

Escaping the Everyday Chaos: Assessing the Needs for Internal Knowledge Transfer in SMEs via an Escape Room

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Abstract. The implementation of an Escape Room to assess the needs for internal knowledge transfer is a method used in the project “Education 4.0 for SMEs”. The aim of this project is to support Small and Medium-sized Enterprises (SMEs) in their digitization challenges in terms of internal knowledge transfer and to help them collect the company’s knowledge among its employees. For this purpose, a needs analysis using a specially designed Escape Room adapted to a fictional company is applied. Initial results from pilot SMEs provide indications of the effectiveness of this method.

Keywords: Knowledge Management · Knowledge Transfer · Serious Game · Escape Room · SMEs · Needs Analysis

1 Introduction

Making existing knowledge visible and usable is one of the goals of knowledge management in companies. A meaningful and clear knowledge base, above all one that is actually used, is crucial in today’s world [13]. But reality is often different. There is no structured and thus efficient knowledge exchange, searches for information are time-consuming, strategies and technologies for knowledge documentation are missing, right up to knowledge loss [21].

This dilemma is the starting point of the project “Education 4.0 for SMEs”. It aims at finding out more about possible support for Small and Medium-sized Enterprises (SMEs) in their digitization challenges, especially in terms

of knowledge transfer. The project focuses on knowledge transfer in terms of exchange and distribution of knowledge among employees within a company. The exchange with partner companies is also taken into account in the project.

In the following, the development and obstacles to knowledge management in SMEs will be displayed, teamwork being one possible solution. Communication and teamwork are essential elements of Escape Rooms as well. Therefore, Escape Rooms as a Serious Game and/or as a Serious Gaming tool serving to increase positive (learning) effects are being reviewed. So far, Escape Rooms have mainly been used for educational purposes – their application in a business context has been rather marginal. Hence, the paper shows possible benefits of an employee-centered needs analysis via an Escape Room and discusses methodical issues. To this end, relevant theoretical aspects are presented, followed by a description of the design and implementation of the Escape Room, which is conceived as the starting point for further cooperation with a company in the field of knowledge management, knowledge transfer and digitization. Given the novelty of the method in this context, first results of the evaluation are discussed with regard to the further development of the method.

2 Knowledge Management in SMEs

Knowledge transfer is an important component of a knowledge management initiative, which among other things has the identification, documentation, classification and storage of important knowledge as its goal [20]. The use of knowledge stored in this way leads – especially in Information Technology (IT) management – to positive effects in a company and to innovation [38], such as the sharing and the common application and further development of knowledge [20].

The use of knowledge management in SMEs rises [25] to increase their competitiveness [36]. Successful knowledge management practices are based on technology, organization and people [43]. Technology is needed for the support of knowledge management processes. Organizational aspects, for instance clear communication structures and transparent responsibilities, lead to a company culture that focuses on the management of its knowledge as a crucial factor for competitiveness. People are the most important factor for knowledge management initiatives – they must accept and “live” knowledge management [24]. An over-estimation of technology and the negligence of people and processes are often reasons for the failure of knowledge management initiatives [15].

A trend towards a decrease in the importance of storage of information and documents in favor of support of knowledge sharing and teamwork can be discovered [20]. This may result in a solid basis of IT systems already used by most companies. In studies from 2000 and earlier, communication and collaboration were not the focus of knowledge management (see [30]). Since 2000, participants in research have asked for communication and collaboration features [24]. For example, a survey from 2015 shows that following process improvement (55 % “very relevant” / 16 % “relevant”) the enhancement of communication flows in the company was most important to the participants (43 % “very relevant” / 29

% “relevant”) [23]. Figure 1 summarizes this trend moving from storage-oriented knowledge management to supporting more and more collaboration oriented knowledge sharing.

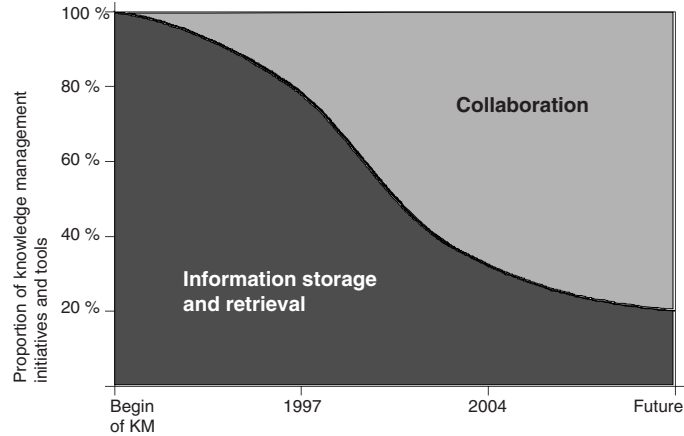


Fig. 1. Trend from storage-oriented towards collaboration oriented-knowledge management [24].

The focus of SMEs’ knowledge management initiatives concerns cooperation, analysis, search and publish information [16]. The systems concentrate on employees and not on implementing a powerful knowledge management system [1]. In the practical use of knowledge management, various hurdles have been identified which must be overcome in order to use it effectively. These are for example:

- Fear of replaceability (“If I document all my knowledge, I am easily replaceable.”) [33];
- Fear of making mistakes (grammar, spelling, incomprehensible or imprecise formulations) [10];
- Assessment of the relevance of topics (“How much time do I invest in a topic?”, cost-benefit ratio) [26];
- Lack of time.

All these obstacles are mitigated by an open and communicative corporate culture [34]. This is the aim of the offers of the project: Many of the hurdles mentioned can be overcome through teamwork.

3 Escape Rooms as Serious Game/Gaming

Everyday life seems to require humans to cooperate with each other in order to be a functioning member of society [39]. This in turn can be seen as an important

motive for introducing cooperative learning situations in education and training, since it equips the learner with an active and more constructive role. For a few decades, collaborative learning has been viewed as an effective and valid teaching method for learning institutions, for example schools [40]. This kind of learning may be defined as a learning situation in which learners engage in a joint learning activity, enabling the construction of knowledge and/or the solution of problems in pursuit of a joint goal (see [41] and [35]).

In recent years, an increasing amount of research has introduced collaborative learning to game-based scenarios – meaning that the given educational content was made accessible through game play (see e.g. [18]). Collaborative game-based learning can be viewed as a “learning by doing” approach, which allows the learner to make mistakes while at the same time avoiding risks in the real-world [35].

Preventing risks but still possibly offering immersion in a situation, so that participants have the feeling of creating and undergoing a (real) experience, are both great benefits of Serious Games [6]. First recorded Serious Games are approaches of simulation, counting and planning games, which linked the acquirement and usage of knowledge in a playful way [2]. Even though the “carefully thought-out educational purpose” [3, p. 1] is focused by such a game, the entertainment factor should not be neglected as both parts support each other to achieve the (learning) goal [28].

3.1 Positive Effects in Escape Rooms

Nowadays, most Serious Games are of a digital kind, but lately another format in which the “hedonic nature of the game is highlighted” [4, p. 43] have gained worldwide popularity: Escape Rooms [9]. Escape Rooms – or Escape Games – are defined as “live-action team-based games where players discover clues, solve puzzles, and accomplish tasks in one or more rooms in order to accomplish a specific goal (usually escaping from the room) in a limited amount of time” [29, p. 1]. They focus on a team-based learning approach, in which players have to delve into a scenario and work together as a team [17]. When the design is specifically directed at reaching a certain educational goal, Escape Games are also considered to be called ‘Educational Escape Rooms’ [4] [7]. However, a concrete educational goal does not have to be of a professional or technical nature alone; the development or encouragement of, for example soft skills, can be conceivable as well [4].

In recent years, a growing interest in an industrial, respectively organizational setting can be detected (see e.g. [14]). Escape Rooms no longer seem to be exclusively a leisure activity or an irrelevant variation of everyday school life. An (Educational) Escape Room can be considered a Serious Game – but in addition, the concept of Serious Gaming is possible, too [4]: Through game-based learning – besides achieving the instruction and story objective – diverse positive learning developments and effects can occur, like generating tolerance towards others and their way of thinking and acting [12]. In most Escape Rooms, teamwork and communication are promoted [29], too. Some studies (e.g. [12]) assert that these

games can be applied as an effective method of changing attitudes towards a designated issue. Even an increase of motivation towards approached subjects and situations of Escape Rooms could be determined, as players felt “double motivated in the process of playing” [4, p. 43]. By improving the participants’ motivation, a deeper engagement with the respective learning content can be ensured [8].

3.2 Escape Rooms in a Business Setting

An employee-centered approach offers numerous advantages: For one, it can support the entry into digital learning and facilitate employees’ access to novel technologies. The gaming component has both intrinsic value (e.g. enjoyment) and extrinsic value, meaning that there is a learning element, respectively knowledge, to be obtained by the employee * the latter being the main objective of an Escape Room designed for a business setting [42]. In addition, the innovative learning context enables the employee to use different strategies and “out-of-the-box” thinking, as it fosters the ability for creative problem-solving [8].

Current research on game-based learning seems to focus on learning goals or the cognition and/or meta-cognition of its participants (see e.g. [44]). This is particularly true for Escape Rooms. Aiming to assess the needs of SMEs and its employees, we did not pursue this focus for the present Escape Room. Rather, a setting was needed that put the participants in an (affective) state, so they would want to share personal and/or informal information and not just superficial or socially desired information.

Affective states – forming a superordinate category for emotions and feelings – have an impact on the learning process and educational achievements, precisely on one’s motivation to learn and achieve a certain goal (see e.g. [31] and [22]). Both positive and negative emotions seem to be a substantial part of learning. The subjective feeling that is experienced can be seen as a source of information that, for example, helps the individual to form judgment and steer cognition e.g. [37]. Information processing and the scope of attention can change due to a specific emotion that is experienced [11, p. 314]: “Many positive emotions broaden individuals’ momentary thought-action repertoires, prompting them to pursue a wider range of thoughts [...]”. Additionally, the emotions one experiences during a learning activity can help with the understanding of individual interests and developing a strong and long-lasting motivation [32]. Dampening or activating positive or negative affect can be helpful in the motivational process to gain access to specific neurological systems, thus accessing further or new information (see e.g. [19] and [27]).

Based on the empirical findings described above, one could assume that through a specific learning environment different affective states might be induced, which could in turn lead to the disclosure of new information. In this case, the emotionally charged Escape Room might enable the participants to access information in a much more flexible way. Facing, for example, a frustrating scenario but also having a sense of success in the end when the riddles are

solved, could accordingly make an Escape Room a helpful tool when evaluating the status quo, as it might provide a more detailed and realistic assessment.

4 The Escape Room in the Project Education 4.0 for SMEs

In the first instance, it is important for projects related to SMEs to know the current status of a company in order to support it in its further development. The project Education 4.0 for SMEs applies, among other methods, a self-developed Escape Room in order to determine the needs in the area of knowledge transfer. The following sections describe all relevant aspects of the developed Escape Room, from the identified requirements to the storyline, structure and specific elements such as a control mechanism for the Gamemaster. The chapter concludes with the main goals that the project wants to achieve by using the Escape Room.

4.1 Requirements

With regard to the objective of a needs analysis, several requirements have to be met: First of all, the target group should be as diverse as possible in order to get a comprehensive insight into all departments and every hierarchical level of the company. Also, it is recommendable that the Escape Room is playable for a variety of people in order to adapt to the respective situation (quantity, diversity of the group) in the company. The realistic range of participants lies between two and six. In addition to the adjustable number of people, the duration of the Escape Room or the difficulty of the riddles also needs to be individually adjusted.

Since the Escape Room serves as an introduction to the needs analysis on the topic of knowledge transfer, it is followed by a feedback discussion with reflective questions and an interactive presentation on the topic combined with individual surveys. The planned time for the entire part is one hour. Therefore the playing time should not exceed 20 to 25 minutes. Correspondingly, it must be possible to control the game from outside if necessary. The mobility of the Escape Room presents the third precondition, as it is played directly on site and therefore has to be adaptable to spatial conditions. The final requirement is to create a realistic working environment with familiar problems and situations in order to motivate and also challenge communication between the participants, in turn encouraging them to make open and realistic statements about the situation in their company. In this vein, the riddles are presented as everyday tasks one faces in an office environment.

4.2 Storyline, Structure and Gameplay

The storyline of the Escape Room is about a company named “DEMMIC”, a fictional, medium-sized company, specializing in the production of components for lightweight construction. One of its sales team members has forgotten to

forward an order to the production department before they went on their well-deserved vacation. The Escape Room takes place right after a customer has called and complained about the missing order. The participants have to gain access to their colleagues' laptops and find it.

The current situation of the company “DEMMIC” serves as a negative example of internal knowledge management:

- No coherent documentation of processes;
- No use of common company standards like file servers etc.;
- Cluttered working environment full of unnecessary stuff (e.g. not work related magazines);
- Outdated or even wrong documents.

The structure of the Escape Room and the riddles and items needed to find the missing order are shown in figure 2.

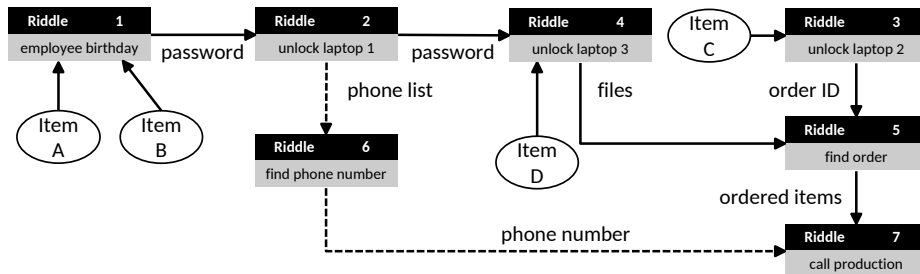


Fig. 2. Riddle-Flow-Chart (as seen in [7]).

After a brief introduction to the Escape Room method, the participants are directly confronted with the starting situation (they are employees of DEMMIC) and sent into the room. Suddenly an actor (the disguised Gamemaster) enters and panic-strickenly talks about the situation of the disappeared order and the angry customer who has just called. The actor also hands over a smartphone as a possibility to call for help and for the Gamemaster to give clues and leaves the room. In addition, the phone is needed for riddle 7 to call the production department with the corresponding order. As it can be seen in figure 2, the participants initially have to find several items (A - C) to solve the starting riddles (1 - 3) and to get access to two of the three laptops. To unlock the third laptop (riddle 4) they have to combine another item (D) with some information they get by solving riddle 3. By unlocking each laptop, the participants get a piece of information which is needed to find the lost order (riddle 5) and afterwards solve the final riddle (7). The dotted arrows to and from riddle 6 in the figure show an optional riddle which can be added or removed by the Gamemaster and will be described in the next section (4.3). After solving riddle 7 by calling the production department the participants can successfully escape

the room. In addition to the riddles 1 to 7, there are a lot of false clues hidden throughout the Escape Room, which is also a common feature in commercial Escape Rooms [29]. This is intended to slow down the participants and simulate a typical situation at work, when they have to search for information.

4.3 Control Options for the Gamemaster

The Gamemaster is aware of the progress the participants have achieved and can intervene whenever needed. To this end, participants are observed audio-visually from the outside. To give hints, the smartphone is used in order to preserve the tense atmosphere of the Escape Room. When calling the participants, the actor (the disguised Gamemaster) leaves clues like: “Have you looked into the drawer? They usually put all their stuff there.”

As mentioned in the previous section, riddle 6 is optional. This was introduced to control the playing time. Especially in the context of the Escape Room being only one of several different workshops that take place at the company, this is a valuable option. Riddle 6 is about finding the right phone number of the production department when given several, partly outdated, lists of numbers. In order to solve this riddle, the participants have to call the right number after finding the correct list. Each call is received by the Gamemaster, who, depending on the correctness of the number, can react correspondingly:

- 1) Answer the phone with: “Person X, from production department. How may I help you?”
- 2) Not answer the phone at all.
- 3) Answer the phone with some excuse that they must have called the wrong number.

When skipping the riddle, the Gamemaster just answers the first phone call with option number 1).

4.4 Main Goals

As the Escape Room is part of the needs assessment in the project Education 4.0 for SMEs, different objectives for further data collection are linked to the participation of the workforce. One of the main goals is to *raise awareness and sensitivity for the importance of appropriate knowledge transfer within the company*. This ranges from understanding of knowing what one knows, to articulation and transparent and comprehensible documentation of the knowledge in question. *Learning more about the current difficulties in knowledge transfer and the status quo in the respective enterprise* represents a further goal. Finally, by showing the participants a worst-case scenario of how not to do knowledge transfer and documentation, they should *be encouraged to talk openly and freely about the experiences they are facing in their everyday working life*.

5 Exploratory Study in two SMEs

Joint work with a company begins with a preliminary discussion with the management to identify starting points. Based on these first results, the so-called practical taster day(s) is individually organized for each company. In addition to a practical insight into the project contents, the format of the practical taster day consists of several workshops including a needs analysis. The needs analysis intends to reify the discrepancy between the desired situation and the actual situation and thus has the aim of “analyzing deficits in education, promotion and organizational development at the strategic, operational and individual level” [5, p. 825]. The management selects the representatives of the workforce who participate in the practical taster day, according to specific criteria. They represent a group as heterogeneous as possible in terms of different departments, hierarchical levels, training, gender, full-time and part-time employment, etc.

In the context of the project Education 4.0 for SMEs, the needs analysis comprises two thematic priorities: digitization and knowledge transfer. While the situation in the field of digitization is primarily evaluated by the method LEGO® SERIOUS PLAY®, the self-developed Escape Room described above primarily serves to assess needs in the area of knowledge transfer. In addition, the technical solutions for knowledge management that may already be available in the company are considered at this point as well.

The collection of data in the area of knowledge transfer is divided into two parts: 1) Participation in the Escape Room is followed by a short feedback round with reflective questions and 2) an interactive presentation about knowledge transfer including individual surveys. Furthermore, at the end of the practical taster day the participants fill in questionnaires in which, among other topics, they also evaluate the experienced Escape Room and the input for the knowledge transfer (12 items with 5 point Likert scale ranging from “fully agree” to “totally disagree”).

5.1 Results of the Questionnaire on the Escape Room

In the first step, some insights from the questionnaire on the Escape Room method as a tool for needs analysis will be given. It proved to be an innovative and enjoyable method, as 90.5 % ($n = 21$) of the participants had not visited an Escape Room in their free time yet, while almost all of them had fun in the session during the practical taster day (95.2 % “fully agreed” and “agreed” on this item, while one was “neutral”). The difficulty and number of tasks were furthermore deemed appropriate by the majority of the participants (85.7 % and 81 % respectively for positive answers, only one participant “totally disagreed”, which might be reflected in one of the answers in the feedback session described in 5.2).

Apart from the method as such, its suitability in terms of its goal *raising awareness for the importance of appropriate knowledge transfer within one’s company* was rated. To this end, the participants were asked whether they “found the ‘Escape Room’ method helpful to think about knowledge transfer in [their]

everyday work”. Although 14.3 % did not take any side and 4.8 % disagreed on this question, the statement was confirmed explicitly by 80.9 %. Also, most of the respondents (76.2 %) agreed that the method helped them “to understand the topic of knowledge transfer better”. Asked for new insights about knowledge management and transfer in their everyday work, the participants answers diverged more, ranging from “totally agree” (19 %) to “disagree” (4.8 %); the majority however “agreed” to have become aware of new aspects (61.9 %). Considering the “practical implications” of knowledge transfer, most participants were positive (76.2 %) that the Escape Room supported their awareness of the topic. However, almost a quarter (23.8 %) had a neutral stance regarding this question, showing that some issues might not be new.

5.2 Results of the Feedback Conversation

In order to contextualize the data from the quantitative and anonymous evaluation that was held at the end of the day, some statements from two feedback rounds held directly after the Escape Room will be drawn on. Asked about the number of people playing the Escape Room, the participants considered it to be “okay”. The participants then pointed out that, while agreeable for this playful context, it was a rather unrealistic scenario compared to their work, in that usually such issues are not solved in a team. At the same time, especially for participants without a special affinity for computers, the team was an essential factor for solving the riddles. This might be an explanation for one participant’s judgment who did not find the task’s difficulty appropriate.

Even this first question relating to the participants’ experiences in the Escape Room, which was mainly meant to serve as feedback for the further development of the method, showed the difficulty of separating methodological feedback on the Escape Room from statements about the Escape Room’s topic of knowledge management. These statements were induced in the context of the second goal, which was for both the participants and the project Education 4.0 for SMEs to *learn about the current difficulties in knowledge transfer and the status quo in the company by encouraging the participants to talk openly and freely about the experiences they are facing in their everyday working life*. To this end, the close connection between the method and the (familiar) topic of knowledge management presents a valuable opportunity to discuss inconvenient issues. In this vein, not only objective aspects were mentioned, such as the applicability of the scenario to various departments, questions of documentation tools and ways of personal knowledge transfer. Rather, these aspects served as a starting point for the possibility of expressing critical issues like the familiar situation of the absence of a colleague as well as possible solutions, for example by official arrangements or unofficial practices.

5.3 Results of the Questions about Knowledge Transfer

“Do you know where in your company which knowledge is available or who you can ask about a certain topic?” This question serves as the main motivation for

the module on knowledge transfer in the workshops during the practical taster days.

In an interactive session, the systems relevant to knowledge management are identified for the purpose of needs analysis. Based on this list, further action might be identified. The aim of the group experience in the preceding Escape Room Session is, among other things, to increase the the ability to criticize and reflect. The participants usually respond very openly to questions regarding the current situation in the company. This leads to results, such as the answers shown in fig. 3.

In the course of the project several surveys have been conducted on the topic of knowledge management in different companies. Figure 3 shows the answer to the question “How much time do you spend searching for information in your daily work?” given in the participating two pilot SMEs and three online seminars about knowledge transfer. As a result, there is a considerable potential for improvement of knowledge management, which could lead to significant time saving in practice.

How much time do you spend searching for information in your daily work ?

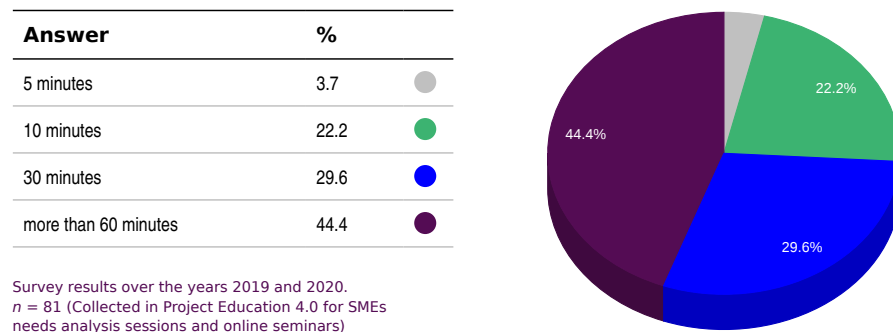


Fig. 3. Survey Results.

A similar conclusion was reached in a survey of more than 1600 office workers, which found that 25 % of respondents spent up to 60 minutes per working day searching for knowledge [21]. The needs analysis showed that companies usually have several IT systems in place that can serve as the basis for a knowledge management initiative. To the above-mentioned question whether the participants know where to find information on a topic or who to ask, most respondents answered that they roughly know this, but that there is still a considerable amount of work to be done to find concrete solutions. Participants would like to have a *simple and central means of access to relevant information*, which reduces the above mentioned search effort.

5.4 Lessons Learned

Due to tight constraints on the duration of the feedback session, some answers stayed relatively superficial. Giving the participants more time (e.g. about 30 minutes instead of 15-20 minutes) to reflect on the topic of knowledge transfer in their company might lead to more profound results. However, the responses received in this short period were already promising and should be examined further in future studies. A basis for this assumption is the relaxed and positive atmosphere that was indeed induced by the method, which, however, is also closely linked to the corporate culture. In the feedback session, banter on the Gamemaster's "mean" riddles and the admission that a certain riddle was "really annoying", as well as various sessions of laughter showed that the planned affective state of the participants could be achieved. Therefore, participatory observation is highly recommended for further studies in order to find out more details.

In addition to the experience gained for further data collection, certain points can also be noted for the design of the Escape Room itself. One opportunity for improvement is the clue system, in which a smartphone was used to communicate with the participants. Even though no problems have been encountered so far, the dependency on the reception level on site (especially indoors) might cause trouble in future sessions. This might be avoided by adding another way of communication, e.g. using the local company network or other internet sources. A possible further development emerged from the fact that communication can be done remotely using common messengers or video conference tools, thus shifting the whole Escape Room to an online solution. Such a digital Escape Room could be integrated better into the daily work routine, for example by decoupling it from the other workshops, thus requiring less time.

6 Conclusion and Further Work

In conclusion, the collected data indicate that the (method) Escape Room has certainly some justification to be used as a tool in the business setting to analyze the needs of in-company knowledge transfer management. This paper does not allow for a clear statement regarding the emotionally inducing impact the Escape Room might have had on its participants. Accordingly, it cannot be ruled out entirely that the collected data from the ensuing feedback conversation would have been generated only on the basis of the preceding Escape Room. Future research could therefore focus on the interim inquiry or retrospective judgment of participants' affective states, in order to examine and understand the effectiveness of these states more closely. In addition, the data collected so far could be further deepened within the project. For example, group discussions or individual interviews with representatives of the workforce could be considered in order to give all participants – the project and the participating SMEs – the opportunity to gain a deeper insight into the topic and especially the problems of knowledge transfer. Finally, the Escape Room method offers various potential fields of application such as Human Resources Development. Working on the

riddles together can provide insight into the team dynamics, especially if the solution is not obvious and various hurdles have to be overcome.

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