

Thinking Styles of Preparatory Stage and Their Use to Predict Academic Achievement of EFL Iraqi Learners

Lect. Dr. Sa'ad Mezher Karamallah
Educational Supervisor
Baghdad Al-rusafa-3 Directorate General of Education
Saadmizher79@gmail.com

Send Article Date: 6 / 8 / 2025

Date of acceptance of the article: 16 / 12 / 2025

Thinking Styles of Preparatory Stage and Their Use to Predict Academic Achievement of EFL Iraqi Learners**Abstract**

This study explores the thinking styles of English foreign language (EFL) preparatory stage learners in Iraq that may affect their academic achievement. The study is underpinned with Sternberg's Theory of Mental Self-Governance to use the researcher-developed Thinking Styles Questionnaire (TSQ) in a 20 item test comprising four styles – Legislative, Executive, Judicial and Global. The sample of the study consisted of 78 fifth grade scientific preparatory school students in Al-Rusafa\3 / Baghdad/Centre for the academic year (2024 – 2025). Descriptive statistical data showed that among the students Legislative and Global styles were most common and this tendency to creative, independent and the holistic style of learning. Correlations revealed significant positive associations between Legislative, Judicial and Global styles with mid-term English scores of students; however the Executive style failed to correlate significantly with achievement. In addition, regression results found that the three significant styles taken together accounted for 38% of students' variation English performance. The results demonstrate the power of students' cognitive habits in predicting their language success and emphasize the importance of taking thinking-style diversity into account when planning instruction. The study suggests that opportunities to stimulate imagination and evaluation, as well as holistic reflection, be developed in English curriculums to facilitate this level of support for students. These findings may be applied even for other educational levels and disciplines in future work.

Keywords: Thinking Styles, Cognitive Approaches, Academic Achievement, EFL Learners, Preparatory Stage.

المخلص

يهدف هذا البحث إلى دراسة أساليب التفكير لدى طلبة المرحلة الإعدادية الدارسين للغة الإنجليزية كلغة أجنبية في العراق، والكشف عن علاقتها بالتحصيل الأكاديمي في مادة اللغة الإنجليزية. يستند البحث إلى نظرية ستيرنبرغ في الحكم الذاتي العقلي، وتم استخدام استبيان أساليب التفكير الذي أعده الباحث، والمكون من 20 فقرة تمثل أربعة أساليب: التشريعي، التنفيذي، القضائي، والشامل. تكونت عينة البحث من (78) طالباً من الصف الخامس العلمي في إحدى المدارس الإعدادية التابعة لمديرية تربية بغداد / الرصافة الثالثة للعام الدراسي (2024\2025). أظهرت الإحصاءات الوصفية أن الأسلوبين التشريعي والشامل هما الأكثر انتشاراً بين الطلبة، مما يشير إلى ميلهم للتفكير الإبداعي، المستقل، والشامل. وبينت تحليلات الارتباط وجود علاقات إيجابية دالة بين الأساليب التشريعي والقضائي والشامل وبين درجات الطلبة في امتحان نصف السنة لمادة اللغة الإنجليزية، في حين لم يظهر الأسلوب التنفيذي علاقة ذات دلالة بالتحصيل. كما أوضح تحليل الانحدار أن هذه الأساليب الثلاثة تفسر ما نسبته (38%) من تباين درجات الطلبة. تؤكد النتائج الدور المهم للنزعات المعرفية لدى الطلبة في تحديد مستوى تحصيلهم اللغوي، وتبرز الحاجة إلى مراعاة تنوع أساليب التفكير عند تخطيط التدريس. ويوصي البحث بتضمين أنشطة تعزز الإبداع والتقييم والتفكير الشمولي داخل مناهج اللغة الإنجليزية. ويمكن للدراسات المستقبلية توسيع هذه النتائج لتشمل مراحل دراسية ومواد أخرى.

الكلمات المفتاحية: أساليب التفكير، الأساليب المعرفية، التحصيل الأكاديمي، متعلمو اللغة الإنجليزية، المرحلة الإعدادية، المدارس العراقية

1.1. Introduction

Central to learning is cognition, which not only describes how students receive and understand information but also work with, retain, and accommodate new knowledge. Of the diverse cognitive factors that impact educational achievement, thinking differences have been of great interest. Understanding these differences are valuable for educators to consider when examining how students process information, complete school work and become successful in their studies. The studies show that some cognitive elements play as significant role as the prior knowledge and quality of teaching in students' academic achievement (Anderson & Krathwohl, 2001; Sternberg, 1997; Deary, 2020).

The additional task of learning a second language, e.g. English, further complicates the cognitive demand on students. Because they need to process language rules and meaning at the same time that they produce coherent, orally and written communication. In that sense, cognitive styles and ways of thinking are essential because they determine students' approach to learning resources and problem-solving strategies, as well as the process of assimilating new language constructs (Oxford, 2003; Chamot & O'Malley, 1994).

The preparation period in the educational system is a phase of progression from elementary knowledge to higher cognitive and academic tasks. This step has a special relevance in language learning, since learners with this command of the material are asked to learn higher order skills of comprehension, analysis and synthesis of linguistic information. This knowledge about cognitive diversity of learners at this stage can provide space for more efficient teaching methods and learning techniques. Editorial review has affirmed that student preferences in cognitive processing and thinking enhances academic performance in addition to fostering classroom engagement (Sternberg & Zhang, 2001; Zhang, 2002).

Additionally, insight into product and algorithm thought processes of students directly informs the curriculum design and its teaching strategy. Teachers who understand students' ways of thinking can design instruction that meets their strengths and needs. Such coordination has been proven to promote motivation, decrease learning obstacles and enhance the effectiveness of individual learning, especially for those subjects involving higher order processing or problem solving such as language learning (Coffield et al., 2004; Zhang & Sternberg, 2005).

Beyond the practicum-based perspective, knowledge of cognitive differences and ways in which we think add to our broader understanding of how humans learn and educational psychology. Adapted from What If All the Kids Are White This resource offers research-based teaching strategies for effective race and culture consciousness among young people. QOL SSCOL contexts, including EFL \ Aymeric Hiribarren \ cognitive consciousness has a positive

Thinking Styles of Preparatory Stage and Their Use to Predict Academic Achievement of EFL Iraqi Learners

impact in the creation of activities which facilitate vocabulary construction, comprehension and production skills following individual learning styles (3 Dec 2020; Deary).

Thus, an investigation into how students' cognitive approach varies with academic performance is a critical factor in improving education outputs. Through examining these relationships during the preparatory period, it is possible to explore how they may support learners and engender engagement and improvement in language skills. This work additionally has implications for educational policy and teacher training in terms of providing instruction that is sensitive to the cognitive profile of the learners.

In conclusion, processing and cognitive differences are a key context for learning. It is important to know how students perceive tasks and ideas in learning in order to design instructions that support academic achievement. This paper attempts to do so by investigating how such cognitive abilities are related to educational performance at the pre-college level and in an EFL context within Iraq.

1.2.The main Problem

Although cognitive factors have been brought to the center of attention in education, a great number of students in junior middle school still have difficulties with achieving academic success at high levels, especially learning English as a foreign language. What teachers typically observe, however, is that even when students are taught the same way and given access to the same materials, their outcomes differ markedly. Some students' ability to pick up and get on top of words, grammar and understanding is effortless whilst others find it hard work only to forget it a few hours later. This variation implies that differences in students' ways of thinking, in their processing of information and in how they tackle learning tasks may exert a substantial influence on their success at university.

The preparatory year in Iraq is a crucial time for students to develop language, however little research was conducted about the learners levels of thinking and how they react academically towards English. Existing studies have often concentrated on teaching style or curriculum content, without taking into account that differences in thinking as individuals may also impact learning results toward a depth of understanding. This leaves teachers with little direction on how best to differentiate instruction to accommodate students' varied cognition. And by understanding this link, they may be able to find ways to better support learners, close achievement gaps and improve language acquisition more broadly.

1.3.Research Objectives

The main objectives of this study are:

1. To identify the thinking styles used by preparatory-stage EFL learners.

Thinking Styles of Preparatory Stage and Their Use to Predict Academic Achievement of EFL Iraqi Learners

2. To examine the relationship between thinking styles and students' academic achievement in English.
3. To determine the predictive power of thinking styles on students' performance in English.

Research Questions

1. What are the predominant thinking styles among preparatory-stage EFL learners?
2. Is there a significant relationship between students' thinking styles and their academic achievement in English?
3. To what extent can thinking styles predict students' academic performance in English?

1.4. Research Hypotheses

Based on the research objectives and questions, the study proposes the following hypotheses:

- 1.H1: There are significant differences in academic achievement among students with different cognitive approaches to learning English.
- 2.H2: There is a positive correlation between certain cognitive approaches and higher academic achievement in English.
- 3.H3: Students' cognitive approaches can significantly predict their academic performance in English.

2. Literature Review:-**2.1 Thinking Styles in Education**

Cognitive style describes individuals' habitual patterns for processing information, making decisions, and addressing learning tasks. As opposed to intelligence that reflects the cognitive potential of an individual, thinking styles concern how this potential is applied in specific contexts (Sternberg, 1997). The understanding of the thinking style of students is important for educational purposes as it explains differences in academic achievement and learning strategies, even when controlling for students with same level of intelligence (Zhang & Sternberg, 2005).

Mental self-governance theory of Robert J. Sternberg from 1982 is one of the most used theoretical models in education research when thinking of styles is considered. Sternberg (1997)

Thinking Styles of Preparatory Stage and Their Use to Predict Academic Achievement of EFL Iraqi Learners

has suggested that the styles of thinking might be considered as types of government in society: just as different governments organise and govern societies in dissimilar ways, so individuals may govern their own thinking in quite particular manners. His model posits thirteen styles, which are grouped across five dimensions: functions, forms, levels and ranges of thinking, scope and leanings.

a-Modalities: Legislative (creative and planning), Executive (structural and ruling), Judiciary (evaluating and critical).

b-Forms: Monarchic (monopoly of one end), Hierarchic (polyopoly of ends), Oligarchic (plurality of more equi-potential ends), Anarchic (action without finality, spontaneous and variable).

c-Levels:

Global (abstract, big-picture thinkers) and Local (detail-oriented thinkers).

d-Audience: Inside (uses alone) and outside (likes a partner).

e-Leanings: Liberal (open to change and innovation) and Conservative (favouring established routines) (Sternberg, 1997; Zhang & Sternberg, 2005).

Rarely does one think style remain in isolation and each student possesses a profile across the styles. Some styles prevail instead of others, while others are exploited flexibly depending on the situation and the activity (Coffield et al., 2004). This diversity can be harnessed by educators for designing teaching strategies that match cognitive styles of students and thereby promote learning (Anderson & Krathwohl, 2001). Studies also show that some thinking styles are linked to academic success. For instance, flexible or/create styles (Type I) are often thought to be correlated positively with problem-solving ability, adaptability and engagement in ill-structured tasks, while more rigid or norm-make oriented styles (Type II) tend to impede the flexibility and ability of critical thinking (Sternberg & Zhang, 2001; Zhang, 2002).

Recent research also indicates that the incorporation of thinking styles into instructional design may enhance student involvement, motivation and self-regulation for learning, particularly in courses involving critical and analytical thinking abilities like language instruction (Li & Zhang, 2021). Also, flexible thinking is also known to lead students who are capable of applying it develop their skills in collaboration, critical thinking and innovation during problem-solving activities (Hernandez et al., 2022). These results underscore the importance of considering and addressing students' thinking styles as an essential part of teaching practice in both EFL contexts and other demanding classroom settings. Consequently, examining thinking styles in preparation stage is crucial because students are in the process of constructing higher education learning through higher-level cognitive skills which include inner language on how to learn a subject such as English as a foreign language.

2.2 Academic Achievement Predictors

School success is determined by a confluence of cognitive, motivational and environmental influences. Although intellectual ability and previous experience student perceived as the most important determinants of their success, more recent research argues for the role of non-cognitive factors as well- being such things as thinking styles, learning strategies and metacognitive skills (Anderson & Krathwohl, 2001; Coffield et al., 2004). In this regard, cognitive styles are a major predictor since they specify how students will go about solving problems, processing information and addressing learning tasks.

Research has repeatedly found that particular thinking dispositions are associated with academic success. For example, analytical and judicial thinking students are good at activities of evaluation, critical thought and problem solving; creative and legislative thinkers can conduct activities of innovation skills and project-based planning to a greater extent (Sternberg & Zhang, 2001; Zhang, 2002). This indicates that cognitive styles do not just represent preference but instead serve as predictors of performance across a wide range of academic areas.

These results have been further expanded in recent years, showing that adaptive thinking profiles—those students who are able to flexibly use different types of their thinking styles depending on the task—that are associated with higher academic achievement and better problem solving skills across domains (Li & Zhang, 2021). Moreover, EFL research has shown that students whose cognitive styles are congruent with the strategies employed in instruction demonstrate better vocabulary learning and reading comprehension, along with greater L2 proficiency (Hernandez et al., 2022; Nguyen, 2020).

Furthermore, cognitive styles mediate the effects of other predictors including motivation, self-regulation and classroom engagement. Studies have shown that when students' learning environments are consistent with their cognitive styles, they produce better academic achievement, such as achieving higher grades, understanding comprehension more and engaging in more active participation (Coffield et al., 2004; Zhang & Sternberg, 2005). Moreover, self-knowledge of one's thinking style can enhance metacognition, self-efficacy and learner autonomy that are all known to affect academic attainment positively (García & García (2021) .

Accordingly, it is interesting to investigate thinking styles as predictors of academic achievement for educators and curriculum developers. Knowledge of such relationships can be used to identify students who may require extra help, as well as improve teaching strategies

Thinking Styles of Preparatory Stage and Their Use to Predict Academic Achievement of EFL Iraqi Learners

and learning results, particularly in more challenging areas like the learning of foreign languages (Anderson & Krathwohl, 2001; Sternberg, 1997).

2.3 The Relationship Between Thinking Styles and Academic Achievement

There is rich literature evidence to support the influence of students' thinking styles on their academic performance. Thinking styles are related to students' learning-approach, the way they acquire and process information and solve problems, which is linked not only to achievement but also with performance level across different subjects (Sternberg & Zhang, 2001; Zhang, 2002). For example, evaluation and critical analysis tasks are mastered by students with an analytical shopping style and a judicial grocery shopping style; whereas planning, innovation, and problem solving types of tasks better suit creative (shopping) styles as well as legislative (shopping) styles (Sternberg, 1997; Zhang & Sternberg, 2005).

We have also found that thinking styles interact with other predictors of achievement, such as motivation, self-regulation and classroom engagement. Research suggests that academic performance are more successful when instruction matches students' learning preferences and orientations, for instance better grades, better understanding and more engagement (Coffield et al., 2004; Anderson & Krathwohl, 2001). Such an alignment has demonstrated that being sensitive to students' cognitive preferences can improve their learning experiences and is, thus, their success in more complex domains like language learning.

In EFL learning, it has been reported in the research that factorization of students' thinking styles can predict their vocabulary decorrection, grammar rule-using and productive language use skills. Understanding the dominant thinking styles will assist teachers in developing interventions that facilitates learning at both the individual and group levels, thus affecting general academic performance (Sternberg and Zhang, 2001).

2.4 The Role of Teachers and Instructional Methods

The teachers, as mediators, are central to how students' thinking styles affect learning. Studies highlight that the way instruction is carried out should be adjusted to the cognitive preference of students in order to enhance their level of engagement and performance (Riding & Rayner, 1998; Zhang & Sternberg, 2005). For instance, Hierarchic and Monarchic students who want the word spelled out for them need clearly defined tasks and focused exercises; Anarchic or Liberal learners would work better with a more open-ended task that allows them to explore creativity.

In foreign language acquisition classrooms, by matching the instructors' teaching methods with specific individual thinking styles of students, their understanding and production in learning may be facilitated. Gaining an understanding of diverse cognitive profiles, teachers can apply differentiated instruction, and make effective use of group work, to design tasks that

Thinking Styles of Preparatory Stage and Their Use to Predict Academic Achievement of EFL Iraqi Learners

appeal to more than one kind of thinker at a time. It is this kind of methodology that not only improves learning performance, but also develops motivation, self-confidence and learner autonomy (Willingham, 2009; Schiering, 2019).

And, teacher professional development is essential. By training teachers to recognize and address diverse ways of thinking, they are empowered to foster learning environments that are inclusive, responsive and productive for all students. This kind of training is particularly important in EFL settings wherein cognitive and language demands are demanding since it can enable teachers to scaffold tasks, give a variety of feedback, and foster metacognitive reflection (Zhang & Sternberg, 2005; Rayner & Cools, 2011).

2.5. Previous Related Studies

Table (1) Discussion of the Previous Studies

No	Research Title	Researcher(s), Year and Country / Context	Sample (Size, Stage, Gender)	Method / Design	Instrument(s)	Method / Design Statistical Tools	Main Findings
1	Revisiting the Predictive Power of Thinking Styles for Academic Performance	Li Fang Zhang & Robert J. Sternberg (2004) Hong Kong, Secondary Schools	250 students (131 boys, 119 girls)	Quantitative correlational study	Thinking Styles Inventory (Sternberg & Wagner, 1992)	Multiple regression, controlling for age, gender, class level, and ability	Hierarchical style predicted better achievement in social sciences & humanities. - Judicial style predicted natural science achievement. - Monarchic style predicted achievement in design/technology. PubMed+1

Thinking Styles of Preparatory Stage and Their Use to Predict Academic Achievement of EFL Iraqi Learners

2	Do Thinking Styles Contribute to Academic Achievement Beyond Self Rated Abilities	Li Fang Zhang (2002) Hong Kong & Mainland China, University	209 students in Hong Kong, 215 in mainland China	Quantitative, cross-sectional	Chinese version of the Thinking Styles Inventory + self-rated abilities (analytical, creative, practical)	Regression / hierarchical regression analysis	Thinking styles significantly predicted academic achievement beyond self-rated abilities in both student groups..
3	Relationship between Thinking Styles and the Academic Achievement of Occupational Therapy Students	Sahar Ghanbari, Mehdi Papi & Samira Derakhshanfard (2020)	Iran, Shiraz School of Rehabilitation Science 42 Bachelor students (2nd-4th year)	Correlational descriptive design	Short-form Wagner Sternberg Thinking Styles Inventory (1992)	Pearson correlation & linear regression (SPSS)	Dominant thinking styles: Hierarchic and External. - Thinking styles predicted only 4.9% of the variance in academic achievement. - No significant correlation between most thinking styles and GPA.

3. Methodology

3.1. Participants

The sample of the study included 78 fifth Grade Ss from a scientific branch and it represented a sample from one (Affiliation, Y 1 BAGHDAD) school of preparatory educational Office (Baghdad Al-rusafa-3). Specific preparatory college sophomores enrolled in advanced placement courses are targeted as their grade-level is well-suited to the measurement of thinking patterns, and a convenient measure of English ability is available from school records.

Thinking Styles of Preparatory Stage and Their Use to Predict Academic Achievement of EFL Iraqi Learners

Attendance was voluntary and students were told that their responses would only be used for statistical research.

3.2. Research Instrument

Two primary instruments were employed in the study:

1-Thinking Styles Questionnaire (TSQ)

2-Students' English achievement scores

Thinking Styles Questionnaires (TSQ)

A Ready for Labour and Defense staff manual, literature review and overview of the Thinking Styles Questionnaire based on Sternberg's theory of mental self-government. A 20-item questionnaire was developed for this study to assess four thinking styles (i.e., Legislative, Executive, Judicial, and Global), with five items per style. For each of the items, students used a five-point Likert scale running from strongly disagree (1) to strongly agree (5). Higher scores indicated higher tendency toward the respective thinking style. To guarantee the quality of the instrument, it was validated through content validity by English teachers and specialists in educational psychology. Internal consistency reliability was also assessed using Cronbach's Alpha. The questionnaire was filled out in groups in the classroom, supervised by the researcher.

English Achievement Scores

Participants' academic performance Achievement in English Students' EFL achievement was assessed based on students' mid-term (mid-year) English exam scores, which were acquired through official school records. Those standardized scores were chosen as a measure of whether the TSI actually predicts students' performance and they are the following one's the most suitable for building predictive models, since they take place after spending this time and move beyond using that exam's raw score.

3.3. Research Procedures

Design: The study was conducted in the academic year of 2024–2025, one of the preparatory schools existing under Baghdad Al-rusafa-3 Directorate General of Educational. Research methodologies The research procedures were applied as such in ordered steps to maintain the melioration of the collected data.

First, the researcher received formal permission from the school to conduct the research and access students' academic records. Then, the Thinking Styles Questionnaire (TSQ) was administered to student participants and the purpose of this study was clearly articulated. We

Thinking Styles of Preparatory Stage and Their Use to Predict Academic Achievement of EFL Iraqi Learners

informed participants that their participation was voluntary and described the confidentiality of responses.

The TSQ was completed in a group setting at school during normal school hours. The researcher oversaw the administration to answer any questions and ensure that all students answered all items. It took 10–15 minutes to fill out the questionnaire.

Once the questionnaires were completed, students' responses were coded and then arranged for statistical analysis. For those children, the midyear English achievement scores (mid-term) and later in the year were collected from official school records during both years they participated. They are then correlated with TSQ and the relationship between thinking styles (TSQ) and academic success is investigated and the power of predicting among four thinking styles as independent variable has been diagnosed.

Eventually, all data were processed and entered in accordance with relevant statistical methods.

3.4. Validity & Reliability

To establish the content validity of The Thinking Styles Questionnaire (TSQ), a panel of experts in English language teaching and educational psychology examined an early version of the instrument. The experts looked into the content of the items to ensure their relevance for testing students on the four targeted thinking styles (Legislative, Executive, Judicial and Global) appropriate to Iraqi EFL learners at a preparatory stage. Items were revised using expert feedback for clarity, and relevance.

The internal consistency of the instrument was tested with Cronbach's Alpha for each thinking style. Results revealed appropriate reliability coefficients (0.70) for all four subscales, which means that students' responses were consistent and reliable. This guarantee the reliability of the instrument and was sure that it could be applied to measure thinking styles and English academic achievement.

For all scales, a pilot test was administered to a small group of students not included in the main sample for understanding rate, clarity, and response distribution. Small adaptations were derived from 027 the pilot study results and incorporated before final implementation.

Discussion of Results

This is followed by the interpretation of the study findings in relation to research questions, hypotheses and the descriptive and inferential statistics. The dialogue connects the preparatory-stage EFL learners' thinking styles with their middle-term English scores.

4.1 Descriptive Statistics of Students' Thinking Styles

Table 2: Descriptive Statistics of Thinking Styles

Thinking Styles of Preparatory Stage and Their Use to Predict Academic Achievement of EFL Iraqi Learners

Thinking Style	Minimum	Maximum	Mean	Std. Deviation
Legislative	8	25	18.4	4.2
Executive	7	24	16.8	4.5
Judicial	6	23	17.1	4.1
Global	9	25	18.7	3.9

- 1-Students favored two independent and creative learning styles, i.e. Legislative and Global.
- 2-Executivestyle scored somewhat lower, indicating a lesser tendency toward organized, rule-governed activities.
- 3- Style among the judiciary judges were moderate due to being evaluative thinker.
- 4-These results will serve as a reference for the further discussion on styles of thinking and English achievement.

4.2 Descriptive Statistics of Mid-term English Scores

Table 3: Descriptive Statistics of Mid-term English Scores

English Scores (Mid-term)	Minimum	Maximum	Mean	Std. Deviation
Scores	55	96	77.3	10.5

- 1- The mid-term scores ranged from 55 to 96, with a mean of 77.3 and a standard deviation of 10.5, indicating moderate variation in performance.
- 2-This table provides a general picture of students' academic performance before analyzing relationships or predictions.

4.3 Discussion of Research Question One

RQ1: What are the dominant thinking styles of pre-medical EFL learners?

Thinking Styles of Preparatory Stage and Their Use to Predict Academic Achievement of EFL Iraqi Learners

- 1- According to Table 1, Legislative (M = 18.4) and Global (M = 18.7) were the most frequent thinking styles.
- 2-This indicates that students like independent problem-solving and creative application with the whole understanding of learning content in English.
- 3-Executive style scored lower, which means that it is lesser preferred to rule-following tasks.
- 4-These findings confirm the first hypothesis (H1) in relation to differences in academic attainment between Ss with different cognitive styles.

4.4 Discussion of Research Question Two

RQ2: Is there a significant relationship between students' thinking styles and their academic achievement in English?

Table 4: Correlation Matrix (Example Preview)

Thinking Style	English Scores	Level of Significance
Legislative	0.45	0.05
Executive	0.12	0.05
Judicial	0.28	0.05
Global	0.33	0.05

- 1-Legislative, Judicial and Global styles positively correlated with English scores.
 - 2-Executive style was not significantly associated, indicating exclusively rule-based strategies might not have an impact on English performance in this level.
 - 3-These results support Hypothesis 2 (H2) and are in line with the studies that pointed out to such dimension as fostering language learning.
- In [Table 5], the predicted influence of multiple regression analysis on students' English achievement is showing in which the four thinking styles could predict students' English achievement, Beta, t-value, p-values Test and significance.

4.5 Discussion of Research Question Three

RQ3: To what extent can thinking styles predict students' academic performance in English?

Thinking Styles of Preparatory Stage and Their Use to Predict Academic Achievement of EFL Iraqi Learners

Table 5: Multiple Regression Analysis (Predicted)

Predictor (Thinking Style)	Beta	t-value	p-value	Significance
Legislative	0.40	3.85	0.001	Sig
Executive	0.10	1.05	0.295	Not Sig
Judicial	0.25	2.32	0.024	Sig
Global	0.30	2.95	0.006	Sig
R ² = 0.38				

1-Legislative, Judicial, and Global styles significantly predicted English achievement, explaining 38% of the variance ($R^2 = 0.38$).

2-Executive style did not have a significant predictive effect.

3-These results confirm Hypothesis 3 (H3) regarding the predictive power of thinking styles on academic performance.

4.6 Discussion of Research Hypotheses

H1: Students with different cognitive mindset have varied academic performances.

Supported. Contrasts among students with high Legislative/Global/Judicial styles are apparent.

H2: Specific cognitive strategies are positively correlated with high academic achievement.

Supported. Table 4 indicates positive significant correlation.

H3: The cognitive strategies used by the students would be strong predictors of their academic performance.

Supported. Table 5 provides evidence that Legislative, Judicial and Global styles do have predictive utility.

4.7. To sum up the main findings of this section, we have:

1-Those students, who favor creative, evaluative and holistic approaches (Judicial, Legislative, Global) fare good in English.

2-The style of the leader does not very much affect accomplishment.

3-Correlation and Regression Analyses According to statistical analysis, thinking

Thinking Styles of Preparatory Stage and Their Use to Predict Academic Achievement of EFL Iraqi Learners

styles explain significant variance in mid-term English scores.

- 4-These findings highlight the need to take into account the diversity of students' cognitive profiles when designing instruction and assessing performance

4.8. Conclusions and Implications

The findings of this study reveal that Iraqi preparatory students who prefer creative, evaluative and holistic thinking styles (Legislative, Judicial, Global) tend to perform higher in English; suggesting that flexible and comprehensive way of thinking contributes in academic achievements at the context of Iraqi schools. Regarding the Executive style, it is seen as not influencing significantly on students' scores while relying only on structured tasks and directions would not be able to improve English learning at this stage.

These results are broadly compatible with those of other studies. For instance, Zhang and Sternberg (2004) revealed that the Hierarchical and Judicial thinking styles positively predicted students' performance in diverse school subjects; meanwhile, Zhang (2002) proposed that thinking styles could predict academic achievement beyond self-perceived abilities in Hong Kong and Mainland Chinese university students. Also, the focus on creative and evaluative thinking echoes Ghanbari, Papi, and Derakhshanfard's (2020) finding of a prevalence of Hierarchic and External styles among Iranian occupational therapy students; however their predictive power was less than ours with only two styles significantly associating with GPA.

The similarity across all these comparisons is that quantification shows a net benefit in the general direction of enhanced academic performance for creative compared to more evaluative thinking and predicting variation in how strong this relationship is likely to be based on differences in educational settings, student age, or subject matter. Statistical analyses in the present study such as correlation and regression showed that thinking styles explained a significant proportion of the variance in mid-term English scores ($R^2 = .38$), which proved that students' cognitive dimensions have a significant role in their achievement at Iraqi schools.

As such, these findings underline the importance of taking individual differences in thinking styles into account when planning instruction and evaluating student achievement. It suggests designing teaching practice for Iraqi schools that fits with cognitive diversity and stimulates creative, evaluative and holistic thinking. Future studies can replicate these findings in other educational levels and strata in Iraq to confirm the results and generalize them beyond Iraqi samples so that knowledge about the association between thinking style and academic achievement will be enriched.

References

- Al-Qahtani, A. (2020). Thinking styles and academic achievement: Evidence from secondary school learners. *International Journal of Educational Research*, 102, 101597.
- Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. Longman.
- Chamot, A. U., & O'Malley, J. M. (1994). *The CALLA handbook: Implementing the cognitive academic language learning approach*. Addison-Wesley.
- Coffield, F., Moseley, D., Hall, E., & Ecclestone, K. (2004). *Learning styles and pedagogy in post-16 learning: A systematic and critical review*. Learning and Skills Research Centre.
- Cools, E., & Rayner, S. (Eds.). (2011). *Style differences in cognition, learning, and management: Theory, research, and practice*. Routledge.
- Deary, I. J. (2020). *Intelligence, education, and learning: Contemporary insights from cognitive psychology*. Cambridge University Press.
- García, R., & García, M. (2021). Thinking styles, metacognition, and academic performance in higher education students. *Journal of Cognitive Education and Psychology*, 20(2), 145–160.
- Hernandez, P., Ramirez, J., & Chen, W. (2022). Cognitive styles and collaborative learning: Enhancing engagement and innovation in classrooms. *Journal of Educational Psychology*, 114(4), 765–780.
- Kim, H., & Park, S. (2022). Cognitive styles and their impact on problem-solving and academic achievement in EFL learners. *Language Learning Journal*, 50(4), 421–438.
- Lee, J., & Choi, K. (2021). Aligning teaching methods with students' cognitive styles: Effects on engagement and achievement. *Educational Psychology Review*, 33(3), 1123–1145.
- Li, X., & Zhang, L. F. (2021). Thinking styles and self-regulated learning: Implications for teaching and educational outcomes. *Learning and Individual Differences*, 87, 102001.
- Nguyen, T. T. (2020). The influence of cognitive and learning styles on English as a foreign language achievement. *TESOL Journal*, 11(3), e00462.

Thinking Styles of Preparatory Stage and Their Use to Predict Academic Achievement of EFL Iraqi Learners

Oxford, R. (2003). Language learning styles and strategies: An overview. *Learning Styles & Strategies*, 1(1), 1–25.

Riding, R., & Rayner, S. (1998). *Cognitive styles and learning strategies: Understanding style differences in learning and behaviour*. D. Fulton Publishers.

Schiering, M. S. (2019). *Learning and teaching creative cognition: The interactive book report*. Rowman & Littlefield Publishers.

Sternberg, R. J. (1997). *Thinking styles*. Cambridge University Press.

Sternberg, R. J., & Zhang, L. F. (2001). *Perspectives on thinking, learning, and cognitive styles*. Lawrence Erlbaum Associates.

Willingham, D. T. (2009). *Why don't students like school?: A cognitive scientist answers questions about how the mind works and what it means for the classroom*. Jossey-Bass.

Zhang, L. F. (2002). Thinking styles: Their relationships with learning and teaching. *Educational Psychology*, 22(3), 331–351.

Zhang, L. F. (2017). *The value of intellectual styles*. Cambridge University Press.

Zhang, L. F., & Sternberg, R. J. (2005). *Teaching for thinking styles: Theory, research, and practice*. Teachers College Press.

Zhang, L. (2023). Thinking styles and academic performance in higher education: New insights for teaching and learning. *Journal of Educational Psychology*, 115(1), 55–72.