

**PONTIFÍCIA UNIVERSIDADE CATÓLICA DO PARANÁ**

**PRÓ-REITORIA DE PESQUISA, PÓS-GRADUAÇÃO E INOVAÇÃO**

**PROGRAMA INSTITUCIONAL DE BOLSAS DE INICIAÇÃO CIENTÍFICA - PIBIC**

**Ou**

**PROGRAMA INSTITUCIONAL DE BOLSAS DE INICIAÇÃO EM DESENVOLVIMENTO TECNOLÓGICO E INOVAÇÃO - PIBITI**

**Ou**

**PROGRAMA DE INICIAÇÃO CIENTÍFICA PARA ESTUDANTES DO ENSINO À DISTÂNCIA - PIC-EaD**

**Identifique à qual programa pertence seu projeto.**

**Deixe apenas o programa que você faz parte e apague os outros dois.**

RELATÓRIO PARCIAL

IMPLEMENTANDO O USO DE LEGO® SERIOUS PLAY PARA POTENCIALIZAR O DESENVOLVIMENTO E TESTE DE PROTÓTIPOS EM UM ATELIÊ DE SOFTWARE

**CURITIBA**

**DATA**

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IMPLEMENTANDO O USO DE LEGO® SERIOUS PLAY PARA POTENCIALIZAR O DESENVOLVIMENTO E TESTE DE PROTÓTIPOS EM UM ATELIÊ DE SOFTWARE

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|  | Relatório Parcial apresentado à Pontifícia Universidade Católica do Paraná, Pró-Reitoria de Pesquisa, Pós-Graduação e Inovação, Programa Institucional de Bolsas de Iniciação Científica, sob orientação do Prof. Sheila Reinehr. |

**CURITIBA  
DATA**

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# 1 INTRODUÇÃO

* **Abstracts**

1. **Article 1: LEGO® Serious Play in Software Engineering Education**

This article main goal was to introduce the LEGO**®** Serious Play (LSP) as an innovative alternative for Practice-Based Learning method for higher education sector, including Software Engineering (SE), once it improves many soft and hard skills. One experience that can be quoted is building a chair with LEGO**®** bricks based on SE activities and software development life cycle models. This activity was validated through 242 computer science students and a post-test to compare the difference between the traditional learning method and the one pointed on the paper. Basically, the LSP brought good results for the most courses that it has been through, once it motivates the students to participate, learn and upgrade their technical skills. The main objective of the LSP activity is to teach SE contents (core activities, software development cycle models and pros, cons and differences between them, practice some soft skills and solve daily problems) in a playful and active way.

The research was based on 3 questions. The method was performed at the Universidad Politécnica de Madrid (UPM) during the 2018-19, following the waterfall model, evolutionary model and incremental based on components. There were 3 phases: Coding, Inter-Coder Agreement and Synthesis. The results were good, with no differences between the chairs built using evolutionary and incremental model, otherwise the waterfall model brought a “size” problem, having the students to improvise at the last minute.

1. **Article 2: Human-robot interaction: Conceptualising trust in frontline teams through LEGO® Serious Play**

The research idea was to test if robots can be part of a human team based on trust. The LSP method was used to build and analyse how the human-robot interaction (HRI) would look like in hospitality frontline teams. There were picked robots to do many different tasks, and at the end of the experiment, there were classified 4 types of them: programmable automatic robots, non-programmable automatic robots, adaptive robots and smart robots. The last one was determined as crucial for the hospitality industry future, that’s why they were chosen to be the focus for the research. The smart robots required autonomy through sensors to recognize the environment, being able to learn and adapt themselves. They recognized that the team can’t be fully composed by non-human being does not work, even with robots taking over tasks once done by people more and more over time, since emotions are never going to be understandable by AI’s. Distinguishing between robots as a tool and robots as a teammate. The experience occurred in workshops with LSP method to build visual and physical models of HRI based on trust (phases: building, sharing and reflecting). It was convocated 17 participants who had any experience in the hospitality industry frontline jobs or has affinity to technology. Tasks: 1) build individual models of a trustable and workable robot; 2) discuss situations where robots are used in a hotel; 3) build a shared model where human and robots work together. Based on appearance (i), performance (ii) and proximity (iii), the results showed that a (i) humanoid shape, human being size, female gender and bright and colorful design of the robots, together with (ii) multifunctionality, predictability, control, (iii) interconnectivity and mobility not only affect positively the trust given to people but also can facilitate some activities. This research can be used as a start to comprehend the human-robot interaction and provide important information for future experiences.

1. **Article 3: Games for Teaching Software Development**

This article main goal was to show the benefits of teaching in different ways, like games and activities, making students “play with the code”. The Lego Serious Play was one of the methods used in this experiment. Playing can help students to improve their learning in many ways, encouraging them to participate and try, without being scared to fail or feeling forced to do it. Furthermore, playing is fun and improvisational. The SCRAF model should be used when learning with games, where students understand their **S**tatus, get the **C**ertain of the results and improve their **A**utonomy. The “R” and “F” serve to guarantee that there isn’t any relation between the players and the rules are going to be fair. The “flow” means a moment when someone is in extreme focus, this is the point the SCARF wants the students to be. The research cited LSP when focused on team works, saying that this method helps on explore individual and team identity. The authors said that they only work with agile projects and MVP’s, with live clients and not prioritizing only computing on the first degrees. This way they motivate and bring a better experience for the students. Finding clients was not a problem since they started (4 year ago), they come from charity organizations, community groups, small businesses or units of the university.

Agile games were taken in different sites and blogs, and the first one was Lego Serious Play to help build the teams and get them to know each other better. Each integrant build what they think they can bring to the project, metaphorically, and then explain their buildings and answer the questions other students can make, they also talk about what could be in others models that are not there. The second game used were to discover different user personas, writing their feelings in sticky notes. Third game goal was to prototype the mini-project applications, matching the developers’ ideas and the client needs. Fourth one Lego4Scrum simulation is used, where students divided in teams build a Lego city with scrum process. An interesting thing about this game is that any student asked the product owner what it would be accepted for the building, unless their model get rejected. The fifth game is the Kanban Game, that brings an experience to see what happens in the workflow if limits are added in each stage. It stars with 3 columns: “to do”, “in progress” and “done”, then the second one is divided in “design”, “develop” and “test”, and finally, work limits are added. The last game was Offing the Off-Site Customer Game, which main goal is to illustrate that direct communication between developers and clients is better than with a business analyst and a constant contact with the client, showing the difference between written and spoken commands. To implement the games, they were situated in a mini-project being run with the same teams they would be in the summer project.

The StrategicPlay brough new ideas for the application, get out the routine and bring the idea that lectures are not always needed, making the students learn by ‘doing not taking’. Even when thing don’t go as planned, it can be a learning opportunity. There are negative points too, like students not cooperating to the activities, so the teachers must be prepared to adapt and improvise.

Have games helped? Yes, in many aspects: the engagement with the project the understanding of the content increased, the quality of software projects heightened, even the students confident seems higher, and many others. There are many agile or business games that institutions must invest to teach their students in a different way.

# 2 OBJETIVO(S)

Neste item devem ser apresentados os objetivos do plano de trabalho que foi aprovado e implementado no programa.

# 3 MATERIAIS E MÉTODOS

Apresentar os materiais e métodos das etapas que já foram realizadas na pesquisa. Em caso de pesquisas teóricas ou revisões sistemáticas, descrever detalhadamente os procedimentos metodológicos utilizados para o desenvolvimento da pesquisa (recorte temporal, base de dados utilizada, descritores, critérios de inclusão e exclusão, entre outros).

Deve obrigatoriamente ser incluída a informação da aprovação do CEP/CEUA se a pesquisa incluir seres humanos ou animais, respectivamente.

# 4 RESULTADOS PARCIAIS

Considerando o cronograma proposto no plano de trabalho, apresentar o desenvolvimento da pesquisa e os resultados atingidos até o momento. Se ocorreu alguma dificuldade ou alteração de cronograma da pesquisa, deve ser aqui relatado e justificado.

## 4.1 PROCESSOS E/OU PROCEDIMENTOS DE DESENVOLVIMENTO TECNOLÓGICO – somente para projetos PIBITI

Projetos de PIBITI têm como objetivo adicional, práticas conectadas ao desenvolvimento teórico aplicado conectados ao desenvolvimento de tecnologia e inovação. Dessa forma, descrever o processo de produção do artefato (produto ou processo) até o momento. Em que momento ele se encontra ou se há alguma geração de alternativas para sua produção.

# 5 ETAPAS FUTURAS

Considerando o cronograma proposto no plano de trabalho, analise a adequação das próximas etapas ao tempo disponível para conclusão.

O calendário com as datas importantes da Iniciação Científica está disponível na página da IC no site da PUCPR.

Lembre-se de que o relatório deve ser corrigido pelo seu orientador e submetido à coordenação da Iniciação Científica pelo próprio orientador. O envio deve ser feito exclusivamente por meio eletrônico.

Não se esqueça de submeter seu texto a uma criteriosa revisão gramatical e ortográfica. Bom trabalho!

# 6 REFERÊNCIAS

Apresente as referências **CONFORME GUIA PARA NORMALIZAÇÃO DE TRABALHOS ACADÊMICOS ABNT.**

# ANEXOS

**OUTRAS ATIVIDADES REALIZADAS**

Anexar aqui a cópia da sua declaração/certificado de participação no XXIX SEMIC e outros eventos científicos, ou outras atividades que julgar pertinentes para sua formação como pesquisador.