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Presentation of a Causal Model of Academic Engagement Based on School Climate, Epistemological Beliefs, and Problem-Solving Styles with the Mediating Role of Academic Self-Efficacy

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ABSTRACT

Objective: The present study aimed to present a causal model of academic engagement based on school climate, epistemological beliefs, and problem-solving styles, with the mediating role of academic self-efficacy.

Methods and Materials: This study was of a correlational type and employed the structural equation modeling (SEM) method. The statistical population included all high school students in Bushehr County during the 2022-2023 academic year, totaling 1,350 individuals. Based on Cochran's formula, a sample of 299 students was selected through cluster random sampling. Data were collected using the Academic Engagement Questionnaire by Reeve, the School Climate Questionnaire, the Epistemological Beliefs Questionnaire by Schommer, the Problem-Solving Styles Questionnaire by Cassidy and Long, and the Academic Self-Efficacy Questionnaire by Jinks and Morgan. Data analysis was conducted using Pearson correlation, regression analysis, and path analysis methods.

Findings: The research findings indicated that school climate has a direct effect on academic self-efficacy. Epistemological beliefs have a direct effect on academic self-efficacy. Constructive problem-solving styles do not have a significant effect on academic self-efficacy in high school students. Non-constructive problem-solving styles have a significant positive effect on academic self-efficacy in high school students. Academic self-efficacy has a direct effect on academic engagement. School climate has a direct effect on academic engagement. Epistemological beliefs have a direct effect on academic engagement. Constructive problem-solving styles have a significant effect on academic engagement in high school students. Non-constructive problem-solving styles do not have a significant positive effect on academic engagement in high school students. School climate indirectly affects academic engagement through the mediating role of academic self-efficacy. Epistemological beliefs indirectly

affect academic engagement through the mediating role of academic self-efficacy. Constructive problem-solving styles do not have an indirect effect on academic engagement considering the mediating role of academic self-efficacy. Non-constructive problem-solving styles have an indirect effect on academic engagement considering the mediating role of academic self-efficacy.

Conclusion: The study confirms that school climate, epistemological beliefs, and problem-solving styles significantly influence academic engagement, with academic self-efficacy playing a critical mediating role. These findings highlight the importance of fostering a positive school environment and developing students' self-efficacy and epistemological beliefs to enhance academic engagement and performance.

Keywords: *Academic Engagement, School Climate, Epistemological Beliefs, Problem-Solving Styles, Academic Self-Efficacy*

1. Introduction

Students are the future builders of any society, and their school years are considered pivotal for their destiny and character development. Success during this period can potentially guarantee their success in later stages of life. Therefore, addressing issues related to students is of paramount importance (Wang, 2024). During their school years, students develop various attitudes towards themselves and their surrounding environment, which largely depend on their experiences during this period. Lack of engagement can disrupt their mental health, undoubtedly leading to consequences for both them and society (Haseli Songhori & Salamti, 2024). Thus, greater attention should be given to the academic domain and its role in academic performance to nurture students' abilities and competencies.

Academic engagement is a construct first introduced to understand and explain academic decline and failure, serving as a foundation for reform efforts in the field of education. Academic engagement refers to self-initiated and goal-directed participation in academic activities, indicating a form of sustained psychological investment that facilitates learning and is accompanied by positive emotional states and individual effort (Fatimah et al., 2024; Meng & Zhang, 2023). Academic engagement is a significant construct used to understand student behavior in relation to the teaching-learning process. Student engagement refers to meaningful interaction within the entire learning environment, which can be understood as the relationship between the student and the school, teachers, peers, instruction, and curriculum (Azhdari & Yousefi, 2021; Robayo-Tamayo et al., 2020). Reeve (2012) believes that academic engagement involves constructive interaction and participation, accompanied by enthusiasm, desire, and learner-based cognition in learning and academic activities, which directly lead to positive academic outcomes (Fakharian et al., 2020; Javadi Elmi et al., 2020). Appleton et al. (2006) demonstrated that academic engagement is a six-factor construct, comprising two broader components: psychological engagement (teacher-student relationships, control over school tasks, and low support for learning) and cognitive engagement (future goals and aspirations, family support for learning, and extrinsic motivation) (Eslami et al., 2016). Some scholars argue that students engage in academic tasks only when the tasks require problem-solving skills and higher-order thinking, such as evaluation, critical thinking, and creativity. However, it is important to note that students do not engage in learning per se but in tasks, activities, and experiences that lead to learning. Therefore, the primary task of the educational system is to encourage students to invest their internal resources (energy, time, and attention) (Ersoy & Peker, 2020; Fakharian et al., 2020; Rajan et al., 2017).

School climate is another important variable in students' academic engagement. The classroom, as a small and subsidiary community, consists of participants from the broader society of each city or country, who differ culturally, behaviorally, socially, and personally, bringing all these characteristics into the classroom. School climate is a specific psychosocial variable created by groups of students and teachers within a particular classroom. This variable is also referred to as the social atmosphere of a school classroom (Tang, 2024). School climate reflects the cultural influence of the school, derived from fundamental and institutionalized values, belief systems, norms, and customs. Moreover, classroom atmosphere and culture are both embedded within the political, social, cultural, and economic contexts surrounding the school (e.g., home, neighborhood, city, state, country). The influence of school climate on students and staff can be either beneficial or hindering for learning and final considerations (Sun et al., 2024; Zhang et al., 2023).

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Problem-solving, as a fundamental topic in cognitive sciences, is one of the essential dimensions of individual life. An individual's ability to solve problems determines the growth of a healthy personality and the establishment of positive social interactions. Life challenges, the changing world, social conditions, and work responsibilities make problem-solving skills essential for every person. Therefore, problem-solving skills are considered essential life skills, and the concept of life is intertwined with acquiring these skills, meaning facing problems and striving to solve them. Problem-solving and decision-making have attracted the attention of many researchers to ensure that individuals can act correctly when faced with situations. Those who effectively utilize problem-solving recognize and address their weaknesses (Unal & Cakir, 2021). A lack of appropriate problem-solving skills is associated with various emotional and behavioral problems in adulthood, such as depression and anxiety, as problem-solving is defined as a complex behavioral and cognitive process aimed at adapting to internal and external challenges (Soltani et al., 2024). That there is a significant relationship between the components of academic engagement (behavioral, emotional, cognitive, agentic engagement) and the components of problem-solving skills (self-confidence in problem-solving, approach-avoidance to the problem, personal control in problem-solving) among female students (Hoseinkhani et al., 2022; Molaei Moghbeli et al., 2022; Parsakia, 2023; Yeung et al., 2023).

Moreover, the concept of epistemology is one of the main and important realms of philosophy, which deals with the nature and justification of human knowledge. Today, psychologists and education specialists are increasingly interested in the process of development and epistemological beliefs, such as how individuals understand phenomena, what theories and beliefs they have about knowing and understanding, and how epistemological assumptions influence cognitive processes of thinking and reasoning (Ayata, 2024; Jiang et al., 2021). Individuals' epistemological beliefs are considered a significant part of the learning process, related to teaching and learning, and influencing how they learn. Epistemological beliefs refer to students' beliefs about the nature and structure of knowledge and ability, regarded as an individual factor (Elhamifar et al., 2019; Kamali Zarch et al., 2013). Epistemological thinking is not only related to school learning but also to important elements of lifelong learning, both in and out of school. The development of epistemological beliefs plays a crucial role in facilitating conceptual changes, organizing scientific knowledge, and providing learning opportunities for students (Börekci & Uyangör, 2021; Bråten & Strømsø, 2004; Efilti & Çoklar, 2016; Elhamifar et al., 2019).

Another crucial indicator of the educational system is academic self-efficacy. Academic self-efficacy refers to an individual's perception of their competence and ability to learn and perform educational tasks and assignments. Individuals' confidence in their educational abilities is influenced by their self-efficacy beliefs. These beliefs powerfully affect their academic motivation and self-regulatory strategies, ultimately impacting academic success (Fatimah et al., 2024; Haseli Songhori & Salamti, 2024). High levels of academic self-efficacy lead to higher grade point averages and persistence in completing assignments. As a result, students with higher academic self-efficacy have better academic adjustment, use more effective learning strategies, and ultimately perform better (Huang, 2023; Meng & Zhang, 2023). Therefore, academic self-efficacy is considered an important psychological component in students' academic achievement, and educational system officials should pay special attention to these two important characteristics (Babaei Parsheh & Mosadeghi Nik, 2022; Fakharian et al., 2020; Javadi Elmi et al., 2020; Shao & Kang, 2022; Zhang, 2022).

Considering the importance of academic engagement and its relationship with school climate, epistemological beliefs, and problem-solving styles with the mediating role of academic self-efficacy in students, as well as its role in reducing educational problems on one hand and the lack of research focus on this intervention on the other hand, this study presents a causal model of academic engagement based on school climate, epistemological beliefs, and problem-solving styles with the mediating role of academic self-efficacy among high school students in Bushehr. The results of this research can be used to improve learning and problem-solving in various subjects. The findings from this study can serve as a guide for future research in this area and can also be utilized by counselors, psychologists, teachers, and educational planners.

2. Methods and Materials

2.1. Study Design and Participants

This research is applied in terms of its objective and is a correlational study employing the structural equation modeling (SEM) method for data collection and analysis. The statistical population of this study consists of all high school students in Bushehr County during the 2022-2023

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academic year, totaling 1,350 individuals. Based on the population size, a sample of 299 students was selected using Cochran's formula. The sampling method used in this study was cluster random sampling. Specifically, out of all the high schools in Bushehr County (30 schools, including both boys' and girls' schools), 20 schools (10 boys' schools and 10 girls' schools) were randomly selected. From each selected school, two classes were chosen randomly, and 15 students from each class responded to the questionnaires.

In this study, after determining the research objectives, appropriate tools were selected, leading to the choice of the aforementioned questionnaires. Subsequently, with permission from the high schools in Bushehr County, the target sample of 299 students was selected using cluster random sampling. Specifically, out of all the high schools in Bushehr County (30 schools, both boys' and girls' schools), 20 schools (10 boys' schools and 10 girls' schools) were randomly selected. From each selected school, two classes were chosen randomly, and 15 students from each class responded to the questionnaires. Efforts were made to gain the students' participation, cooperation, and trust, and the importance of the study was explained to them. Before administering the tests, instructions on how to complete the questionnaires were provided, and participants were assured that their responses would remain completely confidential. Additionally, participants were encouraged to answer the questions patiently and were reminded of the importance of honest cooperation for obtaining accurate results.

Ethical considerations in this study included obtaining informed consent, ensuring privacy and confidentiality, and adhering to these standards throughout the research. Participants were free to withdraw from the study at any time, and they were assured that their information would remain confidential, which was strictly adhered to.

2.2. Measures

2.2.1. Academic Engagement

The Academic Engagement Questionnaire was designed and developed by Reeve in 2013 to measure academic engagement. This questionnaire consists of 17 questions and 4 components: behavioral engagement, agentic engagement, cognitive engagement, and emotional engagement. It is based on a 7-point Likert scale, with questions such as "When studying, I try to combine different viewpoints to arrive at a meaning." The components of the questionnaire include: 1) Behavioral Engagement (items 1-4), 2) Agentic Engagement (items 5-9), 3) Cognitive Engagement (items 10-13), 4) Emotional Engagement (items 14-17). Each item is scored on a scale from 1 (strongly disagree) to 7 (strongly agree), with no reverse-scored items. The score for each dimension is obtained by summing the scores of the respective items, and the total score for academic engagement is the sum of all items. Validity refers to the extent to which a measurement instrument measures what it is intended to measure. In the study by Ramazani and Khamsan (2017), the content, face, and criterion validity of this questionnaire were deemed appropriate. The Cronbach's alpha coefficient calculated by Ramazani and Khamsan (2017) for this questionnaire was above 0.7 (Babaei Parsheh & Mosadeghi Nik, 2022; Haseli Songhori & Salamti, 2024).

2.2.2. School Climate

This questionnaire was developed by Pashiardis in 2000. It contains 30 questions and measures 4 dimensions: Communication (items 16-28-4-13-26-25-24-23), Participation (items 12-5-14-30-29-10-9), Management Organization (items 15-18-17-22-11-3-1-19), and Student-Centeredness (items 20-21-8-7-6-2). Each option is scored on a scale from 1 (very low) to 5 (very high). The total scores for each dimension are calculated, reflecting the school climate that may exist (Sun et al., 2024; Tang, 2024).

2.2.3. Epistemological Beliefs

This questionnaire was designed and developed by Schommer in 1990, consisting of 63 items and measuring 5 dimensions: Simplicity of Knowledge (items 2-11-16-17-19-22-23-33-3-14-18-35-37-38-54-63), Certainty of Knowledge (items 1-5-36-40-6-7-13-31-45-46), Innate Ability to Learn (items 26-32-43-49-8-47-55-57-4-15-25-28-62), Quick Learning (items 10-29-39-50-60-20-24-25-51-53), and Specificity of Knowledge (items 9-27-41-42-44-12-21-30-34-48-61). The questionnaire is scored on a 5-point Likert scale ranging from "strongly disagree" to "strongly agree." The following items are reverse-scored: 2-22-23-14-18-54-56-1-7-45-46-26-32-43-4-15-25-28-39-60-24-53-27-30-48-61. The minimum score is 63, the average is 189, and the maximum is 315. A score between 63 and 126 indicates weak epistemological beliefs, between 126 and 189 indicates moderate epistemological beliefs, and above 189 indicates strong epistemological beliefs. In Rezai's (2010) study, construct validity was assessed using factor analysis to achieve a suitable factor structure. Before the factor analysis, internal consistency was calculated for the 63 items, and 11 items were removed due to negative item-

total correlations, and 16 items were removed due to item-total correlations below 0.1. The principal component analysis was then performed on the remaining 36 items. The initial scree plot analysis suggested a two-factor solution. The principal component analysis with Promax rotation was used to achieve the two-factor structure, leading to the removal of 20 items due to factor loadings below 0.35 or significant cross-loadings on more than one factor. The final analysis revealed 16 items loading on two factors, which were named based on the content of the items as "Simple/Absolute Knowledge" and "Quick/Fixed Learning." The questionnaire's reliability, as measured by Cronbach's alpha, ranged from 0.54 to 0.71. In the study by Kadivar et al. (2012), the reliability of the subscales ranged from 0.65 to 0.75 using Cronbach's alpha. Schommer (1993) demonstrated the predictive validity of this tool, showing that three of the four beliefs predicted aspects of learning, such as comprehension. Test-retest reliability was estimated at 0.74 (Elhamifar et al., 2019; Kamali Zarch et al., 2013).

2.2.4. Problem-Solving Styles

This scale was developed by Cassidy and Long in 1996 and consists of 24 items that assess six factors, with each factor comprising four items. These factors are: Problem-Solving Helplessness or Orientation (indicating the individual's helplessness in problematic situations), Problem-Solving Control (reflecting the external-internal control dimension in problem-solving situations), Creative Problem-Solving Style (indicating planning and considering various solutions depending on the problematic situation), Problem-Solving Confidence (reflecting the individual's belief in their ability to solve problems), Avoidance Style (indicating a tendency to avoid problems rather than confront them), and Approach Style (indicating a positive attitude toward problems and a willingness to face them). Thus, the Helplessness, Control, and Avoidance styles are considered subscales of non-constructive problem-solving, while the Approach, Creativity, and Confidence styles are considered subscales of constructive problem-solving. This questionnaire effectively distinguishes between healthy and unhealthy populations in terms of stress vulnerability. The standardized Problem-Solving Scale by Cassidy and Long contains 24 questions assessing six factors. Each factor comprises four items, with responses provided on a scale of "Yes," "No," or "I don't know." Participants indicate their agreement or disagreement with each item, or select "I can't say" if undecided. Scoring is binary (0 or 1), with a score of 0.5 assigned to "I don't know." The sum of these scores indicates the overall score for each of the six factors. Thus, each factor, with its four items, yields a score ranging from 0 to 4. The factor with the highest score indicates the individual's preferred problem-solving style when facing problems. The maximum problem-solving score is 24, with a minimum of 0 and an average of 12. Items 1-4 represent the Problem-Solving Helplessness factor, items 5-8 the Problem-Solving Control factor, items 9-12 the Creative Problem-Solving Style, items 13-16 the Problem-Solving Confidence factor, items 17-20 the Avoidance Style, and items 21-24 the Approach Style (Hoseinkhani et al., 2022; Soltani et al., 2024).

2.2.5. Academic Self-Efficacy

This questionnaire was developed by Jinks and Morgan in 1999 and consists of 30 items, with each item rated on a 5-point Likert scale from "strongly agree" to "strongly disagree." It includes three components: Talent, Effort, and Context. The questionnaire items are based on a four-point Likert scale, with scores ranging from 1 to 4. Ten items are assigned to the Talent subscale, ten to the Effort subscale, and ten to the Context subscale. The reliability coefficient for this questionnaire was reported by the developers to be 0.82, with the reliability coefficients for the Talent, Effort, and Context subscales reported as 0.78, 0.66, and 0.70, respectively (Fakharian et al., 2020).

2.3. Data analysis

After the tests were administered, the questionnaires were collected, coded, and entered into SPSS software for statistical analysis. The AMOS statistical software was used to test the hypotheses, and data analysis was conducted to extract the results.

3. Findings and Results

In this section, Pearson correlation was used to examine the relationship between the main variables due to the parametric distribution of the data:

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Table 1

Correlation among Research Variables

Variable	1	2	3	4	5	6
1. Academic Engagement	1					
2. School Climate	.947**	1				
3. Epistemological Beliefs	.864**	.888**	1			
4. Academic Self-Efficacy	.978**	.918**	.837**	1		
5. Constructive Problem-Solving Style	.781**	.741**	.783**	.743**	1	
6. Non-Constructive Problem-Solving Style	-.591**	-.502**	-.349**	-.578**	-.638**	1

**p<0.01

The results of the Pearson correlation between the main research variables are presented in the table above. As shown, all the values range between -1 and +1. The variables with significant correlations are marked with asterisks.

Table 2

Model Fit Indices

Index	Desired Value	Obtained Value
Absolute Fit Indices		
Chi-Square/df	< 5	0.714
GFI	> 0.7	0.717
AGFI	> 0.7	0.930
Comparative Fit Indices		
NFI	> 0.7	0.709
CFI	> 0.7	0.717
RFI	> 0.7	0.764
IFI	0-1	0.723
Parsimonious Fit Indices		
PNFI	> 0.7	0.714
RMSRA	< 0.08	0.0296

Regarding the variable of social anxiety, the F-value for the pre-test variable is shown. This F-value (0.035) is not significant because its significance level is 0.853, which is greater than the 0.05 significance level. Therefore, it can be stated that the fourth assumption in using covariance analysis, which is the correlation between the covariate and the independent variable, was not met. It is important to note that if the F-value for the covariate is not significant, the covariance analysis is correct; however, it can be concluded that the selected covariate (pre-test) does not affect the proposed model. The F-value for the effect of the independent variables (stress-based mindfulness training and acceptance and commitment therapy) on reducing social anxiety (95.365) is significant, as the significance level for this row is 0.000, which is less than the 0.05 significance level. Therefore, after excluding the effect of the pre-test, the hypothesis that there is a significant difference between the effectiveness of acceptance and commitment therapy and stress-based mindfulness training in reducing social anxiety among female high school students is confirmed.

The determination coefficient for the endogenous constructs is at an appropriate level. According to the research results, the structural model fit is confirmed. The determination coefficient for the variable of academic engagement is 0.976, meaning that the variables of school climate, epistemological beliefs, and problem-solving styles explain 97.6% of the variance in academic engagement.

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Table 3

Estimation of Indirect Effects

Description	Standardized Estimate	Standard Error	t-value	Significance Level
Indirect effect of School Climate on:				
Academic Engagement	0.315	0.027	5.93	p < .001
Indirect effect of Epistemological Beliefs on:				
Academic Engagement	0.146	0.063	4.37	p < .001
Indirect effect of Constructive Problem-Solving Style on:	0.011	0.321	0.475	0.125
Indirect effect of Non-Constructive Problem-Solving Style on:	0.116	0.033	2.43	p < .001

According to Table 3, the standardized regression coefficient for the indirect effect of school climate on academic engagement is 0.315. The t-value for this coefficient is 5.93. Since the t-value is greater than 1.96, this coefficient is significant at the 5% error level. The results indicate that school climate has an indirect effect on academic engagement considering the mediating role of academic self-efficacy.

Similarly, the standardized regression coefficient for the indirect effect of epistemological beliefs on academic engagement is 0.146. The t-value for this coefficient is 4.37. Since the t-value is greater than 1.96, this coefficient is significant at the 5% error level. The results indicate that epistemological beliefs have an indirect effect on academic engagement considering the mediating role of academic self-efficacy.

Moreover, it is observed that the standardized regression coefficient for the indirect effect of constructive problem-solving style on academic engagement is 0.011. The t-value for this coefficient is 0.475. Since the t-value is less than 1.96, this coefficient is not significant at the 5% error level. The results indicate that constructive problem-solving style does not have an indirect effect on academic engagement considering the mediating role of academic self-efficacy. Additionally, the standardized regression coefficient for the indirect effect of non-constructive problem-solving style on academic engagement is 0.116, and the t-value for this coefficient is 2.43. Since the t-value is greater than 1.96, this coefficient is significant at the 5% error level. The results indicate that non-constructive problem-solving style has an indirect effect on academic engagement considering the mediating role of academic self-efficacy.

4. Discussion and Conclusion

The data analysis results showed that school climate indirectly affects academic engagement, considering the mediating role of academic self-efficacy. These results align with the prior findings (Babaei Parsheh & Mosadeghi Nik, 2022; Fakharian et al., 2020; Haseli Songhori & Salamti, 2024; Rajan et al., 2017). Creating appropriate conditions for students' perception of the school climate, employing high self-efficacy beliefs, and utilizing academic engagement in schools can enhance academic performance. Mentioned studies studies likely supports a positive and significant relationship between academic engagement and students' perception of the educational environment. If the educational environment has features such as consistent rules predicting order for students, teaching styles, student autonomy in different learning situations, scientific competition combined with peer support, and mutual peer assistance, these factors lead to students' cognitive regulation, positive emotions, a positive perception, active presence, and cognitive, motivational, and behavioral engagement.

A positive perception of the educational environment leads to individuals gaining more self-awareness and a more positive attitude, resulting in better self-control. Additionally, students' awareness and understanding of an environment that stimulates their intrinsic and extrinsic motivation encourage self-initiated and goal-directed participation in academic activities, leading to more effort and persistence with a positive attitude toward the educational environment, including peers, teachers, rules, and autonomy. The understanding students have of the rules and regulations in school influences their efforts, seeking help, and academic engagement. As students develop a positive perception of the school climate, they are more inclined to participate, work hard, and persist in academic matters (Fakharian et al., 2020; Haseli Songhori & Salamti, 2024).

The results also showed that epistemological beliefs have an indirect effect on academic engagement, considering the mediating role of academic self-efficacy. It can be suggested that students with high epistemological beliefs and academic self-efficacy are more likely to engage in academic activities. Research has shown that academic engagement in school promotes academic achievement, reduces academic

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decline and dropout, implicitly improves academic performance, and raises students' expectations of their academic abilities (Bråten & Strømsø, 2004; Elhamifar et al., 2019; Jiang et al., 2021). Students who believe that knowledge is relative and complex, that learning ability is acquired, and that learning is a gradual process (developed epistemological beliefs) feel more competent and effective in learning. They are likely to use higher-order cognitive strategies, such as metacognitive self-regulation, critical thinking, and deep processing, and subsequently achieve better learning outcomes (higher grades). Therefore, it can be concluded that students with high-level epistemological beliefs (e.g., the belief that ability is acquired and can improve with effort) have higher academic engagement than other students. These students are more likely to attribute their successes and failures to effort (Bråten & Strømsø, 2004).

Other results showed that constructive problem-solving style does not have an indirect effect on academic engagement, considering the mediating role of academic self-efficacy. These results are consistent with the prior findings (Elhamifar et al., 2019; Haseli Songhori & Salamti, 2024; Hoseinkhani et al., 2022; Molaei Moghbeli et al., 2022; Parsakia, 2023; Soltani et al., 2024; Yeung et al., 2023). These results can be interpreted in that students with problem-solving styles have high motivation, achievement, and performance. Considering that effective performance is the most influential source of judgment about efficiency, it can be explained that high performance and success among learners with non-constructive problem-solving styles increase their academic self-efficacy. On the other hand, individual factors such as class participation, the use of information, and problem-solving skills are related to academic achievement, which increases academic self-efficacy. Learners' awareness of their academic self-efficacy increases their motivation, interaction, effort, voluntary participation in learning activities, and the use of more effective strategies to address problems, leading to improved and sustained academic activities (Elhamifar et al., 2019; Haseli Songhori & Salamti, 2024; Yeung et al., 2023).

5. Limitations & Suggestions

Based on the results of this study, it can be claimed that psychological interventions can be made to enhance students' academic performance by focusing on their epistemological beliefs and academic self-efficacy. Finally, it should be noted that this study only included high school students in Bushehr County as research participants, so the findings are generalizable only to this population. It is recommended that similar research be conducted in other educational levels, such as among university students, and the results compared with those of the present study. Additionally, similar research should be conducted at different ages, and the results compared with those of the present study. It is important to note that the primary data collection method in this study was self-report questionnaires, which are common in most research. Considering that students' performance in real situations may differ from their perception of the same situation, it is recommended that data on the variables be collected from multiple sources, such as interviews, to ensure more reliable results.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contributed in this article.

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