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Examining The Determinants Of Academic Buoyancy Among Indian Engineering Students

Vani Haridasan[1] , Kavitha Muthukumaran[2] , B. Mahalingam[3] , K. Hariharanath[4] , Dr. S. Bharathi Vasu[5]

ABSTRACT

This study investigates the influence of family background, social and emotional skills, and academic challenges on students' capacity to navigate the high school to college transition with specific context to Indian Engineering Students. The objective is to discern factors affecting academic buoyancy and, importantly, to inform the development of targeted interventions. By identifying key influencers, this research has practical implications for designing interventions that enhance student resilience, fostering long-term academic success and overall well-being during the critical transition period. This study aims to provide actionable insights that can guide educators, policymakers, and support services in implementing effective strategies to support students, ultimately contributing to their positive academic experience and future success.

Keywords*: Academic Buoyancy; Socio-emotional skills; Indian Engineering Students.*

INTRODUCTION

The transition from high school to college represents a pivotal developmental milestone fostering personal growth and behavioural changes. Yet, many college students struggle due to a sense of unfamiliarity in the university setting. This is due to facing unexpected cultural, social, and personal challenges (Perry et.al, 2003). First-year engineering students, especially, deal with issues like social, emotional, and financial difficulties. In higher education, adjusting to this new phase takes time as individuals need to adapt to changes (Brooker et. al,2017). Common challenges include managing time, handling workloads, and meeting academic expectations (Brooker et. al,2017). As students shift from a familiar to an unfamiliar environment, they become aware of the various difficulties they encounter during this transition (Nelavai et.al, 2020). Challenges include making friends, staying focused, getting used to a new place, being independent, dealing with learning difficulties, and adjusting to new courses when starting college.

Students need a healthy emotional balance and a supportive family environment to tackle the challenges of transitioning to college. It is recommended for college students to focus on improving both their mental well-being and academic abilities. This improvement becomes evident in their actions and behavior (Bala et. al,2020). Academic resilience is the capacity to sustain high academic performance even when facing challenges. It involves effectively handling issues, stress, worry, or pressure in life. There is another concept called academic buoyancy, which refers to a student's skill in managing everyday academic challenges such as low[1] grades, tight deadlines, exam pressure, and difficult coursework. It

[1]Associate Professor, SSN School of Management, Sri Sivasubramaniya Nadar College of Engineering, Kalavakkam 603110, India.
[2]Associate Professor, SSN School of Management, Sri Sivasubramaniya Nadar College of Engineering.
[3]Associate Professor, Department of Civil Engineering, Sri Sivasubramaniya Nadar College of Engineering.
[4]Professor, SSN School of Management, Sri Sivasubramaniya Nadar College of Engineering.

is important to distinguish between academic resilience and academic buoyancy. Academic resilience deals with major challenges that only a few students face, while academic buoyancy focuses on how students handle the everyday issues, stress, and difficulties that come with regular academic life (Martin et.al, 2008). To improve academic performance and prepare students for the future, higher education systems need to identify and provide the right support for academic challenges. Academic challenges can be major setbacks like having a learning difficulty, repeating a grade, facing suspension, or failing a subject.

The connection between academic performance and socioeconomic status is considered crucial. With an increasing number of students from diverse backgrounds entering college, understanding how socioeconomic status affects student success is vital. The standing of any person in society is reflected in socioeconomic status, which significantly influences the study of academic achievements(Saleem et. al,2021). It is essential because it impacts each student's performance in school.

Moreover, evaluating students' readiness for college, both academically and emotionally, is crucial. Proficiency in handling people, emotions, tasks, and behaviors is not only essential for well-being but is also integral to academic success, employability, and active community participation (OECD,2022).

In this context, the development of socio-emotional skills becomes paramount. Being adept at managing emotions, dealing with people, and navigating various tasks not only promotes well-being but also enhances a student's ability to face academic challenges resiliently. These skills are instrumental in fostering academic buoyancy, where students can successfully navigate the regular academic difficulties encountered in their daily school lives. Thus, the cultivation of socio-emotional skills is intertwined with achieving academic resilience and buoyancy, ensuring students can thrive academically despite challenges. This study aims to understand how family background, social and emotional skills, and academic difficulties affect the student's ability to handle challenges and stay positive in their studies. The results of this study provide interesting insights on the influencing factors of academic buoyancy which help them manage their academic adversity. It can help them come up with the best ways to support students and prepare them to stay resilient and positive in the long run, leading to success and happiness in whatever they decide to do.

LITERATURE REVIEW

Embarking on the journey from high school to university constitutes a momentous leap for first-year college students, a transition marked by emotions ranging from excitement to anxiety. This transformative shift is not just a mere progression from the known to the unknown but rather a nuanced evolution, shaped by diverse backgrounds, talents, and expectations, as elucidated by scholars such as William Bridges (2011) and their Transition Model. The academic landscape poses a formidable challenge for many first-year students, as highlighted by numerous studies. Managing this emotional complexity becomes imperative to foster meaningful connections and cultivate a sense of belonging during the early stages of their university experience, an insight underlined by the research of various scholars in the field of education psychology.

Expectations, a significant determinant during this transitional phase, influence student success, as articulated in studies by Appleton-Knapp and Krentler (2006) using the Expectancy-Disconfirmation Model. Venturing into independent living away from home, students grapple not only with new social dynamics but also heightened academic responsibilities. The gap between expectations and reality, if not effectively managed, can lead to a disconcerting sense of dissatisfaction, impacting student engagement, academic

[5]Professor, MBA Department, Anand Institute of Higher Technology Kazhipattur 603103, India.

achievement, and overall retention rates, findings consistently emphasized in the works of Byrne(2012), Lowe (2003), Money(2017), and Pather (2019).

Theoretical models such as Bridges' Transition Model and the U-Curve Theory of Adjustment, drawn from organizational literature by Risquez et al.(2008), offer valuable insights into the multifaceted phases that students undergo during this transitional period. These frameworks, derived from meticulous research and observation, guide our understanding of the emotional journey students traverse from fear and confusion to adaptation and renewed commitment during their first year in college life.

Socioeconomic status (SES), underscored by the research of Rothstein (2004), Kahlenberg (2004), and Kalogrides (2013), emerges as a critical determinant shaping a student's experience during this transition. The influence of SES, with its implications on resources, educational access, and support systems, becomes crucial in ensuring an equitable opportunity for success in the collegiate journey, a perspective consistently reinforced in educational research.

The concept of academic buoyancy, identified by scholars like Marsh and Martin (2008), assumes a paramount role in aiding students to navigate common challenges in the academic realm. Diverging from a more resilience-focused approach, academic buoyancy equips students with the ability to handle everyday academic hurdles, leading to positive outcomes such as heightened motivation and overall well-being, insights consistently corroborated by studies by Collie et. al (2015)

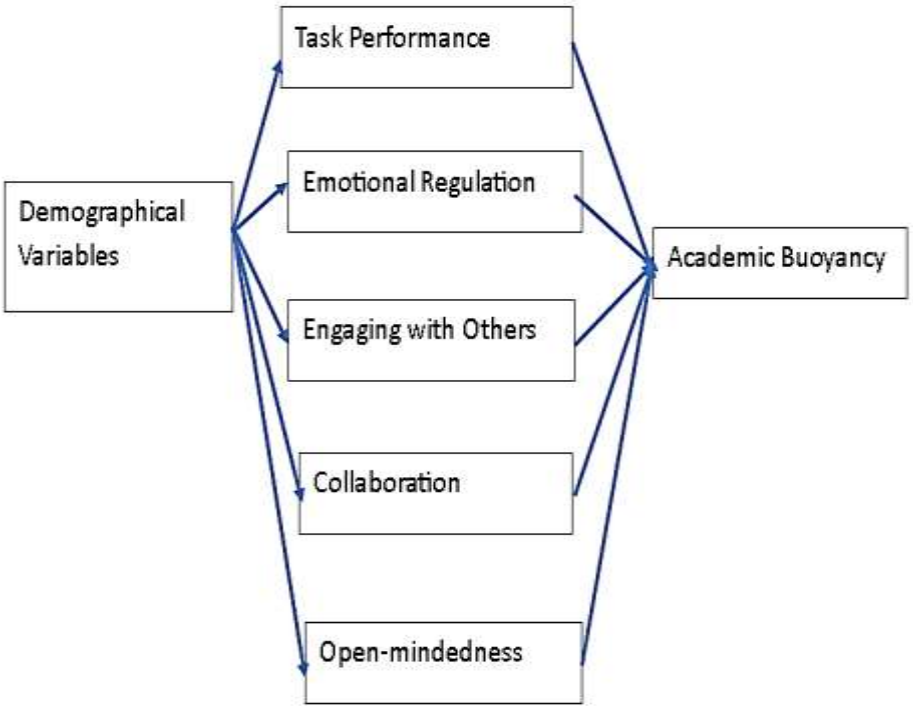
The undeniable significance of social and emotional skills, emphasized by researchers such as Chernyshenko et.al (2001), Kankaraš (2017), Drasgow (2012), Kautz(2014), OECD(2022), and De Fruyt (2015), permeates various dimensions of life outcomes. These skills, integral components of 21st-century and employability skills, equip individuals to contribute meaningfully to society, findings consistently reinforced in an extensive body of literature spanning educational psychology and developmental psychology.

Despite a lot of information about the difficulties faced by first-year college students, there is still a missing piece in understanding how social and emotional skills play a role in helping Indian engineering students handle academic challenges. This gap is noticeable because there has not been enough detailed research from scholars in India. Closing this gap is essential as it can help create specific plans and support systems to make the academic journey smoother and more resilient for Indian engineering students.

RESEARCH QUESTION

How do socio-emotional skills function as critical determinants in cultivating academic buoyancy among first-year Indian engineering students during their transition from high school to university?

PROPOSED CONCEPTUAL MODEL



The proposed conceptual model aims to investigate the correlation between demographic variables and socio-emotional skills among Indian engineering students. This study seeks to identify predictors of academic buoyancy within this context. The model will systematically examine how various demographic factors interact with socio-emotional skills, contributing to the overall understanding of academic buoyancy in the unique setting of Indian engineering education. By exploring these relationships, the research intends to provide insights into the factors that influence academic resilience and emotional well-being among engineering students in India.

RESEARCH METHODOLOGY

Data Collection

The research methodology employed in this study adopts a quantitative approach, encompassing the collection, organization, analysis, and interpretation of numerical data through the application of various statistical techniques. The data was gathered from first-year engineering students, specifically those who were two months into their college experience. These participants are currently undergoing the transitional phase from school to college and represent diverse colleges in and around the Chennai region, India.

A total of 948 students were provided with the questionnaire, from which 854 responses were utilized for analysis after excluding those with missing data. The sampling for the study was based on the Convenience Sampling Method, considering the operational difficulties associated with the process of data capturing. However, by going through this method of sampling it was ensured that all units of population were adequately represented.

Measures

The questionnaire used in this study consists of 15 items on the Social and Emotional skills of the Big Five Model domains and Academic Buoyancy, the construct by Martin and

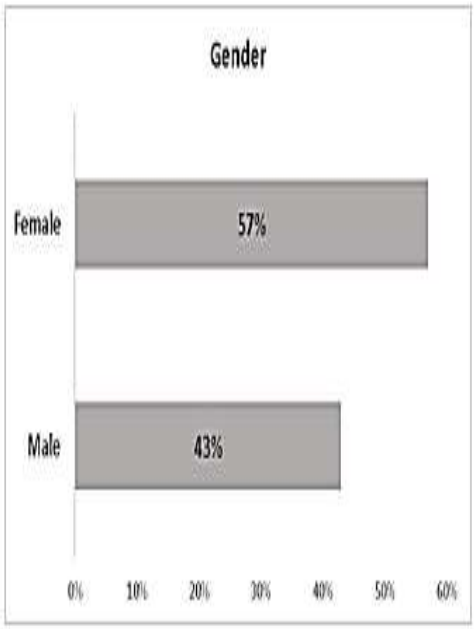
Marsh (2008). All items were measured using 5-point Likert scales. The five broad dimensions that refer to different sets of behaviors, thoughts, and feelings are as follows:

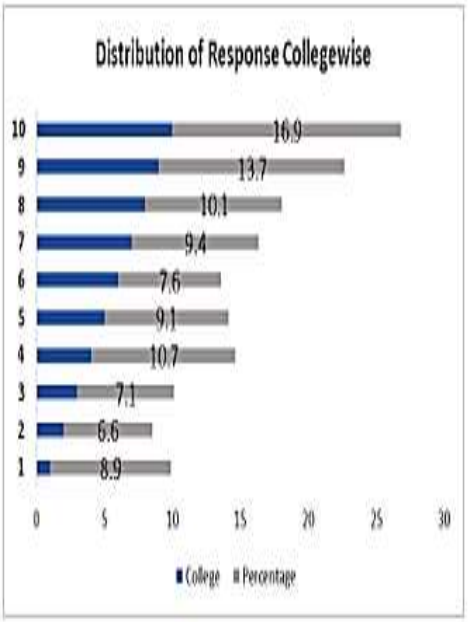
- Task Performance refers to individuals who are self-disciplined and persistent, can stay on task, and tend to be high achievers, especially when it comes to education and work outcomes. The constructs include self-control, responsibility, and persistence.
- Emotional regulation encompasses skills that enable individuals to deal with negative emotional experiences and stressors. Being able to regulate one's emotions is essential for multiple life outcomes and seems to be an especially important predictor of enhanced mental and physical health. The constructs include stress resistance, emotional control, and optimism.
- Engaging with others refers to people who are energetic, positive, and assertive. Engaging with others is critical for leadership and tends to lead to better employment outcomes. The constructs include energy, assertiveness, and sociability.
- Collaboration refers to people who are open to collaboration and can be sympathetic to others and express altruism. The constructs include empathy, cooperation, and trust.
- Open-mindedness is also predictive of educational attainment, which has life-long positive benefits and seems to equip individuals better to deal with life changes. The constructs include curiosity, creativity, and tolerance.

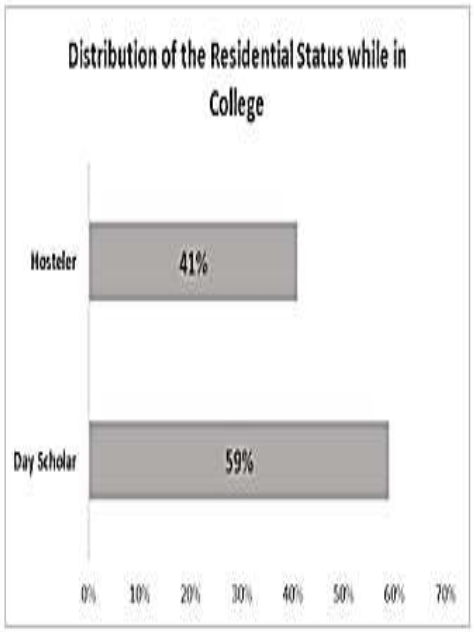
Data Analysis

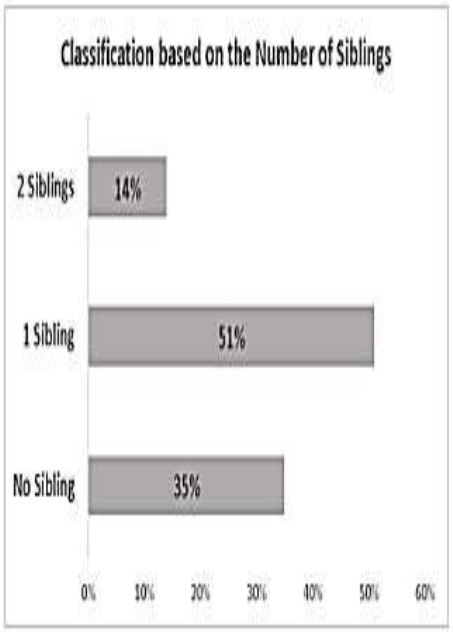
Profile of the Respondents

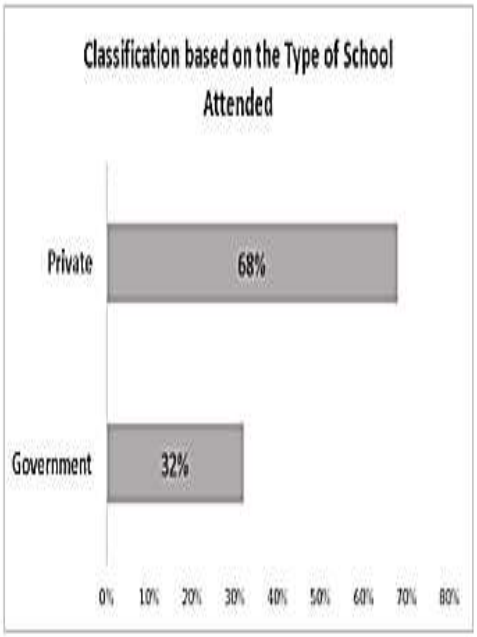
The respondents are classified based on gender, different colleges, the residential status when in college, the number of siblings, the type of school - government or private, the medium of instruction in school, residential status, and economic status. The profile of the respondents is given below.

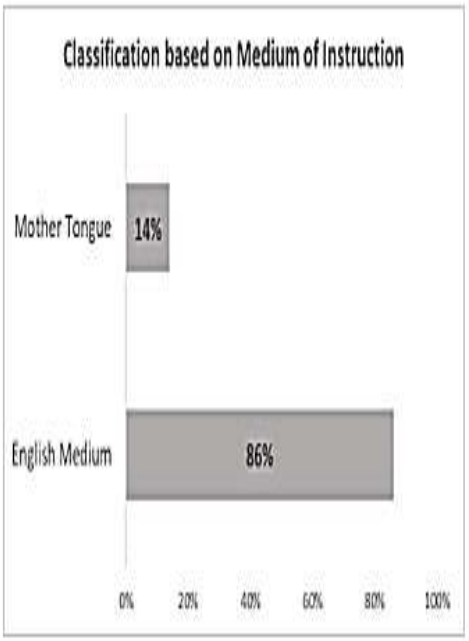

Gender
Female
57%
Male
43%
0%
10%
20%
30%
40%
50%
60%

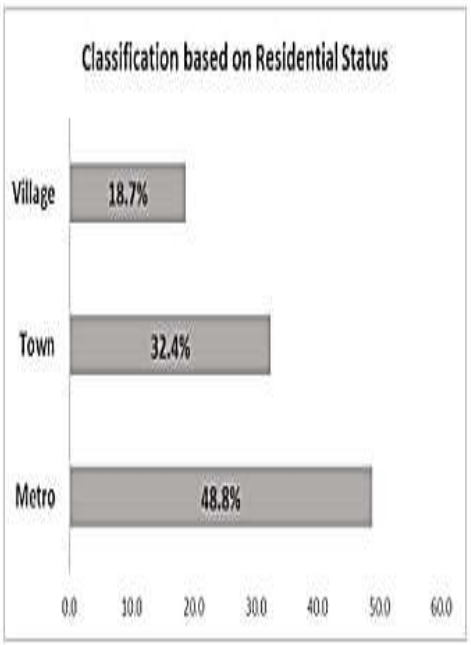

Distribution of Response Collegewise
10
9
8
7
6
5
4
3
2
1
16.9
13.7
10.1
9.4
7.6
9.1
10.7
7.1
6.6
8.9
0
5
10
15
20
25
30
College
Percentage

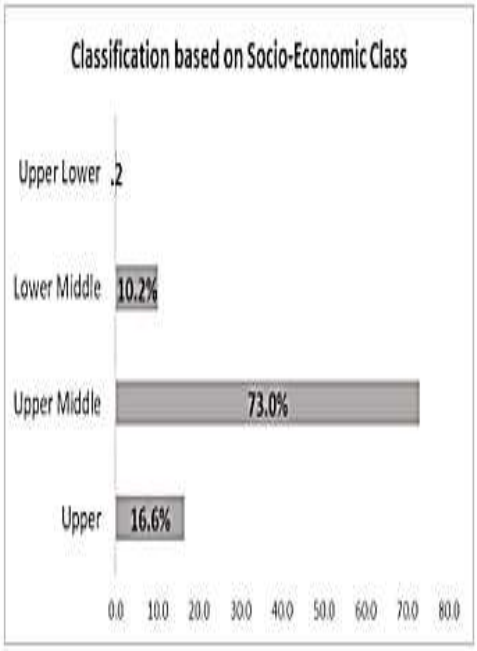

Distribution of the Residential Status while in College
Hosteler
41%
Day Scholar
59%
0%
10%
20%
30%
40%
50%
60%
70%


Classification based on the Number of Siblings
2 Siblings
14%
1 Sibling
51%
No Sibling
35%
0%
10%
20%
30%
40%
50%
60%









The demographic profile reveals that 57% are female students, 59% of students are day scholars, 51% of students have 1 sibling, 68% of students have attended private schools, 86% of students are from English medium schools, 48% of students are from metropolitan areas and 73% students are from the upper middle class in the socio-economic status.

Test of Reliability

Social and emotional skills are crucial for individual success and social interactions. These skills include behaviors, internal states, task approaches, and the ability to manage feelings and behavior. They are vital for the development of children and adolescents and, when combined with academic and cognitive skills, form a well-rounded set essential for success

in both school and later life. To assess these skills, statements about students' emotions, attitudes, and behaviors are used on a 5-point Likert scale from 'strongly disagree' to 'strongly agree.' This approach aims to capture valuable insights into students' emotional intelligence and interpersonal competencies.

In this analysis, Cronbach's alpha is used to test the reliability of the interval-scaled variables. The internal consistency of measures is an indication of the homogeneity of the items that measure the same construct (Sekaran, 2003). From the Cronbach alpha's standpoint, the closer the coefficient alpha is to 1.0, the higher the internal consistency reliability (Cronbach, 1951). In general, the cut-off of reliability Cronbach alpha is 0.6 (Nunnally 1978). The results showed all alpha coefficients ranged from 0.878 to 0.974 indicating good consistency among the items within each dimension.

Variables	**Constructs**	**No. of Items**	**Cronbach's Alpha**
Collaboration	Empathy	6	0.984
	Trust	5	0.923
	Cooperation	7	0.971
Emotional Regulation	Emotional Control	6	0.904
	Optimism	6	0.941
	Stress Resistance	5	0.878
Engaging with Others	Assertiveness	6	0.945
	Energy	6	0.917
	Sociability	6	0.966
Open-mindedness	Creativity	6	0.974
	Curiosity	5	0.948
	Tolerance	7	0.970
Task Performance	Persistence	7	0.962
	Responsibility	6	0.914
	Self- Control	5	0.931

The Cronbach's Alpha for Academic Buoyancy is given below:

	Construct	**No. of Items**	**Cronbach's Alpha**
	Academic Buoyancy	4	0.884

Factor Analysis

After establishing the reliability for the constructs, factor analysis was carried out to confirm the factors of socio-emotional skills. Factor analysis is used to identify clusters of intercorrelated variables called factors. To check the factorability, either the values of the correlation matrix should be greater than 0.3; values on anti-image correlation diagonals should be greater than 0.5 or Measures of Sampling Adequacy – Bartletts, significant and KMO should be greater than 0.6. In this study, Factor analysis using Principal Component Analysis with Varimax rotation was carried out.

The appropriateness of factor analysis is done by examining sampling adequacy through Kaiser- Meyer-Olkin (KMO) statistics. A KMO value of greater than 0.6 can be considered adequate. (Kaiser and Rice, 1974)

- When it comes to collaboration, three factors Empathy, Trust, and Cooperation were extracted with a KMO of 0.906 and the variance explained was 85.09%.
- Emotional Regulation is about how we handle our feelings. Three factors were extracted - Emotional Control, Optimism, and Stress Resistance with a KMO of 0.833 and the variance explained was 72.46%
- Engaging with Others is all about how we connect with people. Three important factors -Assertiveness, Energy, and Sociability were extracted with a KMO of 0.857 explaining 79.47% of why we get along with others.
- Open-mindedness, being open to new ideas, has three factors- Creativity, Curiosity, and Tolerance. The KMO value is 0.899) explaining 86.81% of why being open-minded matters.
- For doing tasks well, three factors emerged -Persistence, Responsibility, and Self-Control with a KMO of 0.847 explaining 78.56% of why some people are good at getting things done.

Test of Association

Association between College and their previous School

To examine the potential association between the college where students are currently pursuing their studies and the school they previously attended, a chi-square test was conducted. The results indicate a statistically significant association between the current college and the school attended in the past.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	31.109[a]	9	.000
Likelihood Ratio	28.707	9	.001
Linear-by-Linear Association	4.142	1	.042
N of Valid Cases	854		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 18.16.

The Chi-Square statistic is 31.109 at p<=0.05.

Association between the Current College and Socio-Economic Status

The potential association between the college where students are currently pursuing their studies and their socio-economic status using the chi-square test. The results indicate a statistically significant association between the current college and socioeconomic status.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	218.756[a]	171	.008
Likelihood Ratio	234.796	171	.001
Linear-by-Linear Association	.033	1	.855
N of Valid Cases	854		

a. 129 cells (64.5%) have expected count less than 5. The minimum expected count is .13.

Since the p-value is less than .0.05 we reject the null hypothesis and conclude that there is an association between the current college and the economic status.

Association between the number of siblings of the student and the type of school that the student attended

The Chi-Square test between the number of students and the type of school attended by the student reveals that there is a significant association between the number of siblings and the type of school attended - government or private school.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.389[a]	2	.015
Likelihood Ratio	8.336	2	.015
Linear-by-Linear Association	3.839	1	.050
N of Valid Cases	854		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 38.92.

ANOVA Test

College and Stress Resistance

The analysis of variance (ANOVA) yielded a statistically significant difference among students from different colleges concerning their stress resistance levels. This finding implies that there are meaningful variations in stress resistance capabilities across the various college groups under investigation.

ANOVA

StressRes

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	21.937	9	2.437	2.475	.009
Within Groups	831.063	844	.985		
Total	853.000	853			

College and Tolerance

The analysis of variance (ANOVA) indicates a statistically significant difference in the tolerance levels of students across various colleges. This finding suggests that there are noteworthy variations in the tolerance levels among students attending different colleges.

ANOVA

Tolerance

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	17.714	9	1.968	1.989	.038
Within Groups	835.286	844	.990		
Total	853.000	853			

Medium of Instruction and Creativity

The analysis of variance (ANOVA) reveals a statistically significant difference in the creativity levels of students based on the medium of instruction in their schools. This finding indicates that there are meaningful variations in the creativity levels among students exposed to different mediums of instruction.

ANOVA

Creativity

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.343	1	4.343	4.360	.037
Within Groups	848.657	852	.996		
Total	853.000	853			

Regression Analysis

In Linear Regression analysis, the focus was on identifying the factors that could predict or influence Academic Buoyancy among college students. The independent variables chosen for this investigation were drawn from the realm of socio-emotional skills. Socio-emotional skills encompass a range of competencies related to understanding and managing emotions, building positive relationships, and effectively navigating social situations.

The rationale behind selecting socio-emotional skills as independent variables stems from the acknowledgment that these skills contribute significantly to the overall well-being and academic success of the student. The ability to regulate emotions, establish positive relationships, and effectively communicate plays a pivotal role in how students approach and overcome academic challenges. By using socio-emotional skills as predictors in the Linear Regression model, the goal was to examine the extent to which these factors could shed light on the variance in Academic Buoyancy among college students.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.529[a]	.280	.267	.85602701

The R-value indicates the strength of the relation between the dependent variable and independent variables. R Square values measure the percentage of the total variance of the dependent variable about its mean that is "explained" or "accounted for" by the independent variable.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.713E-18	.029		.000	1.000
	Cooperation	.204	.198	.204	1.029	.304
	Empathy	.040	.033	.040	1.220	.223
	Trust	.152	.033	.152	4.599	.000
	Optimism	-.172	.258	-.172	-.667	.505
	EmotionalControl	.672	.073	.672	9.197	.000
	StressRes	-.156	.033	-.156	-4.789	.000
	Sociability	.032	.034	.032	.931	.352
	Assertiveness	.532	.268	.532	1.984	.048
	Energy	.006	.032	.006	.173	.863
	Tolerance	.029	.034	.029	.844	.399
	Creativity	.036	.031	.036	1.129	.259
	Curiosity	.228	.033	.228	6.976	.000
	TaPPER	-.038	.198	-.038	-.192	.848
	TaPRES	-.507	.073	-.507	-6.970	.000
	TaPSEL	-.292	.255	-.292	-1.145	.253

a. Dependent Variable: AcadBuoyancy

The regression analysis gives the predictors of academic buoyancy. In summary, Trust, Emotional Control, Stress Resistance, Assertiveness, Curiosity, and Responsibility are the influencing factors of academic buoyancy. But of these stress resistance and responsibility are negatively correlated.

DISCUSSION

The transition from high school to university is a pivotal phase for students, particularly for first-year Indian engineering students who face new academic challenges and a shift in their learning environment. This study delves into the intricate connection between specific socio-emotional skills and the cultivation of academic buoyancy during this critical transition period.

The identified socio-emotional skills, such as trust, assertiveness, emotional control, and curiosity are deemed critical determinants in shaping academic buoyancy among first-year Indian engineering students.

- Trust is crucial in fostering positive relationships, collaboration, and a supportive learning environment. Building trust with peers, faculty, and oneself can contribute to a sense of security and confidence, which are integral components of academic buoyancy.
- Assertiveness empowers students to express their needs, opinions, and concerns effectively. In the academic context, being assertive can aid in seeking help when needed, engaging in collaborative projects, and navigating academic challenges with confidence, all of which contribute to academic buoyancy.
- Emotional control involves the ability to manage and regulate emotions in various situations. For first-year students facing the rigors of university life, emotional control is vital in handling stress, setbacks, and the pressures of academic expectations. This skill supports resilience and contributes to the overall academic buoyancy.
- Curiosity is the driving force behind a student's desire to explore and learn. First-year students who approach their academic journey with curiosity are more likely to adapt to new challenges, seek innovative solutions, and maintain a positive attitude toward learning, aligning with the characteristics of academic buoyancy.

The intricate connection between these socio-emotional skills and academic buoyancy is reflected in how they collectively influence a student's ability to thrive academically. For example, a high level of emotional intelligence may lead to effective problem-solving, while resilience contributes to the perseverance needed during academic difficulties. The study explores how the expression of academic buoyancy, characterized by resilience, optimism, and adaptability, is directly influenced by these socio-emotional skills. This relationship, in turn, has profound implications for the overall well-being of Indian engineering students during the demanding transition. Students equipped with strong socio-emotional skills not only navigate academic challenges more successfully but also experience enhanced emotional well-being and a positive outlook. The study underscores the interconnectedness of academic buoyancy and well-being, emphasizing the importance of fostering these skills to support students holistically.

CONCLUSION

In conclusion, the investigation into the determinants of academic buoyancy among first-year Indian engineering students has shed light on the critical role played by socio-emotional skills. Trust, assertiveness, emotional control, and curiosity have emerged as key factors influencing the students' ability to navigate the challenging transition from high school to university successfully. Resilience allows students to bounce back from setbacks, adapt to new academic demands, and persist in the face of challenges. The intricate connection between these socio-emotional skills and academic buoyancy is evident in the findings, showcasing how trust fosters positive relationships, assertiveness empowers effective communication, emotional control supports resilience, and curiosity fuels a proactive approach to learning. Together, these skills form a robust foundation for academic

buoyancy, enabling students not only to adapt but also to thrive in their academic pursuits. As this study contributes to the growing body of knowledge on student well-being and success, it highlights the importance of recognizing and nurturing socio-emotional skills within the academic setting. The implications extend beyond the immediate academic context, with the potential to positively impact the overall well-being and lifelong success of Indian engineering students. In moving forward, educators, administrators, and policymakers may consider integrating targeted interventions and support programs that focus on enhancing these socio-emotional skills. By doing so, we can contribute not only to the academic success of first-year students but also to their holistic development as resilient, emotionally intelligent individuals capable of meeting the challenges of university life and beyond.

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