Topic: Increasing student motivation in computer programming with gamification

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I. INTRODUCTION

today's students need to be able to adapt to a dynamic environment surrounded by new technologies. The developing of skills like creativity, problem-solving, persistence, collaboration, communication, and critical thinking ability, are crucial skills to a student's future success in the face of constantly evolving technology regardless of their area of study In the research work, it is clearly identified that it is well known in the Computer Science Education community that students have difficulty with programming courses.

II. RELATED WORK

Games attract millions of people all over the world, they spend many times performing often tasks just for fun. In the last decade, several works focus on gamification as a tool to motivate students and increase their engagement in programming courses It also describes the meaning of the use of some of the mechanics of games like leaderboard, levels, Figueredo, J., & García-Penal, F. J. (2020). Increasing student motivation in computer programming with gamification. In 2020 IEEE Global Engineering Education Conference (EDUCON), (27-30 April 2020, Porto, Portugal)

III. METHODOLOGY WORK

The main motivation, in the accomplishment of this work, is to reduce the high rate of failure and lack of motivation of students in courses of introductory programming. This work follows the concept used in many videogames, where a player character has a score that summarizes his/her skills, and where these skills can be improved through problem-solving, collect objects and training. Similarly, the student will have a score that summarizes their programming skills and can train and improve their skills as needed. In order to carry out this research, the identification of the gamification elements that are used in an educational context was defined as a goal, especially in introductory programming courses. The student who loses is eliminated from the tournament. In the academic year of 2019, the average IPG admission grade was 12.3 ± 1.3 points, for computer science course.

IV. RESULTS AND DISCUSSION

The main motivation, in the accomplishment of this work, is to reduce the high rate of failure and lack of motivation of students in courses of introductory programming. This work follows the concept used in many videogames, where a player character has a score that summarizes his/her skills, and where these skills can be improved through problem-solving, collect objects and training. Similarly, the student will have a score that summarizes their programming skills and can train and improve their skills as needed. In order to carry out this research, the identification of the gamification elements that are used

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-In addition to this basic quantitative analysis, qualitative analysis of students' comments on their experience and perception of gamification is important. About using points student having a grade is something that the student gets very nervous about, and with this method, the students ‘have fun’ and do things better without pressure”. Students' opinions about the elimination tournament. “The idea of a tournament is quite interesting but not everyone wants to compete because they are afraid to compete against the ‘sharks’". Finally, some overall comments made by the students. It should be noted the negative effect, stated by the students, that the use of a leaderboard can demotivate and stress the students at the end of the table.

*Abstract—Games have important motivational power. They take advantage of a set of tools to encourage people to engage with them just for the joy of playing and the possibility to win. While gamification is gaining ground in a lot of areas in our society, its application in education is still an emerging trend. In recent years, gamification has attracted the attention of researchers from different areas such as teaching and learning computer programming. Ever since the first programming languages emerged, the problems inherent to programming teaching and learning have been studied and investigated. The theme is very serious, not only for the important concepts underlying computer

science courses but also for reducing the lack of motivation, failure, and abandonment that result from student frustration. In most of these studies and research one factor prevails, lack of student motivation or how to motivate students to learn programming. One way to combat this problem is to use gamification. Using game design elements in non-game contexts is one of the good ways to motivate and encourage students to learn programming. To assess how gamification impacted the learning experience, we compared data from one gamified and non-gamified year. In general, the results show significant improvements in terms of attendance to class, participation, and proactivity. They also suggest that our approach can reduce the high rate of failure grade among students. In conclusion, this case study, we show how the use of concepts related to gamification can improve motivation, passion, beauty, joy, awe, e naturally the succeed in programming.