

ImProject: Improving RE Training by Combining it with Improvisation Theatre Sessions

A Research Proposal

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Abstract—Today factual knowledge training and soft skill training are typically taught as separate disciplines. This approach falls short of the need of the participants to learn, understand and experience the application of typical soft skills such as communication skills within their domain.

Requirements engineering (RE) in practice requires for instance excellent communication skills. We propose to use techniques from improvisation theatre to combine factual knowledge and soft skill training into one workshop format, which we call ImProject.

We propose to add ImProject as a training element/part of normal RE training. ImProject adopts a typical improvisation theatre training session and trains soft skills such as communication skills in typical RE situations.

In this paper, we present our research agenda for investigating how factual knowledge training such as RE and soft skill training can be combined using ImProject and derive further needed research activities. This interdisciplinary research will contribute to improve training within the RE community.

Index Terms—Requirements Engineering, Industrial Training, Training Format, Soft Skills, Improvisation.

I. INTRODUCTION

Being trainers for several years in requirements engineering (RE), software engineering as well as project management (PM) and both in industry and academia, we experienced a lack between the typical training and some of our participants needs. Participants typically appreciate the factual knowledge oriented approach of the training material, and give more or less positive feedback on how the material is taught (e.g. see the publication of Brian Berenbach with respect to a company training [1]). However, generally stated comments during the training and questions from the participants towards the trainer indicate, that something more is needed. Participants ask for advice regarding the integration of interpersonal aspects in a specific context.

We decided to use the broader term *soft skill* to summarize all the skills and abilities that relate to human behavior, communication and psychological patterns in human behavior. For a further discussion on the term's definition, see [2].

These statements imply trainings should extend beyond pure factual knowledge and include some kind of contextual soft skill training as well. One can argue against an

integration, that soft skill training is not specific to people working in the RE domain and so this training could be offered to diverse professional groups. Additionally, this separated format is very efficient from the training provider's point of view and sometimes for the customers too: Slide presentations offer a low-risk format for the customers as well as for the providers.

But there is a demand to integrate factual knowledge and soft skill training, so the question arises how these two could be combined into one joint approach, being taught in parallel?

The need to emphasize on soft skill aspects within the RE education has been recognized from the RE community (e.g. [3], [4]). Efforts to respond to this focus on the secondary education at Universities (e.g. [5]). Little research has been published how to efficiently train practitioners, or to integrate soft skill aspects within training in industrial setups (e.g. [1]).

However, it is insufficient to emphasize on finding a combined training format that just considers both aspects separately. Instead, the new format needs to be more efficient with respect to duration and learning content. It is more than the sum of its parts as Aristotle once stated. This training format then needs to be thoroughly investigated in order to allow us to scientifically and empirically claim success.

This paper presents a research agenda for validating a new training format that is capable of improving (industrial) trainings by combining factual knowledge training (in this case RE) with soft skill training.

We introduce our approach of combining a RE training with a typical training session from an improvisation theatre course, and outline subsequently derived research agenda, questions and topics. Thus, we call our approach ImProject standing for Improvisation Theatre in Projects.

The paper is structured as follows:

Section II illustrates the current situation in RE trainings, underpins the need for additional training elements with two examples and summarizes methods that already enrich classroom trainings. Section III then introduces the general concepts of improvisation theatre before describing the

concept of our workshop format ImProject. In Section IV, we present our research agenda together with our research approach. Finally, Section V summarizes the results of this paper.

II. CURRENT SITUATION

Traditionally, research, education and training in RE are focusing on tools and methods. But it is often neither the method nor the technique that causes a project to fail, but the interpersonal relations and miscommunication [6]. The approach towards teaching RE and the corresponding topics such as stakeholder management and requirements elicitation needs to be less theoretical and needs to include more soft skill related topics. Therefore, new training concepts are needed. Only recently, the RE community as well as the PM community have detected the importance of the so-called socio-technical or soft skill aspects. This is for instance reflected in call for papers explicitly requesting submissions on this topic (e.g. [7], [8]).

The question remains how industrial trainings can be structured in a way, that soft skills are well integrated. The Workshop on Requirements Engineering Education and Training (REET, taking place since 2005 in conjunction with the International IEEE RE Conference) gives a good overview on existing approaches and new aspects. However, the majority of papers focusses on education at Universities.

In industrial approaches, it is common to train specialized practitioners using the experience-based learning model [9], [10].

In this paper we focus on industrial trainings including both on-site trainings, executed at the company's site, and open training at the training company's location. These trainings last one to several days.

Other methods than traditional classroom training exist, and have been presented to the RE community at multiple occasions (e.g. [5]). But screening teaching material, we noticed that in industrial RE trainings nevertheless 'old' training styles seem to dominate: Slide presentations enriched with some small (more or less interactive) exercises. These exercises last 10-20 minutes and enforce the participants to apply the method exactly as it had just been introduced before [11].

This kind of training is not sufficient to train soft skill aspects in projects.

Due to the gap between the content of current training sessions and the really important topics to be addressed, current approaches do not seem to be sufficient. We thus conclude, that it will not be useful to train factual knowledge and soft skills separately. Furthermore, this implies directly that the offer should be a combined training of factual knowledge and soft skills in the corresponding situations. This approach is closer to what the participants experience in their daily work. Consequently, this kind of training might be more efficient as well.

Following, we present two examples from the daily life of a requirements engineer. These illustrate common situations where the requirements engineer uses his factual knowledge while at the same time needs to apply soft skills. These soft skills include for example tense communication and active listening. He does not distinguish whether he applies factual knowledge, such as a method, or a soft skill.

A. Kano Analysis and AMUSE - Two Requirements Engineering Methods that Require Soft Skills

As part of the requirements engineering, requirements need to be prioritized. Otherwise the team which implements them would not have a clear understanding of what to implement first.

In RE for products, there is a well-known method for prioritization of user requirements to decide which one to implement in which version of the product. This is called the Kano Model or Kano Modeling [12].

For each iteration the requirements engineers need to prioritize the users' requirements into the categories:

"Basic" - These requirements are the fundamentals of the product. They are often not even mentioned by the user, but are nevertheless expected.

"Performance" - These requirements are the new features, and often those the user has asked for.

"Excitement" - Requirements the user often has not asked for directly, but which are the reasons he is going to buy or to use the product.

For example, an MP3-player needs to play music. This is a "basic" functionality. Some years ago, having a wheel as the only 'button' to steer the MP3-player was exciting, it was new and only Apple products had it. This was clearly an exciting requirement: Something the users have not asked for, but because of its existence they bought the product.

Another prioritization approach explicitly analyses the user satisfaction with each requirement. This approach is called AMUSE (Appraisal and Measurement of User Satisfaction [13]). AMUSE supports the requirements engineer to detect the requirements which will lead to the highest user satisfaction. Amongst other things AMUSE is used to analyze the hedonic satisfaction of the user.

What does a requirements engineer need to successfully prioritize the requirements together with the user? Of course, he needs to have a clear understanding of the method he uses.

On the other hand, the results of a successful prioritization are prioritized requirements which reflect the real users' priorities. It is thus up to the requirements engineer's communication skills, his intuition and his ability to put himself in the position of the user and empathize with him to understand the user's real priorities.

B. Expectation Management in Long Term Projects

One of the authors participated in an IT infrastructure project, where a new IT system should be customized and rolled-out to several sites of a company. The roll-out was executed site after site. The requirements for customization

were implemented in iterations. Each iteration focused on that site where the system was rolled-out to.

Requirements engineers needed to build up trust with the users of a system.

At a certain point, the system was rolled-out to some site while to other sites it was not yet rolled-out. However, the users at the already rolled-out sites had new requirements or change requests to the system whereas the users at not-yet rolled-out sites were still expecting to receive the system initially. Being the requirements engineer in that situation the author needed to maintain the trust from the users having a rolled-out version of the system. At the same time these users were disappointed by the project management's decision to focus on the roll-out sites and to postpone further requirements or change requests from rolled-out sites. Thus, the requirements engineer was in need to thoroughly manage expectations while eliciting the new requirements or change requests. Doing this successfully, he maintained a good relationship with the users, avoided conflicts, and remained a trusted person from the user's viewpoint – even though the principal anger by the users of not being supported by the project management remained.

This real live example illustrates well that the daily work of the requirements engineer includes situations, where the successful application of requirement elicitation methods only, does not result in positive feedback on the requirements engineer's work.

First, the requirements engineer needs to understand highly emotional situations and see or even better feel them from the user's perspective. Second, he needs to use his communication skills, as well as convincing skills to achieve understanding from the users. Third, the requirements engineer is seen as a communication channel towards the project, especially to the project management. It is the requirement engineer's task to create awareness of the current user situation, especially when emotionally tense and to ask for understanding. So, the requirements engineer needs to appropriately communicate with the project management to make them aware of this situation. All this requires high soft skill competence.

C. Methods to enrich classroom trainings

Other methods have been used to enrich traditional classroom training and enforce learning by creating experience such as the adaptation of board games like "Monopoly" (see "RE-O-Poly" [14]), role plays (e.g. [15]), project simulations [16] or other interactive formats [17].

1) Role Play

One common approach for training social skills is the usage of *role plays*. Role play has been particularly often used for educational purpose and is often used for behavioral oriented training within company trainings too.

However, to the authors' understanding role play has some disadvantages that especially hinder advanced practitioners to participate with their full attention and gain the most learning possible out of these types of interaction.

Role play enforces the participants to make a certain mistake that is often pre-described by the role play instruction. In training, there are participants who cannot distinguish role from emotion associated with the mistake. When participants of this type are enforced to play a project manager making a certain mistake, they might end up being emotionally negatively affected. Thus learning is hindered if not even completely blocked.

Second, role plays consume a lot of time and have the drawback of only a few participants acting, while the other participants are sitting and observing those who act out their role play.

To our experience, role plays often neither bring up the really challenging situations nor foster intuitive reactions. In our trainings we often see participants not taking the situation serious or feeling "observed" by the other participants. This is especially the case for in-house trainings, where the participants sitting in the audience are (direct) colleagues or might even be directing managers (see [11] for a discussion on this topic).

Conclusion: Role play is difficult when participants are enforced into certain error prone situation. The participants might truly believe to act differently in real life situations, thus disconnecting from the learning provided by the role play.

2) RE-O-Poly

Smith and Gotel ([14]) identified eight RE practices to "create a lightweight set of RE practices [...] to improve RE processes" and developed the board game *RE-O-Poly* based on the well-known "Monopoly" game. *RE-O-Poly* is created to support education of undergraduates (beginners) in RE to e.g. "get a broad overview of typical RE problems" and "respond appropriately to unanticipated situations that impact projects". Using "Monopoly" as a base, the authors expect to "encourage face-to-face communication which is useful for learning about a discursive activity."

These interactive methods are based on the approach, that participants need to have fun during the training to activate their learning. However, the willingness to learn depends on each participant himself. This has been extensively studied in the so-called subject-scientific foundation of Holzkamp [18].

And from learning theory it is well known that "theory is not enough, because knowledge does not substitutes experience" ([19] translated by author). Additionally, Daniel Goleman cites Howard Gardner in his well-known book on emotional intelligence: "The best way to learn something is to be interested in it, and enjoy the activity of doing so" ([20] translated by author).

We believe that the situation in current trainings cannot create this well-known "flow" as described by Csikszentmihalyi [21]. However, as flow is the person's state where learning is easiest, this should be the state a person wanting to learn should aim for. Studies show, that "aiming for flow situations leads to success" (e.g. [22]).

III. IMPROVISATION THEATRE

A. General Concepts of Improvisation Theatre

Improvisation theatre consists of so-called improvisation theatre games, also called “improv games” or simply “games”. Each improvisation theatre show is divided into several games. Each game has some base rules. Before the game starts, additional rules are defined by the audience of the show with help from the facilitator.

Originally, improvisation theatre was invented by Keith Johnstone in the late 1950s. He was teaching acting and drama at the Royal Court Theatre in London and thought his students were trying to be “original” and “giving their best”, which according to him resulted in bad acting [23], [24]. (For further information on improvisation theatre we refer to [25].)

Using improvisation theatre games allow us to come up with a new interactive format to train the combination of factual knowledge and soft skills.

The characteristics of improvisation theatre techniques all seem to cover our goals as stated in Section II. These characteristics are

1. Improvisation theatre is interactive.
2. Improvisation theatre is about being spontaneous. Improvisers do not know the scene they will play until they actually start playing it and do not have scripts. They act spontaneously, improvising the scene from what comes into their minds. Thus, they are acting in the moment and need to be very self-aware, as well as aware of their co-players.
3. Improvisation theatre is about having fun. As there is no script, curious situations occur. This creates fun.
4. Announcing improvisation theatre for a training session is new, sounds interesting and channels excitement. - This is a prerequisite for flow while learning.

Improvisation theatre can create realistic setups and immediate feedback.

The usage of improvisation theatre in RE training is unusual. To our knowledge there exist two approaches, ImProject [26] and the (untitled) approach of Mahaux [27], [28].

In our approach, we utilize an improvisation theatre training session which has further advantages:

1. A training session and its games focus on trying out new things, thus is constructed for failure. Thus, making mistakes is the goal for most of these games.
2. Some games, do not distinguish participants (e.g. by role). Thus, an error is made by the group, not by the individual.
3. Training games last between 10 to 20 minutes, each focuses on different things. Thus, to the authors' understanding, this approach is faster than using role play.

Especially, the second item frees the participants to try things out. Participants tend to feel safer, as individual activities

cannot be as clearly separated as when using different roles such as in role play.

B. The ImProject Format

ImProject [26] was initially called REIM (Requirements Engineering and Improvisation Theatre) and initially introduced to the (RE) research community in 2008 [18], [19].

The format has been further developed, and now serves as a workshop format for training situations related to (software) projects. It focuses on the training of soft skills, especially communicational skills together with hard facts. We initially focus our research on RE, because RE is considered to be a highly communicative job within the software engineering discipline (e.g. [3]).

The following summarizes the overarching principles of ImProject:

ImProject is based on a typical improvisation theatre training session and uses storytelling to map to elements of the domain under consideration (here: RE). It is structured in three sections: Warm up, Training and Closure. For each section, games from the corresponding improvisation theatre training sections are being used. All games used in the ImProject format are being described using a pattern language, called Game Language (see [29] for details).

Then, each training game creates the same experience flow:

1. The game forces all participants to make mistakes.
2. The trainer highlights that these types of mistakes happen in real projects as well, regardless how “good”, “well prepared” [...] one is.
3. A negative effect of reflection is reduced, because there is no emotional relationship between the actor and the mistake (dissociation; reflection without emotion). Learning takes place efficiently and blockers or blockades are avoided.
4. ImProject makes it impossible for participants not to engage in the exercise.
5. It creates an atmosphere where failure means learning.
6. Additionally, ImProject enables learning by/through having a lot of fun.

For each game, learning objectives have been defined as part of the pattern language. For instance the game “The Company Game” uses the improvisation theatre game called “Pattern Game” and trains learning objectives such as “The participants understand that they are adding an implicit prioritization to their tasks.”. For details, the reader is referred to Game Language ([29]). As the concept of ImProject is quite complex, a train the trainer guideline has been published as well. This train the trainer guideline is published in a pattern format as well (see [26] for details).

C. Other Approaches using Improvisation Theatre

At a first look, the research from Martin Mahaux (University of Namur, Belgium) looks similar to our approach.

Indeed, he is using improvisation theatre as a technique, too. However, in his research Mahaux uses improvisation theatre as a technique to drive innovation and collaboration within the (software) development process [27]. His approach aims at involving stakeholders to gather and elicit requirements using improvisation theatre games. We utilize games that are used during improvisation theatre training sessions, and are called improvisation theatre training games:

“Analysts and stakeholders can benefit from using these techniques in their requirements project and workshops” [27]. Even though Mahaux emphasizes the aspect of improvisation theatre, his focus on improvisation theatre is to use it as a tool to enhance stakeholder communication, and reach better creative, innovative and collaborative processes during the activity of requirements gathering[28]. Thus, in his approach improvisation theatre is used to create better outcomes with respect to user stories and scenarios within the process of RE not while training RE and related soft-skill.

In contrast to Mahaux, we use structure and content of an improvisation theatre training session to improve the RE training by adding ImProject to train soft skills specific to RE and within RE situations. Thus, we consider improvisation theatre as a tool to train communicational and other soft skill related aspects.

IV. RESEARCH AGENDA AND RESEARCH QUESTIONS

As trainers, we constantly aim at improving our training sessions. As we have outlined in the former sections, there is a need to improve RE trainings with regard to efficiently combining factual RE knowledge training with training of soft skills within RE situations.

The development of the introduced workshop format in the ImProject was driven by one main question, which we call our main research question:

RQ0: How can improvisation theatre be used effectively in RE trainings?

We believe, ImProject could be a good answer to this question, but are of course aware that we need to evaluate our assumption.

Thus, we split this research question into two disjunct research questions that focus on what is to be learned using improvisation theatre.

We want to focus on communication skills, because excellent communication skills are seen to be a key competence (see e.g. Klendauer et al. [31]); the format needs to efficiently provide the possibility to train communication skills. Therefore, RQ1 focuses specifically on these soft skill aspects.

RQ1: How can improvisation theatre be used to introduce an effective way to successfully train communication skills involving RE situations?

Improvisation theatre also is seen to be an effective instrument for team building, awareness training on trust and other aspects in social life. This is reflected by numerous companies offering business consulting based on improvisation theatre, e.g. called Business Theatre (e.g. [32]). We thus believe that our format trains other social aspects than communication, even though we might not foresee exactly which ones. To analyze this, we will interpret the research data in the context of the Grounded Theory [33].

This is reflected in our RQ2.

RQ2: How can improvisation theatre be used within RE training to train other social aspects than communication?

In order to identify if and how RQ1 and RQ2 can be answered using our ImProject format we further detail each research question into research tasks.

A. Examining RQ1

We want to use our format ImProject for the training of communication skills. Thus, we need to identify situations for which ImProject is suited well. Consequently, our first research task states:

RT1: In which situations is ImProject working well?

To provide the empirical evidence for the following questions, we are planning an extended evaluation design, using qualitative as well as quantitative evaluation of feedback questionnaires, structured interviews and repetition over time.

The exact evaluation design will need to be developed, and will contribute to answer

RT2: How do we relate a soft skill aspect in an improvisation theatre game to RE situations?

All games used within ImProject are constructed using the following mechanism: A training game from improvisation theatre is taken as foundation and a desired soft skill artifact (called anticipated learning object) is attached to the game using storytelling. While playing for instance a game which involves throwing balls, in the context of RE these balls become requirements and the catchers become requirement engineers. Even though, these main principles have been documented, further documentation is required here.

One possibility to verify communicational aspects trained by improvisation theatre would be to ask participants to allocate certain learning outcomes to the games played.

Participants will notice learning outcomes by games not by stories. We know this effect from psychotherapy (in psychotherapy stories are known as metaphors [34]). It might be worth to study this effect, but this is beyond the scope of our research.

We further ask:

RT3: Are the anticipated learning objectives achieved with our approach? If not, what is not learned? What else is learned or experienced?

The anticipated learning objectives reflect the related soft skill aspect and have been described for each game as part of the Game Language and need to be validated. As discussed above, the character of learning outcomes is somewhat difficult, so we further separate RT3 into the following research tasks:

RT3a: What are the learning outcomes being reported by the participants? - Cluster & categorize.

RT3b: What are the learning objectives that are learned / trained with our approach? (according to the participants and/or according to the trainer)

RT3a focuses on the aspect of the subject-specific learning outcomes. These aspects will be derived from questionnaires and structured interviews.

To answer RT3b, we examine the results from RT3a and compare these results with our anticipated learning objectives as well as observations made during the training.

This will include a comparison between the learning objectives being trained as opposed to being learned.

The former relates to the intention of the trainer during game execution, the latter refers to the evaluation feedback from the participants.

B. Examining RQ2

We are expecting the participants to report learning outcomes which we have not foreseen by the construction of our format. To examine these 'unexpected' or additional learning outcomes, we ask

RT4: Are there further learning objectives that the participants report to have learned? Which ones are these? Cluster & categorize.

Unexpected or not foreseen learning outcomes cannot be evaluated using a qualitative evaluation. Thus, we plan to use open questionnaires and interviews as part of a qualitative analysis to identify these further learning objectives.

We conclude this section with Figure 1. It provides the reader with a good overview, how the research questions are related with each other.

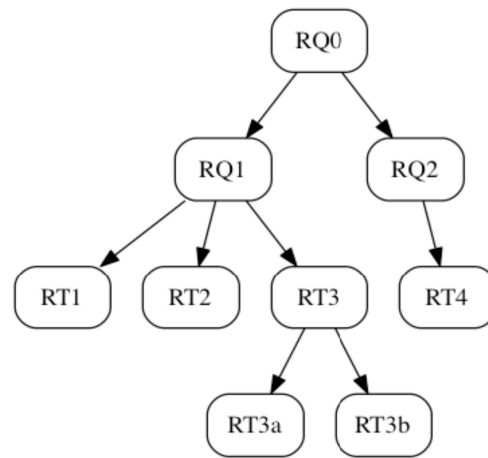


Figure 1: Overview Research Questions

C. Research Approach

To get an answer on the research questions mentioned above, we need a comparison of the learning objectives anticipated by the trainers and curriculum developers on one side and the learning outcomes stated by the participants on the other side as described in [29].

This research design will not be able to answer all assumptions. For example we will not evaluate the quality of the RE process after the trainings from the point of view of the customers as “objects” in the RE process. But for practical reasons this will be the first step to a better assessment of the ImProject method.

We will of course build upon the already available research results, which we received from multiple occasions where we offered parts of ImProject for exploration or pre-testing (e.g. MERE'08 [36], CHASE'12 [36], Young Crew World Congress 2012 [37], EuroPloP'11 [39]).

Most of these sessions lasted around one hour and gave us first feedback how such an interactive approach was perceived by experienced researchers and practitioners in the field of RE.

As the feedback was encouraging, we executed further interactive sessions, trying out more games and experimenting with the structure which finally resulted in what we call today the ImProject format.

Until today, we have executed more than ten sessions. Each of these sessions received very good feedback.

At the end of each game, the participants were asked to reflect on their behavior as well as highlighting their personal experience. At the end of each session, each participant was asked for an overall reflection, along the two questions “What was your most important personal learning?” and “What will you be doing differently from tomorrow onwards?”. Many participants reported learning outcomes that fit to the learning objectives as stated in [29]. Informally stating, we can say that the approach seems to be “working out”. We consider these

executed sessions pre-test to our evaluation, as they have been used to sharpen the games and the format itself.

For all these pre-testing workshops, the trainer was always the same person. Thus, our observations are kept consistent and are not biased, because of different trainers executing the training differently. We are of course aware, that our trainer was gaining more experience over the time as well.

The subsequent next step is a formal evaluation approach executing a full ImProject workshop followed by a sequence of questionnaires and interviews to answer our research questions.

The intended sequence and its timeframe is shown in figure 2.

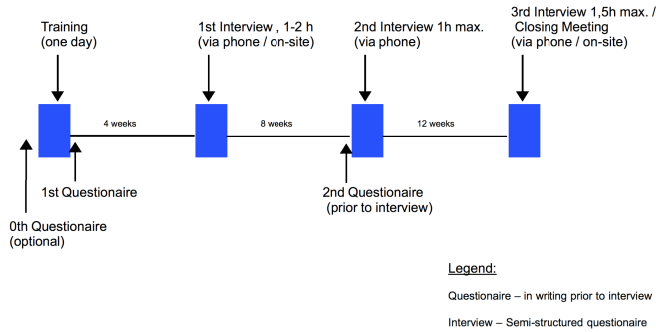


Fig. 1. Intended Evaluation Approach

We will use structured and semi-structured questionnaires as well as interviews to answer. Table 1 gives an overview which evaluation methods are planned to be used to answer our research questions and tasks.

Research Question	Evaluation Method
RQ0	questionnaire, interview, repetition over time
RQ1	structured questionnaire, repetition over time
RQ2	semi-structured questionnaire, interview, repetition over time
RT1	structured questionnaire
RT2	semi-structured questionnaire
RT3	semi-structured questionnaire, follow up interview & repetition over time
RT3a	structured questionnaire
RT3b	semi-structured questionnaire, interview, follow up over time
RT4	semi-structured questionnaire, Interview, repetition over time
RT5	comparative questionnaire

Table 1: Overview, which research questions are planned to be answered by which evaluation method

The subsequent results will also help us to investigate the generalization of our approach.

We will conclude our research answering

RT5: Is the construction of the workshop format ImProject flexible enough to extend to other areas?

Thus, we consider how ImProject can be extended to other “areas of expertise” [39] in (software) projects, e.g. project management.

Games that emerge from further utilizing the workshop format will be added to the Game Language.

In this paper, we didn’t discuss the influence of the relationship between trainer and trainees. For this evaluation, the trainings will be run by the same trainer as during pre-tests in order to be consistent within the experiment. Future research would then include transferring the training to other trainers.

V. SUMMARY

In this paper, we summarized the current situation in industrial RE trainings and pointed out the need for a new training element. We then presented our workshop format ImProject as a possible solution to serve as this training element closing the aforementioned gap. We elaborated why ImProject is based on an improvisation theatre training session.

Further, we discussed already existing approaches and clarified the differences, deriving the contribution to the research community. Thus, we presented our research agenda and research questions. We concluded the paper, presenting our research approach stating that first pre-tests indicate ImProject could be a useful format. However, for further needed evaluation and validation we outlined our evaluation approach using evaluation methods from social science.

One could argue, that more research questions might be derived from using a format such as ImProject, but this would inflate our approach and thus result in losing research focus.

Thus, our next steps are the proper definition of the evaluation design using the table above as input and subsequently its execution.

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