GAME SIMULATION FOR ALTERNATIVE LEARNING IN BASIC PYTHON FOR CS AND IT STUDENTS OF CAVITE STATE UNIVERSITY - IMUS CAMPUS

An Undergraduate Thesis
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ABSTRACT

The goal of this research is to develop a game simulation that serves as an alternative learning tool for computer science and IT students, focusing on the basics of Python programming. The objective is to inspire self-study, encourage a creative learning approach, and familiarize students with problem solving work.

The research incorporates various modules to enhance the learning experience. The Lesson module consists of lectures and lessons that cover the Python programming topic, including tutorials, guided exercises, and challenges that require practical application of the concepts. This module seamlessly integrates with the gameplay, allowing students to actively engage with educational content while progressing through the game.

Iterative Development Cycle was used as the method in developing the game. Iterative development cycle includes Planning, Requirements, Analysis & Design, Implementation, Testing, and Evaluation before the desired deployment. By employing an iterative research design, this study aims to develop a Python programming simulation game iteratively, gathering user feedback and research insights along the way. This approach allows for continuous refinement,

By integrating these modules, the research aims to create an immersive and effective game simulation for alternative learning in basic Python programming. It offers an engaging and interactive environment that facilitates students' learning journey, enabling them to acquire and apply Python programming skills in a fun and educational way.

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INTRODUCTION

Python is a strong, adaptable programming language that has grown in recognition over the past few years. Both novice and seasoned programmers favor it because of its straightforward and simple-to-read syntax. It has many different uses, including machine learning, artificial intelligence, and web development.

According to Smith, J. (2021), Python is an interpreted, interactive, object-oriented programming language. It provides high-level data structures such as list and associative arrays (called dictionaries), dynamic typing and dynamic binding, modules, classes, exceptions, automatic memory management, etc. It has a remarkably simple and elegant syntax and yet is a powerful and general-purpose programming language

Simulation, a type of technology by which theoretical knowledge is transformed into practice, simplifies the difficult-to-comprehend, abstract activities and realistically embodies them and can reach a solution in a short time (Atalan and Donmez, 2019).

In recent years, digital or web-based games have increasingly supported learning. In the context of online education, this research area attracts a significant amount of interest from the scientific and educational community, for example tutors, students and game designers.

With the growing expansion of technology, instructors and those who create educational policy are interested in introducing innovative technological tools, such as videogames, virtual worlds, and Massive Multi-Player Online Games (MMPOGs) (Buckless, 2014; Gómez, 2014).

According to Gagne (2005) It is well documented in the literature that intrinsic motivation in learning activities is strongly correlated with the outcome of the learning process, by promoting direct participation of students in their knowledge building.

Moreover, real-life systems are usually subject to uncertainty and dynamism, some of which are generated by the human component of the system (Gruler et al. 2019). These aspects cannot be easily included in traditional analytical models, and typically require the use of simulation-based methodologies in coordination with other techniques, such as heuristic-based optimization and machine learning methods. As pointed out by Juan et al. (2017), the use of simulation software, tools, and games facilitates the practical understanding of these complex systems and allows students to enhance their learning experience via the development of hands-on activities properly designed by their instructors.

According to Dimitrios Vlachopoulos & Agoritsa Makri (2017), Games and simulations show mixed effects across a number of sectors, such as student performance, engagement, and learning motivation. However, as these studies focus only on certain disciplines, there remains a gap in the literature concerning a clear framework of use across academic programs. As a result, the issue of efficiently integrating games and simulations in the educational process is often up to the instructor's discretion.

Accordingly, this research seeks to offer a thorough understanding of the Python programming language, as well as its potential as a potent tool for creating a wide variety of applications. This will aid students in developing their logic and problem-solving skills, as well as their understanding of basic Python Programming Language fundamentals. This teaching strategy imparts knowledge to students by utilizing advantageous elements of video games.