

Using a Game to Introduce Lightweight Requirements Engineering

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Abstract

This paper describes a game that is being designed to introduce basic Requirements Engineering good practices into a novice organization. Since this is work in progress, we will demonstrate a functional version of the game during the session and seek participation in game-play to inform our early concept exploration.

1. Introduction

Requirements Engineering (RE) deficiencies are considered one of the common causes of project failures. While the literature is replete with new designs and techniques that can address these deficiencies in large organizations, much less research has been done on how to effectively introduce good RE practices into small novice organizations [4]. This work reviews the many good RE practices described in the literature and identifies a lightweight set that is anticipated to help novice organizations in their requirements development and management efforts. The work also explores the use of simulation and traditional games as a pedagogical tool and proposes a game-based approach as a way of helping small organizations introduce these practices. This paper describes a sample game, called RE-O-Poly, that is based on the popular game Monopoly. It is intended to teach RE good practices to novice requirements engineers by reinforcing a small set of lessons.

2. RE challenges

The size, complexity and importance of developing some systems stretch current software development methods to their limits. It also makes it difficult to introduce or change the way in which RE is performed. A panel of distinguished RE researchers identified a number of weaknesses in traditional approaches to engineering requirements for high assurance systems, not atypical RE challenges [5]:

1. Incomplete or ambiguous requirements.
2. Insufficient rigor.

3. Inadequate for development.
4. Overemphasis on functional requirements.
5. Problem not recognized.
6. Current practices lag best practices.
7. Lack of maturity and guidance.
8. Perceived impracticability.
9. Lack of awareness.
10. Admitting mistakes.
11. Selling idea to management.
12. Increased short-term cost.
13. Changing RE practices not in self interest.

This current work aims to examine alternative and simple ways to promote awareness of and introduce RE practices to address some of these challenges.

Table 1. RE challenges and practices

Good Practice	Description	Benefits	Challenge Addressed
Structure	Use standard structure for documents.	Higher quality, lower cost of requirements documents.	1,3
Versioning	Make documents easy to change.	Reduces cost of change.	2
Identifiers	Uniquely identify each requirement.	Unambiguous trace references.	2
Policy	Use policies for requirements management and conflict resolution.	Provides guidance for requirements management. Faster resolution of requirements.	All
Templates	Use standard templates for individual requirements.	Requirements presented in consistent way so more understandable.	3
Language	Use simple, concise and consistent language.	Requirements easier to read, compare and understand.	7
Inspections	Organize formal requirements inspections.	Finds high percentage of problems.	3
Checklist	Use checklists for validation and analysis.	Focuses validation process. Faster, more complete analysis.	2, 3

3. A lightweight set of RE good practices

The Requirements Engineering Good Practice Guide (REGPG) provides a list of 66 good practices [6]. Taking the top ten practices from this list and distilling them into eight essential elements results in a

lightweight set that can be used as a starting point for a novice organization to establish or improve its RE processes. Table 1 loosely shows how each of these practices addresses one or more of the RE challenges.

4. Games as a training tool

Simulation environments are powerful learning tools that encourage exploration by allowing learners to manipulate their learning experience. In academia, simulations enhance lectures, supplement labs and engage students [1]. In the workplace, simulations are a cost-effective way to train personnel. Games are part of an effort to ‘Re-engineer Education’ that supplement or replace traditional approaches to training [3]. Some of the most common instructional games are: digital games, board games, paper and pencil-based games, and card and dice games. Games add additional dimensions to the learning process by supporting: active, experiential and problem-based learning and by providing immediate feedback [2].

5. An RE game

Small novice organizations need a fast, cost-effective and painless way to introduce and adopt RE practices, hence the idea of using games to teach best practices. RE-O-Poly is a game that incorporates the eight RE good practices to help learners:

- Understand the value of RE, its processes and practices, and learn some simple techniques.
- Make proactive decisions about projects that address business needs and requirements.
- Respond appropriately to unanticipated situations that impact projects they are involved with.

The design goal behind the game is to engage the learner, without being overly pedantic. The game is based on the popular Monopoly game, which was developed in the public domain and is now the subject of game-play in many areas. Using the Monopoly interface provided the dual benefit of shortening the game design time as well as offering players a proven and familiar interface (see Figure 1 for an early prototype). RE-O-Poly is designed for players new to RE. It is meant to be used in conjunction with RE training and be facilitated. Some key concepts include:

- Stakeholder Satisfaction Points (SSPs), which players earn or forfeit as the game progresses.
- Projects (drawn from their industry domain) for players to own, run and buy resources for using SSPs and by undertaking tasks.
- Scenario Cards, which show what happens when good RE practices are implemented or not, such

as the use of requirements templates and trace matrices. These are instructional.

- Task Cards, which provide an opportunity to earn (or lose) SSPs by answering RE questions, such as re-wording a problematic requirement.

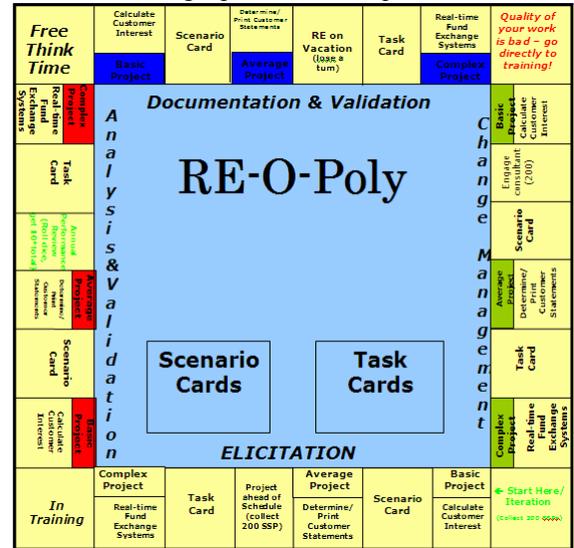


Figure 1. Sample RE-O-Poly interface

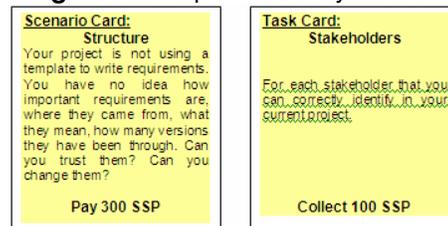


Figure 2. Sample RE-O-Poly scenario / task cards

6. References

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