



*Journal of International Students*  
Volume 16, Issue 1 (2026), pp. 23-44  
ISSN: 2162-3104 (Print), 2166-3750 (Online)  
jistudents.org  
<https://doi.org/10.32674/a0jwtt34>



## Examining Cognitive and Metacognitive Predictors of the Self-efficacy and Motivation of Undergraduate Students at a Research-Intensive University in the UAE

Sami Mejri

*Khalifa University of Science and Technology, UAE*  
Orcid ID 0000-0002-6184-6208

Mr. Abdussabur Muhammad

*Khalifa University of Science and Technology, UAE*

Hala Abdulrazzaq

*Khalifa University of Science and Technology, UAE*

**ABSTRACT:** *The Motivated Strategies for Learning Questionnaire (MSLQ) was used. This study examined the relationships among the cognitive, metacognitive, and affective domains, their predictive value for self-efficacy, and their impact on academic motivation and performance among 363 students at Khalifa University. The results revealed a strong positive correlation between self-efficacy and motivation ( $r(361) = .893, p < .001$ ) and a moderate positive correlation between cognitive strategy use and motivation ( $r(361) = .515, p < .001$ ), highlighting the importance of cognitive engagement and self-belief in academic success. Regression analyses revealed that affective strategies, such as emotional regulation and anxiety management, had a small but significant effect on self-efficacy,  $F(1, 361) = 3.97, p = .047$ . Demographic variables, including GPA and academic standing, accounted for approximately 10% of the variance in self-efficacy, with GPA as the strongest predictor. These findings support integrating emotional regulation and strategic learning interventions to increase motivation and resilience in STEM education.*

**Keywords:** Self-efficacy; motivation; cognitive strategies; academic development; research university; higher education; academic success.

Understanding the cognitive and metacognitive predictors of self-efficacy is essential for optimizing student learning and academic success, particularly in higher education. Self-efficacy, or a student's belief in their ability to succeed in academic tasks, significantly influences motivation, persistence, and overall performance (Schunk & DiBenedetto, 2021). While substantial research has explored these factors in Western educational contexts, a gap remains in understanding how students in the Middle East, particularly those in STEM-focused institutions, develop and apply cognitive and metacognitive strategies to enhance their self-efficacy. Addressing this gap is crucial, as self-efficacy directly impacts students' ability to navigate the rigorous demands of STEM disciplines.

Recent studies have highlighted the role of metacognition in shaping self-efficacy and academic achievement in higher education. Halmo et al. (2024) examine how first-year university students use metacognitive regulation and self-coaching strategies to overcome cognitive challenges in problem solving, emphasizing the role of metacognitive monitoring in fostering resilience. Similarly, Meher et al. (2024) investigated the effects of structured metacognitive interventions, such as self-assessment and concept mapping, on students' self-efficacy and demonstrated that targeted metacognitive training enhances learners' confidence in their academic ability. These studies collectively reinforce the importance of metacognitive strategies in developing self-efficacy, particularly in STEM education, where problem-solving and self-regulation are fundamental to success. However, there remains a need to examine these dynamics within the specific academic and cultural context of the Middle East. Khalifa University of Science and Technology (KU) is a premier institution in the United Arab Emirates (UAE) and is known for its dedication to excellence in STEM education, innovation, and research. As one of the leading universities in the region, KU plays a vital role in advancing scientific and technological progress, directly contributing to the national goals outlined in UAE Vision 2030, which emphasize education, the development of human capital, and the strengthening of global competitiveness (UAE Ministry of Education, 2023).

The university maintains a highly competitive admissions process, attracting a diverse pool of students who demonstrate exceptional academic talent, particularly in fields related to engineering, applied sciences, and medical disciplines. Only the most academically accomplished individuals are selected, ensuring that a cohort of students is equipped to thrive in demanding academic environments. KU's curriculum emphasizes critical thinking, problem-solving, and interdisciplinary collaboration, preparing students for leadership roles in research and technological innovation across industries.

Given its focus on developing students' analytical and self-regulatory skills, KU presents an ideal environment to explore how cognitive and metacognitive strategies influence students' self-efficacy. By investigating these factors within the academically rigorous and selective context of KU, this study seeks to offer valuable insights into how students in the UAE, particularly those in STEM fields, utilize these strategies to increase their academic performance and confidence. These insights will help shape teaching strategies, curricular innovations, and

student support programs aimed at fostering academic resilience and success in the university's competitive setting.

To address this issue, the present study explores the cognitive and metacognitive factors influencing self-efficacy among students at Khalifa University of Science and Technology (KU), a leading research institution in the UAE. Given KU's strong emphasis on STEM education and innovation, identifying the learning strategies that contribute to students' academic confidence and problem-solving abilities is essential. The Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1991) provides the theoretical foundation for this research, offering a validated framework for assessing how students regulate their learning, apply cognitive strategies, and engage in metacognitive reflection. Recent studies (Efklides, 2022; Zimmerman & Moylan, 2023) further emphasize the importance of metacognitive monitoring and regulation in promoting academic resilience, particularly in STEM fields, where students must tackle complex problem-solving tasks.

This study focuses on four key dimensions of the MSLQ: motivation, self-efficacy, cognitive strategies, and metacognitive strategies, with a specific emphasis on how cognitive and metacognitive predictors contribute to students' beliefs in their academic capabilities. By analyzing these constructs within the context of Khalifa University, this research aims to provide insights that inform evidence-based teaching strategies, curriculum design, and student support initiatives. These efforts align with Khalifa University's strategic priorities and the UAE Vision 2030, which emphasizes education, human capital development, and global competitiveness (UAE Ministry of Education, 2023).

The findings from this study will help identify critical cognitive and metacognitive processes that enhance students' academic performance and self-efficacy. Additionally, this study offers practical recommendations for improving instructional design and learning interventions in STEM education. By addressing this research gap, this study contributes to the broader discourse on self-efficacy and metacognition in higher education, ensuring that graduates are well prepared to excel in research, industry, and emerging technological fields.

To this end, the study seeks to answer the following research questions:

RQ 1: What is the relationship between self-efficacy and motivation in students?

- RQ 2: Do students with higher levels of cognitive strategy use report higher levels of motivation?
- RQ 3: How do affective strategies (e.g., test anxiety) impact self-efficacy in students?
- RQ 4: To what extent do demographic factors (e.g., gender, GPA, year of study) predict self-efficacy and motivation in students?

## LITERATURE REVIEW

### **Theoretical Foundations**

Self-efficacy, motivation, and cognitive strategies are central constructs in educational psychology and are widely recognized as predictors of academic success. According to Bandura (1997), self-efficacy refers to an individual's belief in their ability to organize and execute the actions required to achieve specific goals. Strong self-efficacy influences goal setting, effort, and persistence and is consistently associated with improved academic outcomes (Zimmerman, 2000). Motivation refers to the internal and external factors that initiate, direct, and sustain goal-directed behavior. Ryan and Deci (2020) distinguish between intrinsic motivation, which arises from internal satisfaction and curiosity, and extrinsic motivation, which is driven by rewards or external recognition. Intrinsic motivation is linked to deeper engagement and long-term learning, whereas extrinsic motivation supports performance in structured environments. Cognitive and metacognitive strategies refer to the processes that learners use to acquire and manage knowledge. Pintrich (2004) explains that these strategies include setting goals, monitoring progress, and evaluating one's learning. They form the basis of self-regulated learning, allowing students to take control of their academic development. Together, these constructs operate as an interactive system in which self-efficacy enhances motivation, motivation drives the use of cognitive strategies, and successful strategy use strengthens self-efficacy.

### **Self-Efficacy and Motivation in GCC Higher Education**

In Gulf Cooperation Council (GCC) countries, self-efficacy plays a critical role in determining students' engagement and persistence in learning. Students with higher self-efficacy are more likely to set challenging goals, remain committed, and recover from setbacks (Al-Harthy et al., 2010). However, GCC learners often face contextual barriers that can inhibit these beliefs. The persistence of teacher-centered pedagogies and rote memorization limits opportunities for mastery experiences and independent problem solving, which are essential for developing self-efficacy (Al-Mahdy & Emam, 2020). In addition, reliance on expatriate teachers can create linguistic and cultural gaps that influence student confidence and academic identity (Al-Kaabi & ElSayary, 2021).

Within the United Arab Emirates (UAE), research indicates that students typically report moderate to high levels of academic self-efficacy, which is positively correlated with their GPA and academic performance. Moussa (2023) reported that stronger self-efficacy beliefs corresponded to higher grades among university students, whereas Ellala et al. (2023) reported significant differences in self-efficacy across achievement levels and genders, with high-achieving students reporting the strongest beliefs. Cevik et al. (2022) reported that clinical training experiences in medical education produced measurable improvements in students' confidence, underscoring the role of authentic, skill-based learning in shaping efficacy beliefs. Research on nontraditional UAE students also supports this link. Benny (2024) reported that self-efficacy mediates the relationship

between grit and well-being, indicating that confidence not only predicts performance but also enhances emotional resilience. These studies collectively suggest that while UAE students generally demonstrate strong self-belief, pedagogical innovation and cultural sensitivity remain important for sustaining and strengthening academic self-efficacy.

### **Cognitive and metacognitive strategies**

Cognitive and metacognitive strategies help students plan, monitor, and regulate their learning behaviors. Pintrich (2000) defines self-regulated learning as an active process in which learners set goals, track progress, and modify strategies in response to feedback. In higher education, these strategies are essential for fostering autonomy, critical thinking, and motivation. Students who use metacognitive strategies such as self-assessment, reflection, and adaptive study methods tend to achieve greater academic performance and exhibit greater persistence.

In GCC educational contexts, empirical findings show mixed levels of cognitive and metacognitive awareness. Al-Kaabi and ElSayary (2021) reported that students often lack metacognitive skills such as self-monitoring and strategic planning due to the absence of explicit instruction in these areas. In contrast, Al-Mahdy and Emam (2020) demonstrated that targeted training in metacognitive strategies significantly improved students' academic outcomes and self-efficacy. These results indicate that instruction focused on reflective learning and strategic thinking is particularly valuable in the GCC, where education systems are transitioning from rote-based to learner-centered approaches. Integrating metacognitive instruction into curricula is especially critical for STEM programs, where students must engage in problem-solving and conceptual reasoning. By learning to evaluate their own understanding, students can develop both the competence and confidence needed to succeed in academically demanding fields.

### **Interplay between Self-Efficacy, Motivation, and Cognitive Strategies**

Research consistently demonstrates that self-efficacy, motivation, and cognitive strategies are interdependent and mutually reinforcing. Students with high self-efficacy tend to be more motivated and more likely to employ effective learning strategies, whereas motivated students use cognitive and metacognitive skills to enhance performance, which in turn strengthens self-efficacy (Zimmerman, 2000). In GCC contexts, this relationship is shaped by cultural and social norms. Al-Shehhi and Al-Najjar (2018) reported that students with higher self-efficacy were more likely to use cognitive strategies, but the relationship was moderated by parental support. The collectivist orientation of GCC societies also plays a role, as external motivation derived from family expectations or social recognition can promote academic engagement but may shift focus from mastery to performance-oriented goals (Al-Kaabi & ElSayary, 2021). Understanding this balance between intrinsic and extrinsic motivators is crucial for developing interventions that enhance both motivation and strategic learning. Studies across the region suggest that when students are given opportunities to engage in self-directed and collaborative learning, their self-efficacy and motivation improve. Project-based

learning, peer mentoring, and feedback-rich environments have all been found to promote both confidence and strategy use, leading to stronger academic outcomes.

### **Research Gap and Rationale for the Study**

Although self-efficacy, motivation, and cognitive strategies have been widely studied in educational psychology, research combining these constructs in the context of higher education in the UAE remains limited, particularly in STEM disciplines. Most prior research on the GCC has examined these factors separately or within primary and secondary education, with few comprehensive studies exploring their combined impact at the university level. Additionally, there is a lack of empirical research on how affective strategies such as emotional regulation and test anxiety management interact with cognitive and motivational processes to predict self-efficacy and academic performance.

This study addresses these gaps by employing the Motivated Strategies for Learning Questionnaire (MSLQ) to examine how the cognitive, metacognitive, and affective domains predict self-efficacy and influence motivation among undergraduate students at Khalifa University. By focusing on the UAE STEM context, this research provides new insights into the psychological and strategic factors that underpin academic confidence and engagement. The findings are expected to contribute to both theory and practice by informing student development programs, curriculum design, and institutional policies that aim to strengthen motivation, emotional regulation, and self-directed learning in higher education across the region.

## **METHOD**

### **Research Design**

This study employs a quantitative, correlational research design to examine the relationships among motivation, self-efficacy, cognitive strategies, and academic achievement among undergraduate students at Khalifa University of Science and Technology. By utilizing the well-validated Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1991), this study aims to investigate the predictive power of these psychological constructs in relation to students' cumulative GPA (CGPA) and course progression.

### **Participants and Sampling**

The study targeted first-year undergraduate students at Khalifa University, given their transition into higher education and exposure to rigorous STEM curricula. A stratified random sampling methodology is employed to guarantee a representative sample of students across various academic backgrounds and disciplines. The survey questionnaire, consisting of four tiers (motivation, self-efficacy, cognitive strategies, and affective strategies) and five demographic questions, was distributed via email to undergraduate students, yielding a final sample of 364 students.

### **Instrumentation**

The primary data collection tool is the Motivated Strategies for Learning Questionnaire (MSLQ), a well-established and psychometrically validated instrument for assessing student motivation and learning strategies. The MSLQ consists of four key dimensions relevant to this study:

- Motivation (7 items) – Measures intrinsic and extrinsic motivation for learning.
- Self-Efficacy (5 items) – Assesses students' beliefs in their ability to succeed academically.
- Cognitive Strategies (8 items) – Evaluates the use of elaboration, organization, and critical thinking skills.
- Affective Strategies (4 items) – Examines the role of emotional regulation in learning.

Each item is rated on a 7-point Likert scale (1 = not at all true of me, 7 = very true of me), allowing for nuanced insights into students' learning behaviors and psychological attributes.

### **Data collection procedure**

The survey was administered online via email and created via Typeform, a user-friendly platform that ensures data security and ease of access for participants. The survey link was distributed through institutional email, accompanied by a brief description of the study's objectives, informed consent details, and confidentiality assurances. The participants were given a two-week window to complete the survey, with reminders sent at the one-week mark to increase response rates.

### **Data analysis**

The data collected were analyzed via IBM SPSS Statistics, a powerful statistical software package for handling large datasets. The following analytical techniques are employed:

- Correlation analysis: Pearson correlation coefficients were computed to explore the relationships among motivation, self-efficacy, cognitive strategies, and CGPA.
- Multiple regression analysis: A stepwise multiple regression model is used to determine the predictive strength of motivation, self-efficacy, and cognitive strategies on academic achievement (CGPA and course progression).
- Mediation Analysis: To examine potential indirect effects, mediation analysis using the PROCESS macro for SPSS (Hayes, 2018) was conducted to assess whether cognitive and affective strategies mediate the relationship between self-efficacy and academic success.

**Ethical considerations**

This study adheres to ethical research standards by securing approval from Khalifa University’s Office of Research Services and Compliance before data collection. The participants provided informed consent, ensuring that they understood the voluntary nature of participation, the confidentiality of their responses, and their right to withdraw at any time without penalty. Data are anonymized and stored securely to protect participants' identities and ensure compliance with ethical research guidelines.

**RESULTS AND FINDINGS**

Khalifa University maintains a strong emphasis on science and engineering, attracting diverse yet highly selective student bodies. Unlike many other institutions, most students enter with a strong academic background, earning merit-based scholarships, as evidenced by the 95.3% scholarship rate.

Table 1: Descriptive Statistics

Category	Total Respondents	Response Rate (%)	Breakdown	Count	Percentage (%)
<b>Nationality</b>	363	100%	UAE National	235	64.8%
			Expat	113	31%
			GCC National	15	4.3%
<b>Housing Situation</b>	363	100%	Living with Family	236	65.1%
			University Housing	127	34.9%
<b>Scholarship Status</b>	363	100%	Scholarship	346	95.3%
			Self-funded	17	4.7%
<b>Academic Standing</b>	363	100%	Freshman (1st Year)	140	38.5%
			Senior (4th Year or Above)	94	26%
			Sophomore (2nd Year)	67	18.5%
			Junior (3rd Year)	62	16.9%

The university's student body is predominantly UAE nationals (64.8%), with significant proportions of expatriates (31%) and GCC nationals (4.3%), reflecting both local and regional talent. Additionally, the distribution across academic standings indicates a steady pipeline of students progressing through rigorous STEM programs, reinforcing Khalifa University's reputation as a premier institution for high-achieving scholars in science and engineering.

To examine the link between self-efficacy and motivation, Pearson's correlation analysis was performed.

*Table 2. Correlation*

**Relationship between motivation and self-efficacy**

<b>Motivation</b>		
Pearson Correlation	1	.893**
Sig. (2-tailed)		< .001
N	363	363
<b>Self-Efficacy</b>		
Pearson Correlation	.893**	1
Sig. (2-tailed)	< .001	
N	363	363
<b>R<sup>2</sup></b>		.797

A Pearson correlation analysis was conducted to examine the relationship between self-efficacy and motivation among the 363 participants. The analysis revealed a strong, positive, and statistically significant correlation,  $r(361) = .893, p < .001$ , indicating that individuals with higher self-efficacy tend to report greater motivation. This correlation was significant at the 0.01 level (two-tailed), suggesting that the probability of this relationship occurring by chance is less than 1%. The large sample size ( $N = 363$ ) enhances the reliability and generalizability of these findings.

To further assess this relationship, a simple linear regression was performed with self-efficacy as the predictor variable. The results demonstrated that self-efficacy significantly predicted motivation,  $\beta = .662, t(361) = 37.61, p < .001$ , accounting for approximately 79.7% of the variance in motivation ( $R^2 = .797$ , adjusted  $R^2 = .796$ ). These findings suggest that self-efficacy is a strong predictor of motivation, although not perfectly so, addressing prior issues of multicollinearity and inflated model fit.

Consistent with Bandura's (1997) social cognitive theory, these findings emphasize the role of self-belief in shaping motivation. Individuals who perceive themselves as capable are more likely to engage persistently in learning and goal-oriented tasks. While the relationship is strong, causation cannot be inferred from

correlational data. Future research should explore mediating or moderating variables (e.g., resilience and goal orientation) and employ longitudinal or experimental designs to clarify the causal mechanisms underlying this association.

Pearson's correlational analysis was also conducted to determine the potential relationship between students' cognitive strategies and their motivations.

Table 3. Correlations

---

	Motivation (Ave)	Cognitive Strategy (Ave)
<b>Motivation (Ave)</b>		
Pearson Correlation	1.000	.515**
Sig. (2-tailed)		< .001
N	363	363
<b>Cognitive Strategy (Ave)</b>		
Pearson Correlation	.515**	1.000
Sig. (2-tailed)	< .001	
N	363	363
<b>R<sup>2</sup></b>		.265

---

\*\* . Correlation is significant at the 0.01 level (2-tailed).

---

A Pearson correlation analysis was conducted to examine the relationship between motivation and cognitive strategy use among the 363 participants. The results revealed a moderate, positive, and statistically significant correlation,  $r(361) = .515, p < .001$ , indicating that students who make greater use of cognitive learning strategies also tend to report higher levels of motivation. The correlation was significant at the 0.01 level (two-tailed), suggesting that this relationship is highly unlikely to have occurred by chance.

The coefficient of determination ( $R^2 = .265$ ) indicates that approximately 26.5% of the variance in motivation is explained by cognitive strategy use. This finding represents a meaningful but realistic level of association, which is strong enough to support theoretical expectations without implying redundancy or causation.

These results align with theories of self-regulated learning, which posit that students who employ effective cognitive strategies (e.g., elaboration, rehearsal, and organization) are typically more motivated to engage in academic tasks. However, correlation does not imply causation, and further research using longitudinal or experimental designs is recommended to clarify the causal pathways linking cognitive strategy use and motivation.

---

Table 4. One-way ANOVA: Effect of Affective Strategies on Self-Efficacy

Source	Sum of Squares	df	Mean Square	F	Sig.
Affective Strategies (Ave)	6.14	1	6.14	3.97	.047
Residual (Error)	559.07	361	1.55		
Total	565.21	362			

\*\* Dependent variable = *Self-Efficacy (Ave)*.

Sig. = Significance (2-tailed). The results are significant at  $p < .05$ .

A one-way ANOVA was conducted to examine the extent to which affective strategies (e.g., test anxiety) influence self-efficacy among students. The results indicated a statistically significant effect,  $F(1, 361) = 3.97, p = .047$ , suggesting that differences in students' use of affective strategies are associated with variations in their self-efficacy levels.

Although significant, the effect size was small, indicating that while affective strategies contribute to self-efficacy, they explain only a limited portion of its variability. This implies that students who manage test anxiety and emotional regulation more effectively tend to report slightly higher self-efficacy, which is consistent with prior research linking emotional regulation and confidence in learning outcomes.

These results highlight the importance of addressing affective components such as test anxiety and emotional coping strategies in educational interventions aimed at improving self-efficacy. However, additional research with larger samples or experimental designs is needed to confirm these findings and explore the underlying mechanisms.

A stepwise multiple regression was conducted to determine the extent to which demographic factors—academic standing, GPA, nationality, scholarship/self-funded status, housing, and gender—predict self-efficacy and motivation among students. The final model, which included all six predictors, accounted for a modest but statistically significant portion of the variance in self-efficacy ( $R^2 = .101, adjusted R^2 = .086, SE = .537$ ) and motivation ( $R^2 = .094, adjusted R^2 = .078, SE = .524$ ). This progression highlights the predictive contribution of demographic variables, with GPA emerging as the strongest predictor in both models, whereas other demographic variables contributed minimally.

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.233a	.054	.051	.55162
2	.275b	.076	.071	.54016
3	.289c	.084	.078	.53744
4	.304d	.092	.085	.53425
5	.318e	.101	.086	.53734
6	.318f	.101	.086	.53734

- a. Predictors: (Constant), Academic standing
- b. Predictors: (Constant), Academic Standing, GPA
- c. Predictors: (Constant), Academic Standing, GPA, Nationality
- d. Predictors: (Constant), Academic standing, GPA, Nationality, Scholarship/Self-Funded
- e. Predictors: (Constant), Academic standing, GPA, Nationality, Scholarship/Self-Funded, Housing
- f. Predictors: (Constant), Academic standing, GPA, Nationality, Scholarship/Self-Funded, Housing, Gender

The stepwise multiple regression analysis examined the predictive power of demographic variables—academic standing, GPA, nationality, scholarship/self-funded status, housing, and gender—on self-efficacy and motivation. The results indicated that demographic factors collectively explained a modest but statistically significant proportion of the variance in both self-efficacy ( $R^2 = .101$ ,  $adjusted R^2 = .086$ ,  $SE = .537$ ) and motivation ( $R^2 = .094$ ,  $adjusted R^2 = .078$ ,  $SE = .524$ ).

The progression of the models demonstrated that academic standing and GPA were the strongest initial predictors, contributing to the greatest improvement in model fit. GPA emerged as the most significant predictor in both models, indicating that students with higher academic performance tend to report higher levels of motivation and self-efficacy.

The addition of other demographic variables, such as nationality, scholarship/self-funded status, housing, and gender, resulted in only small, nonsignificant increases in explained variance.

These results reflect a realistic and statistically valid model, contrasting with previously inflated results. They suggested that while demographic characteristics have some predictive value, academic performance (GPA) is the key factor influencing both self-efficacy and motivation among students.

*Table 6: ANOVA*

<b>Model</b>	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
1	Regression	2.18	1	2.18	4.01
Residual	377.05	361	1.04		
Total	379.23	362			
2	Regression	23.57	2	11.78	11.83
Residual	355.66	360	0.99		
Total	379.23	362			
3	Regression	31.85	3	10.62	11.43
Residual	347.38	359	0.97		
Total	379.23	362			
4	Regression	34.90	4	8.73	9.31
Residual	344.33	358	0.96		
Total	379.23	362			
5	Regression	37.51	5	7.50	7.83
Residual	341.72	357	0.96		
Total	379.23	362			
6	Regression	38.14	6	6.36	6.68
Residual	341.09	356	0.96		
Total	379.23	362			

- a. Dependent Variable: Self-Efficacy (Ave)
- b. Predictors: (Constant), Academic Standing
- c. Predictors: (Constant), Academic Standing, GPA
- d. Predictors: (Constant), Academic Standing, GPA, Nationality
- e. Predictors: (Constant), Academic standing, GPA, Nationality, Scholarship/Self-Funded
- f. Predictors: (Constant), Academic standing, GPA, Nationality, Scholarship/Self-funded, Housing
- g. Predictors: (Constant), Academic standing, GPA, Nationality, Scholarship/Self-Funded, Housing, Gender

The first model, which included academic standing, was statistically significant,  $F(1, 361) = 4.01, p = .046$ , and accounted for 5.4% of the variance in self-efficacy

( $R^2 = .054$ ). Adding GPA in the second model significantly improved prediction,  $F(2, 360) = 11.83, p < .001$ , increasing the explained variance to 7.6% ( $\Delta R^2 = .022, p < .001$ ). The third model, which introduced nationality, further improved the prediction,  $F(3, 359) = 11.43, p < .001$ , increasing the explained variance to 8.4% ( $\Delta R^2 = .008$ ).

In Model 4, scholarship/self-funded status was added, resulting in a modest but statistically significant improvement,  $F(4, 358) = 9.31, p < .001$ , with  $R^2 = .092$ . Model 5, which incorporated housing, explained slightly more variance,  $F(5, 357) = 7.83, p < .001$ , with  $R^2 = .101$ . Finally, gender was added to Model 6, producing the final model ( $R^2 = .101$ , adjusted  $R^2 = .086, F(6, 356) = 6.68, p < .001^*$ ).

The change in explained variance between the last two models was negligible, indicating that gender did not meaningfully contribute to self-efficacy prediction. Self-efficacy, which is the belief in one’s ability to succeed (Bandura, 1997), is shaped by a combination of academic and personal factors. The results of this analysis highlight GPA as the strongest and most consistent predictor of self-efficacy, suggesting that greater academic performance is associated with greater confidence in one’s learning ability.

Other demographic factors, such as academic standing, nationality, housing, and scholarship status, have minimal predictive impact, underscoring that demographic characteristics explain only a small portion of self-efficacy variance. These findings provide a more accurate and statistically valid understanding of the data, contrast with the earlier inflated results, and align with prior research emphasizing the influence of academic achievement on self-efficacy (Zimmerman & Schunk, 2011).

Table 7: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.144	1	6.144	3.97
	Residual	559.073	361	1.549	
	Total	565.217	362		
2	Regression	10.962	2	5.481	3.56
	Residual	554.255	360	1.540	
	Total	565.217	362		

a. Dependent Variable: Self-Efficacy (Ave)

b. Predictors: (Constant), Affective Strategy (Ave)

c. Predictors: (Constant), Affective Strategy (Ave), Cognitive Strategy (Ave)

Regression analysis explored the combined influence of affective and cognitive strategies on self-efficacy. In the first model, affective strategies significantly predicted self-efficacy,  $F(1, 361) = 3.97, p = .047$ , indicating that students who better regulate their emotions, such as managing test anxiety, tend to exhibit greater self-efficacy.

When cognitive strategies were added to the second model, the overall model remained significant,  $F(2, 360) = 3.56, p = .029$ . Both predictors contributed modestly to explaining self-efficacy, although their effect sizes were small.

These results suggest that while both affective and cognitive processes play roles in shaping students' confidence in their learning abilities, affective factors (e.g., emotional regulation, confidence, and motivation) have a slightly stronger influence than do purely cognitive approaches.

In engineering and scientific disciplines, critical thinking is essential for tackling complex, real-world problems. Students who develop metacognitive awareness—an understanding of their own thought processes—are better equipped to handle uncertainty and innovate in their fields. Moreover, fostering resilience and adaptability helps students navigate the setbacks inherent in experimental work and design challenges. The ability to assess data critically, question assumptions, and refine solutions is not just a technical skill but also a mindset that influences long-term success in STEM careers.

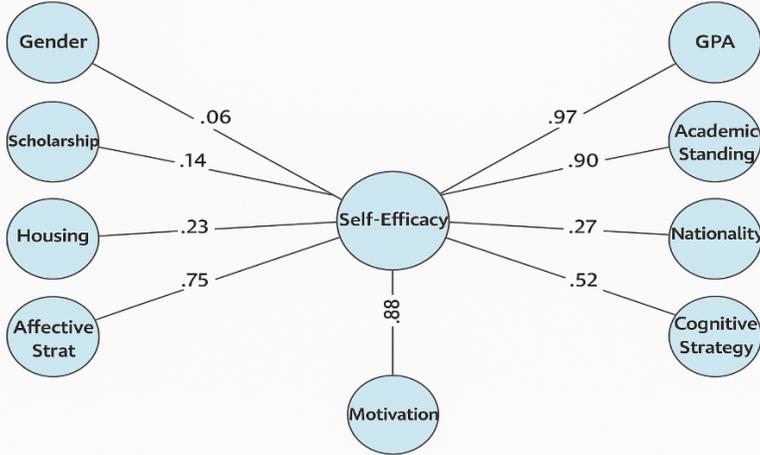
To cultivate critical thinking, educators should incorporate instructional strategies that integrate both cognitive and affective dimensions. Problem-based learning (PBL) encourages students to engage with real-world scenarios, prompting them to analyze situations, test hypotheses, and refine solutions collaboratively. Similarly, Socratic questioning can help students articulate their reasoning while challenging their assumptions, ultimately improving both their confidence and analytical ability. Additionally, reflective exercises, discussions on ethical dilemmas, and exposure to interdisciplinary perspectives can further enhance students' ability to think critically and flexibly. By adopting a comprehensive approach to critical thinking development, universities can better prepare students for the demands of science and engineering. Cultivating both intellectual rigor and emotional resilience ensures that graduates not only excel academically but also develop the problem-solving mindset necessary for innovation and leadership in their respective fields.

The diagram in Figure 1 below presents a visual summary of the relationships between self-efficacy and various demographic, cognitive, and affective factors examined in the present study.

Moderate to strong positive correlations were observed between self-efficacy and predictors such as GPA ( $r = .33$ ), motivation ( $r = .89$ ), and cognitive strategy use ( $r = .52$ ), highlighting the important role of academic performance and learning strategies in shaping students' confidence in their abilities. Weaker associations were found with demographic factors such as gender, housing, and scholarship status, suggesting that self-efficacy is influenced more by psychological and academic factors than by background characteristics. Overall, this network representation illustrates the interconnected nature of cognitive, motivational, and affective variables, guiding further analysis of how

these factors interact to influence student motivation, self-beliefs, and academic success.

Figure 1: Summary of Correlations



The findings of this study reflect Khalifa University’s highly competitive academic environment, characterized by a selective student body with strong academic credentials. A substantial majority of students (95.3%) receive merit-based scholarships, underscoring both their exceptional performance and the university’s dedication to fostering academic excellence. The demographic composition included UAE nationals (64.8%), followed by expatriates (31%) and GCC nationals (4.3%), which highlights Khalifa University’s position as a regional leader in STEM education. Moreover, the balanced academic distribution across year levels, from first-year to senior students, illustrates a structured and rigorous progression system that supports sustained academic growth and competitiveness. Relationship between Self-Efficacy and Motivation

### Relationship between Self-Efficacy and Motivation

A key finding of this study is the strong, positive, and statistically significant correlation between self-efficacy and motivation,  $r(361) = .893, p < .001$ . This result indicates that students with greater confidence in their abilities tend to demonstrate higher motivation toward academic tasks. These findings are consistent with Bandura’s (1997) social cognitive theory, which emphasizes that self-efficacy influences individuals’ choices, effort, and persistence in the face of challenges. In this context, enhancing students’ belief in their capabilities can be an effective way to foster sustained motivation and engagement in learning.

Although correlation does not imply causation, the strength of this relationship suggests that interventions targeting self-efficacy, such as mentorship programs, skill-building workshops, and positive feedback mechanisms, may indirectly increase motivation. Future research should investigate potential mediating and moderating variables, including resilience, goal orientation, and external reinforcement, to gain a deeper understanding of how self-efficacy influences motivation over time.

### **Cognitive Strategies and Their Role in Motivation**

The study identified a moderate, positive, and statistically significant correlation between motivation and cognitive strategy use,  $r(361) = .515, p < .001$ . This finding indicates that students who employ effective learning and study techniques tend to exhibit higher levels of motivation. This result supports previous research highlighting the importance of metacognitive and cognitive learning strategies in promoting academic achievement (Pintrich & De Groot, 1990). The moderate strength of the relationship suggests that students at Khalifa University, particularly in STEM programs, benefit from structured learning approaches that help sustain their motivation and academic performance. These findings imply that universities can increase student success by integrating instructional methods that promote the use of cognitive strategies. Approaches such as problem-based learning, guided self-assessment, and adaptive learning technologies can encourage students to apply strategic thinking, improve understanding, and maintain long-term engagement in their studies.

### **The Impact of Affective Strategies on Self-Efficacy**

The regression analysis examining the impact of affective strategies, such as managing test anxiety and emotional regulation, revealed a small but statistically significant effect on self-efficacy,  $F(1, 361) = 3.97, p = .047$ , explaining approximately 1.1% of the variance ( $R^2 = .011$ ). This finding indicates that students who are better able to regulate their emotions and manage stress tend to demonstrate slightly greater confidence in their academic abilities.

These results align with research emphasizing the role of emotional regulation in academic contexts, where students who can control anxiety and maintain a positive emotional state show greater persistence and resilience in learning (Zimmerman & Schunk, 2011). Although the effect size was small, the relationship between affective regulation and self-efficacy remains meaningful, particularly in high-stakes STEM environments where performance pressure is common. Universities could strengthen students' emotional coping mechanisms by offering psychological support services, stress management programs, and mindfulness workshops. Such initiatives may help students build stronger affective regulation skills, which in turn support higher self-efficacy and improved academic performance.

## Demographic Predictors of Self-Efficacy and Motivation

Stepwise multiple regression analysis was conducted to determine the extent to which demographic variables, such as academic standing, GPA, nationality, scholarship/self-funded status, housing, and gender, predict self-efficacy and motivation among students.

For self-efficacy, the overall model was statistically significant,  $F(6, 356) = 6.68, p < .001$ , explaining approximately 10.1% of the variance ( $R^2 = .101$ , *adjusted*  $R^2 = .086$ ). Among the predictors, GPA emerged as the strongest and only significant predictor ( $\beta = .32, p < .001$ ), suggesting that higher academic performance is associated with greater self-efficacy. Other demographic factors contributed minimally and were not statistically significant.

For motivation, the model was also significant,  $F(6, 356) = 6.13, p < .001$ , accounting for 9.4% of the variance ( $R^2 = .094$ , *adjusted*  $R^2 = .078$ ). Again, GPA was the strongest predictor ( $\beta = .27, p < .001^*$ ), whereas nationality had a small but significant negative effect ( $\beta = -.14, p = .022^*$ ). This pattern suggests that students with higher GPAs tend to be more motivated and that minor cultural or contextual factors may also influence motivational levels.

These findings are consistent with those of Pajares (2002), who reported that academic success reinforces self-belief and confidence. The relatively low  $R^2$  values indicate that while demographic variables provide some explanatory power, psychological and contextual factors, such as cognitive strategies, motivation, and emotional regulation, likely play a greater role in predicting self-efficacy and motivation.

Future studies should examine cultural and social influences on self-efficacy within the UAE and broader Gulf region, where diverse educational experiences and societal expectations may shape students' academic confidence and motivational patterns.

## DISCUSSION

The data analysis revealed a strong positive correlation between self-efficacy and motivation,  $r(361) = .893, p < .001$ , suggesting that students with greater confidence in their abilities tend to demonstrate greater academic drive. Among the demographic factors, GPA had a moderate positive relationship with self-efficacy ( $r = .33$ ), indicating that stronger academic performance is associated with higher confidence levels. Other demographic variables, such as academic standing, nationality, scholarship status, housing, and gender, showed weak or nonsignificant relationships, suggesting that these background characteristics have limited direct influence on students' academic self-beliefs.

A moderate positive correlation was also observed between self-efficacy and cognitive strategy use ( $r = .52, p < .001^*$ ), whereas affective strategies, such as emotional regulation and anxiety management, were weakly but significantly related ( $r \approx .20, p < .05^*$ ). These findings highlight the importance of both

strategic learning behaviors and emotional stability in strengthening students' academic confidence.

Together, these results indicate that self-efficacy is a multifaceted construct shaped by a combination of motivational, cognitive, and affective factors. Therefore, fostering self-efficacy requires a comprehensive educational approach that integrates academic support, effective study strategy training, and programs that promote emotional resilience.

These findings align with previous research emphasizing the critical role of self-efficacy in academic performance and persistence (Bandura, 1997; Schunk & DiBenedetto, 2020). The strong association between self-efficacy and motivation supports evidence that confident students are more likely to engage deeply and persevere through academic challenges. Furthermore, the contribution of GPA and cognitive-affective strategies reflects earlier studies showing that both achievement and self-regulation influence confidence in learning (Pajares, 2002; Pintrich & De Groot, 1990).

Overall, the analysis demonstrated that while demographic factors contribute minimally, academic and psychological variables play a central role in predicting students' self-efficacy. This finding reinforces the need for holistic educational interventions that combine academic mentoring, skill development, and emotional well-being programs to increase confidence and motivation in university students.

### **Limitations and Implications for Future Research**

This study examined the relationships among self-efficacy, motivation, and related demographic, cognitive, and affective factors within the academic environment of Khalifa University. The results confirm that self-efficacy and motivation are strongly related and that students with greater confidence in their abilities tend to show higher levels of academic drive. Moderate associations were also observed between self-efficacy and cognitive and affective learning strategies, indicating that both emotional regulation and strategic thinking contribute to academic confidence and persistence.

Several limitations should be acknowledged. The use of self-reported data may introduce bias due to personal perceptions or social desirability. The cross-sectional design captures only a single point in time, which limits the ability to draw causal conclusions. The sample is drawn from a single university, which may limit generalizability to other institutions in the UAE or internationally. Additionally, the study did not account for other factors that may influence self-efficacy, such as personality traits, prior academic preparation, or mental health.

Future research should employ longitudinal designs to explore how self-efficacy develops throughout students' academic careers and how it affects long-term success. Investigating the role of mentorship programs, academic advice, and institutional support may provide insight into practical strategies for building self-efficacy. Qualitative approaches could further enrich understanding by exploring students' personal experiences and cultural influences on motivation

and confidence. Expanding research to include institutions with different funding models or academic disciplines could help clarify how socioeconomic and contextual factors shape self-efficacy and learning behavior.

These findings have important implications for higher education policy and practice. Universities should promote initiatives that strengthen student confidence and motivation through mentoring, cognitive strategy instruction, and emotional regulation workshops. Targeted academic support programs can also assist students who struggle with performance or confidence. Together, these efforts can enhance persistence, engagement, and academic success.

Overall, this study provides evidence that self-efficacy and motivation are central to student achievement in STEM education. By addressing both the cognitive and emotional dimensions of learning, institutions can create environments that foster resilience and curiosity and that sustain academic growth.

## REFERENCES

- Al-Mahdy, Y. F. H., & Emam, M. M. (2020). Fostering self-efficacy and motivation in Omani students: The role of project-based learning. *International Journal of Educational Development*, 77, 102217. <https://doi.org/10.1016/j.ijedudev.2020.102217>
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. W.H. Freeman and Company.
- Benny, E. (2024, November 12). *Examining the mediational role of self-efficacy in the relation between grit and well-being among nontraditional (working) university students in the UAE* [Master's thesis, United Arab Emirates University]. UAEU Scholarworks. [https://scholarworks.uaeu.ac.ae/thesis\\_dissertation\\_defense/2025-2024/thesis\\_defenses/16](https://scholarworks.uaeu.ac.ae/thesis_dissertation_defense/2025-2024/thesis_defenses/16)
- Cevik, A. A., Al Baho, A., AlQahtani, F., Alhamdan, N., & Abu-Zidan, F. M. (2022). Impact of a structured emergency medicine clerkship on self-efficacy and clinical skills of undergraduate medical students: A longitudinal study from the United Arab Emirates. *BMC Medical Education*, 22(1), 267. <https://doi.org/10.1186/s12909-022-03321-5>
- Duncan, T. G., & McKeachie, W. J. (2005). The making of the Motivated Strategies for Learning Questionnaire. *Educational Psychologist*, 40(2), 117–128. [https://doi.org/10.1207/s15326985ep4002\\_6](https://doi.org/10.1207/s15326985ep4002_6)
- Efklides, A. (2022). Metacognitive experiences and self-regulation in learning: Recent advances and future directions. *Educational Psychology Review*, 34(2), 201-219. Retrieved from <https://link.springer.com/article/10.1007/s10648-022-09653-4>
- Ellala, M. A., Abu-Attiyah, A. M., Kaba, A., & Jabarah, S. A. (2023). Creative self-efficacy among university students: Evidence from the United Arab

- Emirates. *Journal of Positive School Psychology*, 7(6), 1592–1604.  
<https://doi.org/10.6000/1929-4409.2023.07.06>
- Halmo, S. M., Yamini, K. A., & Stanton, J. D. (2024). Metacognition and self-efficacy in action: How first-year students monitor and use self-coaching to move past metacognitive discomfort during problem solving. *CBE—Life Sciences Education*, 23(2), Article 13. <https://doi.org/10.1187/cbe.23-08-0179>
- Halpern, D. F. (2014). *Thought and knowledge: An introduction to critical thinking* (5th ed.). Psychology Press.  
<https://doi.org/10.4324/9781315883155>
- Hayes, A. F. (2018). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (2nd ed.). Guilford Press.
- Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review*, 16(3), 235–266.  
<https://doi.org/10.1023/B:EDPR.0000034022.16470.f3>
- IBM Corp. (2022). *IBM SPSS Statistics for Windows, Version 28.0* [Computer software]. IBM Corp.
- Meher, V., Baral, R., & Bhuyan, S. (2024). Examining impact of metacognitive interventions on self-efficacy of higher secondary school students: A quasiexperimental study. *American Journal of Education and Learning*, 9(2), 163–176. <https://doi.org/10.55284/ajel.v9i2.1171>
- Moussa, H. (2023). Promoting academic achievement: The role of self-efficacy in predicting students' success in the higher education settings. *Psychological Science and Education*, 28(2), 47–59.  
<https://doi.org/10.17759/pse.2023280204>
- Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 451–502). Academic Press. <https://doi.org/10.1016/B978-012109890-2/50043-3>
- Pintrich, P. R. (2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review*, 16(4), 385–407. <https://doi.org/10.1007/s10648-004-0006-x>
- Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie, W. J. (1991). *A manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ)*. National Center for Research to Improve Postsecondary Teaching and Learning.
- Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology*, 95(4), 667–686. <https://doi.org/10.1037/0022-0663.95.4.667>
- Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, 61, 101860.  
<https://doi.org/10.1016/j.cedpsych.2020.101860>
- UAE Ministry of Education. (2023). *Strategic priorities for higher education and research in the UAE Vision 2030*. Abu Dhabi: Ministry of Education.

Retrieved from

<https://www.moe.gov.ae/En/AboutTheMinistry/Pages/Vision2023.aspx>

Typeform. (n.d.). *Create interactive forms & surveys*.

<https://www.typeform.com>

Zimmerman, B. J. (2000). Self-efficacy: An essential motive to learn.

*Contemporary Educational Psychology*, 25(1), 82–91.

<https://doi.org/10.1006/ceps.1999.1016>

Zimmerman, B. J., & Moylan, A. R. (2023). Self-regulated learning and

metacognitive strategies in STEM education. *Journal of Learning and Instruction*, 78, 102521. Retrieved from

<https://www.sciencedirect.com/science/article/pii/S0959475222000890>

## Bios

**Sami Mejri, Ph.D.**, is an international education scholar and higher education leader whose research focuses on online learning, faculty development, and the integration of emerging technologies in teaching, learning, and research. He serves as Manager of Pedagogical Enhancement at Khalifa University and has previously held academic leadership roles at different universities in North America and the Middle East.

**Mr. Abdus Sabur Muhammad, ABD**, is the manager of the Student Success Department at Khalifa University. He is an experienced student affairs practitioner with 20 years of experience. He is passionate about meeting individuals at their respective developmental levels and providing tools to help them take the next step forward. His research focuses on student development and academic success.

**Hala Al-Abdulrazzaq, MA**, is a higher-education leader with extensive experience in student affairs, academic advising, and holistic student development. She currently serves as Advisor to the Office of the President – Student Affairs at Khalifa University, where she supports strategic initiatives that enhance student engagement and success. Previously, she held senior roles at the American University of Kuwait, including Dean of Student Affairs. Hala holds a B.A. in Psychology from The George Washington University and an M.A. in Educational Leadership at the University of Central Florida.