Development of a Modularized Undergraduate Data Science and Big Data Curricular Using No-Code Software Development Tools

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Abstract

Over the last decade, Data Science has emerged as one of the most important subjects that has had a major impact on industry. This is due to the continual development of scientific methods, algorithms, processes, and computational tools that help to extract knowledge from raw data efficiently and cost-effectively, compared with early-generation tools. Professional data scientists create code that processes, analyses and extracts actionable insights from high volumes of data. This process requires a deep understanding of mathematical principles, statistics, business knowledge, and computer science. But most importantly, the data science development chain requires knowledge of a high-level programming tool and its dependencies. This is a major problem in some aspects due to the steep learning curve. In this paper, we describe and present a modularized Data Science curriculum for undergraduate learners that relies on no-code software development tools as programming aids for non-computer science majors. No-code development tools have been added to the traditional teaching pedagogy to improve students' motivation and conceptual understanding of coding despite their limited programming skills. The study aims to assess the impacts of visual programming languages on the performance of non-computer science majors on programming problems. The study's sample consists of 50 fourth-year students from the Faculty of Science and Technology at the Midlands State University. A post-survey questionnaire and assessment items were administered to the control and experimental groups. Results show that the students drawn from the experimental group benefited from the use of a visual programming language. These results offer evidence-based recommendations for incorporating high-performance no-code software development tools in the formal curriculum to aid teaching and learning data science programming for students of diverse academic backgrounds.