

Access this article online
Quick Response Code:

Website: www.jehp.net
DOI: 10.4103/jehp.jehp_965_23

The mediating role of emotional intelligence in the relationship between learning motivation and academic outcomes: Conditional indirect effect of gender

Samiha H. Sayed^{1,2}

Abstract:

BACKGROUND: The role of emotional intelligence and learning motivation in shaping university students' academic outcomes has received greater attention, especially during the modernization era. Thus, this study investigates the mediating role of emotional intelligence in the relationship between learning motivation and academic outcomes while examining the gender-conditional indirect effect.

MATERIALS AND METHODS: A cross-sectional study was conducted in four randomly chosen cities in Saudi Arabia (Riyadh, Jeddah, Hail, and Yanbu), where 400 health science students were conveniently selected using equal allocation (100 students/campus). A digital survey was used for data collection (April-May 2022) containing three sections: Personal Characteristics and Academic Outcomes, Modified Schutte Self-Report Inventory, and Academic Motivation Scale.

RESULTS: Emotional intelligence positively correlated with learning motivation ($r = 0.525, P < 0.001$) and academic outcomes ($r = 0.153, P < 0.001$), where academic outcomes had a weak positive correlation with learning motivation ($r = 0.115, P = 0.014$). Mediation analysis confirmed that emotional intelligence fully mediates the relationship between learning motivation and academic outcomes with an insignificant direct effect of learning motivation on academic outcomes [$(\beta = 0.049, P = 0.573)$, 95% CI (-0.059, 0.144)]. The conditional indirect effect of gender significantly moderated 16.1% of the mediating effect of emotional intelligence [$(\beta = 0.161, P = 0.005)$, 95% CI (0.035, 0.273)]. The significant indirect effect was proved for the male gender only [$(\beta = 0.157, P = 0.004)$, 95% CI (0.072, 0.240)]. No significant gender differences concerning emotional intelligence ($P = 0.534$) and academic outcomes ($P = 0.466$) were detected. However, male students had significantly higher learning motivation than female students ($P < 0.001$).

CONCLUSION: Emotional intelligence completely mediates the relationship between learning motivation and outcomes with a stronger mediating effect for male students. Thus, policymakers must focus on improving the students' emotional intelligence skills to boost their learning motivation and academic outcomes.

Keywords:

Academic success, emotional intelligence, mediation analysis, motivation

Introduction

Nowadays, people live in the age of modernization and globalization, where they struggle to cope with many

issues in everyday life to accomplish their needs and goals. Thus, the traditional focus of the educational systems on intellectual and logical intelligence is going out of the stand, where other forms of intelligence can fit this advanced era. Evidence proved

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Sayed SH. The mediating role of emotional intelligence in the relationship between learning motivation and academic outcomes: Conditional indirect effect of gender. *J Edu Health Promot* 2024;13:123.

¹Department of Public Health, College of Health Sciences, Saudi Electronic University, Riyadh, Saudi Arabia, ²Department of Community Health Nursing, Faculty of Nursing, Damanhour University, Damanhour, Egypt

Address for correspondence:

Dr. Samiha H. Sayed,
Department of Public Health, College of Health Sciences, Saudi Electronic University, Dammam, Saudi Arabia.
E-mail: s.ramadan@seu.edu.sa

Received: 05-07-2023
Accepted: 04-09-2023
Published: 29-04-2024

the capability of Emotional Intelligence (EI) to boost individuals' abilities to accomplish their life goals and learning outcomes. In addition, it is vital to harmonize mental and physical health, realizing the fullest development of humanity and overall quality of life.^[1-3]

The EI concept has been explored by three main theories. First, Salovey and Mayer (1990) characterized EI as an individual's capability to monitor his feelings and emotions and those of others, owning abilities to discriminate between these feelings and emotions and employing this information as a guide to think and act.^[4] Second, Goleman (1995) symbolized EI as a set of abilities to inspire oneself and endure frustration, impulse control, and defer gratification. It also regulates mood and reduce distress that decline the individual's ability to think, empathize, and hope. Moreover, Goleman (1995) verified the predictive ability of EI for academic success more than traditional intelligence.^[5] Third, Bar-On (1997) marked EI as a group of non-cognitive competencies and skills that can alter the individual's ability to cope with varied environmental responsibilities and pressures.^[6] In addition, Bar-On (2000) offered an emotional-social intelligence model, which was operationalized by the emotional quotient inventory as the initial self-reported measure.^[7] Thus, EI was pointed out as a predictor of achievement in numerous life domains, especially work, school, and home.

Abundant studies have examined the relationship between EI and Academic Outcomes (AO) in numerous educational settings.^[8-11] EI could equip individuals with skills for educational pursuits where they realize that students' emotions could strongly mark their learning strategies, motivation, and academic performance. Specifically, the emotional regulation domain of EI contributes to enhancing AO by sustaining motivation to pursue learning or goals mastering. EI can also facilitate positive peer and teacher interactions and the expression of proper school behaviors, supporting the necessary social context for successful learning.^[9-11] A recent meta-analytic study by MacCann *et al.* (2020) suggested that EI, especially the emotional understanding domain, assisted the students in mastering the academic content in the subjects that necessitate an understanding of people and their emotions, such as the language, arts, and humanities.^[12] Moreover, a study during the COVID-19 pandemic implied that EI aids university students in modifying their study habits during this challenging period and the associated shift to a blended learning model. It explored that EI had an indirect positive relationship with the student's study habits, where cognitive engagement mediates and strengthens this relationship.^[1]

Deci and Ryan's self-determination theory supposed that motivation reflects the individual's intention to

act, which is grounded on the presence of a motive or purpose to drive an individual to commence, develop, and conclude a behavior. The theory shaped it on a continuum from high to low self-determined behavior, starting with intrinsic/autonomous motivation (an individual engages in a certain behavior for enjoyment and interest) to extrinsic/controlled motivation (an individual participates in a certain behavior to gain positive outcomes or avert negative ones) to amotivation or complete absence of motivation.^[13,14] The relationship between EI and Learning Motivation (LM) is largely studied in the literature. A recent Chinese study confirmed that EI is a positive predictor of LM, where students' self-efficacy and adequate social support mediate this relationship.^[15] A clarification was raised by Trigueros *et al.* (2019), who explored that EI had a positive correlation to positive emotions while it had a negative correlation to negative ones. Besides, positive emotions positively predicted self-motivation and resilience, which predicted motivation.^[16] Over and above, Salvador-Ferrer (2021) found that LM could increase EI where learning to manage emotions could be affected by LM, which indicates that the drive to acquire skills and habits could direct students to learn how to manage or master their emotions.^[17]

The intricate connection between LM and AO is widely studied in academic literature, revealing diverse findings. Recently, Bano and Riaz (2023) depicted that LM moderated the relationship between student participation, functional motive, and AO among university students. It explained that high and moderate LM levels enhanced the effect of relational and functional motives on AO.^[18] In addition, Mahdavi *et al.* (2021) explained that university students who had greater motivation for succeeding in their educational and academic goals were more productive in their education and had better performance.^[19] Moreover, Steinmayr *et al.* (2019) discovered that the students' ability to self-concept was the greatest motivational predictor of their grades, learning goals, and achievement motives, even above and beyond the variances in their intelligence and earlier grades.^[20] Otherwise, a path analysis in an earlier study by Rotgans and Schmidt (2012) suggested that LM had limited predictive validity for AO; it was indirectly related to AO, where learning strategies and classroom behavior mediated the relationship.^[21] In short, despite the proven importance of LM for AO, most of the literature highlighted the presence of many mediating variables in this pathway relationship.

The present evidence is deficient in examining the moderating role of gender on the mediating effect of EI between LM and AO. Nevertheless, the gender differences are generally investigated and displayed conflicting

results. Many studies proved no gender differences in EI skills,^[9,22] while others proved that females had higher EI abilities than males.^[23-25] Such discrepancy could be explained through the culture-linked variations in the psychosocial development of males and females. Besides, the components of EI are examined where there are various EI measures. Evidence also revealed that females may have better scores than males in emotions-related domains, such as empathy, interpersonal relationships, and social responsibility.^[26] Likewise, the LM-linked gender differences also have combined findings. A recent meta-analytic study revealed that male students had higher LM than their female counterparts;^[27] however, the opposite is revealed by other studies.^[28,29] Otherwise, no gender-associated differences in LM were detected by Arias *et al.*, (2022). The type of motivation (intrinsic or extrinsic), the students' age group, personality attributes, and learning context can explain this controversy.^[27,29]

The mediating role of EI on AO was widely studied in the light of its effect on many academic performance and achievement-linked variables such as self-efficacy,^[30,31] verbal intelligence and openness,^[2] school burnout,^[32] and emerging adulthood.^[33] Nevertheless, the mediating effect of EI in the relationship between LM and AO is under investigation in the literature. This gap directs attention to the current and further comparable studies to fill this literature gap by combining EI, AO, and LM in one conceptual model while analyzing the moderating role of gender through the hypothetical model deployed in the present study [Figure 1]. It also answered the research questions of whether there are relationships between EI, LM, and AO and whether there are different relationships between them according to the student's gender. Henceforth, the current study generates valuable knowledge that can support the designation of a targeted intervention to expand students' EI skills to use their emotions efficiently, interact with others, and enhance problem-solving and motivation, boosting their AO.^[16,30] Therefore, it can benefit policymakers and academic managers to direct efforts and allocate resources to invest in future generations.

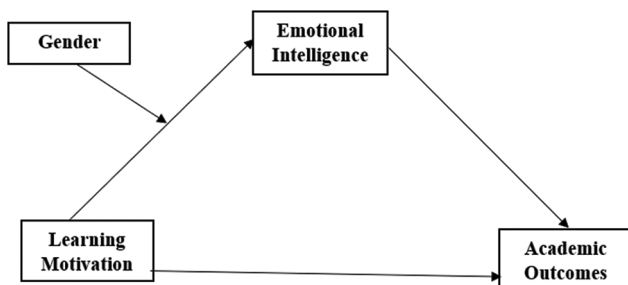


Figure 1: Hypothetical model of the interrelationship between EI, LM, AO, and gender

Materials and Methods

Study design and setting

A descriptive cross-sectional study was conducted on four randomly selected health sciences colleges in four different cities (Riyadh, Jeddah, Hail, and Yanbu) in Saudi Arabia. This was to ensure the homogeneity of the student's background information that may correlate with EI skills as a domain-specific skill.

Study participants and sampling

A multistage cluster random sampling technique was utilized to pick undergraduate health sciences students. The four cities were randomly chosen (Riyadh, Jeddah, Hail, and Yanbu). Then, one university campus was picked from each city to incorporate a convenient sample of 400 students who consented to participate in the study through the email invitation. The researcher used the equal allocation technique of 100 students from each campus. The required sample size was estimated using the Steven K. Thompson (2012) formula based on the average number of health sciences students registered in the nominated colleges during the second 2022 semester (4193).^[34] Besides, the following parameters are 95% confidence level (1.96), 0.05 proportion of error, and 50.0% probability. It formed a sample size of 341.15 at minimum. After counting the probability of nonresponse and cluster size, the ultimate sample was 400 students.

Data collection tool and technique

The investigator designed an electronic survey after reviewing relevant recent literature. It contained three sections: -

- **Personal Characteristics and Academic Outcomes:** age, gender, marital status, academic level, and perceived income level. The level of AO in the last semester was reported by the students as a Grade Point Average (GPA) percentage (>60-100). The mean percent scores were calculated and categorized as low (≤ 70), average, (71-85) and high (≥ 86).
- **Modified Schutte Self-Report Inventory (MSSRI):** designed and validated by Schutte *et al.* (1998)^[4,35] based on Salovey and Mayer's (1990) model.^[4,35] The items were later modified and distributed over three domains and revalidated by Austin *et al.* (2004).^[36] The investigator adapted and translated it into the Arabic language. It contains 33 items rated on a five-point Likert scale from strongly agree (5) to strongly disagree, (1) creating a total score of (33 to 165), after reversing the scoring for three items. It was grouped as low, (33-77) average, (78-121) and high (122-165) EI level.
- **Academic Motivation Scale (AMS):** designed using the views of the self-determination theory, by Vallerand *et al.* (1992).^[37] The investigator adapted it after translation into Arabic. It embraced 28

items rated on a five-point Likert scale from exact no correspondence (1) to exact correspondence, (5) creating an overall score of (28 to 140). It was grouped as low, (28-65) average, (66-102) and high (103-140) LM level.

The investigator translated the EI and LM scales into Arabic with back-translation by another researcher to guarantee their accuracy. Six experts in the field investigated the instrument's content validity, and the wanted modifications were performed based on their feedback. The overall scale Content Validity Index (S-CVI) was 0.87. The instrument's internal consistency was guaranteed using Cronbach's α coefficient: EI ($\alpha = 0.828$) and AM ($\alpha = 0.878$).

The investigator piloted the instrument on 40 students omitted from the study sample. The pilot test's target was to guarantee the instrument's clarity, pertinence, and cultural consistency. The students suggested minimal modifications that the investigator fixed.

The investigator employed the Survey Monkey program for survey designation. The investigator sent an official letter to the Ministry of Higher Education and the survey's link seeking approval for data collection in the randomly selected colleges. After approval, the students' affairs in each college publish the survey's link through official university emails to male and female students. The desired sample size was reached after two months (from April to May 2022). The average time for survey completion on the Survey Monkey program was 10 -14 minutes.

The raw data was exported as an Excel sheet from the Survey Monkey program; then, it was fed and analyzed using IBM SPSS 26.0 software SPSS, Inc., Chicago, IL, USA. The study variables were summarized using frequency, percentage, mean, standard deviation, and 0.95% confidence interval. The independent-sample *t*-test was used to guarantee the significance of the mean differences of the studied variables by students' gender. The correlations between the studied variables were tested using the Pearson correlation coefficient (*r*).

The investigator decided on the independent variable (learning motivation), the dependent variable (academic outcomes), and the mediating variable (emotional intelligence). Then, the investigator used path analysis to examine the mediating role of EI on the relationship between LM and AO by investigating the total, direct, and indirect relationships between these observed variables. The Analysis of Moment Structure Software (AMOS 26.0 SPSS, Inc., Chicago, IL, USA) was employed for specifying, estimating, testing, and modifying the model using the Maximum Likelihood

Estimation (MLE) method. The model fit with the current study data was guaranteed using numerous indices: the absolute fit measures: the Chi-square value/degrees of freedom ratio $\chi^2/df < 5$, Root Mean Square Error of Approximation (RMSEA < 0.05), and Goodness of Fit Index (GFI > 0.90). Incremental fit measures: Normed Fit Index (NFI > 0.90) and Comparative Fit Index (CFI > 0.90). Additionally, the Parsimony Comparative Fit Index (PCFI > 0.50).^[38,39]

The conditional indirect effect of gender on the relationship between EI and AO was also tested using multiple groups or pairwise comparisons between males and females through the critical ratio for the difference. The bootstrapping technique (500 samples) was used with the two-sided bias-corrected 95.0% confidence intervals (to estimate the intervals and determine the statistical significance of the indirect effect).^[40,41] The cut-off value of statistical significance (*P* value) was < 0.05 . Throughout analyses, age, academic level, perceived income, and marital status were incorporated as covariates.

Ethical considerations

The ethical approval of the present study was gained from the Institutional Review Board of the research ethics committee of the Saudi Electronic University (number: SEUREC-22023). The investigator followed the Declaration of Helsinki throughout the study conduction. The survey's link contained an explanation of the study's purpose, importance, and value of their input, along with the contact details for answering their questions. The investigator also guaranteed the students' online informed consent before initiating the survey. The students were also informed about their voluntary participation and full right to decline their responses at any time. The investigator also informed them that all answers were anonymous and employed only to fulfil the study's purposes.

Results

The total sample (400) contained 205 male (51.2%) and 195 female (48.8%) students. The total mean age was 22.56 ± 2.11 , slightly higher in males (23.52 ± 2.54) than in females (22.14 ± 2.77). The highest percentage of males (52.7%) were single compared to 43.1% of females, and nearly similar percent were enrolled in first to third academic level (46.3%, 47.7%). Moreover, the highest percentage of males (42.4%) and females (48.2%) perceived having adequate income. No statistically significant differences were observed by gender in all personal characteristics ($P > 0.05$) [Table 1].

Table 2 shows that the studied participants had low EI and LM levels with average AO. The overall EI mean

Table 1: The participants' personal characteristics by gender

Parameters	Categories	Total (400)		Males (205)		Females (195)		$\chi^2/t^{**} (P)$
		No.	%	No.	%	No.	%	
Age (years)	20 – 23	197	49.2	97	47.3	100	51.3	$t=5.321$ (0.319)
	24 – 26	203	50.8	108	52.7	95	48.7	
	Mean±SD	22.56±2.11		23.52±2.54		22.14±2.77		
Marital status	Single	192	48.0	108	52.7	94	43.1	$\chi^2=3.695$ (0.058)
	Married	208	52.0	97	47.3	111	56.9	
Academic level	1-3	188	47.0	95	46.3	93	47.7	$\chi^2=5.989$ (0.069)
	4-6	116	29.0	69	33.7	47	24.1	
	7-8	96	24.0	41	20.0	55	28.2	
Perceived income status	Inadequate	150	37.5	81	39.5	69	35.4	$\chi^2=1.344$ (0.511)
	Adequate	181	45.2	87	42.4	94	48.2	
	Adequate and saving	69	17.2	37	18.1	32	16.4	

[†]Chi square test, ^{**}Independent sample t-test, P significant at <0.05

Table 2: Mean scores of the studied variables

Parameter	Total score min-max	Observed score min-max	Mean±SD (LL, UL 95% CI [†])			Level	t-test ^{**}	Sig.
			Overall	Male	Female			
EI	33-165	42-122	71.57±15.95 (70.01, 73.03)	71.07±15.72 (68.85, 72.95)	72.01±16.17 (69.88, 74.17)	Low	- 0.622	0.534
LM	28-140	28-109	64.86±18.08 (63.01, 66.45)	68.06±18.31 (65.80, 70.65)	62.01±17.42 (59.81, 64.17)	Low	3.598	0.000**
AO	60-100	56-98	84.87±10.34 (83.94, 85.76)	85.26±11.32 (83.80, 86.77)	84.55±9.53 (83.41, 85.75)	Average	0.733	0.466

EI=Emotional Intelligence, LM=Learning Motivation, AO=Academic Outcomes (based on GPA), [†]CI=Confidence Interval. **P<0.01, *P<0.05, ^{**}Independent sample t-test

score was [71.57 ± 15.95, 95% CI (70.01, 73.03)] with no statistically significant difference between males and females ($t = -0.622, P = 0.534$). The overall LM mean score was [64.86 ± 18.08, 95% CI (63.01, 66.45)] with a highly statistically significant difference between males and females ($t = 3.598, P = 0.000$). Moreover, it shows the overall mean scores of the students' AO [84.87 ± 10.34, 95% CI (83.94, 85.76)] with no statistical significance difference between males and females ($t = 0.733, P = 0.466$).

Table 3 illustrates that AO has significant positive correlations with total EI ($r = 0.153, P = 0.001$) and total LM Score ($r = 0.115, P = 0.014$). Moreover, total LM had a significant strong positive correlation with EI ($r = 0.525, P < 0.001$).

A path model was set to examine the mediating effect of EI on the relationship between LM and AO. The default model fits perfectly the data based on the following indices [$\chi^2/DF = 0.078, DF = 1, CIMN = 0.032, GFI = 1.000, NFI = 0.999, CFI = 1.000, PCFI = 0.928$].

Figure 2 and Table 4 present the results of the mediation analysis. As shown, LM has a significant total effect on AO ($\beta = 0.117, P = 0.056$) with positive 95% CI (0.022, 0.211), but it has no significant direct effect on it ($\beta = 0.049, P = 0.573$) with negative 95% CI (-0.059, 0.144) that contains zero. However, it has a significant indirect

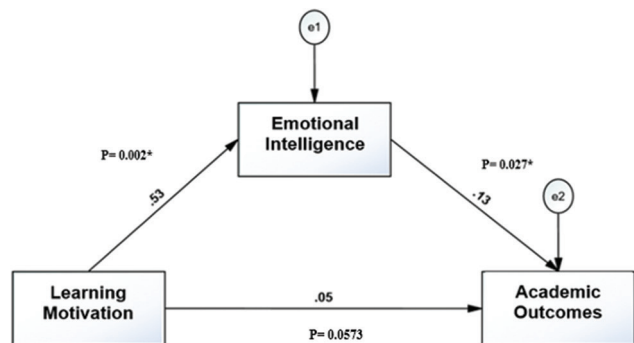


Figure 2: Standardized direct mediating effect of EI between LM and AO

positive effect on AO ($\beta = 0.068, P = 0.023$) with a positive 95% CI (0.016, 0.114). As well, LM has a significant positive total and direct effects on EI ($\beta = 0.527, P = 0.002$) with positive 95% CI (0.464, 0.593), which already has a significant positive total and direct effects on AO ($\beta = 0.128, P = 0.027$) with positive 95% CI (0.027, 0.213). These findings proved that EI totally mediates the relationship between LM and AO, where the significance of the direct effect of LM on AO disappeared by the mediating effect of EI.

Table 5 illustrates that gender is a significant moderator of the mediating effect of EI on the relationship between LM and AO ($\beta = 0.161, P = 0.005$) with a positive 95% CI (0.035, 0.273).

Table 6 goes in depth to illustrate which gender has a higher moderating effect. It depicts that both male and female gender has significant direct effects on the relationship between LM and EI [($\beta=0.559, P = 0.004$) with positive 95% CI (0.476, 0.628)] and [($\beta =0.514, P = 0.007$) with positive 95% CI (0.389, 0.615)], respectively. In addition, the male gender also has significant direct effects on the relationship between EI and AO ($\beta = 0.281, P = 0.004$) with positive 95% CI (0.127, 0.422); however, the female gender shows no significance ($\beta = 0.007, P = 0.899$) with negative 95% CI (-0.122, 0.148). Moreover, the male gender has significant indirect effects on the relationship between LM and AO ($\beta = 0.157, P = 0.004$) with positive 95% CI (0.072, 0.240), while it has an insignificant direct effect ($\beta = 0.043, P = 0.530$) with negative 95% CI (-0.118, 0.212). The female gender shows insignificant direct ($\beta = 0.035$) or indirect ($\beta = 0.004$) effects on the relationship between LM and AO ($P > 0.05$) with negative 95% CIs.

Discussion

The current study accepted all the research hypotheses. Correlation analysis portrayed that LM had a strong positive correlation with EI, while it had a weak positive correlation with AO. In addition, EI had a significant positive correlation with AO. Mediation analysis proved that EI had a full mediating effect on the influence of LM on AO. Specifically, LM had a significant indirect positive effect on AO, while it had a significantly higher positive and direct effect on EI. Likewise, EI had a significant positive direct effect on AO. These effects proved the mediating role of EI where it was strongly correlated with independent (LM) and dependent (AO) variables. Besides, the fading of the significance of the LM direct effect on AO through its strong positive correlation with

EI. Therefore, EI has a central role in determining health sciences students' achievement by modifying their LM.

The current literature does not have sufficient evidence regarding the mediating effect of EI on the relationship between LM and AO. However, the mediating role of EI between diverse variables was investigated in numerous studies. A Spanish study by Salvador-Ferrer (2021) proved that EI was a mediator in the relationship between achievement motivation and life goals among university students. It also indicated that achievement motivation significantly and positively affected EI and life goals.^[17] Moreover, an Iranian study by Mahdavi *et al.* (2021) discovered that LM significantly and positively correlated with AO among university students.^[19] Another significant mediation of EI was confirmed among Pakistani university students by Noor and Hanafi (2017), who proved significant relationships between EI, AO, and emerging adulthood, where EI fully mediates the relationship between them.^[33] As a result, the AO of students could be enriched if they can link EI abilities to their emerging adulthood.

In accordance with the current study, Emon *et al.* (2023) illustrated that EI positively impacts Bangladeshi university students' academic performance.^[23] Tam *et al.* (2021) also depicted that EI and LM were significant predictors of students' AO and suggested that by boosting students' EI level, their LM would rise accordingly, and ultimately, their AO would improve.^[42] Besides, EI independently predicted AO through emotional understanding skills and significantly mediates the effect of verbal intelligence and openness on AO among Spanish adolescents.^[2] Molero Jurado *et al.* (2021) added that EI significantly mediates the relationship between low AO and burnout via emotional regulation skills.^[32]

A recent Chinese study by Chang and Tsai (2022) showed that EI positively affected LM. However, it proved that EI did not directly affect AO, whereas LM and self-efficacy fully mediated the relationship between both.^[30] The absence of a direct effect of EI on AO in Chang and Tsai's study could be explained by their focus on students' achievement in online English courses only during the stressful COVID-19 pandemic and the associated shift to e-learning modules. Furthermore, a recent study among

Table 3: Correlation matrix between the studied variables

Variables	AO (GPA)		Total EI score	
	r	P	r	P
Total EI Score	0.153	<0.001**		
Total LM Score	0.115	0.014*	0.525	<0.001**

EI=Emotional Intelligence, LM=Learning Motivation, AO=Academic Outcomes, GPA=Grade Point Average. **P<0.01, *P<0.05, r=Pearson Correlation Coefficient

Table 4: Standardized total, direct, and indirect effects of the studied variables

Path	Total effects (LL, UL 95% CI)	Direct effects (LL, UL 95% CI)	Indirect effect (LL, UL 95% CI)
LM→EI	0.527 (0.464, 0.593)	0.527 (0.464, 0.593)	-----
Sig.	P=0.002*	P=0.002*	
EI→AO	0.128 (0.027,0.213)	0.128 (0.027,0.213)	-----
Sig.	P=0.027*	P=0.027*	
LM→AO	0.117 (0.022, 0.211)	0.049 (-0.059, 0.144)	0.068 (0.016, 0.114)
Sig.	P=0.046*	P=0.573	P=0.023*

EI=Emotional Intelligence, LM=Learning Motivation, AO=Academic Outcomes, LL=Lower Limit, UL=Upper Limit, 95% CI=Confidence Interval. Significant at >0.05 using bootstrapping with two-sided bias-corrected confidence intervals

Arabian students in China by AL-Qadri and Zhao (2021) proved that EI was a significant predictor of students' AO, with statistically significant differences between male and female students' EI scores, AO level and LM; in favor of the female students, which is not in line with the current study.^[43] Gender differences may be explained by the difference in the age group where AL-Qadri and Zhao's study was conducted among school students besides the smaller sample size (303 students) than the current study and the higher number of female students than their male counterparts.

Conversely, Getahun Abera (2021) proved no correlation between EI and AO. The regression analysis also confirmed that EI did not predict the AO of university students.^[22] This contradiction could be attributed to the lesser sample size (111 students) along with the higher EI and AO among the students in this contradicting study compared to low EI and average AO in the current study.

Moreover, the current study proved a significant gender conditional indirect effect, which substantially moderated about 16.1% of the mediating effect of EI in the relationship between LM and AO, where the significant indirect effect was confirmed for the male gender only. Over and above,

the male gender also directly affected the relationship between EI and AO, while both male and female gender directly affected the relationship between LM and EI, but the male gender effect was slightly higher. These findings proved that gender moderated the influence of LM on EI thus, it significantly moderated the mediating effect of EI. Specifically, EI had a stronger mediating effect between LM and AO for male students only. Evidently, the study revealed significant gender variances in the LM level, where males had higher LM levels than females. However, insignificant gender differences were detected in the EI level and AO, with overall low levels of EI and LM and average AO among males and females.

Regrettably, there is no evidence concerning the moderating role of gender on the mediating effect of EI in the relationship between LM and AO. A recent study by Bermejo-Martins *et al.* (2021) verified that gender moderated the mediating effect of self-care on the relationship between EI and stress. Thus, cultivating EI skills could lead to adopting self-care that is useful for lessening stress and, accordingly, for physical and mental health.^[44] Also, Alghamdi *et al.* (2020) revealed that the female gender moderated the relationship between multitasking and AO in online classes than traditional ones in the USA.^[45] Moreover, a Chinese study by Liu *et al.* (2020) demonstrated that gender moderated the effect of self-efficacy on academic self-control and hence significantly moderated the mediating effect of self-control in the relationship between self-efficacy and academic procrastination.^[46]

Concerning the gender differences regarding the studied variables in the current study, the literature generally investigated it and displayed mixed results. In line with the current study, a recent meta-analytic study by

Table 5: Conditional indirect effect of gender on the mediating effect of EI

Gender	EI mediating effect			Sig.
	β	95% CI		
		LL	UL	
The moderated mediating effect of Gender	0.161	0.035	0.273	0.005*

EI=Emotional Intelligence, LM=Learning Motivation, AO=Academic Outcomes, LL=Lower Limit, UL=Upper Limit, 95% CI=Confidence Interval. Significant at >0.05 using bootstrapping with two-sided bias-corrected confidence intervals. Gender was coded (1=Male, 2=Female)

Table 6: Pairwise comparisons of the standardized effects of gender on the relationships between EI, LM, and AO

Path/Gender	Total effects (LL, UL 95% CI)	Direct effects (LL, UL 95% CI)	Indirect effect (LL, UL 95% CI)
LM→EI			
Male	0.559 (0.476, 0.628) P=0.004*	0.559 (0.476, 0.628) P=0.004*	-----
Female	0.514 (0.389, 0.615) P=0.007*	0.514 (0.389, 0.615) P=0.007*	-----
EI→AO			
Male	0.281 (0.127, 0.422) P=0.004*	0.281 (0.127, 0.422) P=0.004*	-----
Female	0.007 (-0.122, 0.148) P=0.899	0.007 (-0.122, 0.148) P=0.899	-----
LM→AO			
Male	0.200 (0.048, 0.335) P=0.012*	0.043 (-0.118, 0.212) P=0.530	0.157 (0.072, 0.240) P=0.004*
Female	0.039 (-0.112, 0.200) P=0.609	0.035 (-0.137, 0.208) P=0.727	0.004 (-0.063, 0.078) P=0.899

EI=Emotional Intelligence, LM=Learning Motivation, AO=Academic Outcomes, LL=Lower Limit, UL=Upper Limit, 95% CI=Confidence Interval. Significant at >0.05 using bootstrapping with two-sided bias-corrected confidence intervals. Gender was coded (1=Male, 2=Female)

Solpuk Turhan (2020) proved that gender had a weak effect on LM, where male students demonstrated higher levels of LM behaviors than female students.^[27] Conversely, a Spanish study by Arias *et al.* (2022) explored no significant differences in LM level in terms of gender.^[24] However, Daher *et al.* (2021) proved that female students had significantly higher LM scores in science education.^[28] Moreover, an Indian study by Koyuncuoglu (2020) explored significant differences in the LM mean scores, where females had significantly higher LM than males.^[29] The discordance in LM-linked gender difference with the current study may be attributed to the variation in the students' background criteria such as age, educational level, and type of college or nature of the study.

Moreover, a novel meta-analytic study by Somaa *et al.* (2021) reinforced that gender partially mediates the relationship between EI and academic performance.^[47] An Ethiopian study by Getahun Abera (2021) and an Indian study by Meher *et al.* (2021) also confirmed the absence of significant gender differences in EI scores.^[9,22] Conversely, a Bangladeshi study by Emon *et al.* (2023) illustrated that higher AO and female gender were significantly related to greater EI scores among university students.^[23] Getahun Abera (2021) also showed a statistically significant difference in AO levels between male and female Ethiopian students, where males exceed their female counterparts.^[22] This contradiction could be attributed to Albers's higher AO level than the current study's average level.

Limitations and research implication

To the investigator's knowledge, the present study is the initial combination of learning motivation (independent variable), academic outcomes (dependent variables), and emotional intelligence (mediator variable) in one conceptual model while analyzing the moderating role of gender. This feeds the current literature gap and shapes the road for further similar studies in other types of colleges. Moreover, the study used a representative sample from four diverse areas of Saudi Arabia with an adequate sample size calculated using a standardized formula. The study's limitations may lie in using an online survey, which might limit the response rate. Besides, relying on self-reported data may raise reliability concerns; however, it is suitable and acceptable for evaluating an individual's perceptions, feelings, and judgments. However, using self-reported GPA is another limitation, but it is the most suitable to reach a representative sample in KSA from diverse areas. Thus, the investigator weighed the risk against the benefits of filling the current literature gap.

Conclusion

The present study succeeded in accepting all the research hypotheses. It proved significant positive correlations

between all the studied variables with no significant gender differences regarding EI level and AO. However, it specified significant gender differences in LM level where male students had higher LM than their female counterparts. In addition, LM was positively correlated with EI and AO EI was positively correlated with AO. EI had a completely mediating effect on the influence of LM on AO. Gender moderated the influence of LM on EI and thus significantly moderated the mediating effect of EI. Specifically, EI had a stronger mediating effect between LM and AO for male students.

Thus, the following are recommended: integrating the EI skills into college curricula as a buffering power for the effect of LM on AO, designing EI skills education and training sessions for college students, updating the teaching methods and strategies to boost students' motivation and EI skills and raise the awareness among the faculty about the importance of EI and LM for the student's achievement. Finally, it is suggested to introduce the assessment EI in the entrance exams of health science colleges.

Acknowledgment

The author appreciates and thanks all the students who contributed to completing this work.

Data availability

Data can be obtained from the corresponding author.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Iqbal J, Asghar MZ, Ashraf MA, Yi X. The impacts of emotional intelligence on students' study habits in blended learning environments: The mediating role of cognitive engagement during COVID-19. *Behav Sci (Basel)* 2022;12:14. doi: 10.3390/bs12010014.
2. Jolić Marjanović Z, Altaras Dimitrijević A, Protić S, Mestre JM. The role of strategic emotional intelligence in predicting adolescents' academic achievement: possible interplays with verbal intelligence and personality. *Int J Environ Res Public Health* 2021;18:13166. doi: 10.3390/ijerph182413166.
3. Tripathi I, Mehrotra R. Emotional intelligence: A review. *Academica: An Int Multidiscip Res J* 2021;11:809-15.
4. Salovey P, Mayer JD. Emotional Intelligence. *Imagin Cogn Pers* 1990;9:185-211. <https://doi.org/10.2190/DUGG-P24E-52WK-6CDG>
5. Goleman D. Working with Emotional intelligence. Why it can matter more than IQ. London: Bloomsbury Inc; 1995. p. 3-13.
6. Bar-on R. The emotional intelligence inventory (EQ-i): Technical manual. Toronto: Multi-Health Systems; 1997.
7. Bar-On R. Emotional and Social Intelligence: Insights from the emotional quotient inventory. In: In R Bar-On, and JDA Parker, (Eds), the handbook of emotional intelligence. Jossey-Bass,

- San Francisco; 2000. p. 343-62.
8. Moslehi M, Samouei R, Tayebani T, Kolahduz S. A study of the academic performance of medical students in the comprehensive examination of the basic sciences according to the indices of emotional intelligence and educational status. *J Educ Health Promot* 2015;4:66. doi: 10.4103/2277-9531.162387.
 9. Meher V, Baral R, Bankira S. An Analysis of emotional intelligence and academic performance of four-year integrated B.Ed. trainees. *Shanlax Int J Educ* 2021;9:108-16. <https://doi.org/10.34293/EDUCATION.V9I2.3555>.
 10. Lanciano T, Curci A. Incremental validity of emotional intelligence ability in predicting academic achievement. *Am J Psychol* 2014;127:447-61. doi: 10.5406/amerjpsyc.127.4.0447.
 11. Pekrun R. The impact of emotions on learning and achievement: towards a theory of cognitive/motivational mediators. *Applied Psychology* 1992;41:359-76. <https://doi.org/10.1111/j.1464-0597.1992.tb00712.x>.
 12. MacCann C, Jiang Y, Brown LER, Double KS, Bucich M, Minbashian A. Emotional intelligence predicts academic performance: A meta-analysis. *Psychol Bull* 2020;146:150-86. doi: 10.1037/bul0000219.
 13. Deci EL, Ryan RM. The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychol Inq* 2000;11:227-68.
 14. Deci EL, Ryan RM. Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian Psychology* 2008;49:182-5.
 15. Tang Y, He W. Relationship between emotional intelligence and learning motivation among college students during the COVID-19 pandemic: A serial mediation model. *Front Psychol* 2023;14:1109569. doi: 10.3389/fpsyg.2023.1109569.
 16. Trigueros R, Aguilar-Parra JM, Cangas AJ, Bermejo R, Ferrandiz C, López-Liria R. Influence of emotional intelligence, motivation and resilience on academic performance and the adoption of healthy lifestyle habits among adolescents. *Int J Environ Res Public Health* 2019;16:2810. doi: 10.3390/ijerph16162810.
 17. Salvador-Ferrer CM. Achievement motivation and goals in life: The mediating role of emotional intelligence. *Electron J Res Educ Psychol* 2021;19:53.
 18. Bano S, Riaz MN. Moderating role of academic motivation and entitlement between motives of students and academic achievement among university students. *J Pak Med Assoc* 2023;73:759-62. doi: 10.47391/JPMA.01016.
 19. Mahdavi P, Valibeygi A, Moradi M, Sadeghi S. Relationship between achievement motivation, mental health and academic success in university students. *Community Health Equity Res Policy* 2023;43:311-7. doi: 10.1177/0272684X211025932.
 20. Steinmayr R, Weidinger AF, Schwinger M, Spinath B. The importance of students' motivation for their academic achievement - replicating and extending previous findings. *Front Psychol* 2019;10:1730. doi: 10.3389/fpsyg.2019.01730.
 21. Rotgans JJ, Schmidt HG. The intricate relationship between motivation and achievement: Examining the mediating role of self-regulated learning and achievement-related classroom behaviors. *Int J Teach Learn High Educ* 2012;24:197-208.
 22. Getahun Abera W. Emotional intelligence and pro-social behavior as predictors of academic achievement among university students. *Community Health Equity Res Policy* 2023;43:431-41. doi: 10.1177/0272684X211033447.
 23. Emon M, Ahmed Jalal Siam S, Al-Noman Siddique M. Exploring the link between emotional intelligence and academic performance among bangladeshi private university students. *Malaysian Mental Health Journal* 2023;2:26-8. <http://doi.org/10.26480/mmhj.01.2023.26.28>.
 24. Arias J, Soto-Carballo JG, Pino-Juste MR. Emotional intelligence and academic motivation in primary school students. *Psicol Reflex Crit* 2022;35:14. doi: 10.1186/s41155-022-00216-0.
 25. Miri MR, Kermani T, Khoshbakht H, Moodi M. The relationship between emotional intelligence and academic stress in students of medical sciences. *J Educ Health Promot* 2013;2:40. doi: 10.4103/2277-9531.115836.
 26. Salavera C, Usán P, Jarie L. Emotional intelligence and social skills on self-efficacy in secondary education students. Are there gender differences?. *J Adolesc* 2017;60:39-46. doi: 10.1016/j.adolescence.2017.07.009.
 27. Sölpük Turhan N. Gender differences in academic motivation: A meta-analysis. *Int J Educ Psychol* 2020;7:211-24. <http://dx.doi.org/10.17220/ijpes.2020.02.019>.
 28. Daher W, Alfahel E, Anabousy A. Moderating the relationship between student's gender and science motivation. *Eurasia J Math Sci Technol Educ* 2021;17:1-16. <https://doi.org/10.29333/ejmste/10829>.
 29. Koyuncuoglu O. An Investigation of academic motivation and career decidedness among university students. *Int J Res Educ Sci* 2020;7:125. <https://doi.org/10.46328/ijres.1694>.
 30. Chang YC, Tsai YT. The effect of university students' emotional intelligence, learning motivation and self-efficacy on their academic achievement-online English courses. *Front Psychol* 2022;13:818929. doi: 10.3389/fpsyg.2022.818929.
 31. Usán Supervía P, Quílez Robres A. Emotional regulation and academic performance in the academic context: The mediating role of self-efficacy in secondary education students. *Int J Environ Res Public Health* 2021;18:5715. doi: 10.3390/ijerph18115715.
 32. Molero Jurado MDM, Pérez-Fuentes MDC, Martos Martínez Á, Barragán Martín AB, Simón Márquez MDM, Gázquez Linares JJ. Emotional intelligence as a mediator in the relationship between academic performance and burnout in high school students. *PLoS One* 2021;16:e0253552. doi: 10.1371/journal.pone.0253552.
 33. Noor F, Hanafi Z. The role of emotional intelligence in mediating the relationship between emerging adulthood and academic achievement. *Malaysian J Learn Instr* 2017;14:145-68. <https://doi.org/10.32890/mkli2017.14.1.6>.
 34. Thompson S. *Sampling*. 3rd ed. John Wiley and Sons Company; 2012. p. 59-60.
 35. Schutte NS, Malouff JM, Hall LE, Haggerty DJ, Cooper JT, Golden CJ, *et al*. Development, and validation of a measure of emotional intelligence. *Pers Individ Dif*. 1998;25:167-77. [https://doi.org/10.1016/S0191-8869\(98\)00001-4](https://doi.org/10.1016/S0191-8869(98)00001-4).
 36. Austin EJ, Saklofske DH, Huang SHS, McKenney D. Measurement of trait emotional intelligence: Testing and cross validating a modified version of Schutte *et al.*'s (1998) measure. *Pers Individ Dif* 2004;36:555-62. Available from: <https://www.sciencedirect.com/science/article/pii/S0191886903001144>.
 37. Vallerand RJ, Pelletier LG, Blais MR, Briere NM, Senecal C, Vallieres EF. The academic motivation scale: A measure of intrinsic, extrinsic, and amotivation in education. *Educ Psychol Meas* 1992;52:1003-17. <https://doi.org/10.1177/001316449205204025>.
 38. Steiger JH. Understanding the limitations of global fit assessment in structural equation modeling. *Pers Individ Dif* 2007;42:893-8. <https://doi.org/10.1016/j.paid.2006.09.017>.
 39. Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *J Pers Soc Psychol* 1986;51:1173-82. doi: 10.1037/0022-3514.51.6.1173.
 40. Hayes AF. *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. 3rd., New York, NY, US: Guilford Press; 2013. p. 507.
 41. Preacher KJ, Rucker DD, Hayes AF. Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behav Res* 2007;42:185-227. doi: 10.1080/00273170701341316.
 42. Tam HL, Kwok SY, Hui AN, Chan DK, Leung C, Leung J, *et al*. The significance of emotional intelligence to students' learning motivation and academic achievement: A study in Hong Kong

- with a confucian heritage. *Child Youth Serv Rev* 2021;121:105847. <https://doi.org/10.1016/j.chilyouth.2020.105847>.
43. AL-Qadri AH, Zhao W. Emotional intelligence, and students' academic achievement. *Problems of Education in the 21st Century* 2021;79:360-80. <https://doi.org/10.33225/pec/21.79.360>.
 44. Bermejo-Martins E, Luis EO, Fernández-Berrocal P, Martínez M, Sarrionandia A. The role of emotional intelligence and self-care in the stress perception during COVID-19 outbreak: An intercultural moderated mediation analysis. *Pers Individ Dif* 2021;177:110679. doi: 10.1016/j.paid.2021.110679.
 45. Alghamdi A, Karpinski AC, Lepp A, Barkley J. Online and face-to-face classroom multitasking and academic performance: Moderated mediation with self-efficacy for self-regulated learning and gender. *Comput Human Behav* 2020;102:214-22. <https://doi.org/10.1016/j.chb.2019.08.018>
 46. Liu G, Cheng G, Hu J, Pan Y, Zhao S. Academic self-efficacy and postgraduate procrastination: A moderated mediation model. *Front Psychol* 2020;11:1752. doi: 10.3389/fpsyg.2020.01752.
 47. Soma F, Asghar A, Hamid PF. Academic performance and emotional intelligence with age and gender as moderators: A meta-analysis. *Dev Neuropsychol* 2021;46:537-54. doi: 10.1080/87565641.2021.1999455.