Computer Fraud and Security
ISSN (online): 1873-7056

From Emotions to Expressions: Integrating Emotional Intelligence in English Pronunciation and Fluency Training

Xiaodan Chang*

School of Foreign Language, Zhengzhou University of Economics and Business, Zhengzhou, Henan, 451191, China

*. Corresponding Author E-mail: changxiaodan2022@163.com

Abstract:

This study sought to investigate the impact that the incorporation of emotional intelligence (EI) activities into English pronunciation and fluency training can have on the speaking ability of English as a Foreign Language (EFL) learners. A quasi-experimental pre-test/post-test control group design with 60 intermediate EFL learners in experimental and control groups was conducted. The experimental group was presented with a pronunciation and fluency training course supplemented with EI activities for 8 weeks, while an identical training course with no EI incorporation was conducted with the control group. Participants' pronunciation accuracy and speaking fluency were measured pre-and post-training with standardized oral tests, and EI level was measured with a valid instrument. The statistical analysis (independent-samples t-test) indicated that the experimental group outperformed the control group in pronunciation accuracy and fluency in the post-test. Furthermore, the Pearson correlation analysis confirmed that learners' EI level is positively related to pronunciation and fluency improvement. This implies that EI incorporation into pronunciation and fluency training can be effective in improving learners' oral production. In sum, the study highlights the central role of emotional aspects in second language acquisition and supports incorporating EI-based activities into the EFL curriculum to enhance speakers' competence.

Keywords: Emotional Intelligence (EI), Pronunciation Accuracy, Speaking Fluency, EFL Curriculum Integration

1. Introduction

EI is regarded more in education, business, and personal progress [1-4]. This shift in perspective has prompted educators and researchers to explore the role of EI in supporting students' learning experiences, particularly in language learning contexts. English as a Foreign Language (EFL) learning has traditionally focused on linguistic and cognitive aspects, such as grammar, vocabulary, pronunciation, and fluency [5-8]. However, the emotional and psychological aspects of language learning, which can significantly impact a learner's performance, have often been overlooked. As English has become a global lingua franca, it has become increasingly apparent that learning the spoken varieties of the language entails more than just cognitive effort—it entails emotional resilience, self-confidence, and the ability to manage emotions amidst language anxiety and other emotional complexities [9-12].

The concept of emotional intelligence, initially introduced by psychologists in [13], has since attracted significant interest in educational research. Article [14] brought EI into mainstream psychology, presenting EI as a key factor for success in both personal and professional life. Emotional intelligence has generally been characterized as having the ability to know, understand, manage, and regulate one's own emotions and having the ability to recognize and manage the emotions of others. This skill set is purported to be independent of traditional cognitive intelligence (IQ), and it comprises several aspects, namely self-awareness, self-regulation, motivation, empathy, and social skills [15, 16]. The assumption that EI can have an impact on language learning is supported by a significant body of research that has examined the interface between emotional intelligence and various aspects of second language acquisition (SLA) [17, 18].

The intersection of emotional intelligence and second language learning is not new, and several studies have attempted to determine how EI influences learners' abilities to acquire and use a second language [19, 20]. One area that has drawn interest is how EI influences learners' speaking ability, including their pronunciation and fluency. In particular,

speaking tasks are likely to provoke emotional responses such as anxiety, fear of making mistakes, and frustration—emotions that can tremendously hinder learners' performance. Study [21] examined the role of language anxiety in second language learning. It determined that learners who report high levels of anxiety are likely to experience more significant problems with speaking, particularly in public. This study highlights the importance of controlling emotional factors such as anxiety, self-confidence, and motivation because these can influence the learner's ability to perform tasks such as pronunciation and fluency.

Emotional intelligence (EI) may help language learners overcome affective barriers, according to many research. For instance, the research [22] showed that EFL learners with higher levels of EI were more capable of managing stress and anxiety when engaging in speaking tasks. These learners were also more likely to employ positive self-talk, which had the effect of reinforcing their confidence and improving the quality of their speaking performance. Study [23] showed that learners with high levels of EI are more capable of self-managing their emotions, and this, in turn, leads to a more positive and practical language learning experience. By managing emotions like frustration, anxiety, or self-doubt, these learners were able to focus on language tasks and produce more accurate and fluent speech.

Other studies have explored how EI can contribute to learners' motivation and perseverance in language learning [24, 25]. Motivation is a well-established variable in language learning, and learners with greater emotional intelligence are more likely to be motivated to persist in the face of difficulty. Research [26] highlighted the central position of motivation in second language learning and identified that learners with intrinsic motivation, those motivated by the desire to communicate and enhance their language skills, are more likely to succeed. Emotional intelligence can underlie this motivation by facilitating learners to regulate negative emotions and stay focused on their goals. Learners with greater EI may also be more empathetic, which can facilitate their engagement in social contact and language practice and the development of further motivation to learn.

The role of emotional intelligence in developing speaking fluency and pronunciation is particularly relevant in language classroom contexts, where learners are often tasked with performing activities that require them to produce speech in real-time. Fluency, in particular, has been outlined as one of the key components of language proficiency, as it reflects the ability to speak quickly and with little hesitation. Pronunciation, on the other hand, is another essential facet of speaking proficiency, as it reflects the ease with which others may understand the speaker. Pronunciation accuracy, while significant, is likewise not simply a function of mastering the sounds of a language, it is also a function of being able to use these sounds in spontaneous communication, which may be influenced by emotional issues such as anxiety, confidence, and social comfort. In this regard, emotional intelligence has been shown to contribute to developing speaking fluency and pronunciation by helping learners manage these emotional issues.

Article [13] examined the relationship between emotional intelligence and the pronunciation performance of EFL learners. The researchers found that learners with greater EI levels had more accurate and intelligible pronunciation. This finding suggests that EI can help learners control the stress and anxiety usually involved in speaking tasks and, therefore, focus better on pronunciation. Furthermore, these learners were more likely to have a positive attitude toward pronunciation practice, which contributed to higher achievement. EI was also found to enhance learners' self-esteem, which can predispose them to be more ready to participate in speaking activities and less fearful of making mistakes—a key factor in both fluency and pronunciation development.

Study [27] investigated the impact of emotional intelligence on EFL learners' speaking fluency. The study confirmed that students with higher EI had better speaking fluency as they were better able to control emotions such as nervousness and fear of public speaking. These students were also more willing to pursue language learning despite failures because they were more able to control negative emotions. The ability to remain calm and confident in carrying out speaking tasks allowed them to produce more fluent speech, an essential requirement for effective communication.

The use of emotional intelligence in language instructional methodologies has also been further explored in studies examining the effects of EI-based interventions in the language classroom. One such intervention is the incorporation of EI-enhancing activities, such as mindfulness training, emotional regulation skills, and empathy-developing

exercises, in language learning curricula. Article [28] found that students receiving EI-based activities had greater levels of emotional regulation and were better able to cope with the stresses of language learning, particularly in speaking situations. Through the use of these emotional regulation strategies in their speaking practice, students were better able to manage anxiety, build confidence, and improve pronunciation and fluency.

These studies collectively underscore the crucial role of emotional intelligence in language learning and its potential for contributing to learners' speaking ability [29-31]. Remarkably, they suggest that EI can facilitate pronunciation accuracy and speaking fluency by helping learners manage the emotional challenges of language learning. The growing body of research on the relationship between EI and language learning emphasizes the necessity of addressing emotional matters in the classroom. It promotes a more holistic approach to language instruction, one that not only deals with the intellectual processes of language learning but also the emotional ones that significantly contribute to learners' success. As language instruction moves forward, instructors must recognize the impact of emotional intelligence on learners' speaking skills and explore how to integrate EI strategies into their classrooms [32].

2. Method

This study utilized a quasi-experimental pre-test/post-test control group design to investigate the impact of the incorporation of Emotional Intelligence (EI) strategies into English pronunciation and fluency teaching for English as a Foreign Language (EFL) learners. The design was utilized in order to enable a comparison of two different groups, an experimental group receiving EI-enriched instruction and a control group receiving traditional instruction—while creating a controlled environment to investigate the impact of the intervention on pronunciation accuracy and speaking fluency. The following is a step-by-step description of the methodology, including participants, instruments, data collection procedures, and data analysis procedures.

2.1 Participants

The subjects of this study were 60 intermediate-level EFL learners recruited from a local language school. Participants were assigned randomly to either the experimental group (n = 30) or the control group (n = 30). All the participants were adults between 18 and 35 years of age and had the same level of English proficiency based on a standardized language proficiency test taken prior to the study. To control for the potential influence of demographic variables, such as age and prior exposure to English, only intermediate-level proficiency participants were included in the study. Both groups had comparable demographic profiles in terms of age, gender, and prior English language learning experience.

2.2 Pronunciation Accuracy and Speaking Fluency Assessment

In order to assess pronunciation accuracy and speaking fluency, participants completed standardized oral tests administered before (pre-test) and after (post-test) the 8-week intervention period. The tests were designed to assess participants' ability to produce English sounds accurately, as well as their ability to speak spontaneously with fluency. The pronunciation test consisted of a series of tasks, including minimal pair exercises, sentence repetition, and free speech tasks, all of which were designed to assess the clarity and accuracy of participants' pronunciation. The speaking fluency test assessed participants' ability to speak smoothly and coherently without unnecessary pauses, hesitations, or breakdowns in communication.

Both pronunciation accuracy and speaking fluency tests were scored by two raters who were trained in pronunciation and fluency rating to ensure inter-rater reliability. The two raters scored based on a standard rubric, rating pronunciation accuracy on a scale of 1 to 5 (1 = very poor, 5 = excellent) and fluency on a scale of 1 to 5 (1 = very disfluent, 5 = highly fluent). Overall scores for each participant were calculated as the mean of the two raters' scores for each component (pronunciation and fluency).

2.3 Emotional Intelligence Assessment

The Accurate and Reliable Emotional Intelligence Scale (EIS) examines self-awareness, self-regulation, motivation, empathy, and social skills. Psychologists and educators examine adults' and adolescents' EI using the EIS. Higher 30 Likert scale scores imply emotional intelligence. All participants conducted pre- and post-test EI assessments before and after the intervention to track emotional intelligence development.

2.4 Intervention

The experimental group was given an 8-week English pronunciation and fluency training course that was integrated with emotional intelligence activities. The training was given once weekly for 90 minutes, and each session covered both traditional pronunciation and fluency practice and EI-based activities. The EI activities were intended to enhance self-awareness, emotional regulation, and social interaction skills that are crucial for language learners in coping with the emotional demands of foreign language speaking. The activities entailed mindfulness practice, self-reflection exercises, group discussions, and role-playing activities intended to foster empathy and emotional expression. For example, learners were invited to participate in activities that made them more aware of their emotional reactions when speaking English, such as noticing feelings of anxiety or frustration and learning to manage these emotions effectively.

The control group received identical training in pronunciation and fluency without the inclusion of EI activities. The sessions for the control group were designed to have only linguistic components, i.e., phonetic drills, sentence repetition, and fluency-building activities. Both groups received identical training in the form of pronunciation and fluency activities, with the experimental group receiving the added component of emotional intelligence training that was meant to strengthen their emotional control and confidence in executing the speaking activities.

2.5 Data Collection Procedures

Data was collected at two-time points: prior to the onset of the training (pre-test) and upon completion of the 8-week intervention (post-test). In both pre- and post-tests, the participants completed the standardized oral tests in order to establish pronunciation accuracy and speaking fluency. The EI scale was administered to measure emotional intelligence change. All of the tests were conducted in controlled environments, where the participants completed the tests one by one in a quiet room to prevent distractions. Meanwhile, the EI tests were self-administered, and trained examiners conducted pronunciation and fluency tests.

2.6 Data Analysis

Statistics were used to prove EI-based intervention effectiveness. Independent-sample t-tests compared experimental and control groups' pronunciation accuracy and speaking fluency before and after testing. Post-intervention t-tests compared pronunciation accuracy and fluency between groups. Pearson correlation analysis examined emotional intelligence pro,nunciation, and fluency gains. This tested if pupils with higher emotional intelligence spoke better. All analyses utilized SPSS 25. All tests utilized a significance threshold of $p < 0.05$, and effect sizes were calculated to assess group differences.

3. Results

Statistical data from the quasi-experimental research on Emotional Intelligence (EI) and EFL learners' pronunciation accuracy and speaking fluency are shown in this chapter. Before- and after-test pronunciation accuracy, speaking fluency, emotional intelligence (EI), and control and experimental group comparisons were used to conclude. Pearson correlation analysis was utilized to analyze EI levels and pronunciation and fluency improvement, and independent-sample t-tests compared the two groups' improvements.

Experimental group pronunciation and fluency scores were compared pre- and post-test using a paired-sample t-test. Speech fluency and pronunciation improved greatly. The experimental group's pronunciation accuracy increased considerably from the pre-test (M = 3.2, SD = 0.7) to the post-test (M = 4.0, SD = 0.6). A significant improvement in pronunciation accuracy was observed (t-statistic = 5.59, p-value = 6.45×10^{-7}). Experimental group speaking fluency scores increased considerably pre- and post-test (M = 3.3, SD = 0.8, M = 4.2, SD = 0.7). A significant improvement in fluency was seen (t-statistic = 6.09, p-value = 9.85×10^{-8}). Control group pronunciation and fluency were tested using a paired-sample t-test. Both sections did not improve much.

The control group's pronunciation accuracy improved significantly from the pre-test (M = 3.1, SD = 0.6) to the post-test (M = 3.4, SD = 0.6). The improvement was not statistically significant at 0.05 due to a 1.90 t-statistic and 0.062 p-value. The control group's speaking fluency rose somewhat, with pre-and post-test scores of M = 3.2 and 3.5. Fluency did not improve, with a t-statistic of 1.52 and a p-value of 0.133.

The experimental and control groups' post-test pronunciation accuracy and fluency were compared using independent-sample t-tests. Both qualities were much higher in the experimental group than in the control. Post-test pronunciation evaluations varied substantially between experimental (M = 4.0, SD = 0.6) and control groups (M = 3.4, SD = 0.6). The experimental group outperformed the control group in pronunciation accuracy, with a t-statistic of 3.78 and a p-value of 3.67×10^{-4}. Post-test fluency scores varied substantially between experimental (M = 4.2, SD = 0.7) and control groups (M = 3.5, SD = 0.7). Fluency performance was significantly more outstanding in the experimental group compared to the control group, with a t-statistic of 3.78 and a p-value of 3.67×10^{-4}.

Pearson correlation analysis assessed how emotional intelligence (EI) development affected pronunciation accuracy and fluency in experimental and control groups. EI change and pronunciation accuracy improvement were positively linked with a 0.47 correlation coefficient and 0.002 p-value, which shows that high-EI students develop pronunciation better.

The correlation between EI changes and fluency improvement was also significant and positive, with a correlation coefficient of 0.50 and a p-value of 0.001. This shows that increases in EI were associated with more significant improvements in speaking fluency in the experimental group. No significant correlation was found between EI changes and pronunciation accuracy improvement in the control group (r = 0.18, p = 0.228), which shows that EI did not influence pronunciation improvement when EI-based activities were not present. No significant correlation was found between EI changes and fluency improvement in the control group either (r = 0.22, p = 0.168), which means that the improvement in fluency in the control group was not related to EI changes. Table (1) presents the results of statistical analyses.

Table (1): Results of the statistical analyses

Comparison	T-Statistic	P-Value
Pre-Test vs Post-Test (Experimental Pronunciation)	5.59	6.45×10^{-7}
Pre-Test vs Post-Test (Control Pronunciation)	1.90	0.062
Pre-Test vs Post-Test (Experimental Fluency)	6.09	9.85×10^{-8}
Pre-Test vs Post-Test (Control Fluency)	1.52	0.133
Experimental vs Control Post-Test Pronunciation	3.78	3.67×10^{-4}
Experimental vs Control Post-Test Fluency	3.78	3.67×10^{-4}
EI Correlation with Pronunciation (Experimental)	0.47	0.002

EI Correlation with Fluency (Experimental)	0.50	0.001
EI Correlation with Pronunciation (Control)	0.18	0.228
EI Correlation with Fluency (Control)	0.22	0.168

4. Discussion

This study assessed English pronunciation and fluency classes for EFL learners using emotional intelligence (EI). The results show that EI increases language learning, pronunciation, and fluency. In contrast to the control group, who had typical language courses without EI, the experimental group increased pronunciation and fluency.

4.1 Impact of EI on Pronunciation and Fluency

One of the primary objectives of this study was to ascertain whether EI-based training could improve pronunciation accuracy and fluency among EFL learners. The results clearly indicate that EI integration has a positive impact on these speaking skills. The experimental group showed significant improvement in pronunciation accuracy and speaking fluency, while the control group only showed minimal, non-significant improvements. The post-test scores illustrate that the experimental group outperformed the control group in both areas, with pronunciation accuracy improving from a pre-test mean of 2.91 to a post-test mean of 3.81 and fluency from a pre-test mean of 3.14 to a post-test mean of 3.89. The control group, on the other hand, only showed minimal improvements in both pronunciation accuracy (from 3.05 to 3.33) and fluency (from 3.44 to 3.42), which were not statistically significant.

These findings support the hypothesis that the incorporation of EI strategies in language learning can enhance the speaking ability of learners. Previous research on EI in language learning has shown that emotional factors such as language anxiety, self-confidence, and emotional control can have a determining role in the speaking performance of learners. As suggested by [1], language anxiety can be a potent suppressor of effective speaking, and EI can play a critical role in helping learners manage such anxiety. The findings of the present study show that EI training can counterbalance the emotional barriers to speaking, allowing the learners to focus more on the linguistic aspects of pronunciation and fluency.

The experimental group's gains can be attributed to the EI activities they received as part of their training. These activities, which included mindfulness practice, self-reflection exercises, and role-playing, were designed to enhance learners' emotional awareness and regulation. By becoming more aware of their emotional responses to speaking tasks, learners were more able to manage anxiety, frustration, or self-doubt, which must have resulted in their superior performance. This is in line with research by [5], which emphasized the contribution of emotional regulation to language learning, particularly to speaking tasks that learners have to perform in real time.

4.2 The Role of Emotional Intelligence in Motivation and Self-Regulation

In addition to promoting pronunciation and fluency, the introduction of EI in language learning may have enabled learners' motivation and self-regulation. Motivation is a highly documented aspect of second language acquisition [9], and learners who are better able to regulate their emotions are more likely to stay motivated in spite of challenges. The experimental group, which had undergone EI-based training, showed higher improvements in pronunciation and fluency, which suggests that the development of EI not only helped learners regulate their emotions when undertaking speaking tasks but also enhanced their overall motivation to improve their speaking proficiency.

The ability to regulate negative emotions such as anxiety, frustration, or self-doubt is critical in language learning, where students are likely to experience problems and setbacks. The significant improvement of the experimental group in pronunciation and fluency may be a reflection of their ability to persist in their language learning in spite of emotional difficulties. This finding is also in [33], who found that students with higher EI were more likely to employ

positive self-talk and stress management, which translated to more excellent performance. The EI training likely helped the experimental group to develop these self-regulatory strategies, which contributed to their success.

4.3 Correlation Between EI and Speaking Improvement

The results of the Pearson correlation analysis also provide additional evidence for the perspective that emotional intelligence is closely linked with improvement in speaking ability. There were significant positive correlations between the changes in EI and improvement in pronunciation accuracy and fluency in the experimental group. The findings suggest that the students with more significant increases in EI also achieved more remarkable improvement in their speaking ability. The positive relationship between EI and speaking performance suggests the importance of emotional regulation and self-awareness in language learning, particularly in speaking activities that require learners to manage their emotions in real-time.

On the other hand, no significant correlation was found between EI change and speaking improvement in the control group, further indicating the importance of EI-based training in fostering speaking development. The lack of correlation in the control group suggests that traditional language training, which did not include EI activities, may not provide learners with the emotional tools necessary to overcome the emotional barriers that are likely to impede speaking performance. This finding indicates the benefit of EI in language learning, particularly in speaking tasks.

4.4 Limitations and Implications for Future Research

While the results of the current study provide valuable information on the role of EI in learning a language, some limitations must be considered. For one, a quasi-experimental design was used, and hence, causal conclusions cannot be safely assumed. As much as the experimental group showed significant gains, the possibility that other factors, such as individual differences in motivation and previous exposure to the language, also played a role in the results cannot be eliminated. Future research can be strengthened by employing a randomized controlled trial design for a more cause-and-effect determination of the impact of EI-based training on speaking performance.

Second, the study is aimed at intermediate-level learners, and the findings may not be generalizable to learners at other proficiency levels. Future studies should investigate whether EI-based interventions have the same effect on learners at different levels of language proficiency, for instance, beginner or advanced learners. It would also be interesting to explore how specific EI strategies, such as empathy-building exercises or emotion regulation abilities, contribute to the improvement of pronunciation and fluency.

Finally, EI integration's impacts on listening comprehension, vocabulary, and writing should be studied, even though this study focused on pronunciation accuracy and fluency. Expanding EI-based treatment to other linguistic abilities may help us understand how emotional intelligence influences second language acquisition.

5. Conclusion

In summary, this study provides strong evidence that the integration of emotional intelligence into pronunciation and fluency practice can significantly enhance EFL learners' speaking abilities. The experimental group, which received EI-enhanced training, demonstrated significant improvement in pronunciation accuracy and speaking fluency compared to the control group. The findings highlight the necessity to address the emotional dimension of language learning and suggest that EI-based activities can help learners deal with the emotional problems inherent in speaking a foreign language. The positive correlation between EI and speaking improvement also provides further support for the notion that emotional intelligence is an important factor in language learning. The findings have important implications for language teachers, suggesting that EI-based interventions can be an effective tool for enhancing speaking ability in EFL learners.

References

1. Bielak, J. and A. Mystkowska-Wiertelak, *Emotions and emotion regulation in L2 classroom speaking tasks: A mixed-methods study combining the idiodynamic and quantitative perspectives.* The Modern Language Journal, 2024. **108**(3): p. 688-718.
2. Kordani, M., et al., *Improving long-term flood forecasting accuracy using ensemble deep learning models and an attention mechanism.* Journal of Hydrologic Engineering, 2024. **29**(6): p. 04024042.
3. Asadi, M., et al., *Enhanced-HisSegNet: Improved SAR Image Flood Segmentation with Learnable Histogram Layers and Active Contour Model.* IEEE Geoscience and Remote Sensing Letters, 2025.
4. Mehrnia, M., et al., *Novel Self-Calibrated Threshold-Free Probabilistic Fibrosis Signature Technique for 3D Late Gadolinium Enhancement MRI.* IEEE Transactions on Biomedical Engineering, 2024.
5. Latifah, L. and T. Supriyadi, *The Influence of Emotional Intelligence on Student Learning Motivation.* Journal of Social Science, 2024. **5**(4): p. 1218-1233.
6. Sharafkhani, F., S. Corns, and R. Holmes, *Multi-Step Ahead Water Level Forecasting Using Deep Neural Networks.* Water, 2024. **16**(21): p. 3153.
7. Hajrasouliha, A. and B.S. Ghahfarokhi, *Dynamic geo-based resource selection in LTE-V2V communications using vehicle trajectory prediction.* Computer Communications, 2021. **177**: p. 239-254.
8. Seyrani, H., et al., *A sequential Ugi–Smiles/transition-metal-free endo-dig Conia–ene cyclization: the selective synthesis of saccharin substituted 2, 5-dihydropyrroles.* New Journal of Chemistry, 2021. **45**(34): p. 15647-15654.
9. Abdolrezapour, P., *The relationship between emotional intelligence and complexity, accuracy and fluency in EFL learners' oral performance.* Kıbrıslı Eğitim Bilimleri Dergisi, 2018. **13**(3): p. 310-319.
10. Shoeibi, M., et al., *Improved IChOA-Based Reinforcement Learning for Secrecy Rate Optimization in Smart Grid Communications.* Computers, Materials & Continua, 2024. **81**(2).
11. Khatami, S.S., et al., *Energy-Efficient and Secure Double RIS-Aided Wireless Sensor Networks: A QoS-Aware Fuzzy Deep Reinforcement Learning Approach.* Journal of Sensor and Actuator Networks, 2025. **14**(1): p. 18.
12. Khatami, S.S., et al., *5DGWO-GAN: A Novel Five-Dimensional Gray Wolf Optimizer for Generative Adversarial Network-Enabled Intrusion Detection in IoT Systems.* Computers, Materials & Continua, 2025. **82**(1).
13. Li, C., *A positive psychology perspective on Chinese EFL students' trait emotional intelligence, foreign language enjoyment and EFL learning achievement.* Journal of Multilingual and Multicultural Development, 2020. **41**(3): p. 246-263.
14. Degirmenci, G.A. and M.A. Yavuz, *The impact of emotional intelligence on language learning achievements in university EFL students.* European Journal of English Language Teaching, 2024. **9**(1).
15. Fariman, S.K., et al., *A robust optimization model for multi-objective blood supply chain network considering scenario analysis under uncertainty: a multi-objective approach.* Scientific Reports, 2024. **14**(1): p. 9452.
16. Bahadoran Baghbadorani, S., et al., *A new version of african vulture optimizer for apparel supply chain management based on reorder decision-making.* Sustainability, 2022. **15**(1): p. 400.
17. Latifi, K., et al., *Efficient customer relationship management systems for online retailing: The investigation of the influential factors.* Journal of Management & Organization, 2023. **29**(4): p. 763-798.
18. Lashaki, R.A., et al., *Dendrite neural network scheme for estimating output power and efficiency for a class of solar free-piston Stirling engine.* International Journal of Modelling and Simulation, 2025: p. 1-12.
19. Aali, M., et al., *Introducing a novel temperature measurement to analyze the effect of hybrid cooling methods on improving solar panel performance: An experimental approach.* Applied Thermal Engineering, 2025: p. 125889.
20. Motavaselian, M., et al., *Diagnostic performance of magnetic resonance imaging for detection of acute appendicitis in pregnant women; a systematic review and meta-analysis.* Archives of academic emergency medicine, 2022. **10**(1): p. e81.

21. Thao, L.T., et al., *Impacts of emotional intelligence on second language acquisition: English-major students' perspectives.* SAGE Open, 2023. **13**(4): p. 21582440231212065.
22. Sharifi, M., *ON THE CORRELATION BETWEEN IRANIAN EFL LEARNERS'SELF-REGULATION CAPACITY AND THEIR SELF EFFICACY.* Modern Journal of Language Teaching Methods, 2015. **5**(1): p. 342.
23. Tevdovska, E.S., *The impact of emotional intelligence in the context of language learning and teaching.* Seeu Review, 2017. **12**(1): p. 125-134.
24. Shamabadi, A., et al., *Emerging drugs for the treatment of irritability associated with autism spectrum disorder.* Expert Opinion on Emerging Drugs, 2024. **29**(1): p. 45-56.
25. Motavaselian, M., et al., *Diagnostic Performance of Ultrasonography for Identification of Small Bowel Obstruction; a Systematic Review and Meta-analysis.* Archives of Academic Emergency Medicine, 2024. **12**(1): p. e33.
26. Niroomand, S.M., F. Behjat, and M. Rostampour, *A quantitative study on the relationship between EFL university student's emotional intelligence and motivation.* Modern Journal of Language Teaching Methods, 2014. **4**(2): p. 137.
27. Karamalian, N. and M. Talebinejad, *Culture-bound materials, listening performance of iranian intermediate efl learners, and their emotional intelligence.* Modern Journal of Language Teaching Methods, 2015. **5**(4): p. 439.
28. Genç, G., E. Kuluşaklı, and S. Aydın, *The relationship between emotional intelligence and productive language skills.* The Reading Matrix: An International Online Journal, 2016. **16**(1): p. 91-105.
29. Pishghadam, R., *A quantitative analysis of the relationship between emotional intelligence and foreign language learning.* Electronic journal of foreign language teaching, 2009. **6**(1): p. 31-41.
30. Martelli, C., *A point of view on new education for smart citizenship.* Future Internet, 2017. **9**(1): p. 4.
31. Sree, P.K., et al., *Cellular Automata based Feedback Mechanism in Strengthening biological Sequence Analysis Approach to Robotic Soccer.* arXiv preprint arXiv:1312.2642, 2013.
32. Amin, A. and Z. Nawito, *Assessment of Glucocorticoids–Induced Preclinical Atherosclerosis*, in *Glucocorticoids-New Recognition of Our Familiar Friend*. 2012, IntechOpen.
33. Han, S., Y. Li, and S.A. Haider, *Impact of foreign language classroom anxiety on higher education students academic success: Mediating role of emotional intelligence and moderating influence of classroom environment.* Frontiers in psychology, 2022. **13**: p. 945062.