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The Effect of Teaching the Reflective Thinking Model on Academic Self-Efficacy and Achievement Motivation in Female Students of Farhangian University in Ahvaz

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ABSTRACT

Objective: The purpose of this study was to determine the effect of reflective thinking training on academic self-efficacy and achievement motivation among female students of Farhangian University of Ahvaz.

Methods: This research employed an experimental-field design with a pre-test and post-test control group. The participants consisted of 45 female students selected through available sampling from Farhangian University of Ahvaz during the 2015–2016 academic year. They were randomly assigned into three groups: one experimental group and two control groups, each comprising 15 participants. The experimental group received training based on a reflective thinking model, while the two control groups did not receive any training. Pre-tests of academic self-efficacy and achievement motivation were administered to all groups prior to the intervention. After completing the training program, post-tests were conducted. Data were analyzed using multivariate analysis of covariance (MANCOVA).

Results: Findings indicated that reflective thinking training significantly increased academic self-efficacy (F=22.1, P<0.001) and achievement motivation (F=27, P<0.001) among the students.

Conclusions: Reflective thinking training has a significant positive effect on academic self-efficacy and motivation in female students of Farhangian University of Ahvaz.

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Introduction

The model of reflective thinking is one of the most significant educational and philosophical approaches in contemporary pedagogy, first formally defined and explained by John Dewey (1933), the eminent philosopher of education. Dewey described reflective thinking as *"the active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it, and the further conclusions to which it tends."* Today, this definition closely aligns with the concept of critical thinking and is frequently discussed alongside it in academic and scientific communities (Farkhandeh & Mohammadi, 2021).

The key features and dimensions of the reflective thinking model can be summarized as follows:

(a) Activeness: The learner is not merely a passive recipient of information but actively reconsiders, examines, and analyzes knowledge to gain deeper understanding or correct misconceptions.

(b) Continuity and persistence: Reflection is a continuous and deliberate process in which the learner explores ambiguities in concepts or experiences until reaching clarity or an acceptable conclusion.

(c) Critical evaluation: Reflective thinking relies on rationality, evidence, and logical criteria; conclusions must be based on valid and accurate data.

(d) Problem solving: Learners generate, test, and evaluate hypotheses when faced with challenges — a process rooted in Dewey's scientific method and empiricism.

In essence, reflective thinking is a cognitive process through which individuals actively and continuously review, analyze, and evaluate their experiences, beliefs, and emotions to uncover new relationships, deeper meanings, and effective solutions (Sahib Yar et al., 2022).

The stages of reflective thinking typically begin with identifying a problem or uncertainty, followed by searching for hypotheses, implementing solutions, evaluating results, and refining conclusions. In this model, *experience*, *participation*, and *experimentation* are central elements. Reflective thinking is therefore not only a learning skill but also a foundation for personal, social, and cultural growth (Kadivar, 2012).

Research by McLeod, Bari, and Welch (2015) emphasized the necessity of implementing reflective thinking models in higher education to improve planning, evaluation, and learning outcomes. When applied alongside cognitive training, guided participation, and authentic learning

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experiences, reflective thinking enhances students' knowledge, practical skills, and conceptual understanding.

The reflective thinking model brings subtle yet significant improvements to learners' performance. Its emphasis on active engagement and realistic problem-solving fosters positive self-perception and enhances motivation. Kadampour, Moradian, and Shokri (2013) found that reflective thinking activates a wide range of functional, cognitive, metacognitive, and moral skills. Students often experience a heightened sense of competence and satisfaction when exposed to reflective learning environments. Such emotional fulfillment strengthens self-efficacy, leading to greater motivation, perseverance, and academic achievement.

At various stages of reflective-based teaching, instructors can motivate students by posing engaging and relevant questions that connect learning to real-world contexts. Providing students with ownership of knowledge fosters pride and deeper engagement, motivating both teachers and learners to pursue further reflective learning (Johnson & Reeves, 1996).

In summary, the reflective thinking model, based on the mental tools framework of Komers, Jonassen, and Mayes (1992, cited in Fardanesh, 2013), helps learners organize course content around critical and creative thought. Reflective learning activities—such as questioning current actions, planning next steps, and setting conditions for progression—enhance self-direction, communication, experimentation, feedback, and continuous improvement.

Reflective teaching also plays a practical role in teacher development and instructional improvement. Empirical evidence suggests a statistically significant relationship between reflective teaching and teacher self-efficacy in areas such as student interaction, curriculum design, and classroom management. Teachers who engage in reflective practice demonstrate higher self-efficacy and teaching effectiveness (Ahmadi, 2013; Yousefi Isa Kan, 2014).

In the context of the 21st century, characterized by rapid technological and informational change, reflective thinking has become increasingly vital. Modern education must prepare learners to face unpredictable challenges through active engagement and meaningful learning experiences. Thinking, reflection, and problem solving are thus interwoven and essential for intellectual development. Reflective thinking, more than critical thinking, enhances learners' cognitive depth by enabling them to examine and refine their own thought processes (Fardanesh, 2012).

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Academic self-efficacy refers to an individual's belief in their capacity to successfully perform academic tasks, overcome challenges, and achieve educational goals. Bandura (1997) identified self-efficacy as a core construct underlying motivation, self-regulation, and achievement. Students with high academic self-efficacy show greater persistence, resilience, and academic performance (Al-Aamiri & Mohajeran, 2025).

A study by Perhamnia (2021) among postgraduate students revealed that both reflective and scientific thinking significantly correlate with research self-efficacy. Similarly, Kayaninejad et al. (2012) reported that reflective thinking, self-efficacy beliefs, and academic achievement are positively related. Reflective thinking thus enhances students' ability to analyze their learning, boosts self-confidence, and promotes academic success.

Achievement motivation, as defined by McClelland and Atkinson (1953), is an individual's desire to excel, meet high standards, and achieve success. It drives individuals to overcome challenges and reach personal or social goals, playing a crucial role in learning and personal growth (Gage & Berliner, 1992; Elliott & Church, 1997; Murray, 1983).

Given the established importance of academic self-efficacy and achievement motivation—and the demonstrated effectiveness of reflective thinking—the present study seeks to answer the following research question: Does training based on the reflective thinking model influence academic self-efficacy and achievement motivation among female students at Farhangian University of Ahvaz?

Material and Methods

This study employed an experimental field design using a pre-test and post-test structure with control groups. The design included one experimental group and two control groups. To accurately examine the effect of reflective thinking training at Farhangian University, it was essential to include a third group consisting of student teachers at the non-continuous professional level who did not take internship courses.

Initially, pre-tests measuring academic self-efficacy and achievement motivation were administered to all three groups. Subsequently, the experimental group received training based on the reflective thinking model, while the two control groups received no intervention. Upon completion of the training sessions, a post-test was administered immediately to all groups to measure the impact of the intervention.

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The statistical population included all female students of Farhangian University of Ahvaz during the academic year 2015–2016 (Gregorian calendar), totaling approximately 900 students.

A convenience sampling method was employed. Based on methodological recommendations that a minimum of 15 participants per group is sufficient for comparison in parametric tests, a sample size of 45 students was selected and equally divided among three groups (15 participants in each).

Instruments

1. Academic Self-Efficacy Scale (Owen, Furman, & Rubin, 1988): The Academic Self-Efficacy Scale was originally developed by Owen, Furman, and Rubin (1988) to assess students' perceived academic competence. The instrument was translated into Persian by the researcher. It comprises 33 items across five subscales:

1. Major organization and planning (10 items: 22–31)
2. Academic self-efficacy (9 items: 1–7, 9, 12)
3. Learning self-efficacy (4 items: 8, 10, 11, 16)
4. Verbal self-efficacy (5 items: 17, 20, 21, 23, 32)
5. Quantitative self-efficacy (5 items: 13–15, 18, 19)

Responses are scored on a 4-point Likert scale ranging from 1 (Very Low) to 4 (Very High), yielding a total possible score between 33 and 132.

Validity and Reliability

- Mirdrikund (2016) reported internal consistency reliability (Cronbach's alpha = 0.93) and test-retest reliability (r = 0.90).
- Hosseini Dolatabadi et al. (2013) reported Cronbach's alpha of 0.90.
- Jamali et al. (2012) reported Cronbach's alpha values of 0.91 for males and 0.90 for females.
- Owen et al. (1988) reported Cronbach's alpha values for subscales ranging from 0.50 to 0.86.

In the present study, Cronbach's alpha coefficients were 0.88 (internal consistency) and 0.71 (split-half reliability), indicating acceptable reliability.

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2. Achievement Motivation Scale (Hermans, 1970): The Hermans Achievement Motivation Scale (1970) consists of 29 items and yields a total score without subscales. Items are presented as incomplete sentences, each with four response options (A–D) representing varying degrees of achievement-oriented behavior.

Scoring is as follows:

For items 1, 4, 9, 10, 14, 15, 16, 20, 23, 27, 28, and 29, scores range from 1 (A) to 4 (D).

For all remaining items, the scoring is reversed.

Total scores therefore range between 29 and 116.

Validity and Reliability:

Hermans (1970) established content validity and confirmed item–behavior correlations.

Homan & Asgari (2000) confirmed construct validity via factor analysis (factor loadings ≥ 0.30).

Reported reliability coefficients include:

Hermans (1970): Test-retest = 0.84, Cronbach's alpha = 0.84.

Abbasian Fard (2009): Test-retest = 0.82, Cronbach's alpha = 0.84.

Homan & Asgari (2009): Cronbach's alpha = 0.83.

In the current study, Cronbach's alpha and split-half reliability coefficients were 0.84 and 0.83, respectively, confirming acceptable internal consistency.

Educational Intervention: Reflective Thinking Model

The reflective thinking training used in this study was adapted from the "mental tools" framework proposed by Komers, Jonassen, and Mayes (1992) and further developed through Aghazadeh's (2013) integrated teaching model.

The training program aimed to help students: Understand the nature and process of reflective thinking; Engage in diverse learning activities based on reflective, creative, and critical thinking; Apply reflective thinking skills in lesson planning, teaching, and self-assessment; Develop flexible thinking, comparative reasoning, generalization, cause-and-effect analysis, and reflective evaluation.

The experimental group participated in structured training sessions, each focusing on specific reflective thinking skills and strategies. A summary of the training sessions is presented in Table 1.

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Table 1. Steps of teaching reflective thinking model taken from Aghazadeh (2013)

Session	Component	Stage	Thinking	Educational techniques
1	Conducting the pre-exam-General description of reflective thinking pattern	----	-----	Introduction, statement of objectives
2	problem solving	Communicate with the information source	creative	database tools
3	problem solving	Drawing a conceptual map with timelines of events	* Contemplative	semantic organizing tools
4	problem solving	Analysis of structural relationships between content	* Contemplative	semantic net working tools
5	problem solving	Relationships between thoughts, ideas and concepts	* Contemplative	dynamic modeling tools
6	Explaining the cause of the events	Sequence of events and statement of effective factors	critical	interpretation of information tools
7	Explain cause and effect	Hypothesizing, collecting relevant evidence and classifying	* Contemplative	visualization tools
8	Help to design learning topics	Building knowledge by building phenomena and concepts	* Contemplative	knowledge construction tools
9	Statement of the problem	To share experiences and information about the problem	creative	Communication and collaboration tools
10	ideation	idea generation	critical	brainstorming
11	Presenting complex mental images	Solving complex problems as well as simple problems	* Contemplative	System modeling tool
12	Conducting the post-test	------	------	closing program

Results

Descriptive measurements for the four research variables—academic self-efficacy, achievement motivation, confidence in decision-making, and reflective thinking—were calculated separately for the experimental and control groups at both pre-test and post-test stages (Table 2).

Table 2. Descriptive indices of research variables by groups and test stages

Variable	Group	Pre-test Mean (SD)	Post-test Mean (SD)
Academic self-efficacy	Experimental	94.0 (7.8)	101.0 (8.1)
	First control	95.4 (2.3)	94.2 (3.0)
	Second control	96.8 (3.4)	96.0 (4.6)
Achievement motivation	Experimental	84.6 (1.3)	90.7 (4.1)
	First control	86.8 (3.8)	85.2 (0.4)
	Second control	85.2 (3.1)	86.5 (0.5)

As shown in Table 2, the experimental group demonstrated an increase in both academic self-efficacy and achievement motivation from pre-test to post-test, whereas the two control groups

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showed minimal change. Before performing the analysis of covariance (ANCOVA), several statistical assumptions were examined:

Linearity: The Pearson correlation coefficient between pre-test and post-test scores of academic self-efficacy was $r = 0.81$ ($p < 0.001$), and for achievement motivation, $r = 0.84$ ($p < 0.001$). These results confirmed linear relationships between the covariates and dependent variables.

Multicollinearity: The correlation between the pre-tests of the two dependent variables was $r = 0.51$, below the 0.90 threshold, indicating no multicollinearity.

Homogeneity of Variances: Levene's test yielded $F = 0.96$ for academic self-efficacy and $F = 0.37$ for achievement motivation (both $p > 0.05$), confirming the equality of variances across groups.

A multivariate analysis of covariance (MANCOVA) was conducted to evaluate the overall effect of reflective thinking training on the dependent variables while controlling for pre-test scores. The results (Table 3) revealed a significant multivariate effect of group membership on the combined dependent variables.

Table 3. Multivariate covariance analysis on post-test means of academic self-efficacy and achievement motivation

Test	Value	F	Hypothesis df	Error df	Sig.	Effect Size
Pillai's Trace	0.77	5.68	8	72	0.001	0.38
Wilks' Lambda	0.26	8.24	8	70	0.001	0.48
Hotelling's Trace	2.62	11.15	8	68	0.001	0.56
Roy's Largest Root	1.23	36.4	4	36	0.001	0.72

These findings indicate a significant difference between the experimental and control groups on at least one of the dependent variables. Subsequent one-way ANCOVA tests were conducted for each dependent variable to identify specific differences (Table 4).

Table 4. One-way covariance analysis results for post-test means (controlling for pre-test scores)

Dependent Variable	SS	df	MS	F	Sig.	Effect Size
Academic self-efficacy	1493	2	746	22.1	0.001	0.53
Achievement motivation	677	2	338	27.0	0.001	0.58

Both academic self-efficacy ($F = 22.1$, $p < 0.001$) and achievement motivation ($F = 27.0$, $p < 0.001$) showed statistically significant differences between groups after controlling for pre-test scores. Adjusted post-test means for each variable are shown in Table 5.

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Table 5. Adjusted post-test means for research variables

Variable	Experimental	First Control	Second Control
Academic self-efficacy	101.81	94.46	94.95
Achievement motivation	91.13	85.24	86.13

Bonferroni post hoc tests (Table 6) indicated that the experimental group differed significantly from both control groups on both dependent variables ($p < 0.01$).

Table 6. Bonferroni post hoc comparisons of group means

Dependent Variable		Comparison	Mean Difference	Sig.
Academic self-efficacy		Experimental vs. First Control	7.35	0.01
		Experimental vs. Second Control	6.85	0.01
Achievement motivation		Experimental vs. First Control	5.88	0.01
		Experimental vs. Second Control	5.50	0.01

The results clearly demonstrate that reflective thinking training significantly enhanced both academic self-efficacy and achievement motivation among female students of Farhangian University of Ahvaz. The experimental group showed higher adjusted post-test means compared to both control groups, confirming the effectiveness of the reflective thinking model as an instructional approach in teacher education.

Discussion

The findings of the present study confirm that reflective thinking training significantly enhances both academic self-efficacy and achievement motivation among female student teachers. These findings are consistent with previous empirical research highlighting the positive role of reflective thinking in promoting self-efficacy and motivational development among teacher education students.

The results are in agreement with those reported by Nosratnia and Moradi (2017), who found a significant and positive correlation between reflective thinking patterns and teachers' sense of self-efficacy. Their regression analyses indicated that reflective teaching could serve as a strong predictor of teachers' perceived competence. Similarly, Babaei (2016) demonstrated that the components of the reflective thinking model—including metacognitive, cognitive, critical, and reflective dimensions—accounted for approximately twenty-five percent of the variance in teachers' self-efficacy scores, with reflective thinking emerging as a significant predictor.

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Furthermore, Daha (2015), in a mixed-methods study, reported that student teachers who engaged closely with educational mentors using higher-order thinking strategies developed greater self-efficacy. Participants who had previous experience with educational coaching demonstrated higher levels of confidence and effectiveness in implementing innovative instructional methods.

In line with these findings, Zahrabi and Yousefi (2016) also observed a meaningful relationship between reflective thinking and achievement motivation. Similarly, Karagolan, Yilmaz, and Keyser (2016) found that reflective thinking training significantly improved pre-service teachers' motivation in Turkish teacher education institutions. Complementing these results, Amasul Biongan (2015) highlighted that teachers' reflective thinking skills substantially influenced students' motivational priorities through collaborative learning and enhanced social awareness.

Other related studies support these conclusions. Young Lee, Forlizzi, Kim, and Kessler (2015) reported that reflective strategies fostered participants' motivation to achieve program objectives and encouraged engagement in additional learning activities. Likewise, Waring (2013) documented that reflective thinking positively affected learners' mental flexibility and intrinsic motivation. Additionally, Junur, Clark, and Bayazit (2013) showed that the use of reflective teaching strategies not only improved instructional quality but also encouraged sustained cooperation between teachers and students, creating a more collegial and supportive classroom atmosphere.

The observed outcomes in the present study can be explained through the cognitive and motivational mechanisms activated by reflective thinking. The reflective thinking model stimulates mental flexibility and cognitive fluency by encouraging students to analyze their learning processes systematically and critically. This structured reflection strengthens self-regulation and helps learners identify effective strategies for problem-solving. As students become more adept at reflecting on their experiences, they gain a stronger sense of mastery and control over their learning, thereby enhancing their academic self-efficacy.

Moreover, the process of engaging in reflective thinking fosters a sense of purpose and persistence in tackling learning challenges, which, in turn, increases motivation to achieve. Successfully navigating the sequential stages of reflective thinking—from problem identification to solution evaluation—provides students with tangible experiences of competence and growth. This sense of

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accomplishment reinforces their intrinsic motivation to continue learning and applying reflective strategies in future teaching scenarios.

These results suggest that reflective thinking is not merely a cognitive exercise but a holistic developmental process that cultivates professional confidence, autonomy, and motivation among student teachers. Therefore, it is recommended that internship supervisors and educational mentors at Farhangian University adopt reflective thinking as a foundational framework in teacher training programs. Internship courses should incorporate systematic reflective practices aligned with constructivist principles to enhance pre-service teachers' self-efficacy and motivation.

Furthermore, it is advisable that, at the beginning of their teacher education programs or internships, students be provided with self-assessment tools to evaluate their reflective and instructional skills. Such assessments would help guide individualized development plans, ensuring that reflective thinking becomes an integral part of professional preparation and lifelong learning among future teachers.

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Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by ethics committee of Farhangian University.

Author contributions

All authors contributed to the study conception and design, material preparation, data collection and analysis. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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