International Conference on Electrical, Computer and Energy Technologies (ICECET), Prague, Czech Republic, 20-22 July 2022

Introductory computer programming teaching and learning approaches: Review

Mbiada, AK; Isong, B; Lugayizi, F; Abu Mahfouz, Adnan MI

Abstract
Computer programming is at the core of the computing discipline and its understanding and mastery are critical to a student's success. However, its abstract nature makes it difficult to teach, learn, understand and assimilate. Moreover, most introductory programming (IP) modules are now offered by several students with diverse backgrounds (computing and non-computing) in most institutions as a means of ensuring digital core competencies in all disciplines. This has led the majority of these students to face several challenges leading to a lack of motivation, significant failure and dropout rates despite several teaching and learning methods and tools that have been proposed, designed and developed. This paper, therefore, surveyed different methods and tools geared at IP teaching and learning to improve their learning experience. Several studies were considered and the findings were grouped into delivery-based, content-based, tool-based, and assessment-based approaches. In addition, the advantages and disadvantages of the reviewed methods were also illustrated, as well as the contexts of their application. Also, several challenges and opportunities for future research were identified.