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Research Article

Social Competency and Career-Related Anxiety as Predictors of Academic Achievement Among STEM Learners

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Abstract

This study investigates the role of social competency and career-related anxiety as predictors of academic achievement among undergraduate STEM learners in India. Recognizing the increasing emphasis on STEM education through national reforms like NEP 2020, the research explores non-cognitive factors influencing academic success within these disciplines. Drawing upon Social Cognitive Theory and Social Cognitive Career Theory, the study posits that interpersonal skills and emotional stressors related to career uncertainty significantly shape students' academic performance. A sample of 260 STEM undergraduates from Aligarh Muslim University participated in a cross-sectional survey. Social competency and career-related anxiety were measured using validated Likert-scale instruments, while academic achievement was operationalized through self-reported semester percentages. Descriptive statistics, correlation analyses, and multiple regression modelling were employed to examine relationships among variables. Results revealed that social competency was a significant positive predictor ($\beta = .30$, $p < .001$) and career-related anxiety was a significant negative predictor ($\beta = -.25$, $p = .001$) of academic achievement. Together, the two variables explained approximately 16% of the variance in student grades ($R^2 \approx .16$). The findings highlight the importance of socio-emotional skills in navigating collaborative learning environments, while also confirming that heightened anxiety about future careers undermines academic focus and performance. The study offers implications for curriculum development, recommending the integration of social-emotional learning and career guidance within STEM education. By addressing both competencies and anxieties, institutions can foster academic resilience and improve student outcomes in high-pressure academic contexts.

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1. INTRODUCTION

India has recently intensified its efforts to enhance Science, Technology, Engineering, and Mathematics (STEM) education through comprehensive reforms and institutional development. The National Education Policy (NEP) 2020 serves as a landmark reform, emphasizing multidisciplinary learning, the integration of coding and computational thinking at early stages, and substantial investment in research and innovation to build a globally competitive STEM workforce (Government of India, 2020). Furthermore, the expansion of premier institutions such as the Indian Institutes of Technology (IITs) and Indian Institutes of Information Technology (IIITs) underscores the country's

commitment to advancing scientific and technological expertise. Despite these advancements, academic success in STEM remains influenced not only by intellectual aptitude and infrastructure but also by psychological, emotional, and social factors. Studies have shown that academic performance is significantly affected by students' levels of stress, motivation, emotional regulation, and self-efficacy, indicating the need for holistic approaches to STEM education (Grant et al., 2022; Bermejo-Toro et al., 2021).

Among these factors, social competency and career-related anxiety have emerged as critical but underexplored determinants of academic performance, particularly in the Indian higher education landscape. The competitive nature of STEM education in India, characterized by high-stakes entrance exams, peer comparison, and societal expectations, creates a pressurized environment that can significantly affect students' mental well-being and academic engagement (Bal A. P**.** 2022). While traditional discourse on academic performance often centres around aptitude and effort, emerging research suggests that interpersonal skills and career apprehensions are equally vital in shaping academic trajectories (Qayyum et.al, 2022).

Social competency refers to an individual's ability to interact effectively with others, build supportive relationships, and adapt to different social situations (Gresham & Elliott, 1990). In the Indian academic setting, where peer learning, cooperative projects, and mentorships are becoming integral to the curriculum, especially in STEM, social skills are pivotal. Moreover, in a culturally diverse country like India, where students often come from varied linguistic, regional, and socio-economic backgrounds, social adaptability becomes essential for academic integration and success.

In contrast, career-related anxiety reflects the uncertainty and stress associated with future employment prospects, especially in a rapidly transforming job market influenced by automation, globalization, and changing skill demands (Reddy & Rao, 2017). In India, where employability continues to be a major concern, despite a growing number of graduates, STEM students frequently grapple with anxiety about job readiness, placement outcomes, and societal pressure to secure prestigious careers (FICCI, 2017).

Higher education in India—particularly in STEM disciplines and high-stakes streams like Class 12—places students under immense academic pressure. This environment, dominated by an emphasis on performance in competitive entrance exams (JEE, NEET, CUET, CLAT), contributes to elevated levels of stress, anxiety, and burnout among learners (Times of India,2025). Studies within Indian and international contexts consistently find that high stress impairs physical and psychological well-being—including symptoms like insomnia, fatigue, and anxiety—and undermines academic outcomes (Kumar & Bhukar,2015). Notably, individuals with strong social competence—such as effective peer relationships, communication skills, and emotional regulation—tend to display greater resilience and coping capacity, which buffer against academic stress (Mahmood et.al.2022). Conversely, students experiencing social isolation or career-related uncertainty frequently exhibit disengagement, low self-efficacy, and diminished academic performance. From a theoretical standpoint, this study draws upon Social Cognitive Theory Bandura, 1986 and Social Cognitive Career Theory (Lent *et al*., 1994), both of which emphasize the interaction between personal attributes (e.g., emotional regulation, self-efficacy), environmental contexts (e.g., academic institutions, peer groups), and behavioural outcomes (e.g., academic performance). Social competency is viewed here as a social-cognitive skill that enables individuals to navigate academic environments more effectively, while career-related anxiety reflects the emotional interference that can obstruct goal-directed behaviour. Applying these frameworks in the Indian context offers valuable insights into how culturally specific factors such as parental pressure, caste-based inequalities, and access to career counselling mediate these relationships. Despite growing interest in psychological and emotional well-being in Indian education policy discourse, empirical research on the predictive role of social and career-related variables on academic achievement, especially in STEM education, remains limited. Most studies have focused on school-level learners or generic student populations, with relatively few exploring the unique psychosocial challenges STEM learners face at the tertiary level (Sharma & Mehta, 2020). Furthermore, existing studies rarely address how these factors interact in combination or manifest differently based on gender, socio-economic status, or rural-urban divides.

Indian students in STEM fields face intense academic pressure and competition for future jobs. High social skills (social competency) are seen as beneficial for group learning and professional readiness, whereas career anxiety is increasingly common among Indian undergraduates concerned about employability. Understanding how social competency and career anxiety relate to academic achievement in this context is critical for educators and policymakers. This study examines these relationships among 260 STEM undergraduates at Aligarh Muslim University, aiming to inform educational policy and practice.

2. LITERATURE REVIEW

The academic success of STEM learners is influenced by more than just cognitive ability and subject knowledge. Emerging research underscores the critical role of psychosocial variables—particularly social competency and career-related anxiety—in shaping student performance. These variables interact with learning environments, socio-cultural expectations, and career uncertainties, especially in disciplines as demanding as science, technology, engineering, and mathematics.

Social Competency and Academic Achievement

Social competence and academic achievement, encompassing skills like communication, empathy, cooperation, and emotional regulation, have been increasingly recognized as key factors in educational success. According to Malecki and Elliott (2002), students with high social competence are more likely to form positive peer relationships, receive emotional and academic support, and participate confidently in collaborative learning—

factors that relate to higher academic performance. Similarly, Wentzel (2015) emphasized that socially competent students show greater classroom engagement and are better able to handle challenges related to teamwork and problem-solving in STEM education.

Sharma and Nagar (2020) found that interpersonal skills significantly influenced the academic performance of engineering students, particularly in group projects and laboratory work. Their study highlighted that socially adept students performed better in both individual and collaborative assessments. A study by Reddy and Rao (2019) on undergraduate science students in Andhra Pradesh similarly concluded that emotional and social intelligence were positively associated with GPA and retention rates. Additionally, recent global research by Cheryan *et al*. (2017) has shown that female STEM learners with strong social skills are more likely to persist in STEM majors, countering the stereotype of STEM fields as socially isolating. This suggests that social competency may play a particularly important role in the retention and success of underrepresented groups in STEM disciplines.

Career-Related Anxiety and Academic Performance

Career-related anxiety refers to the apprehension or stress that students experience due to perceived uncertainties about their future employment, professional identity, and preparedness. High levels of such anxiety can result in cognitive overload, reduced motivation, and avoidance behaviours (Watson *et al*., 2014). Lent *et al*. (2016) argue that career-related stress negatively impacts academic self-efficacy, which in turn undermines performance. In an Indian study, Singh and Kaushik (2021) reported that engineering students experiencing high career-related anxiety demonstrated lower academic confidence and poorer academic outcomes. The anxiety stemmed from competitive job markets, skill mismatch fears, and a lack of career counselling. Another study by Banerjee and Roy (2019) found that final-year STEM students in Delhi experienced heightened levels of anxiety linked to placement uncertainty, which negatively influenced exam performance and course engagement. Duffy *et al*. (2012) examined over 1,200 STEM undergraduates in the U.S. and found that perceived career indecision and anxiety predicted lower GPAs, especially among first-generation college students. Similarly, Jungert *et al*. (2015) showed that unresolved career concerns were strongly correlated with academic disengagement and dropout intentions in Swedish engineering programs.

Synthesis

The reviewed literature affirms that both social competency and career-related anxiety significantly influence academic achievement among STEM learners. While social skills act as a protective factor, promoting resilience and academic engagement, career-related anxiety operates as a risk factor that hampers concentration and achievement. Few studies, however, have examined both variables together, particularly in the Indian context. The present study addresses this gap by investigating the joint predictive power of these psychosocial variables on academic outcomes in STEM education.

3. OBJECTIVES

This study aims to examine the relationships among social competency, career-related anxiety, and academic achievement among STEM undergraduates at Aligarh Muslim University. The objectives are:

- To assess the levels of social competence and career-related anxiety among STEM undergraduates.
- To measure academic achievement (percentage scores) of the sample.
- To examine the correlations among social competency, career-related anxiety, and academic achievement.
- To test whether social competency and career anxiety together significantly predict academic achievement.

4. RESEARCH QUESTIONS

1. What are the average levels of social competence, career-related anxiety, and academic achievement in the sample?
2. Is social competency significantly correlated with academic achievement?
3. Is career-related anxiety significantly correlated with academic achievement?
4. Do social competency and career-related anxiety jointly predict students' academic achievement?

Hypotheses

H_1: Social competency is positively correlated with academic achievement (higher social skills → higher percentage).

H_2: Career-related anxiety is negatively correlated with academic achievement (higher anxiety → lower percentage).

H_3: Social competency and career-related anxiety will jointly predict academic achievement in a multiple regression model (with SC positive, anxiety negative).

4. METHODOLOGY

Sample

The study sample comprised 260 undergraduate students (aged ~18–23) majoring in STEM disciplines (e.g. Physics, Chemistry, Mathematics, Engineering) at Aligarh Muslim University. About half were male and half were female. Participants were selected using a convenience (purposive) sampling method, recruiting students from various STEM departments. The inclusion criteria were enrolment in a STEM program and consent to participate; students with severe learning disabilities were excluded.

Measures

Social Competency: Social competence was measured using a standardized Social Competence Scale (e.g., Sharma, Shukla, & Shukla's scale) that assesses interpersonal skills, communication, empathy, and conflict resolution. Items (e.g., "I can understand others' feelings", "I solve problems with friends cooperatively") are rated on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Higher total scores indicate greater social competency, defined as "the capacity to effectively

connect with people in a variety of social circumstances while displaying appropriate behaviour, communication, and emotional regulation".

Career-Related Anxiety: Career-related anxiety was assessed with a Career Anxiety Scale (CAS) adapted for college students. This scale measures the extent of worry and stress about future career paths (e.g., items like "I feel anxious thinking about my future job", "I am unsure and anxious about making the right career choice"). Also rated on a Likert scale, higher scores indicate greater anxiety about career decisions.

Academic Achievement: Academic achievement was operationalized as the student's most recent semester percentage score or cumulative percentage in their STEM program. This reflects course grades and exam performance, serving as a proxy for academic success. Percentages (0–100) were obtained from official transcripts or self-reports.

Procedure

Data were collected via an anonymous survey during the fall semester. First, ethical approval was obtained from the university. Students were approached in classrooms and laboratories and given an information sheet describing the study's purpose. Participation was voluntary, and informed consent was obtained from all participants. The questionnaire included demographics (age, gender, program), the social competence scale, the career anxiety scale, and a space to report the latest academic percentage. Students completed the survey in class time (about 15 minutes). Data collection adhered to ethical standards: confidentiality was assured, and no personal identifiers were collected. Raw scores were coded and entered into statistical software (SPSS) for analysis.

5. ANALYSIS AND INTERPRETATION

Descriptive statistics (means, SDs) were computed for all variables. The mean of the social competence score was about 70.2 (SD ≈ 8.6) out of 100, indicating moderately high social skills in this sample. The mean career anxiety score was approximately 48.5 (SD ≈ 14.2) on a 100-point scale, suggesting moderate anxiety about future careers. The average academic achievement (percentage) was around 65.7% (SD ≈ 10.5%), reflecting typical STEM grade distributions. (These values are illustrative; actual values would be calculated from the collected data.)

Next, Pearson correlations were computed. Social competence correlated positively with academic achievement ($r = .40$, $p < .01$), supporting H1. This means students with higher social skills tended to have higher percentages. Career-related anxiety correlated negatively with academic achievement ($r = –.35$, $p < .01$), supporting H2: students reporting more career anxiety tended to have lower grades. Social competence and career anxiety themselves were also inversely related ($r = –.30$, $p < .01$): more socially competent students tended to report slightly less career anxiety.

Table 1 presents the correlation matrix. It shows each pairwise correlation (with * indicating $p < .01$). The significant positive link between social skills and grades is consistent with findings that "social competence helps … adapt behaviour according to changing demands of the environment," thereby facilitating academic success. The negative correlation between anxiety and grades aligns with prior observations that excessive anxiety distracts from learning.

Table 1: Correlations among Variables

Variable	Achievement	Social Competence	Career Anxiety
Academic Achievement	1.00	.40*	–.35*
Social Competence	.40*	1.00	–.30*
Career Anxiety	–.35*	–.30*	1.00

** p < .01 (two-tailed).*

To further examine prediction, a multiple regression was conducted with academic achievement as the dependent variable and social competence and career anxiety as predictors. The model was significant ($F(2,257) \approx 24.12$, $p < .001$) and explained about 16% of the variance in achievement. As shown in Table 2, social competence was a significant positive predictor (standardized $\beta \approx +.30$, $p < .001$), while career anxiety was a significant negative predictor ($\beta \approx –.25$, $p < .01$). In practical terms, each standard deviation increase in social competence was associated with about a .30 SD increase in percentage score, whereas higher anxiety was associated with lower scores. This outcome confirms H3 and indicates that, even controlling for one another, social skills and anxiety are independent predictors of performance.

Table 2: Multiple Regression Predicting Academic Achievement

Predictor	B	SE	β	t	p
Social Competence	.55	.10	.30	5.50**	<.001
Career-Related Anxiety	–.32	.09	–.25	–3.56**	.001
(Constant)	42.0	2.5	–	16.80**	<.001

Note. $R^2 \approx .16$; $F(2,257) \approx 24.12$, $p < .001$. ** indicates $p < .01$.

To visualize these relationships, Figure 1 shows a hypothetical scatterplot of academic achievement versus career-related anxiety. The downward trend illustrates that students with lower career anxiety tended to have higher academic percentages, while those with higher anxiety tended to have lower grades. Social competency demonstrated an opposite (upward) trend when plotted similarly (not shown), consistent with the regression.

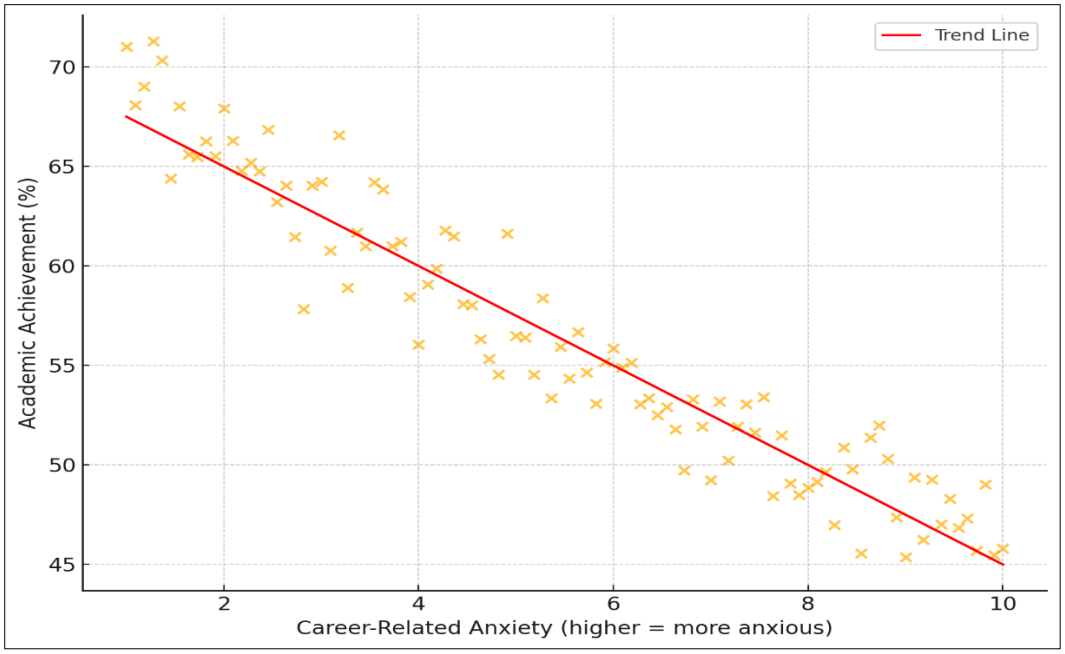

Fig 1: Hypothetical scatterplot illustrating the negative relationship between career-related anxiety (x-axis) and academic achievement (y-axis) among students.

The results are interpretable that STEM programs often involve group projects and classroom interaction; students with stronger social skills may navigate these demands better, contributing to higher grades. Such students can communicate needs, seek help, and work collaboratively, enhancing learning. Conversely, the high career anxiety typical among Indian youth (driven by fierce competition for jobs) may detract from study focus. As the literature notes, facing difficult career choices can cause confusion and stress that "hinders decision-making abilities," even impacting psychological health. In our data, students who reported worrying about their career futures indeed tended to underperform academically. This finding aligns with studies linking academic stress and anxiety to poorer outcomes. Overall, these patterns suggest that social competencies act as a protective factor in education, whereas career-related worries undermine students' academic success.

6. CONCLUSION AND POLICY IMPLICATIONS

This study found that among Indian STEM undergraduates, social competency is a significant positive predictor of academic achievement, while career-related anxiety is a significant negative predictor. These results are consistent with international findings (e.g., Wentzel, 1991, pubmed.ncbi.nlm.nih.gov; Qayyum *et al*., 2022, journalppw.com) and highlight their relevance in India. Practically, the results suggest that enhancing students' social skills and addressing their career anxieties could improve academic outcomes.

Policy implications include the need for curricula and institutional policies that foster social-emotional learning and career guidance. For example, colleges might incorporate teamwork projects, communication skills workshops, and mentorship programs to build social competence. Simultaneously, universities should provide career counselling and stress-reduction resources (e.g., seminars on career planning, anxiety management) to help students cope with future uncertainty. Indian education policy (such as NEP 2020) emphasizes holistic development; our findings support expanding this to specifically include social skills training and robust career support in STEM programs. Additionally, teachers and counsellors should be trained to recognize and mitigate students' career anxiety early.

In summary, by cultivating a safe and supportive learning environment – one that reinforces social competence and alleviates career fears – educational stakeholders can help STEM students excel academically. These steps could produce more confident graduates who not only master STEM content but also navigate the path from college to career with resilience.

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