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Factors Influencing Attrition in a Biomedical Engineering Program

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Abstract

Student attrition from universities is an issue of concern globally. However, there is a lack of systematic studies to understand the factors that might influence students' attrition from engineering programs. In this case study, statistical data for two groups of students admitted during the academic years 2000–2005 and 2006–2011 was used. The analysis suggests that the students attrition could be influenced by admission requirements, program completion requirements and curriculum design and contents. Further, first year students require more attention.

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Keywords: Attrition in engineering programs; student retention in engineering programs; biomedical engineering.

1. Introduction

Student attrition from universities and, in particular, undergraduate engineering degree programs has been an issue of concern globally [1-6]. Various studies suggest that students' changing academic interests or financial constraints might be possible contributors to attrition. Further, biomedical engineering (BME) is a multi-disciplinary field of study and in the recent two decades or so, undergraduate programs in this field have gained significant importance globally. Such multi-disciplinary programs train students to develop and apply knowledge as well as skills of basic science and engineering to several physiological aspects of the human body. Though the programs may have different emphases, the curricula components, in general, include mathematics, physical

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sciences, life sciences, basic engineering, biomedical engineering and general studies [7]. Also, in such multi-disciplinary programs enrollment is open for students from a variety of academic backgrounds in science, engineering and medicine. Therefore, students' performance in the biomedical engineering programs may vary significantly. Poor or inconsistent performance may affect students' motivation to continue in the program. Although, several studies have analyzed students' performance in engineering programs [8-16]. However, there is a lack of systematic studies to understand the factors that might influence students' retention or reduce attrition from engineering programs.

2. Methods

In this case study, statistical data for 12 academic years was used to analyze attrition in an undergraduate biomedical engineering program. For the purpose of current study, attrition was defined as the number of students who neither completed the program requirements, nor registered any course/component of the program for more than two consecutive semesters. The student population was divided into two groups – group G1 included students admitted during the academic years 2000–2005 and group G2 included students admitted during the years 2006–2011. The main difference between the two groups was that from the academic year 2006–07 major changes were introduced in the program related to admission requirements, program completion requirements as well as curriculum design and contents.

3. Results and Analysis

The ratio of students in the groups G1:G2 was 8:5. Figure 1 gives cumulative attrition from the two groups calculated as a percentage of total intake over the respective five-year periods.

Figure 2 gives the percentage of students who aborted their program within two semesters – equivalent to one academic year. The values for each group were calculated as a percentage of total intake over the respective five-year periods.

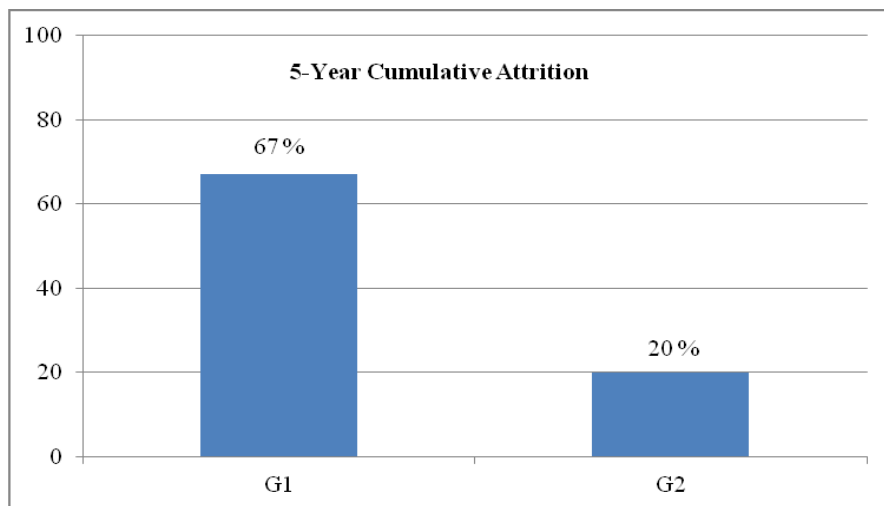


Fig.1. Five-year cumulative attrition for the two groups is given as a percentage of their respective cumulative intake.

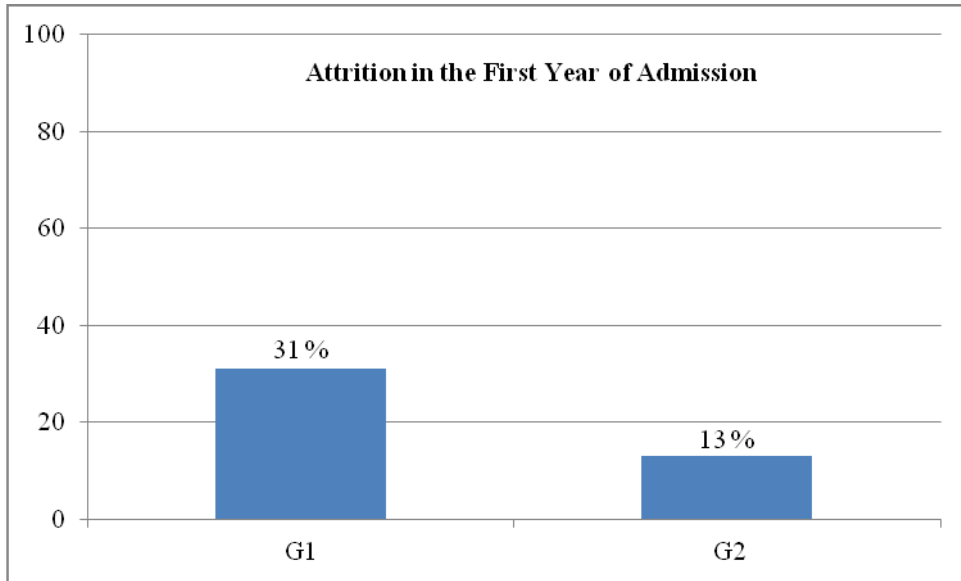


Fig. 2. Percentage of students who aborted their program in two semester. The values for each group are calculated as a percentage of their respective cumulative intake.

Cumulative attrition from G1 and G2 was 67% and 20% of their corresponding intake, respectively. This shows that the attrition from program was reduced significantly. As a consequence the retention of students was enhanced. This effect could possibly be a direct result of the changes introduced in the program as described in section 2. Also, from Figure 2, it is important to note that 31% students in G1 and 13% students in G2 did not continue their studies in the program beyond two semesters. There are two points to be particularly emphasized here. First, 46% of the aborting students in G1 and 66% of the aborting students in G2 took their decision in the early stages of the program, suggesting that in each group a significant number of students took their decision of leaving the program early. Second, a significant majority of the aborting students in G2 compared to G1 (66% compared to 46%) took an early decision, possibly suggesting that the students in G2 were more clear about their academic interests. As the majority of courses in these early semesters are basic and common with other engineering programs, the students could easily transfer their earned course credits to another program.

4. Conclusion

The results of this study indicate that attrition from the program has been reduced significantly after the introduction of the major changes as described in section 2. This has effectively enhanced student retention in the program. Further, the analysis suggests that appropriate program requirements and curricula can influence retention and reduce attrition. First year following admission requires more attention.

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