



Let's play serious

In the LEAP project, we are working towards the development of games that support the demonstration of three main agile concepts: technical debt, 5S, and SCRUM. The games are being created using Unity. English, Spanish, Portuguese, Estonian, and Greek are the currently supported languages. In addition to the games, learning sheets are also provided to facilitate the use of the game in the context of agile and lean courses. Here we present an overview of the three games in their current playable state.

Technical Debt Game

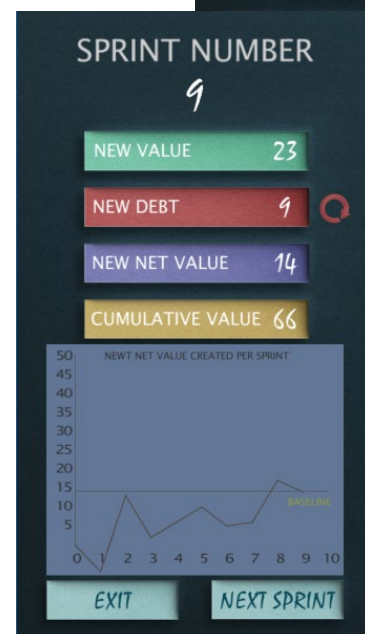
The concept of technical debt reflects the extra development work that arises when choosing a fast and easy coding approach instead of applying the best overall solution. It works in a similar way to monetary debt. If technical debt is not repaid, it accumulates 'interest', making it harder to implement changes later on and increases software entropy. However, technical debt is not always a bad thing as sometimes, like in proof-of-concept, it is required to move projects forward.

The Technical Debt game aims at raising awareness of the players to this concept and how to manage it in real situations. In short sessions of a few minutes on an Android device, the game mimics the development of an IT coding project in which the team is using an Agile methodology during the course of 10 sprints. Each sprint is represented by a game turn in which the players have to choose whether to invest in one of the available methods to reduce technical debt or do nothing. To tackle technical debt the players are given four options:

- Reduce complexity: code refactoring
- Continuous integration (CI): merging devs copies
- Increase test coverage: percentage of code tested
- Code Review: peer review

Each of these investments has an immediate cost, reducing the net value temporarily, and deferred benefits that will show in later turns. Therefore, the player has to choose wisely in order to maximize the net value of the code created by the project. At the end of the 10 turns, a summary will show the final net value obtained by the players' decision and the player's personal best.

Fig. 3 shows a graphical representation of the evolution of the value created throughout all the sprints. It can be seen how the new value, new debt, new debt value (new value – new debt) and cumulative value are shown.



Top

The user has to pick whether doing one of the four investments at a cost or doing nothing at no cost for each sprint.

Left

At the end of each sprint, the user is shown information about the progression of value and debt.

5S game

5S, as shown in the last newsletter, is the name of a workplace organization method that uses a list of five Japanese words: seiri, seiton, seiso, seiketsu, and shitsuke, meaning sort, set in order, shine, standardize and sustain. The list describes how to organize a work space for efficiency and effectiveness by identifying and storing the items used, maintaining the area and items, and sustaining the new order. The learning goal for the students is to understand that the 5S method can help them organize a place more effectively than by applying any other method.

The 5S game offers three different scenarios that share some similarities: working in a pharmacy, doing some work on a laptop and a working in a scrapyard. All of them start with a messy and impractical workplace full of items which have to be organized by the players in order to perform the main task efficiently, which is the only task that scores points. In the pharmacy and the scrapyard the players have to deliver products to the clients while in the computer desktop players have to send certain files through email. The players can organize the items using different methods depending on the scenario or automatically use the 5S (with a cost in time) and see the difference. The underlying concepts are the same in all three scenarios, but they involve different complexity and affordances related to the demonstration of the 5S.



Top

Computer desktop scenario after applying part of the 5S.



Left

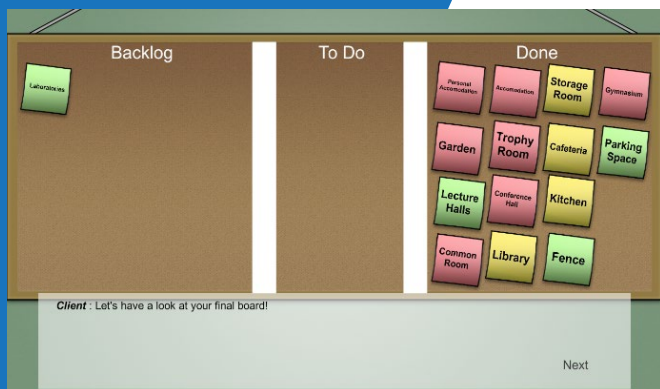
Pharmacy scenario with 5S applied.



Scrum game

Scrum is a model which is applicable in small teams that work in small to medium sized projects. There are three specific roles in this team: the Scrum Master is the overall coordinator, the Product Owner is the interface of the team with the client, and finally the Team Members who implement a project with the Scrum Master and cooperate with him. The learning goal for the players is to learn the SCRUM process by taking part in it and further use it every day in solving similar problems. This game offers two scenarios that work in the same way, one about the urban planning of a university campus, shown here, and one about agricultural engineering.

In this game the player has to choose one of the available roles: Scrum Master (SM), Product Owner (PO) or Team Members (TM). Each role has a different gameplay. Players are given information about the theme of the campus and the size and the number of the students living in it. Depending on the role, the player should pick 15 facilities from the board and prioritize them from the most important to the less one using colors. The client interferes during the whole process, asking particular facilities to be built; the player should adjust their prioritization according to what the client asked. In the end, the client accepts or rejects the outcome and the player earns some points. After all the sprints, the player gets a score for the role and a score for the project, which will depend on how well the team resources and priorities were managed. Let's see the gameplay for each role.



Top

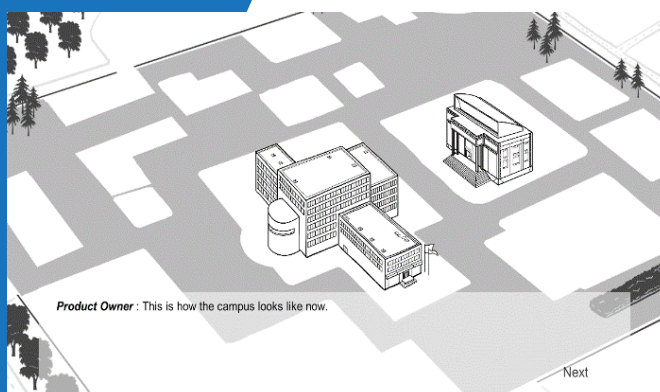
Initial briefing from the Product Owner point of view. Each of the three roles has its own gameplay.

Center

Overview of the task board, describing what has been done and still needs to be done.

Bottom

The players can see at each sprint how the decisions they take impact the work progress (here the building of a university campus).



SCRUM Game Roles



Product Owner

The PO has a briefing with the client and then informs the team, answering questions about the project. Afterwards, the PO presents the pool of ideas and answers the questions of the SM. After that, assigns priorities to the tasks. Following, the team starts working and the PO answers to the client after each sprint, changing tasks' priorities according to the client's requests.

Scrum Master



The SM gets the briefing from the product owner and assigns the tasks from the pool of ideas to the sprints. Once the PO sets the priorities, the player has to define the effort for each task and suggest the team what to do in the next sprint, which is optional (but costs points). As the SM, the player has control over the sprint time and has to maximize the cooperation of the team workers. This is done by assigning team workers to each task taking into account their skills.



Development team

Playing as the TM, the player has to select the tasks for each sprint, following the recommendation of the SM or not. In each sprint, the player (as the team) is assigned project tasks, each of which has three subtasks. The player has to assign these subtasks to the team members, again, taking into account their skills.

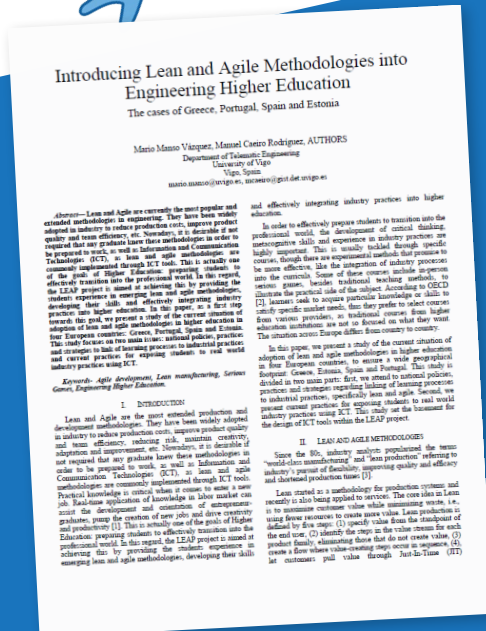


Next steps

The dissemination of the LEAP project continues with interviews in enterprises and talks in conferences. The last one is going to be presented in this year's EDUCON conference. Our team will present a paper entitled "Introducing Lean and Agile Methodologies into Engineering Higher Education" that describes a study of the current situation related to the adoption of lean and agile methodologies in higher education in four European countries (Greece, Portugal, Spain and Estonia). This study focuses on two main issues: national policies, practices and strategies to link of learning processes to industrial practices and current practices for exposing students to real world industry practices using ICT.

Since the games are in their final stages of development, this spring all our partners will host a test and demonstration of the three games. This test will provide real feedback from potential users and valuable information about bugs and improvements that will allow our team to polish the games to their final version.

More info at <http://leapproject.eu>



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