

A gamified proposal for software risk analysis in agile methodologies

Gloria Piedad Gasca-Hurtado

María Clara Gómez-Álvarez

Mirna Muñoz

Adriana Peña

{gpgasca,mcgomez}@udem.edu.co

mirna.munoz@cimat.mx

adriana.pena@cucei.udg.mx

AGENDA

1. Introduction
2. Key Concepts
3. Gamified proposal
4. Case Study
5. Conclusions

1. Introduction



- ✓ Risk management is a crucial process for the success of software development projects.
- ✓ In such projects, risk management facilitates project success by implementing structured activities that can minimize the probability of risks that can affect project success.
- ✓ However, risk management in agile projects is not explicit because the scenarios are limited to discussions in daily meetings.

1. Introduction

Agile environments do not provide a structured process for risk management.



It's fundamental the design of techniques and tools for facilitating the implementation of risk management process as a strategy for process improvement in agile environments

1. Introduction



Present a gamified proposal for risk analysis oriented to agile work environments and independent of the methodology adopted by the team.

2. Key Concepts



Risk Management

Systematic approach for minimizing exposure to potential losses. Such an approach is a continuous method for assessing what could go wrong, determining which risks to control, and implementing actions to faces high-priority risks.



Gamification

- The application of the same principles and environments to games, regardless of the expected results
- A process of implementing motivational affordances in individuals.

3. Gamified Proposal

3.1 Methodology



3. Gamified Proposal

3.1 Methodology

Identification
of techniques

A systematic Literature review
assists in exploring risk management
techniques and tools

Id	Technique/ Tool	Id	Technique/ Tool
1	Informal approach [32]	15	Brainstorming [35]
2	Periodic approach [33]	16	Taxonomy [25],[36],[31]
3	Formal approach [33]	17	Learned lessons [31]
4	Risk Lists [33]	18	Scenarios analysis [31]
5	Risk strategy analysis [33]	19	Spreadsheet [25]
6	Diagram of dependence between assets [27] [29]	20	List of assets to consider [25], [27], [29]
7	Ad-hoc approach [33]	21	Risk action list [33]
8	Threat catalog [25] [28]	22	Analysis by tables [25], [27], [29]
9	Attack trees [28]	23	Algorithmic analysis [27], [29]
10	Interviews [28]	24	Graphic Techniques [27], [29]
11	Meetings [28]	25	Risk strategy model [33]
12	Delphi assessment [28]	26	Risk stories prioritization matrix [37]
13	Document risk management policy [30]	27	Burndown risk technique [38]
14	Questionnaires [31] [34]	28	Risk board with two types of nodes [39]

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3. Gamified Proposal

3.1 Methodology

Classification
of techniques

Classification of techniques according to the level of difficulty: complex (C), intermediate (I), and simple (S)

Id	Technique/ Tool	Difficulty Level			Id	Technique/ Tool	Difficulty Level		
		S	I	C			S	I	C
1	Informal approach		X		15	Brainstorming		X	
2	Periodic approach		X		16	Taxonomy			X
3	Formal approach		X		17	Learned lessons		X	
4	Risk List		X		18	Scenarios analysis			X
5	Risk strategy analysis		X		19	Spreadsheet		X	
6	Diagram of dependence between assets			X	20	List of assets to consider	X		
7	Ad-hoc approach		X		21	Risk action list		X	
8	Threat catalog		X		22	Analysis by tables			X
9	Attack Trees			X	23	Algorithmic analysis			X
10	Interviews		X		24	Graphics Techniques			X
11	Meetings		X		25	Risk strategy model		X	
12	Delphi assessment			X	26	Risk stories prioritization matrix			X
13	Document the risk management policy			X	27	Burndown risk technique			X
14	Questionnaires	X			28	Risk board with two types of notes	X		

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3. Gamified Proposal

3.1 Methodology

1. Selection of techniques with difficulty level – Simple (S) according to the Agile Manifesto.
2. Establishing a relationship between the techniques and the gamification principles

Design of a
gamified
technique

Id	Technique/ Tool	Id	Technique/ Tool	Id	Technique/ Tool
1	Orientation	4	Achievement based rewards	7	Transformative
2	Persuasive elements	5	Y Generation adaptable	8	Wellbeing oriented
3	Learning orientation	6	Amusement factors	9	Research generating
				10	Knowledge-based

Relationship between risk management techniques and gamification principles											
<i>Technique/Tool</i>	<i>Principle</i>	1	2	3	4	5	6	7	8	9	10
Risk board with two types of notes		x	x			x	x				
Questionnaires			x							x	x
List of assets to consider			x							x	x

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3. Gamified Proposal

3.1 Methodology

Technique
evaluation

- The proposal was evaluated to assist software development teams to adopt the technique for risk management.
- The results are summarized in the case study section.



3. Gamified Proposal

3.2 Proposal Components - Roles



- ✓ Project Manager
- ✓ Team members
- ✓ User/Client

3. Gamified Proposal

3.2 Proposal Components - Phases

1. Identify and classify the possible project risks

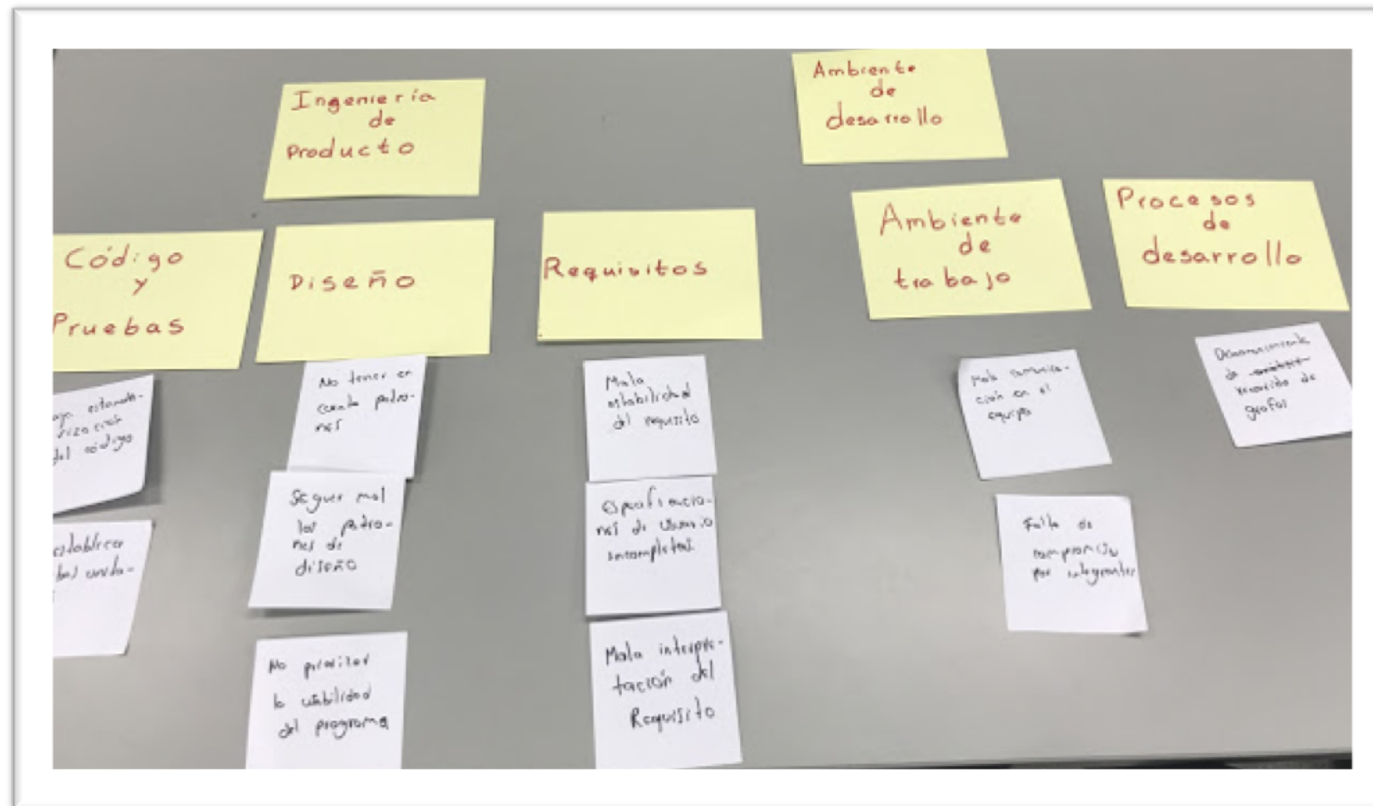
In this phase, each team member identifies a set of risks, registers them individually in post-it notes and associates each risk with one of the following categories.

Product engineering	Development Environment	Program constraints
Requirements	Development Process	Resources
Design	Development System	Contract
Code and Test	Management Process	Program Interfaces
Engineering specialities	Management Methods	+ Añada otra tarjeta
+ Añada otra tarjeta	Work Environment	
	+ Añada otra tarjeta	

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3. Gamified Proposal

1. Identify and classify the possible project risks



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3. Gamified Proposal

3.2 Proposal Components - Phases

2. Determine the priority of the identified risks



- The team members use a variant of Fibonacci sequence for establishing risk priorities.
- Such sequence is the same as the technique of planning poker, but in this case, each number expresses priority in increasing order.
- Every team member define each risk priority and socialize the priority for establishing a consensus.

3. Gamified Proposal

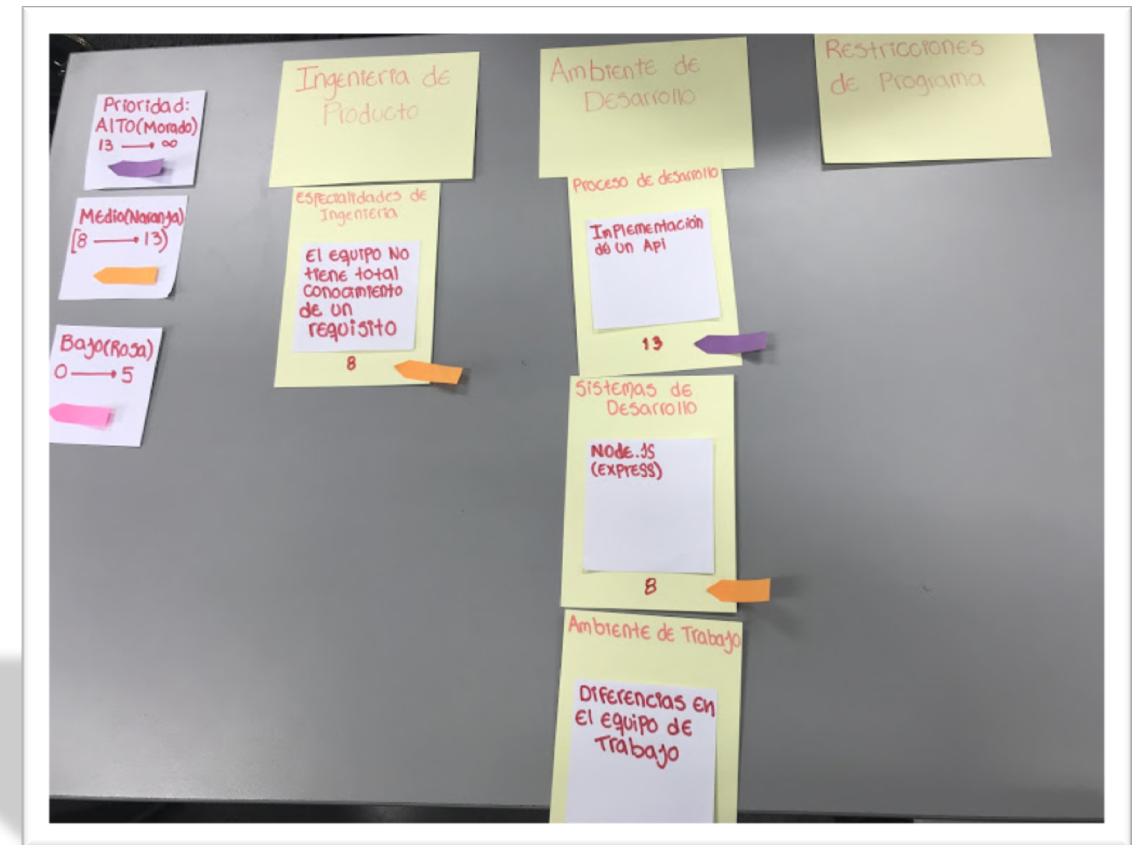
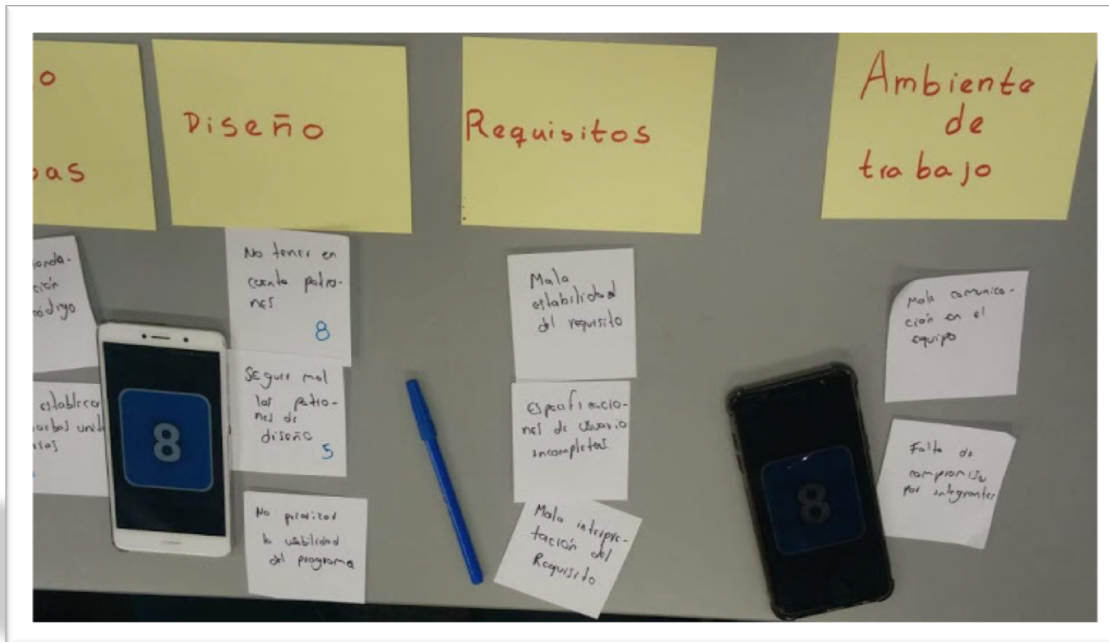
2. Determine the priority of the identified risks

- The team defines the priority scale of each risk based on their values: High, Medium and Low

Priority	Series numbers	Priority	Series numbers	Priority	Series numbers
High	13, 20, infinite	Medium	5,8	Low	0,1,2,3

3. Gamified Proposal

2. Determine the priority of the identified risks



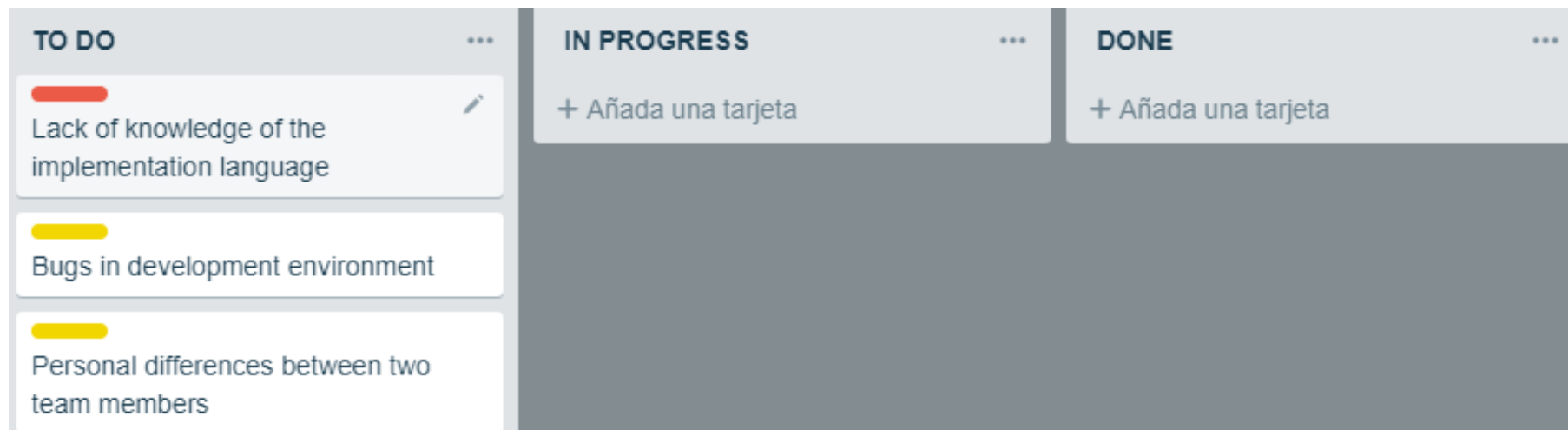
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3. Gamified Proposal

3.2 Proposal Components - Phases

3. *Elaborate the project risks board*

- In each iteration, the team decides which risks to be controlled (list of risks "*To do*") and defines the activities associated with this effort.



4. Case Study



- ✓ The software risk analysis proposal was included in the subject Software Engineering IV of seven semester of the Bachelor of Systems Engineering, University of Medellín–Colombia.
- ✓ Students formed seven groups and their roles are Scrum Master, Developers, and a Product Owner. The teams used Scrum and executed 6 sprints in 10 weeks.
- ✓ The goal of the team is to implement a minimum viable product.

4. Case Study

- ✓ Each student answered a questionnaire.
- ✓ This questionnaire assesses metrics of technique like:
 - the level of enjoyment, level of closeness to reality, and level of promoting active participation.
 - Other techniques features as the time assigned to each phase of the risk analysis, the quality of material, and the level at which the activity stimulates the thinking of team members.



4. Case Study - Results

- ✓ For the variable ***level of enjoyment***, 86.4% of participants consider it to be good, very good or excellent.
- ✓ The second variable is the ***level of closeness to reality*** where 19 participants consider it to be good, very good or excellent, demonstrating that the proposal is not a “toy activity.”
- ✓ The third variable is the ***level of promoting the active participation*** of team members where 81.9% of participants think that this level is good, very good or excellent evidencing that the proposal promotes teamwork and face-to-face interaction.

4. Case Study - Results

- ✓ A question is asked about the ***global score of the activity***. 27.7% of the participants assign good, 50% very good, and 22.7% excellent.



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5. Conclusions

- ✓ The gamified proposal for risk analysis in agile environments include three phases: 1) identify and classify possible project risks, 2) prioritize the identified risks, and 3) elaborate /integrate the project risks board.
- ✓ Risk identification includes a risk taxonomy as a guide that gives more formality to risk management in agile environments.
- ✓ Such a technique could be applied by software development teams using material common to agile methodologies such as a Kanban board or post-it notes.

<i>Technique</i>	<i>Principle</i>	1	2	3	4	5	6	7	8	9	10
Gamified Technique		x	x	x		x	x		x	x	x

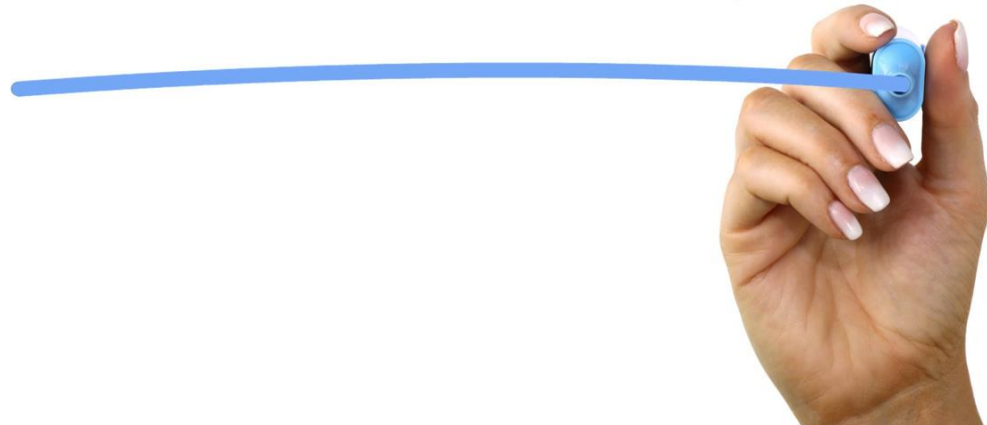
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5. Conclusions

✓ In future work, we will:

- 1) Apply the proposed technique in teams using other agile methods in academic and industrial contexts
- 2) Use the assessment framework to determine the gamification level of the technique
- 3) Compare formally the technique and the gamification principles

QUESTIONS



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