Different Approaches to Teaching a Database Course to Undergraduate and Graduate Students

Authors : Samah Senbel

Abstract : Database Design is a fundamental part of the Computer Science and Information technology curricula in any school, as well as in the study of management, business administration, and data analytics. In this study, we compare the performance of two groups of students studying the same database design and implementation course at Sacred Heart University in the fall of 2018. Both courses used the same textbook and were taught by the same professor, one for seven graduate students and one for 26 undergraduate students (juniors). The undergraduate students were aged around 20 years old with little work experience, while the graduate students averaged 35 years old and all were employed in computer-related or management-related jobs. The textbook used was 'Database Systems, Design, Implementation, and Management' by Coronel and Morris, and the course was designed to follow the textbook roughly a chapter per week. The first 6 weeks covered the design aspect of a database, followed by a paper exam. The next 6 weeks covered the implementation aspect of the database using SQL followed by a lab exam. Since the undergraduate students are on a 16 week semester, we spend the last three weeks of the course covering NoSQL. This part of the course was not included in this study. After the course was over, we analyze the results of the two groups of students. An interesting discrepancy was observed: In the database design part of the course, the average grade of the graduate students was 92%, while that of the undergraduate students was 77% for the same exam. In the implementation part of the course, we observe the opposite: the average grade of the graduate students was 65% while that of the undergraduate students was 73%. The overall grades were quite similar: the graduate average was 78% and that of the undergraduates was 75%. Based on these results, we concluded that having both classes follow the same time schedule was not beneficial, and an adjustment is needed. The graduates could spend less time on design and the undergraduates would benefit from more design time. In the fall of 2019, 30 students registered for the undergraduate course and 15 students registered for the graduate course. To test our conclusion, the undergraduates spend about 67% of time (eight classes) on the design part of the course and 33% (four classes) on the implementation part, using the exact exams as the previous year. This resulted in an improvement in their average grades on the design part from 77% to 83% and also their implementation average grade from 73% to 79%. In conclusion, we recommend using two separate schedules for teaching the database design course. For undergraduate students, it is important to spend more time on the design part rather than the implementation part of the course. While for the older graduate students, we recommend spending more time on the implementation part, as it seems that is the part they struggle with, even though they have a higher understanding of the design component of databases.

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