

# Game-based Support of Online Learning of Programming

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The process of teaching new knowledge, whether in social sciences, natural sciences or engineering, meets regularly with many pitfalls that must be overcome to successfully adopt new information. Among one of the main problems with absorption of new knowledge, we can include insufficient student motivation to learn. Therefore, except the classic ways to motivate students to learn the new material (reward and punishment), we can use the method that encapsulates the learning process in a more attractive and especially more entertaining form – in games.

For a long time games have been used in the learning process. This can be seen in the kindergartens and primary schools, where games take the form of different musical and kinetic activities. In recent years, computer games have been promoted in the educational process. This is mainly due to the advent of computerization of schools, as well as by increasing the public awareness of the need to familiarize children from an early age with commonly used technologies. In this way the new education sector opens up new opportunities to teach students new and old learning material anew in interactive form.

Poor motivation of students can be also seen at colleges and universities. The technically-oriented of these, e.g. FIIT STU, try to prioritize programming courses in the early years of study. Teaching programming languages at FIIT STU in the first years of undergraduate study has received increased attention. During the first three semesters, students meet with five compulsory courses, whose main task is to learn and improve student's skills in selected programming language such as C and Java. Because C language is the first programming language with which students at bachelor level study meet (and which will be used throughout the entire study), it is extremely important to overcome to successful continuation of the study mastered at least its syntax, basic commands and good programming practices. Due to recent statistics of success in programming courses, more than one-third of enrolled students fail to pass the course Procedural programming and a quarter of the remaining students fail the

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subsequent course on Data structures and algorithms. It shows that approximately half of the accepted students for undergraduate study do not acquire the essential basics of the C language during the first three semesters of study.

In our project, we try to answer the question how to support and enrich teaching of C language in order to increase completion rates in the above-mentioned programming courses and thus the knowledge and skills of students to create programs in C language. Researchers in recent years examine options to make the process of online learning of programming languages more attractive to students. Insufficient level of student's motivation, which stands for their poor academic results, can be according to undertaken research successfully increased by the enrichment process of learning by games and game features [1, 2, 3].

In our work we explore the area of existing solutions using games as a tool to support online learning in educational systems. We analyze the effectiveness of online learning and games compared to traditional teaching methods. We are working on a method to support online learning using games and improve the current process of teaching programming at the faculty. The proposed solution will be evaluated using a software prototype – a game developed to encourage the learning process in the basic programming in C.

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## References

- [1] Malliarakis, C., Satratzemi, M. and Xinogalos, S. „Towards a new massive multiplayer online role playing game for introductory programming. “ Proceedings of the 6th Balkan Conference in Informatics. 2013, pp. 156–163.
- [2] Wang, Li-Chun, and Ming-Puu Chen. „The effects of game strategy and preference-matching on flow experience and programming performance in game-based learning. “ *Innovations in Education and Teaching International*. 2010, pp. 39-52.
- [3] Eagle, M. and Barnes, T. „Experimental evaluation of an educational game for improved learning in introductory computing. “ Proceedings of the 40th ACM technical symposium on Computer science education. 2009, pp. 321–325.