact case management (e.g., cases requiring reporting to the authorities, personnel injuries, days absent following an event, etc.). Some of these factors are important related to safety and have not been possible to address in any detail in this study. Furthermore, the deviation management system had not been used for very long at the time of the study - and this could also impact how familiar employees are with the system and types and number of cases reported.

When the deviation management system has been used for some more time and include more data, it would be interesting to conduct a follow-up study. It would be valuable to divide case managers in groups according to how frequently they manage tasks and compare their rating of case management value. Frequency of use, and thus a higher level of familiarity with the case management system might contribute to increased case management value score, which again may give an indication of how training and support should be organized. Finally, a higher level of familiarity with the system might contribute to reducing the average number of days spent on managing the individual cases.

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