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# Supporting Process Implementation with the Help of Tangible Process Models

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## Abstract

- (a) **Situation faced:** Companies invest considerable resources in the elaborate design of computer-based process models. Because of these models' inherent complexity, they are not necessarily suitable for communicating with and training the employees who are supposed to apply them, but their understanding the processes is essential for efficient and effective work. Hence, creative, innovative methods are needed to bring these abstract models to life and increase their adoption by employees who typically have a low affinity for IT-related tools. Therefore, the methods that are developed should require little previous knowledge, (ideally) should not be IT-based, and should stimulate creativity, collaboration, and discussion. They should also create a playful experience while still offering guidance and overview of existing processes.
- (b) **Action taken:** The company considered in this case searched for new, playful ways of communicating existing processes to employees who have little knowledge about process operations or process management. Two methods, a process card game and a process board game, were chosen and implemented. The card game conveys the most important process steps and process characteristics in a playful manner, providing a positive experience for the training participants and, thus, being memorable. The process board game complements the card game by conveying deeper knowledge about,

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for example, incidents that had in the past had positive or critical influences on the process. Both methods were developed in theory, both have been implemented as prototypes, and both have been tested in training new employees and during simulations, after which they were evaluated based on predefined requirements.

- (c) **Results achieved:** The participants in the training were interviewed orally and in written form to evaluate the methods' benefits. Feedback from the trainers was included as well. These participants evaluated the methods positively, as both the participants and the trainers attested to the methods' ability to provoke discussions and stimulate creativity. Both methods are applicable to a variety of processes with reasonable effort.
- (d) **Lessons learned:** Creative models demand the ability to abstract from business processes that are normally filled with details, so a clear business outcome and target group must be in mind when the new methods are first set up. However, since they do not provide a complete presentation of a process, additional methods should be used as complements. It is advisable to focus on one process that matters most to the target group at the beginning and to concentrate on the basic process features while designing the creative methods. Moreover, the degree of creativity should fit the company and its corporate culture.

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## 1 Introduction

The benefits reaped by Business Process Management (BPM) are well understood, and many companies use computer-based models to document their procedures (Liebert 2012; Vlahovic et al. 2010). However, these models should be more than a documentary tool, as other benefits unfold when employees apply the process models and draw information for their daily work from them. However, domain experts are not typically sufficiently familiar with process models to understand and interpret them fully, so they are not willing to apply them (Bandara et al. 2007; Grosskopf et al. 2010).

The company that is the focus of this case searched for new ways to communicate existing processes to employees. This case study, conducted in cooperation with the FOM Hochschule für Oekonomie and Management, deals with the design and implementation of innovative training methods that help to impart knowledge about processes to employees. The two approaches presented in this paper help employees to understand process models and convert them into operational procedures.

This paper deals with a medium-sized German auditing, tax, and management consultancy called Accounting&Tax (A&T) that executes audits and consultancy mainly within the health, social services, and public sectors. A&T employs approximately 250 employees at ten locations in Germany. The prevalent business processes are highly knowledge-intensive, so they are usually complex and unpredictable and require precise interactions between a variety of departments and functions involved.

These procedures have a substantial impact on the quality perceived by the customers, which significantly affects customer satisfaction and the economic success of the company as a whole.

In the audit industry, efficient processes are crucial not only for economic reasons but also because legal and self-regulatory professional standards dictate a narrow framework and faultless processes. Even though the firm made detailed, computer-based process models accessible via its intranet, the rate at which these models were applied remained low. The *Knowledge Management* department deduced that this problem was due to the models' complexity, which might be difficult for non-experts in BPM to understand. As described in the BPM lifecycle model (Dumas et al. 2013) the "process implementation" phase also covers the aspect of organizational change, and organizational change management was required to enable employees to adapt to the scheduled processes.

Negative attitudes toward process implementation and the resulting lack of applications of the implemented models significantly affect BPM's benefits. Difficulties arise when management and the process management department assume that the mere presence of IT-based models will result in the required changes.

In order to address these "human" issues in the process implementation phase of BPM, the company developed creative methods from the IT-based models to convey process knowledge playfully. This rejection of opaque, businesslike process models changed the employees' attitudes, and the processes suddenly became understandable. When employees were provided with the precise, targeted information they needed to perform and prioritize their tasks, the presented process became tangible for them.

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## 2 Situation Faced

Because of the importance of its business processes, the enterprise represented them in IT-based process models created using the modeling language BPMN 2.0. These models serve the purpose of providing training and instruction and are the basis for analyses/improvements and external certifications. In addition, a process-oriented job control supported by a dedicated IT system is based on these models (Russack 2013). The multifaceted areas of application assumes that the process models depict a comprehensive and complete picture of all the affected activities, resources, and coherencies. The respective sub-processes, as well as each single activity, have to be coordinated effectively, and the required information must be provided completely and on time, so the process models are relatively complex.

The staff turnover in A&T is relatively high, which is common in the industry, but in increasingly competitive markets, professional service firms should work continuously to improve the efficiency of their job executions. Consequently, new employees must be trained often and quickly.

### 3 Action Taken

New staff members must capture and process a large amount of information quickly, so the department of Knowledge Management at A&T searched for suitable training methods that would help new employees understand the company's business processes.

Management wanted these methods to be an alternative to extensive texts and ordinary process models, which had not proven to be sufficient training tools, as the more extensive and accurate the descriptions and process flow charts, the less they were used. At the same time, management knew that efficient communication of processes is a key success factor for establishing process thinking in an organization (Dombrowski et al. 2015; Bandara et al. 2009).

While process models and process descriptions are geared toward perfection and completeness, discussions with, informal interviews with, and observations of employees indicated that it was exactly those attributes that caused uncertainty and a feeling that one could not cope with the complexity these models imply. Therefore, while searching for new ways to improve the application of the process models, "imperfection" was the first requirement directed at the new training method.

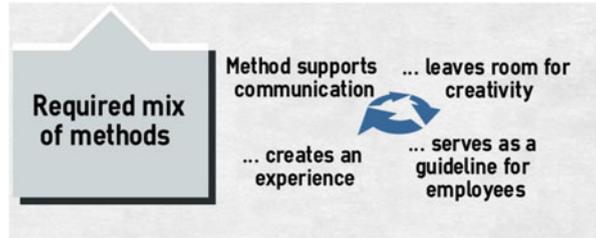
What seems paradoxical has proven to be useful: Obvious incompleteness and gaps in descriptions in process models promoted creativity in the beholders and motivated them to think about changes, additions, and variations (Herrmann 2012). Completeness is not necessarily as advantageous for the success of training as is employees' actual application of the models, which are important if the company is to reap the benefits of any BPM implementation (Dumas et al. 2013). The company's Department of Knowledge Management knew it had to convince employees of the necessity and desirability of such tools and of their ability to apply them, so it needed new training methods that appeal to both the factual and the emotional parts of the employees' perceptions. Hence, the department sought to create training methods that combine the logical, abstract process models with emotional, symbolic elements in order to facilitate the learning success. Since new employees in the enterprise typically have a low affinity for IT-related tools, the department also wanted to use methods that were not IT-based.

These requirements were converted into a framework that is summarized in Fig. 1.

#### 3.1 The Process Card Game

Starting from the requirements presented in Fig. 1, the core team of the knowledge-management project identified several suitable methods and elaborated on them during an intensive brainstorming session. One of these methods, the process card game, is based on traditional card games that are often used for comparisons of, for example, cars, airplanes, and ships. The cards typically show pictures of the objects, each with a number and letter on top (e.g., 1A, 1B, 1C, 1D). Attributes like speed,

**Fig. 1** Framework:  
Requirements for an ideal mix  
of methods



power, price, and weight are also given. Each player receives an equal number of cards and is allowed to play only the top card of his or her own cards, from which the player chooses an attribute and reveals the associated value (e.g., price). The player with the best value wins and is awarded with the other player(s)' card(s). The goal is to win all the cards.

Based on this game, the single process steps of a process (e.g., “Send the audit report”) were portrayed on the cards. An image was assigned to each step, and each process step was given selected attributes and characteristic values (e.g., attribute: handling time; value: 0.25 h). Thus, a card game consisting of the individual process steps of a business process emerged.

The cards offer the advantage of making immediately visible the relevant process characteristics, as they constitute the central element of each card. In IT-based process models, the visualization of the process flows is often at the core, so even though a variety of process attributes can be attached to the models, this important information is often not immediately visible.

For the sake of clarity, no more than six features should be displayed on each card, so the features should be selected carefully with reference to the training's objective and the target group (For example if the participants are asked to reconstruct the sequence of the process at the end of the training, showing the attributes “predecessor” and “successor” on the cards would reveal too much beforehand). Suggestions for useful process characteristics can also be taken from the BPM context framework (e.g., based on the process dimensions of value contribution, knowledge intensity, creativity, interdependence, and variability) (vom Brocke et al. 2016).

Potentially meaningful process attributes are:

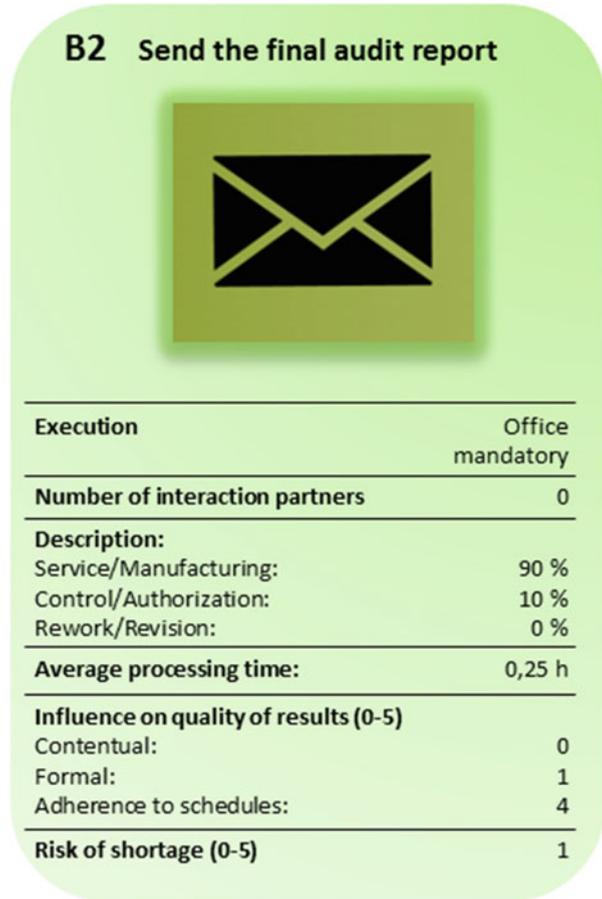
- Necessity of the process step (mandatory vs. optional)
- Roles: Who is responsible? Who accomplishes the tasks (customers, suppliers etc.)?
- Characteristics: Planning, execution, control, rework, feedback, mental activities, physical activities, etc.
- Qualifications and/or competencies required
- Development perspectives for those involved
- Input/Output
- Scope/Objectives
- Customer expectations regarding output (quality of results)

- Required resources, tools, specifications
- Predecessors, successors, parallel activities
- Frequency of repetitions of each process cycle
- Duration (processing time, transition time)
- Required control activities
- Cost
- Contribution to value creation
- Impact on quality
- Risks (e.g., risk of shortage)
- Degree of IT support, IT tools used
- Workload: time pressure, quantities
- Predictability/leeway in decision-making/structuring
- Transparency
- Communication and interaction
- Spatial arrangement
- Potential conflicts
- Outsourcing potential

We next describe one example of the process card game. Six process attributes were selected:

- **Necessity of the process step**—mandatory versus optional. This aspect of a process is important for new employees since they need to know in which cases a process step may be omitted (e.g., for economic reasons).
- **Interactive partners**—the number of functions that work together to complete the process step, not including those who work on the upstream and downstream process steps. New employees learn which colleagues and departments to involve in their activities and decisions and in which situations and sequences their support is needed. This process attribute indicates the degree to which the specific process step depends on other functions (“degree of dependence”) and, in so doing, become aware of some of the reasons for delays in the process flow.
- **Description/value contribution of the process step**—proportions and degree (share, percentage) of service/production/review/rework in the process step. While the service and production part of a process usually adds value directly, non-value-adding parts like control and rework activities should be reduced to a minimum.
- **Estimated average duration/processing time measured in hours**—provides an idea of what the single process step contributes to the overall processing time.
- **Impact on the overall process quality**—the quality of results based on content quality, formal quality, and timeliness. The impact of the process steps on each of the three building blocks of quality (ranging from 0 = no impact, 5 = high impact) can be objectified, giving new employees who are willing and motivated to increase the quality of their work an idea of where to start. This knowledge also helps them to set the right priorities in their daily work.

**Fig. 2** Example: Card portraying the process step “Send the final audit report”



- **Risk of shortage/bottleneck**—sensitizes new employees to risks so they can plan for them. The higher the risk, the higher the chances that this process step might cause delays (ranging from 0 = no risk, 5 = very high risk) in the whole process.

An exemplary card from the game is shown in Fig. 2.

The process card game is used as a part of the initial 5-day training for new employees at A&T. The attendees get subject-specific input and learn about important business processes. The IT-based process flow charts are shown initially as an introduction to give the new hires a rough overview. Then, at the end of a training day or the beginning of the next one, the card game comes into action. Participants play in groups of two to four people, comparing the values of the attributes and collecting their opponents' cards when the “better” value wins. This approach also leads to lively discussions related to, for example, “Is a higher value at ‘risk of shortage’ really the winning value?” The participants are intended to reflect on the

process and discuss the steps with their attendant values, thereby playfully deepening their knowledge about the process. After playing a few cards, the trainees often pose questions about the process steps, and the characteristics and values are clarified with the help of the trainer. Finally, the attendees model the complete process with the cards by placing the individual process steps in the correct order based on the “swim lane” method in which each department has its own “lane”.

The card game can also be used for process modeling on a highly abstract level. The amount of time it takes the attendees to model the process, along with the accuracy of the results, indicates how well the participants understand the whole process, providing important feedback and insight for the trainer.

### **3.2 The Process Board Game**

The process board game is a playful way to communicate extensive information about the processes, so it is a useful complement to the card game. Compared to the card game, though, the board game has fewer process steps, as the level of abstraction is higher so it does not take some details into account. The process example portrayed here consists of seven steps, but its content is identical to the process described and used in the card game, which consists of 20 steps. The game can be played by two or three teams of 1–4 players (2–12 players in total). A trainer directs the game and moderates discussions (especially those provoked by the “chance” cards).

The aim of the game is to produce as many products as possible within a predetermined time (45–90 min). Since A&T produces a service, rather than a product, the “product” is a completed audit report that is sent to the customer at the end of the annual audit. Each completed audit report brings money at the end of the process but only as long the required level of quality is achieved. There is also competition among the teams, as the team that finishes a report faster than the other teams receives significantly more “money.” If a team’s product quality is lower than required, there are significant deductions in revenues, while exceeding the quality requirement results in a bonus payment. In the end, the team that generated the highest revenues wins.

The groups go through the necessary process steps to complete and deliver the audit, rolling dice in order to move forward. Each process step is divided into six sub-steps. One dimension, employee satisfaction affects the pace of the game, and this feature (employee satisfaction) is displayed on a scale from 1 to 15. If employee satisfaction falls to a score of seven or lower, the operating speed also falls, and one point is subtracted from the dice’s value. Conversely, employee satisfaction at a value of 12 or higher means a better operating speed, and the team adds a point to the value of the dice. There is also a connection between satisfaction and quality, as dissatisfied employees reduce quality while satisfied employees boost it. The higher the quality, the higher the revenues in the end.

Employee satisfaction and quality are also influenced by “chance” cards, which increase excitement and provide opportunities to gain new experience-based knowledge. Before entering a new process step, a new “chance” card is removed

from the stack read aloud. These “chance” cards present typical issues that have occurred repeatedly in the course of the real process in the past. These incidents result in either positive or negative impacts for the group, as they influence employee satisfaction and quality positively or negatively. The chance card describes the situation and its impact on employee satisfaction and quality are briefly described on the cards. For example:

- Parts of upstream process steps have not been completed: Negative impact → quality decreases → total quality points are reduced.
- Required information is not yet available/required documents are not available: Negative impact → quality decreases → total quality points are reduced.
- Information is entered incorrectly in an IT system: Negative impact → quality decreases → total quality points are reduced.
- Employees from upstream process steps have already completed parts of the work of the process: Positive impact → satisfaction increased → dice number is raised → team is faster.
- An intern or an employee from another department supports the team: Positive impact → satisfaction increased → dice number is raised → team is faster.
- Deadline is moved up: Negative impact → quality decreases → total quality points are reduced.
- There are customer complaints: Negative impact → satisfaction decreases → dice number is reduced → team is slower.
- Customers are satisfied: Positive impact → satisfaction increased → dice number is raised → team is faster.
- Time pressures forces the team to work more quickly than under normal circumstances: Negative impact → quality decreases → total quality points are reduced + Negative impact → satisfaction decreases → dice number is reduced → team is slower.
- An employee becomes ill: Negative impact → satisfaction decreases → dice number is reduced → team is slower.
- A machine is broken: Negative impact → quality decreases → total quality points are reduced + Negative impact → satisfaction decreases → dice number is reduced → team is slower.
- A process step is automated: Positive impact → satisfaction increased → dice number is raised → team is faster.
- Few errors found by the quality-control audit: Positive impact → satisfaction increased → dice number is raised → team is faster + Positive impact → quality increases → total quality points increase.

These incidents and their impacts are identified with the help of employees who are experienced in the process. This effort also assists in process analysis since this group searches for typical incidents and possible solutions, albeit under playful, cheering conditions—in contrast to the more somber attempts for continuous improvement.

In the course of the game these incidents are discussed with the participants: Do those things really happen? Are the effects portrayed correctly? What events lead to

the problems presented? How could they be prevented? By doing this, information about the process is communicated to the new employees in an entertaining manner.

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## **4 Results Achieved: Critical Reflection and Evaluation of the Methods**

The goal was to determine the effectiveness of the method, which is deemed successful if it meets the requirements formulated and summarized in the initial framework (Fig. 1). Based on this framework, an ideal method promotes creativity, supports communication, and combines abstract artifacts with symbols and vivid descriptions to reduce complexity. These attributes led to the specific requirements: a method that stimulates creativity among the participants, is neat and instructive, helps employees understand the process, creates a playful experience, promotes discussions and participation, and considers varying levels of expertise. Even so, it is unlikely that one method would meet all requirements completely.

### **4.1 Evaluation of the Process Card Game**

After the training of new staff members had been running for several cycles, the participants, including the trainers, were invited to complete a survey that asked them to reflect on the process card game. This survey was supplemented with a personal interview in order to uncover the reasons for the results. The evaluation results for the process card game are shown in Fig. 3.

As Fig. 3 shows, the card game was assessed as a method that stimulates discussion and creates an experience, primarily because of the playful contest in which the attendees participated. Comparing the processes' attributes and their values, discussing why the "enemy's" value is higher than one's own, winning and losing—such emotional moments stay in one's memory. In addition, playing cards against each other creates a relaxed atmosphere, a welcome change during a week full of teacher-centered training. Moreover, playing cards is connected to childhood memories, which promotes a comfortable feeling throughout the event which is beneficial for training's success. The criteria "Stimulates creativity" and "Encourages participation" were rated high, with four out of five points each, probably because it is an interactive game. In addition, the final modeling of the process demanded a high degree of creativity and provoked discussions among the attendees.

The card game neither constitutes a complete process model nor a complete process documentation, which helps to explain the low ratings with respect to the criterion "Is the method neat and instructive?" The card game can always be seen as a supplement to existing (often IT-based) process models and other methods that help to communicate the process.

**Fig. 3** Evaluation results for the process card game



The ratings on previous knowledge and level of expertise required are relatively low in terms of both the difficulty of understanding the method itself (the card game) and understanding the process the card game depicts. The participants reported that, even though the process had been explained theoretically, the relationships between the steps, roles, and activities become most apparent during the game.

The evaluations confirm the expectations for this method, as it improves the communication of processes and related information, so it improves the new employees' ability to apply the implemented process models.

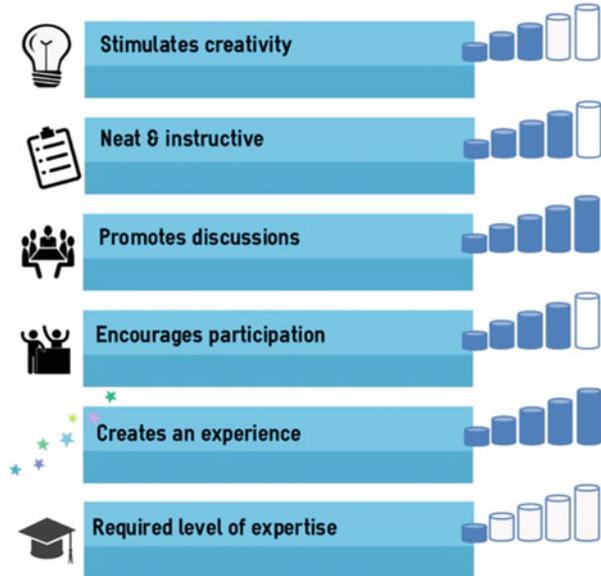
## 4.2 Evaluation of the Process Board Game

In order to evaluate the quality of the board game method, the participants and trainers were invited to complete a survey that asked them about their opinions and perceptions of the board game. The survey was supplemented by a personal interview in order to determine the causes for the results.

Figure 4 summarizes the evaluation results for the process board game method.

As Fig. 4 shows, the board game was perceived as stimulating discussions, creating an experience. It was also rated as being relatively instructive, perhaps because of the "chance" cards and the incidents they contain, which make problems and real operational coherences more tangible. Only one person perceived the game as useless. The participants also testified that the knowledge

**Fig. 4** Evaluation results for the process board game



required to play the game is low—referring to both the game’s rules and knowledge about the process. In summary, the evaluation results confirm the expectations.

### 4.3 Summary of the Results Achieved

The problem A&T encountered with implementing detailed business process models was that high complexity often interfered with comprehensibility. In order to turn complexity into something understandable, the company created new tools to support communication of the processes. The innovative, game-based methods helped A&T handle the trade-off between the completeness and intelligibility. With reference to the BPM framework (Dumas et al. 2013), we argue that successful implementation of a process also requires sufficient training of the affected employees, which was especially true in the case of knowledge-intensive service and high fluctuation in processes. The human side of implementation must be kept in mind by considering how plain process models can be turned into something vivid with which an employee *wants* to deal? In the case presented here, these models were used as a foundation for new methods that are adapted to “arouse” the process, turn it into something tangible, and thereby serve as a supportive communication tool.

The card game and the board game helped to change the prevailing attitudes of new employees toward the existing process models: The playful approach led the employees to want to deal with the IT-based models, as once they understood the

procedures, they lost their timidity about asking for additional details. In the protected, playful classroom environment, the employees realized that it is not a sign of weakness to ask questions. Their basic understanding of the processes that was acquired during the training and with the help of the two games helped them to understand the processes' complex interrelationships. The board game in particular highlighted dependencies between departments and the effects of historically accurate incidents. Understanding the degree to which their work affects others also improved the attitude in the departments that participated in the training.

In short, the number of employees who retrieved the IT-based models on the firm's intranet increased, while requests for additional information on individual process steps declined.

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## 5 Lessons Learned

Process models have to serve multiple areas of application (e.g., process analysis, process improvements attempts, documentary purposes, form the basis for certifications, trainings, communication), which tends to make these models inherently complex. However, employees who are not familiar with process thinking might be overwhelmed by this complexity. The benefits of BPM implementations can be negatively affected if employees do not apply the available models to the desired extent.

One important finding of the case presented is that the newly introduced methods should be seen as enhancements of, rather than as substitutes for, the computer-based models (e.g., based on BPMN 2.0). In other words, the computer-based models should be the basis for supplementation by the new methods.

A clear business outcome and target group should be in mind when new methods are first set up. Designing these creative methods demands time, so it is advisable to start with a maximum of three core processes that are particularly important to the target group. Once employees have gained an understanding of process thinking and changed their attitudes toward the topic, they will be more willing to deal with the existing process models. Therefore, it may not be necessary to represent all existing processes in the new, creative form.

The advantage and the "core" of the new methods are their level of abstraction. Both the card game and the board game help employees to understand the basic sequence of the process by omitting details. With the target group and the business outcome in mind, the designers of the methods should focus only on the handful of details that will be presented. Feedback loops with participants in the training and other employees involved in the processes will help the designers to stay focused.

Such new, creative methods work only so long as they fit the prevailing corporate culture. The level of creativity and playfulness should always be aligned with the company's values and "unwritten rules."

The two new methods closed a gap between business analysts (experts in process modeling) and specialty departments (experts in their fields who often lack a deep understanding of process management methods).

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