

# 3<sup>rd</sup> IMPRESS Multiplier Event

Tutorial of the 2020 CSEE&T conference program

## A Gamification Toolset for Improving Engagement of Students in Software Engineering Courses

18:00 - 21:00, November 11, 2020  
(ONLINE)

### Schedule

Wednesday, November 11th	
18:00 - 18:15	<p><b>Introduction: IMPRESS students with games</b></p> <p>Speaker Tanja E.J. Vos</p> <p>Abstract The EU funded Erasmus+ IMPRESS project proposed the use of gamification to improve students' engagement, and hence their appreciation, in software engineering education at the university level. To this end the project has developed a diverse set of tools that are available for teachers around the world to make subjects like software testing and specifications more fun. In this tutorial we present the tools that resulted from this project.</p>
18:15 - 19:00	<p><b><i>Gamifying teaching formal specifications, lessons learned</i></b></p> <p>Speaker: Ivan Martinez Ortiz, Wishnu Prasetya</p> <p>Abstract Quality of software can increase substantially when formal specifications are provided. However, teaching students to write them is not always easy as courses on formal methods are often experienced as boring and difficult by students. This part of the tutorial will present a game called FormalZ that teachers can use to introduce some variation in their class. Students can have some fun in playing the game and, while doing so, learn the basics of writing formal specifications. Unlike existing software engineering themed education games, FormalZ takes a rather radical approach, namely deep gamification where playing gets a more central role in order to generate more engagement. Moreover, teachers can take advantage of the analytics capabilities that are integrated in FormalZ to follow the</p>

	<p>students' progress or proactively support students that get stuck during the activity.</p> <p>In this tutorial we will go through the basic gameplay of FormalZ, discuss its live analytics, and how it can be embedded in teaching.</p>
19:00 - 19:45	<p><b><i>Gamifying a software testing course with Code Defenders</i></b></p> <p>Speaker: Gordon Fraser</p> <p>Abstract Software testing is an essential skill for software developers, but it is challenging to get students engaged in this activity. The CodeDefenders game addresses this problem by letting students compete. Students can “attack” source code by introducing faults while other students “defend” it by writing tests to reveal these faults. In the tutorial we will describe how we integrated CodeDefenders as a semester-long activity of an undergraduate and graduate level university course on software testing. We complemented the regular course sessions with weekly Code Defenders sessions, addressing challenges such as selecting suitable code to test, managing games, and assessing performance. Our experience and our data show that the integration of Code Defenders was well-received by students and led them to practice testing thoroughly. Positive learning effects are evident as student performance improved steadily throughout the semester.</p> <p>Participants of the tutorial will also here be able to get hands-on experience with the tool and discuss the potential use of the tool in their courses.</p>
19:45 - 20:00	break
20:00 - 20:45	<p><b>QuiZZRep</b></p> <p>Speaker: Rui Prada</p> <p>Abstract Quizzes can be used to improve educational activities in several ways. They are good motivational tools to keep students engaged in class, and are useful to illustrate gaps in the knowledge students may have. Quizzes may also be used off-class as a study tool promoting active learning and self-regulation of learning. We have developed a tool to share and deliver quizzes to students to be used primarily in software engineering classes. To feed the tool we processed the data of years of question and answering reports from courses offered by the IMPRESS partners.</p>

	<p>The core functionality of the tool is the creation of questions and quizzes. It is built having in mind the re-usability of questions. New users get access to a database of questions previously created in the system that facilitates the creation of their new quizzes. While creating a new quiz users can add new questions to the system as well. Questions are organised in topics, which in addition to facilitate their re-usability, support the creation of assignments that work as templates for automatic generation of quizzes on demand by students. Students can register to a course getting access to the quizzes teachers built for them. Students answer the quizzes in their specific perspective of the system. The tool builds a set of analytics that are available to the students and the teacher regarding the questions (e.g. their difficulty), the quizzes and the students' performance. Quizzes may be run in-class only if needed, making use of a QR code system, may be open for a long period, and can be exported to be used in external tools.</p> <p>Participants will be able to get hands-on experience with the tool, get familiar with its functionalities and discuss the potential use of such tool in software engineering courses. We will discuss the results of using the tool in two courses at Instituto Superior Técnico, Universidade de Lisboa.</p>
20:45 - 21:00	Conclusions & wrap up