Investigating Factors that Predict Progress High Achieving Engineering Students Make Towards Desired Outcomes of College

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INTRODUCTION

- Prior research shows that living on campus have direct and indirect relationship with Student engagement and achievement (Astin et al., 1994; Turley and Wodke, 2010).
- There is evidence that motivation is a predictor of academic performance (Adesope et al. 2021; de Barba et. al, 2016). Motivation has been identified as a learning and study strategy construct (Weinstein, 2016).
- Studies have shown that the quality of effort students invest into course learning significantly improve their academic achievement. (Astin, 2019).
- Authors have developed and validated instruments that can measure students' background, course learning, utilization of academic resources, motivation among several other (Gonyea, 2008, Weinstein, 2016).
- However, little is known about factors that influences the progress towards desired outcome of college of high achieving engineering students.
- In this study, a predictive modelling of students' achievement in terms of overall progress they made towards desired college outcome is conducted.
- The overall desired outcome of college for this study include gains in intellectual and scholarly development, gains in scientific and technological knowledge, gains in personal development, and gains in vocational development (Gonyea et al., 2003).
- Improving the overall progress students make towards desired outcome of college will result in graduating competent engineers who can function effectively in advancing the scientific and technological landscape of the nation.

RESEARCH QUESTION

RQ: What factors are significant predictors of overall progress high achieving engineering students made towards desired outcome of college?

METHODS

- Analytic sample = 51; Aged 20-39; Race (Caucasian White = 49; Asian-Caucasian =1 and Mexican-American = 1); Majors: Mechanical and Aerospace Engineering, and Civil and Environmental Engineering; High Achieving Engineering Students of CGPA > 3.5
- Theoretical framework: I-E-O (Input-Environment-Output) Model
- Data Collected using College Students Experience Questionnaire (CSEQ) and Learning and Study Strategies Inventory (LASSI).
- Dependent variable: Overall progress students made towards desired outcome of college.
- Independent variable: Course learning, Parents' educational background, Scholarships, Using Academic Resources, and Motivation
- Normality Test indicates data fulfilled Normality assumption.
- Pearson Correlational Analysis and Multiple Linear Regression Model

DEMOGRAPHY

Variables	Measurement	n	%
Gender	Female	11	22%
	Male	40	78%
Majors	Mechanical and Aerospace Engineering	29	57%
	Civil and Environmental Engineering	22	43%
Parent with at least college degree	None	5	10%
	Mother Only	5	10%
	Father Only	7	13%
	Both Parents	34	67%
Residence	Resides on Campus	9	18%
	Resides Within Walking Distance Campus	26	51%
	Resides Within Driving Distance Campus	16	31%

CORRELATION ANALYSIS RESULTS

	1	2	3	4	5	6
Course Learning	1	0.227	0.386**	0.144	-0.265	0.402**
Using Academic Resources		1	0.119	0.216	-0.158	0.089
Motivation			1	0.225	-0.221	0.369**
Scholarship				1	-0.009	0.011
Parents' Education					1	0.011
Desired Outcome of College						1

MULTIPLE REGRESSION MODEL RESULTS

	Unstandardized B	Std. Error	Standardized Beta	t	Sig.
(Constant)	7.918	19.449		0.407	0.686
Course Learning	0.818	0.347	0.342	2.356	0.023
Motivation	1.389	0.677	0.295	2.050	0.046
Parent Education	2.909	2.332	0.170	1.248	0.219
Using Academic Resources	0.074	0.387	0.026	0.192	0.849
Scholarship	-3.096	3.870	-0.109	-0.800	0.428

DISCUSSION AND CONCLUSION

- With almost two-third of the research participants' who are high achieving engineering students having both parents with college degree. The result suggest that both parents having at least a college degree may have positive influence on students' achievement.
- Results showed that the multiple regression model statistically predicted academic success , $F(5, 50) = 2.988$, $p = 0.021$, $R = 0.50$, adjusted $R^2 = .25$. These results indicate a linear relationship in the population, and the multiple regression model is a good fit for the data.
- The correlation analysis shows that course learning has a significant moderate positive relationship with the overall progress students made towards desired outcome of college at $r (50) = 0.40$, $p < 0.01$.
- The correlation analysis shows motivation has a significant moderate positive relationship with the overall progress students made towards desired outcome of college at $r (50) = 0.37$, $p < 0.01$.
- Course learning is a significant predictor of the overall progress students made towards desired outcome of college, $t (50) = 2.356$, $p = 0.023$
- Motivation is a significant predictor of students' achievement in terms of overall progress students made towards desired outcome of college, $t (50) = 2.050$, $p = 0.046$. This corroborate the findings that motivation is a significant predictor of academic success. (Adesope et al. 2021).
- In sum, faculty should design instruction and assessment in a way that will engender more student engagement with course learning. Students should be encouraged to utilize intrinsic and extrinsic motivation when undertaking an academic task.

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