

EXPERIENCES WITH ROLE-PLAYING IN TEACHING INFORMATION SYSTEMS PROJECT MANAGEMENT

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Abstract: *Live action role playing games is a viable approach for training of practical competencies where the students play out real life roles in a designed and constrained environment, with roles, resources, and rules. This paper reports on experiences with roleplaying in a master level course in information system project management. The students played two games during the course, one on requirements prioritization together with stakeholders, and one on communication within a project. The response from the students were positive, as they reported that they considered the games fun and instructive. Still, there are challenges relating to the design of the games, as well as their facilitation. In particular, students need to have explicit and complete instructions before they play out their roles, and the game design needs to ensure active participation from all players.*

Keywords: *Information systems, Project management, Education, Gamification, Role playing*

1 INTRODUCTION

Various types of designed games have for long been considered a valuable tool for education at all levels. These games can be used to learn material with no strong relation to the rules of the game, for instance in quiz games like Kahoot¹, or in games where a correct answer to for example a math question brings you further towards some goal. On the other hand, the games themselves may mimic a lifelike situation where the participants should get some understanding of some real-life aspects like how to handle patients in care, how to manage a business, or how to act in a project. Another dimension of games is to what extent they apply computers, or whether they are realized as computer programs. Digital games have had a lot of development lately, whereas tabletop games (board games played on a table with resources like dice, cards, and pieces) or other non-digital games are perhaps not as fashionable in education. A particular type of non-digital games is the Live Action Role Playing (larp) games where players take a certain role and play this role in a setting and with constraints designed for the game.

Larp has a history in business management education for at least 60 years (Paul & Mukhopadhyay, 2005), and has the advantage that the students participating can learn skills in a domain where communication, coordination, and social competence is crucial for good performance. Within the related area of management information systems the areas of information systems development and software engineering are typical fields where socio-technical skills are needed to handle stakeholder communication, coordination of teams, extraction of requirements, training of users, and so on.

In this paper we will discuss the use of larp in an information systems project management course at master level. The 21 students of the course participated in two games where they in the first experienced being a stakeholder in a requirement prioritization process, and in the second game experienced communication chains in a game where the line from project sponsors to developers differed in length. Both games were small in larp context, and were played within one and a half hour in the context on lectures on stakeholder management and communication in information systems projects.

We continue this paper by describing role playing and in particular larp in education. Then we describe the setting and motivation for the games, as well as the games themselves. In the evaluation section there will be a discussion of the experiences from the games and an analysis of data collected from the games. We continue by discussing the potential of such games, and how to proceed to implement the use of such games as an educational tool, before we conclude.

¹ <https://kahoot.com/>

2 LIVE ACTION ROLE-PLAYING

Game-playing is a main approach to learning for both humans and higher animals. In many situations games create a situation where the learner can experience a real world problem without taking the consequences of making a bad decision, or perhaps the learner increases abilities in a particular skill just by repeating behavior in a life-like environment. This perspective is taken to the full in educational use of live action role-playing games (larp) games.

Larp games often mimic a complex situation and the players (learners and others) get assigned to roles they play in that particular context. Such games can of course be played for other purposes than education, like for dramatic or artistic expression. The games are, however, not as free as theatre sport where players are given a context only, and is free to elaborate on that. The players have to abide by constraints and rules coming from the formulation of the game. Larp games can be played over a time span of a few days, but also as short as an hour.

In education settings, such games have been applied perhaps as long as we have had some sort of formal education (Vanek et al. 2016). In experience reports and research they have been given differing names, indicating different connotations and contexts, for instance process drama, gamified drama, situated learning and problem-based learning, progressive inquiry, self-directed learning, experiential education, etc. The effect of larps in educational settings is, however, hard to measure, and few, if any, empirical reports exist that is able to confirm effectiveness in learning by quantitative measures. However, a few experience reports exist, reporting increased student interest & engagement from presenting them with a near-authentic environment that enables them to internalize knowledge, skills, and competencies (Simkins 2011; Harder, 2009).

In university level teaching, larps have been used in the business and management areas (Keys & Wolfe, 1990; Paul & Mukhopadhyay, 2005) as well as in health care education (Kaplonyi et al., 2017). Even though the computing, information systems and software engineering fields also contain a focus on social skills, and human relations, many of the games designed for education in those fields are digital games, i.e., software that creates the game environment (Hainey et al, 2010; Le Henaff et al., 2014; Pfahl et al, 2004; Maratou et al., 2016). In a survey on games for software engineering education, Caulfield et al. (2012) note that 22 out of 26 educational games for this topic are digital games. As for larps in this domain, Henry and LaFrance (2006) present a list of five one hour long games used to learn students about aspects of the software engineering process, for instance, requirements engineering or product review. The larps relate to the activities of a group semester project. Redondo et al (2012) present tools that emulate software projects for student groups, and include some role-playing in the activities.

3 THE SETTING

During spring 2018, the author was responsible for a master subject on information systems development (ISD). The course has as its main aims to work with research topics within ISD, and focus for this years version was information systems project management. The literature of the subject was a textbook by Avison and Torkzadeh (2009), as well as scientific articles covering subjects like agile methods, team work, stakeholders, communication, estimation, management and offshoring. The students were master students in the information science program at the University of Bergen, with a varying background. Some have indicated a preference for more technical problems in their master studies, whereas others have a more socio-technical orientation.

Initially, the teaching in the course was planned to be a mixture of lectures and reflection exercises in between lectures. However, the students indicated that they would learn more about how projects may develop. As one of several responses to that, I developed two role-playing games in the larp form, where the students were able to play chosen roles in a particular context aimed to simulate some problematic aspects of projects.

4 THE GAMES

The two larp games developed was done as part of teaching of two important topics in project management. The first game was intended to give the students some experience on stakeholders and how they influence ISD projects in a requirements prioritizing context, the second on how chains of imprecise human communication distorts the initial meaning of a message. Both the stakeholder concept and communication concept were in the course presented in terms of research articles from the ISD field. The games were intended to support this by giving an experience on what the careful consideration of these concepts could imply in real information system projects.

4.1 THE STAKEHOLDER GAME

The stakeholder game is the simplest of the two games. It is a game where a project manager is responsible, after negotiation with project stakeholders, for prioritizing two out of five requirements in the project. We had three project teams and one project manager in each team. The stakeholder roles we had in the larp were customer, IT operations person, developer, and project manager. The customers delivered requirements to one project each. The operations team was supposed to deliver services to all projects and thus was stakeholder to all. The developers had to participate in at least two projects each. These are not unrealistic situations and can be considered to mimic an organization that has a few ISD projects to handle simultaneously. The intention was that through interaction with many types of stakeholders, the project manager roles in particular, but also the other participants, should learn about the complexity of such processes for making decisions.

To create a level of uncertainty for the project manager it was introduced a die throw to mimic stakeholder availability. It is not uncommon in real projects that stakeholders are not available at important moments, and decisions have to be made with missing information. To have variation in availability of stakeholders, the project managers in different projects were also allowed to communicate with only one, two or as many stakeholders as wanted in a meeting. The restrictions on the number of meeting participants are supposed to give an impression of how communication constraints may influence outcome. For a more complete description of the game, see Appendix A.

17 of the students participated in the game. We had three projects, so there were three project managers and customer players. The operations team had three players, and the remaining eight were taking developer roles. The first project manager had the option to communicate with only one stakeholder in each meeting, the second with two, and the third with as many as needed for each meeting. The students were instructed about the whole game from written instructions before the game. They had an hour (a lunch break) to read the rules. All had the same instructions from the start, so everybody knew the other players' roles besides their own. The game lasted for 1 hour and 15 minutes, with a 20 minutes briefing session after the game.

4.2 THE COMMUNICATION GAME

After what I perceived as a successful first game, I designed a new larp to be done in connection with the lecture on communication in project management. The game was held between two lectures on variation in communication channels and a review of communication in agile software development. A short description of the game is given in Appendix B.

The point of this game was among others to see the effect of one extra communication link in the chain of communication from the persons who decided on the projects to those who should assess risk factors. In each game the CIO and the next commander (NC) should describe two projects in a particular business context (see Appendix B), then they should each communicate the information of one of the two projects to two persons, an operations responsible, and a software developer. The operations person and the developer had the role of assessing the risks in the particular project. They would identify the risks and agree on the largest risk factor. The difference was that the CIO did not meet the two who should do the risk assessments, but instead told about the project idea to a project manager (PM). The PM should then go to the risk assessors. So in this case there was an extra link of communication from the two who envisioned the two

projects to those who assessed risks. This extra link had a purpose of creating a larger communication distance from the project owner to those who did the risk assessment.

One other aspect of this game was that the players were given the option to play their role in different manners, chosen by themselves. They could play interested or uninterested, critical or positive, etc. The intention was to give the students an impression of the effect of certain types of behavior from an information receiving person.

We had two groups doing the larp, each with a CIO, NC, PM, and 4 assessors, making a total of 7 persons. The rest of the students were assigned a role as researcher, and they were supposed to be quiet observers at three meetings, the CIO/PM meeting, and each of the NC or PM meetings with assessors. They did not participate in meetings between CIO and NC, and the assessors' internal meetings. Such passive roles are recommended in educational uses of larp, as many persons feel intimidated by having to play a particular roles (Vanek et al, 2017). The students in researcher roles collected data about the meetings, and an overview of these are given in the evaluation of the communication game.

It is worth noting that only players who was informed about the game's design from the start were the researchers. The others got their instructions as the game developed. The reason for this, was that the goal of the game otherwise would become too obvious for the students, and thus some of the effects we wanted to experience would be cancelled out. This game lasted for about 1 hour and 15 minutes, with a 15 minutes debriefing after the game.

5 EVALUATION

The evaluation of the games is split into three parts. First, I go through the evaluation of the stakeholder game, then the communication game, and then shortly a summary of the students' overall impressions of using games in this kind of education. Note that the evaluation is mainly an evaluation at the Reaction level of Kirkpatrick and Kirkpatrick's (2006) learning evaluation model. There is not data available to conclude about any increased knowledge or skills on the larp players' part.

5.1 EVALUATION OF THE STAKEHOLDER GAME

The evaluation of the game was mainly done with a briefing and discussion immediately after the game. Some questions regarding the students' experience with the game was also done in a survey after the game. However, not all students responded to that.

The students gave the immediate impression that they were happy about the game, but initially thought it difficult to understand the game, and wanted more precise descriptions of the game. However, as soon as they had a role to play and enacted it, they got a better feeling of the game. As one of the respondents of the later survey commented: *«It was a lot to think about when we got the instructions for the game, but as soon as you got your role, it became clearer what that role was supposed to do.»*

Some of them suggested that we played it once more, as they felt that they would have improved their game play in a repeated game. They considered it relevant to the three scientific articles presented before the game on various stakeholder roles. The students felt that some of the game rules were too unspecific, and they suggested that constraints should be given by resources like how many people in total you could call for meetings during the one hour game. They also wanted to have a number of hours available for the project, so that they could use estimates and the hour constraints when prioritizing.

During the briefing after the larp, we did an informal scoring of the project managers' performances. It is interesting that the one who could communicate with most people scored the lowest. It is of course not possible to use this as evidence for anything, but at least it shows that you cannot conclude that more communication is necessarily better.

In a survey done the week after the larp games the students were asked five-scale questions about how much insight gained from the game, how successful the game was, ability to play own role, game design, and game facilitation. The respondents all answered from neutral to a positive score on these questions (See Table 1).

Table 1: Student assessments of the Stakeholder game:

	Very positive	Positive	Neutral	Negative	Very negative
Gained insight	4	6	2	0	0
Successfulness	3	7	2	0	0
Ability to play role	3	7	2	0	0
Game design	2	7	3	0	0
Game facilitation	2	8	2	0	0

In addition to the responses from the discussion one of the respondents suggested a more complex game, with more chaos, so to have a more stressful (and realistic) setup: *«Make it more detailed next time. Role play is for getting insight into a process. Make more chaos by adding more details, possibly to get more understanding of real situations from the experience».*

In the survey one respondent also commented on the long breaks that came up in the game. The student argued that it would be easy for players not to participate much if they were uninterested: *«If someone didn't want to participate, you had enough time to relax and choose a role where they didn't really need to participate. Too much time for many to sit and do nothing.»* The game should be designed so that participants would be more active throughout the game. I consider this a relevant criticism based on my own observations of the game.

5.2 EVALUATION OF THE COMMUNICATION GAME

The evaluation of this game has three parts, an immediate assessment of the game, the survey data from the week after the game, and an evaluation based on the data collected by the researchers.

Immediately my own impression was that this game was more chaotic than the previous one. A main reason for this was my own facilitation of the game. The players were given instructions on paper about their role during the game's development, so they did not know from beforehand what to do. However, the players did not read these completely before they started to enact their roles. It seems that for a complex game like this you need to ensure that instructions are understood. You cannot rely on students actually reading and understanding their role from a textual description, so you need to give oral instructions as well.

The students reacted also positively to this game, but it was hard to see immediately if the extra communication link had an impact. They also reported that it was chaotic, but at the same time they suggested that chaos on the surface may be the reality of real life ISD projects, even though there is actual meaningful interaction going on in the project.

The answers regarding insight, successfulness, role-playing ability, design, and facilitation was the a little bit more critical in this game, in particular the design of the game and the facilitation of the game got less positive scores (See Table 2).

The textual comments support my own assessment: *«In this game the rules should have been clearer from the start, so that everyone knew what was expected by them at all times. There was some confusion in the game, but it improved well»* One also suggested that the researcher role actually influenced the game in some manner. However, it was not clear in what direction this influence went.

Table 2: Student assessments of the Communication game:

	Very positive	Positive	Neutral	Negative	Very negative
Gained insight	3	6	4	0	0
Successfulness	2	7	4	0	0
Ability to play role	3	8	2	0	0
Game design	1	5	7	0	0
Game facilitation	1	4	7	1	0

ANALYZING DATA COLLECTED THROUGH THE GAME

During the game and immediately after the game we collected some data. Among others, the students having the researcher roles counted the number of communication breaks during a meeting. Communication breaks was considered to fall in the categories repetition, misunderstanding, a question for clarification, or other. In each meeting there were one or two researchers present. The initial meetings between the CIO and the NC did not have researchers present, as well as the risk assessment meetings between developer and operator.

One could use the communication breaks count as an indicator of communication problems, possibly getting a difference in communication when chains are longer. However, in this case, there was no difference. Also, obviously four observations is not enough to given any statistical significance. A final point is also how the students filling the researcher role actually did their job. They may assess the same kind of situations differently, resulting in incomparable scores. Anyhow, the main objective of using students in this role was to involve them even if they did not like to play an active role in the larp.

The researchers also noted on a triangle like the one in Figure 1 how they felt the attitude of the receiver was in the meeting. The letter indicated how they placed the different receivers (for example, operators or developers who got information from a PM). The letters O for operations person and D is for developer. This kind of data was collected from the active meeting participants themselves, where they assessed themselves as a receiver, or for the NC or PM, how they assessed the operator and developer as communication receivers. In the example Figure 1 we see how the assessments were distributed, the subscripts indicate who did the assessment, researcher(r), PM(pm), operator(o), or developer (d). In Figure 1 shown here the operator representative seems to be mainly on a scale from engaged to critical, not being uninterested, whereas the developer may be more on the uninterested side. As for the previous communication breaks scoring the researchers may have different perspectives on how to score attitude, so any conclusions are hard draw from this material.

To illustrate the data gathered from a meeting: in the particular meeting of Figure 1 there were two researchers present, who noted 5 and 8 communication breaks respectively. This meeting was the meeting with fewest noted communication breaks. In other meetings we had from about 10 to about 30 communication breaks. In addition the researchers were encouraged to give a short description of the meeting in terms of communications. In the meeting of Figure 1 one researcher noted: *“The operations person had many questions and the project manager had few answers”*. Other participants made similar comments about the same meeting. The contradiction of these comment and the count of communication breaks clearly suggests that the data is not particularly valuable for analysis.

Anyhow, in a simple comparison of the receiver’s average triangle placement in meetings and the number of communication breaks, the meetings with engaged and critical receivers seem to have the less communication breaks. Less critical engagement or uninterestedness in meetings showed more communication breaks. But these observations are for now only unverified hypotheses.

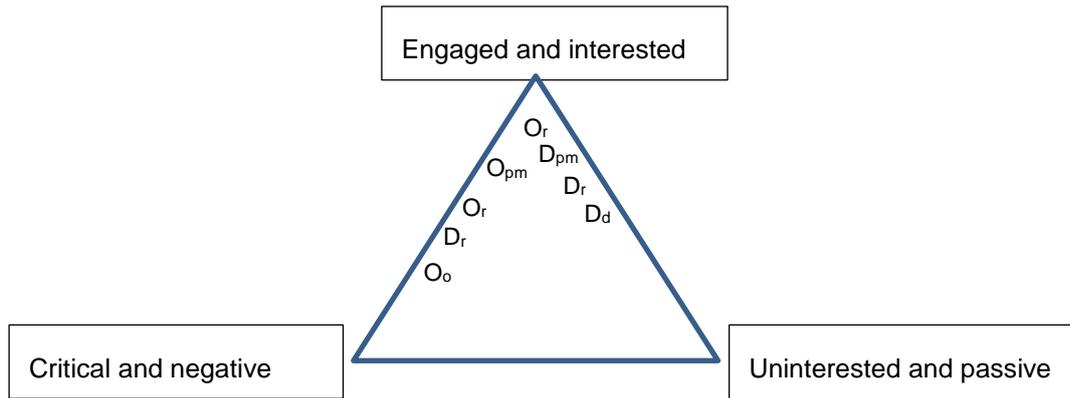


Figure 1. Example of the assessment of the information receivers behavior in meetings.

5.3 OVERALL EVALUATION

In the survey I also asked about the students' general impression of the larps. The 14 who responded to the survey felt that the larps had been instructive (8) or very instructive (6). 12 of them also found the games exciting or very exciting, most of them (8) considered them fun, but at the same time they did not consider them very demanding. In total they consider the larps to be valuable in information systems development. Their comments indicated again that the learning effect was good, in particular to some theoretical concepts: *«I think it was a good way to get a better understanding of the curriculum, than just reading the articles. It gave insight and better understanding.»* One commented about risk: *«I felt that this was a good way to get some practical education without risks.»* But again, better information and facilitation were the critical points in comments.

6 DISCUSSION

Larps have been used in professional education in many areas. In the reported experiences here, we see how it can be applied within information systems development. The students mainly received this type of games in a positive manner, and their engagement in the games was high. It is hard to measure any learning effect, but having experienced some of the problems you would meet as a professional project participant, will hopefully give the students something to build on as they enter the work life, enabling them to reflect on the situations they encounter. The importance of this is also suggested by the students as they answered that they got a better understanding of the theoretical material from these games.

The larps were focusing on requirements work and communication links, which are important parts of any system development project, and perhaps easier to design a game for. It would be interesting also to include topics like architecture and design, as well as acceptance testing, which have the flair of being to a large extent socio-technical practices. The challenge is for the larp designer to create realistic situations, roles, rules, and resources that the students can play with.

Through the evaluation of the larps, it became clear that preparation of the larp as well as the facilitation of the larp was critical to a successful play. The students must have clear instructions, as in their eagerness to play they do not read and completely understand the instructions they are given. But even though this was not perfect in the larps, the students expressed that the games was fun, interesting, and instructive.

For this particular education topic, project management, it would only be possible for some of the players to actually play the project manager role, which is what many of the students want. Replays would be a possibility for having students experience different roles in project, and this could reduce the problem with game instructions, as the rules would be better known the second time. Another issue is the rather long breaks the students experience during the game. It is a challenge for the larp designer to come up with meaningful activities that can ensure more active play for each of the participants. One such idea was the inclusion of the research role, which also had the effect that students who feel uncomfortable with role playing, actually may participate in a more anonymous manner. Even though the data collected from them

were of dubious quality and have limited value for analyzing the play, hopefully also these students learned much about project management from being observers.

For the future, it would be an interesting challenge to design longer larps, for instance lasting for a whole day, or even for a couple of days. This would require a lot of planning, preparation, and facilitation of a complete game representing for example a full project from start to end. Given the positive responses from students on the one-hour larps presented here, the learning effects may be worth it both for students and the teacher, as the situation becomes even more realistic. In such a design, one could also plan for more elaborate ways of measuring the learning effects of the game using before-and-after tests, as well as other techniques for evaluating learning (Calderon & Ruiz, 2015).

7 CONCLUSION

This paper reports on a successful application of live action role playing games in information systems education. The games and the student evaluations confirm that also in project management education this pedagogical technique has a potential. With even more engagement put into designing and facilitating the games from the instructor's side, it is believed that students may have large learning effects from participating in such games. Important insights to consider for the larp designer are: first, to give game instructions in a manner that secures that all players know the rules, and second, that the participating students should be actively engaged during the whole game.

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APPENDIX A

INFO 333 – Role play - Stakeholders

This is a role play where the goal is to get consensus on requirements in an IT project. We have N projects with N appointed customers and N appointed project managers. The task for each project is to within an hour to find a suitable number of requirements out of a set more or less precisely defined requirements from the customer. The customer must initially formulate 4-5 requirements, which through the game must be reduced to 2 requirements with good estimates on work effort needed as well as precision in the requirements. The goal is to establish a prioritization in collaboration with developers and operations personnel. Communication between stakeholders is enacted in meetings. The project manager organize meetings according to defined rules.

Roles:

Customer: delivers 4-5 requirements to **one** project, as precise as possible. Must participate in prioritization of requirements, may also modify the requirements descriptions under way (both clarifications or additions). Is involved in one project only.

Operator: represents the interests of the ICT operations department. Wants new solutions to satisfy requirements to security, stability, robustness, integrity, and standardization. Operators must relate to all projects.

Developer: participates in two projects. Is interested in working with new, exciting technology, which makes it possible to enable efficient solutions, quality, and good user experiences. The developers know about technological constraints, and is capable of assessing costs related to requirements. The cost/effort of requirements should be assessed comparatively to each other. The project has in any case resources to fulfill two requirements.

Project manager: Manages **one** project and shall establish consensus about requirements through communication in meetings. This is the only form of communication across groups of stakeholders within this game. There are constraints regarding how many can participate in meetings. Some project managers can only meet with one stakeholder at a time, some may meet with two at a time, and others may have an unlimited number of meeting participants.

Rules:

1. Initial meeting. Project manager and customers meet and the customer presents the requirements to the project manager. Max 10 minutes.
2. Each of the stakeholder groups will have a group space where they may discuss experiences with different aspects of the process until now. In particular people in each group may communicate about experiences in previous meetings, and so on. Anything is an ok topic. The stakeholder group members are at this groups space when they are out of the meetings, and they should then be available for meetings with the project manager as long as they are in the meeting place. There should be no communication across stakeholder groups.
3. Meetings are run at the initiative of the project manager. Every project manager has an initial limit as to how many stakeholder they can talk with at the meetings, 1, 2 or unlimited.
 - a. Project manager calls for a meeting with the stakeholders who are supposed to join.
 - b. It is not allowed to call persons who was in meeting with this project manager the last 5 minutes.
 - c. Those who are called for a meeting will not accept the calling if they get a 1 on a die throw when called for. (in that case they are ill, or need to pick up a child in the kindergarten, or must go to the liquor store to get some wine for the dinner party tonight). Otherwise they will have to meet. They may then not be called for by the same project manager the next five minutes after the meeting was finished. It is the responsibility of each

of the persons to look after the clock. For example when they are available for meeting call in a project.

- d. Every meeting may last a maximum of 10 minutes. The persons who are participating in the meeting should go back to their meeting place when 10 minutes have passed or when the meeting is formally closed by the project manager.
4. The project manager does not need to have meetings all the time. They may use the time at the project manager meeting place to coordinate with other project managers (for example about who is to talk to a stakeholder first) or to think through how to go on in their work.
5. We stop the meeting activities after one hour of negotiations. All the projects are played in parallel.
6. The project manager presents the two requirements and explain them in the context of the complete information system. Afterwards the project members score the results of the process on a scale from 1 to 6, based on how satisfied they are with the outcome of the process (assessing degree of agreement with the project manager, possibility to participate, ...).
7. Finally we reflect on the experiences.

APPENDIX B

INFO 333- Role Play - Communication

PSD2 (Revised Payment Service Directive) is a new regulation of finance business which is seen as a serious challenge from the companies. Among others, the customer now owns the account data and other data the bank has about the customer. It is the banks responsibility to facilitate API services for data access for third party actors or the customer. They should also be able to do payment and other transactions through such API-s.

In light of this, Sillybank Ltd. is considering opening their data bases with full, but anonymized customer data for external parties for payment. The bank also wants the option to freely use solutions developed with the use of these data. We will not consider contractual issues in relation to this, but will focus on how this may be realized as a technology and what initially needs priority.

1. CIO (Chief Information Officer) and the next commander (NC) will discuss between them how to handle this. They describe more concretely two subprojects that has to be realized in relation to the above idea. They will spend 10 minutes on this. They shall also assign the two projects, one project each.
2. **Chain 1:** The NC will bring one of the two project ideas to a developer and an ICT operations responsible and explains the idea. They will spend 10 minutes on this. Questions about clarifications are allowed, but not discussions about risks/challenges/solutions.
3. **Chain 1:** The developer and the operator decide which risk is the most important in the project. They will spend 5 minutes on this.
4. **Chain 2:** The CIO will meet and inform one project manager about idea number 2. 5 minutes are assigned to this meeting.
5. **Chain 2:** Project manager brings the idea on to a developer and an operator and explains the idea. Questions for clarifications are allowed, but not discussions about risks/challenges/solutions. (10 minutes)
6. **Chain 2:** Developer and operator will agree on the most important risk in project 2. (5 minutes).

It is also possible to involve a researcher/observer role into this game. They will observe how the communication flows.

Afterwards there is a debriefing where:

1. Every operator/developer pair will tell what the project is and what the largest risk is.
2. Every CIO will give an assessment of the response from each operator/developer pair.

After this, open discussion about experiences:

Focus on the use of middle man: did this extra link in the communication chain have any consequences.

Manner of meeting behavior from operator/developer/project manager. Did various types of behavior have any consequences?