

Measurement of Engineering Design Creativity in Undergraduate Students

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Abstract: To mold the innovators of the future, engineering schools must educate engineers who can generate creative solutions to design problems. We examined the innovation capabilities of freshman and senior undergraduate engineering students through a concept generation exercise using the 6-3-5 method. Their concepts were scored for originality, and originality was correlated with individual differences such as academic performance (GPA) and engineering design self-efficacy. In contrast to previous results, seniors and freshmen did not differ in originality. Freshman students with low GPA and low self-efficacy produced the lowest originality scores. The creativity of senior students was also assessed longitudinally by comparing their originality on two design problems given across one academic year. An order effect was found: receiving design problem A followed by design problem B led to an increase in originality, while the opposite order showed no change. The results are discussed in relation to practical applications for engineering curricula.