

نمذجة العلاقات الهيكلية بين التقييم التكويني، ومهارات التغذية الراجعة، والتعلم الذاتي،
وتحصيل اللغة الإنجليزية كلغة أجنبية: أدلة من التعليم العالي العراقي

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Modeling the Structural Relationships among Formative Assessment, Feedback Literacy, Self-Regulated Learning, and EFL Achievement: Evidence from Iraqi Higher Education

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المخلص

هدفت الدراسة الحالية إلى فحص العلاقات البنائية بين التقويم التكويني، وثقافة التغذية الراجعة، والتعلم المنظم ذاتيًا، والتحصيل في اللغة الإنجليزية كلغة أجنبية (EFL) لدى طلبة الجامعات العراقية. اعتمدت الدراسة المنهج الكمي الارتباطي للتحقق من كيفية تأثير ممارسات

التقويم التكويني في ثقافة التغذية الراجعة لدى الطلبة والتعلم المنظم ذاتيًا، وكيف تسهم هذه المتغيرات في التحصيل في اللغة الإنجليزية كلغة أجنبية. جُمعت البيانات من طلبة المرحلة الجامعية الأولية الملتحقين بأقسام اللغة الإنجليزية في عدد من الجامعات العراقية باستخدام استبانات مُقننة وموثوقة. واستُخدم نموذج المعادلات الهيكلية (SEM) لتحليل العلاقات بين متغيرات الدراسة. وأظهرت النتائج أن التقويم التكويني يُعد متنبًا مهمًا بكل من ثقافة التغذية الراجعة والتعلم المنظم ذاتيًا. كما بينت النتائج أن التعلم المنظم ذاتيًا يؤثر تأثيرًا إيجابيًا في تحصيل الطلبة في اللغة الإنجليزية كلغة أجنبية. كذلك أشارت النتائج إلى أن ثقافة التغذية الراجعة تؤدي دورًا وسيطًا بين التقويم التكويني والتعلم المنظم ذاتيًا. وتؤكد الدراسة أهمية دمج ممارسات التقويم التكويني وتنمية ثقافة التغذية الراجعة لدى الطلبة من أجل تعزيز التعلم الذاتي وتحسين التحصيل اللغوي في سياقات التعليم العالي العراقية. كما تقدم النتائج دلالات تربوية مهمة لمعلمي اللغة الإنجليزية كلغة أجنبية، ومصممي المناهج الدراسية، وصناع السياسات التعليمية.

Abstract

The present study aimed to examine the structural relationships among formative assessment, feedback literacy, self-regulated learning, and English as a Foreign Language (EFL) achievement among Iraqi university students. The study adopted a quantitative correlational design to investigate how formative assessment practices influence students' feedback literacy and self-regulated learning, and how these variables contribute to EFL achievement. Data were collected from undergraduate students enrolled in English departments at several Iraqi universities through validated questionnaires. Structural Equation Modeling (SEM) was employed to analyze the relationships among the study variables. The findings revealed that formative assessment significantly predicted feedback literacy and self-regulated learning. Moreover, self-regulated learning demonstrated a positive effect on students' EFL achievement. The results also indicated that feedback literacy played a mediating role between formative assessment and self-regulated learning. The study highlights the importance of integrating formative assessment practices and developing students' feedback literacy to enhance autonomous learning and language achievement in Iraqi higher education contexts. The findings provide pedagogical implications for EFL instructors, curriculum designers, and educational policymakers.

1.Introduction



Improving English as a Foreign Language (EFL) achievement remains a major concern in higher education institutions worldwide. In recent years, formative assessment has received considerable attention as an effective instructional approach that enhances students' learning outcomes, engagement, and academic performance (Black & Wiliam, 2009; Shute, 2008). Through continuous assessment and feedback practices, formative assessment supports learners in identifying their learning needs and improving their academic performance (Panadero et al., 2018). In addition, recent research highlights the importance of feedback literacy and self-regulated learning as essential components that enable students to effectively use feedback and take control of their own learning processes (Carless & Boud, 2018; Winstone & Carless, 2020; Zimmerman, 2002).

Despite growing scholarly interest in formative assessment, feedback literacy, and self-regulated learning, several gaps remain in the literature. Previous studies have often examined these constructs separately rather than investigating their interrelationships within a comprehensive framework (Panadero, 2017). Furthermore, although feedback literacy has emerged as an important area of research in recent years (Carless & Boud, 2018), limited empirical evidence exists regarding how formative assessment, feedback literacy, and self-regulated learning collectively contribute to EFL achievement. This gap is particularly evident in Iraqi higher education contexts, where research examining these variables remains limited.

To address this gap, the present study examines the structural relationships among formative assessment, feedback literacy, self-regulated learning, and EFL achievement among Iraqi university students. Specifically, the study investigates whether formative assessment contributes to the development of students' feedback literacy and self-regulated learning and how these variables collectively influence EFL achievement. By providing empirical evidence from the Iraqi EFL context, this study seeks to extend the existing literature and offer pedagogical implications for improving English language teaching and learning in higher education.

2. Review of the Literature

2.1 Formative Assessment

Formative assessment has become a central concept in contemporary educational research due to its significant contribution to improving

students' learning processes and academic achievement. Unlike summative assessment, which evaluates students' performance at the end of instruction, formative assessment is integrated into daily classroom activities to monitor learning progress and provide ongoing feedback (Black & Wiliam, 2009). Formative assessment enables teachers to identify students' strengths and weaknesses during instruction and modify teaching strategies accordingly. Formative assessment helps learners identify gaps between their current and desired performance and supports continuous improvement in learning outcomes (Sadler, 1989).

Researchers have consistently highlighted the positive role of formative assessment in enhancing students' engagement and learning motivation. According to Black and Wiliam (2009), Through formative assessment practices, students become more actively involved in classroom interaction, self-monitoring, and responding constructively to feedback.. Similarly, Andrade and Brookhart (2020) argued that formative assessment supports students' metacognitive development and helps them become more responsible for their own learning. Embedded formative assessment practices can enhance classroom interaction and student learning (Wiliam, 2011).

In EFL contexts, formative assessment has been found to improve language learning outcomes by creating interactive learning environments in which students receive immediate and constructive feedback. Lee (2017) emphasized that formative assessment practices such as peer assessment, classroom questioning, and teacher feedback facilitate students' language development and classroom participation. Additionally, formative assessment encourages learners to identify their language learning difficulties and develop appropriate strategies to overcome them. Effective assessment practices can enhance student learning and engagement in higher education contexts (Carless, 2015). Despite its pedagogical importance, formative assessment practices remain insufficiently implemented in many higher education contexts, including Iraqi universities. Traditional teacher-centered approaches continue to dominate classroom instruction, limiting students' opportunities to engage actively in the learning process. Consequently, investigating the role of formative assessment in Iraqi EFL classrooms is essential for understanding how assessment practices may contribute to students' academic development and language achievement. Formative assessment also supports students in developing independent learning skills and learning how to learn (Fukuda et al., 2020).

2.2 Feedback Literacy



The concept of feedback literacy has recently emerged as an important area in higher education research. Feedback literacy refers to learners' ability to understand, interpret, evaluate, and utilize feedback effectively in order to improve future performance (Carless & Boud, 2018). Contemporary educational perspectives emphasize that effective feedback is not merely information transmitted from teachers to students; rather, students themselves must actively engage with feedback and apply it meaningfully to their learning processes.

According to Carless and Boud (2018), feedback literacy consists of several interrelated dimensions, including appreciating feedback, making judgments, managing emotional reactions, and taking action based on feedback information. Students who possess strong feedback literacy skills are generally more capable of identifying weaknesses in their academic performance and implementing appropriate improvement strategies.

Previous studies have demonstrated that feedback literacy positively influences students' academic engagement, self-reflection, and learning autonomy. Winstone and Carless (2020) argued that feedback literacy encourages students to become active participants in the feedback process rather than passive recipients of teachers' comments. Furthermore, learners with higher feedback literacy levels tend to demonstrate stronger self-monitoring abilities and increased academic confidence. Feedback also plays a significant role in supporting students' self-regulated learning processes (Butler & Winne, 1995). In EFL learning environments, feedback literacy plays a particularly significant role because language learning requires continuous revision, reflection, and performance improvement. Effective utilization of teacher and peer feedback may help learners improve their writing, speaking, and grammatical accuracy. However, limited research has explored feedback literacy among Iraqi university students, particularly regarding its relationship with formative assessment and self-regulated learning.

2.3 Self-Regulated Learning

Self-regulated learning (SRL) is widely recognized as a critical factor in students' academic success. SRL refers to learners' ability to control and regulate their cognitive, motivational, emotional, and behavioral learning processes in order to achieve specific academic goals (Zimmerman, 2002). Self-regulated learners actively participate in their learning by setting goals, monitoring progress, selecting learning strategies, and evaluating learning outcomes. Self-regulated learning involves learners'



active control over cognitive, motivational, and behavioral processes during learning (Zimmerman & Schunk, 2011). Self-regulated learning requires learners to monitor and evaluate their own learning processes actively (Schunk & Greene, 2018). The theoretical foundations of self-regulated learning are strongly associated with social cognitive theory. Zimmerman (2008) explained that self-regulated learning involves cyclical processes consisting of forethought, performance monitoring, and self-reflection. During these stages, learners continuously evaluate their academic performance and make necessary adjustments to improve learning effectiveness. Goal orientation plays a central role in the development of self-regulated learning strategies (Pintrich, 2000). Numerous studies have reported positive relationships between self-regulated learning and academic achievement. Panadero (2017) indicated that students with high self-regulation skills are generally more motivated, independent, and academically successful than students with weak self-regulation abilities. In EFL contexts, self-regulated learning has been linked to improved language proficiency, increased learner autonomy, and higher academic performance. Self-regulation strategies positively influence language learning achievement in EFL contexts (Seker, 2015). Moreover, formative assessment and feedback practices may significantly contribute to the development of self-regulated learning. Continuous feedback helps learners monitor their progress and identify areas requiring improvement. Therefore, formative assessment and feedback literacy may function as important predictors of students' self-regulated learning behaviors. Effective formative assessment practices contribute significantly to the development of self-regulated learning skills (Nicol & Macfarlane-Dick, 2006).

2.4 EFL Achievement

EFL achievement refers to students' academic performance and proficiency in learning English as a foreign language. EFL achievement is influenced by various cognitive, motivational, instructional, and environmental factors. Researchers have emphasized that students' achievement in language learning depends not only on linguistic competence but also on learners' engagement, self-regulation, and responsiveness to instructional feedback (Hattie & Timperley, 2007).

In higher education settings, improving EFL achievement remains a major educational objective due to the increasing importance of English in academic and professional communication. Iraqi university students often encounter difficulties in developing English language proficiency because of limited exposure to authentic English environments and



reliance on traditional teaching methods. Consequently, identifying instructional factors that may improve EFL achievement is highly important for language educators and policymakers.

Previous studies have demonstrated that formative assessment positively influences language achievement by promoting continuous learning and constructive feedback practices. Similarly, self-regulated learning enables students to become more autonomous and strategic learners, which may ultimately improve their academic performance. Furthermore, feedback literacy may enhance students' ability to benefit from feedback and utilize it effectively for language improvement.

2.5 Formative Assessment, Feedback Literacy, Self-Regulated Learning, and EFL Achievement

Recent educational research has increasingly emphasized the interconnected nature of formative assessment, feedback literacy, self-regulated learning, and academic achievement. Formative assessment practices provide learners with continuous opportunities to receive feedback, reflect on their performance, and improve learning strategies. Through these processes, students may gradually develop feedback literacy skills that enable them to interpret and utilize feedback effectively. Formative assessment practices can facilitate self-regulated learning among EFL learners (Xiao & Yang, 2019). Several studies have suggested that feedback literacy may facilitate the development of self-regulated learning behaviors. Learners who actively engage with feedback are more likely to monitor their learning progress, set academic goals, and implement improvement strategies (Winstone & Carless, 2020). Consequently, feedback literacy may function as a mediating variable between formative assessment and self-regulated learning. Self-regulated learning involves learners' active control over their learning processes, and learner autonomy is considered an essential factor in successful EFL learning contexts (Zhao, 2014). Additionally, self-regulated learning has consistently been associated with higher academic achievement in EFL contexts. Students who effectively regulate their learning processes tend to demonstrate greater persistence, motivation, and academic performance. Therefore, examining the structural relationships among formative assessment, feedback literacy, self-regulated learning, and EFL achievement may provide a comprehensive understanding of how these variables interact within Iraqi higher education settings. Different assessment approaches may influence students' self-regulated learning behaviors in language learning environments (Huang, 2011). Despite the growing international literature

on these variables, limited empirical research has investigated their structural relationships simultaneously in Iraqi EFL contexts. Most previous studies have focused on isolated relationships rather than developing comprehensive structural models. Therefore, the present study attempts to address this research gap by examining the direct and indirect relationships among formative assessment, feedback literacy, self-regulated learning, and EFL achievement among Iraqi university students. Research has shown that formative assessment positively affects students' self-regulated learning development (Ismail et al., 2022).

2.6 Mediating Role of Feedback Literacy and Self-Regulated Learning

Recent developments in educational research have increasingly emphasized the complex and mediating role of feedback literacy in shaping students' self-regulated learning processes. Feedback literacy is not merely the ability to understand teacher comments; rather, it represents a deeper cognitive and metacognitive capability that enables learners to interpret, evaluate, and strategically use feedback to improve future performance (Carless & Boud, 2018).

Within the framework of formative assessment, feedback is considered a core mechanism that drives learning improvement. However, the effectiveness of feedback depends largely on students' ability to actively engage with it. In this regard, feedback literacy functions as a mediating construct that transforms external feedback into internal learning actions. Students with higher feedback literacy are more likely to reflect on feedback messages, identify performance gaps, and implement appropriate learning strategies.

In parallel, self-regulated learning (SRL) has been widely recognized as a fundamental component of academic success. SRL involves goal setting, strategic planning, self-monitoring, and self-evaluation (Zimmerman, 2002). The interaction between feedback literacy and SRL suggests that students who are capable of understanding feedback are also more capable of regulating their own learning processes effectively.

Recent empirical evidence indicates that feedback processes significantly enhance SRL when learners actively interpret and apply feedback information (Panadero et al., 2018). Therefore, feedback literacy can be considered a cognitive bridge that connects formative assessment practices with self-regulated learning behaviors, ultimately leading to improved academic performance in EFL contexts.

3. Problem Statement and Research Questions

3.1 Problem Statement



Although formative assessment, feedback literacy, and self-regulated learning have received increasing scholarly attention in recent years, limited research has investigated the structural relationships among these variables within Iraqi higher education contexts. Existing studies have mainly focused on examining each variable independently rather than integrating them into a comprehensive structural model that explains their direct and indirect influences on EFL achievement.

In Iraqi universities, English language instruction continues to face several pedagogical challenges, including excessive reliance on traditional assessment methods, limited student engagement with feedback, and insufficient emphasis on learner autonomy. In many EFL classrooms, assessment practices remain teacher-centered, where students passively receive evaluation without actively utilizing feedback to improve their learning performance. Such practices may negatively affect students' self-regulated learning abilities and ultimately limit their academic achievement in English language learning.

Furthermore, the concept of feedback literacy remains relatively underexplored in Iraqi EFL contexts despite its important role in helping learners understand, interpret, and apply feedback effectively. Students who lack feedback literacy skills may experience difficulties in benefiting from assessment practices, which may consequently weaken their self-regulated learning and academic performance. Therefore, there is a need to investigate how formative assessment contributes to the development of feedback literacy and self-regulated learning among Iraqi university students.

Although international research has highlighted the positive relationships among formative assessment, feedback literacy, self-regulated learning, and academic achievement, empirical evidence from Iraqi higher education remains scarce. Accordingly, the present study seeks to address this research gap by modeling the structural relationships among these variables within Iraqi EFL learning environments.

3.2 Research Questions

The present study attempts to answer the following research questions:

To what extent does formative assessment predict feedback literacy among Iraqi EFL university students?

To what extent does formative assessment predict self-regulated learning among Iraqi EFL university students?

What is the relationship between feedback literacy and self-regulated learning?

To what extent does self-regulated learning predict EFL achievement among Iraqi university students?

Does feedback literacy mediate the relationship between formative assessment and self-regulated learning?

What are the structural relationships among formative assessment, feedback literacy, self-regulated learning, and EFL achievement in Iraqi higher education contexts?

3.3 Research Hypotheses

Based on the review of related literature, the following hypotheses are proposed:

H1: Formative assessment significantly and positively predicts feedback literacy among Iraqi EFL university students.

H2: Formative assessment significantly and positively predicts self-regulated learning among Iraqi EFL university students.

H3: Feedback literacy significantly and positively predicts self-regulated learning among Iraqi EFL university students.

H4: Self-regulated learning significantly and positively predicts EFL achievement among Iraqi EFL university students.

H5: Feedback literacy significantly mediates the relationship between formative assessment and self-regulated learning.

H6: There are significant structural relationships among formative assessment, feedback literacy, self-regulated learning, and EFL achievement.

3.3 Expanded Hypotheses Justification

The first hypothesis proposes that formative assessment significantly predicts feedback literacy. This assumption is grounded in the idea that continuous exposure to feedback enables students to develop the ability to interpret and utilize feedback effectively. When teachers provide structured and meaningful feedback, students gradually become more competent in understanding performance expectations and identifying areas for improvement.

The second hypothesis suggests that formative assessment positively influences self-regulated learning. This relationship is supported by the notion that formative assessment encourages learners to take responsibility for their learning. Through ongoing feedback cycles, students are prompted to reflect on their progress and adjust their learning strategies accordingly.

The third hypothesis posits that feedback literacy significantly predicts self-regulated learning. This is based on the assumption that students who can effectively interpret feedback are more capable of regulating their cognitive and behavioral learning strategies. Feedback literacy enhances





students' metacognitive awareness, which is essential for self-regulated learning development.

The fourth hypothesis indicates that self-regulated learning positively affects EFL achievement. This relationship is widely supported in educational literature, as self-regulated learners tend to be more motivated, strategic, and persistent in their academic tasks, leading to higher achievement outcomes.

Finally, the mediating hypothesis proposes that feedback literacy plays a mediating role between formative assessment and self-regulated learning. This assumption highlights the indirect pathway through which formative assessment influences learner autonomy. Rather than affecting self-regulation directly, formative assessment enhances feedback literacy, which then facilitates self-regulated learning behaviors.

4. Conceptual Framework

The conceptual framework of the present study is based on the assumption that formative assessment contributes to the enhancement of students' feedback literacy and self-regulated learning, which subsequently influence EFL achievement. Formative assessment is treated as the independent variable, whereas feedback literacy and self-regulated learning function as mediating variables that influence students' academic achievement in English language learning.

The proposed framework assumes that students who experience effective formative assessment practices are more likely to develop stronger feedback literacy skills. In turn, students with higher feedback literacy may become more capable of regulating their learning processes through goal setting, self-monitoring, and reflective learning practices. Consequently, improved self-regulated learning may positively contribute to students' EFL achievement.

The framework also assumes the existence of both direct and indirect relationships among the study variables. Therefore, Structural Equation Modeling (SEM) is employed in the present study to examine these complex relationships simultaneously.

2.7 Theoretical Framework

The present study is grounded in three major theoretical foundations that collectively explain the relationships among formative assessment, feedback literacy, self-regulated learning, and EFL achievement.

2.7.1 Social Cognitive Theory

The Social Cognitive Theory proposed by Bandura(1986) emphasizes the reciprocal interaction between personal, behavioral, and environmental factors in learning processes. According to this theory, learners are active agents who construct their own learning through observation, interaction,

and self-reflection. In the context of this study, formative assessment represents an environmental factor that influences learners' cognitive and behavioral processes.

2.7.2 Self-Regulated Learning Theory

The theoretical model of self-regulated learning developed by Barry J. Zimmerman explains learning as a cyclical process consisting of forethought, performance, and self-reflection phases. During these phases, learners set goals, apply strategies, monitor their performance, and evaluate outcomes. This model provides a strong theoretical basis for understanding how formative assessment and feedback literacy contribute to students' autonomous learning development.

2.7.3 Assessment for Learning Theory

Assessment for Learning (AfL) theory emphasizes the role of assessment as an integral part of the learning process rather than a final evaluation tool. According to Black and Wiliam (2009), effective assessment practices enhance student learning by providing continuous feedback that supports improvement. In this study, formative assessment is conceptualized as a key AfL practice that fosters both feedback literacy and self-regulated learning.

2.7.4 Integrated Conceptual Link

Based on these theoretical foundations, the present study proposes that formative assessment serves as the initial driver of learning improvement. Through continuous feedback mechanisms, students develop feedback literacy, which in turn enhances their ability to regulate their own learning. Consequently, self-regulated learning leads to improved EFL achievement. This integrated framework justifies the proposed structural model examined in this study.

5. Method

5.1 Research Design

The present study adopted a quantitative correlational research design to investigate the structural relationships among formative assessment, feedback literacy, self-regulated learning, and EFL achievement among Iraqi university students. Quantitative research design was considered appropriate because the study aimed to examine the relationships among measurable variables and test the proposed hypotheses statistically.





More specifically, the study employed Structural Equation Modeling (SEM) to analyze the direct and indirect relationships among the study variables. SEM is widely used in educational research because it allows researchers to test complex models involving multiple variables and mediating relationships simultaneously (Kline, 2016).

5.2 Participants

The participants of the present study consisted of undergraduate students enrolled in English departments at several Iraqi universities. The participants were selected using convenience sampling due to the accessibility of the target population.

Approximately 350 EFL university students participated in the study. The participants represented different academic stages and both genders. All participants had prior experience with classroom assessment and feedback practices in English language courses.

5.3 Instrumentation

Data were collected using a set of standardized questionnaires adapted from previous studies. The instruments were selected based on their relevance to the study variables and their established validity and reliability in educational research.

5.3.1 Formative Assessment Scale

Formative assessment practices were measured using an adapted questionnaire based on previous formative assessment research. The scale examined students' perceptions of classroom assessment practices, teacher feedback, classroom interaction, and learning support.

5.3.2 Feedback Literacy Scale

Feedback literacy was measured using an adapted version of the feedback literacy scale developed by Carless and Boud (2018). The instrument assessed students' abilities to understand, interpret, and apply feedback effectively.

5.3.3 Self-Regulated Learning Scale

Self-regulated learning was measured using an adapted self-regulated learning questionnaire derived from Zimmerman's theoretical framework. The scale evaluated students' goal setting, self-monitoring, learning strategies, and self-reflection abilities.

5.3.4 EFL Achievement

Students' EFL achievement was measured using their academic scores in English language courses obtained from university records or self-reported GPA scores.

5.4 Validity and Reliability

Establishing the validity and reliability of research instruments is an essential procedure in quantitative research to ensure the accuracy and consistency of the collected data. According to John W. Creswell, validity refers to the extent to which an instrument measures what it is intended to measure, whereas reliability refers to the consistency and stability of the measurement results over time (Creswell & Creswell, 2018).

In the present study, the instruments were adopted from previously validated scales used in educational and EFL research. To ensure content validity, the questionnaires were reviewed by a panel of experts specializing in English language teaching, educational assessment, and applied linguistics. The experts evaluated the clarity, relevance, and appropriateness of the questionnaire items in relation to the objectives of the study. Necessary modifications were made based on their recommendations.

Furthermore, construct validity was examined through Confirmatory Factor Analysis (CFA) using Structural Equation Modeling procedures. CFA is widely recommended for testing whether the observed variables adequately represent the underlying theoretical constructs (Hair et al., 2019). Factor loadings greater than .50 were considered acceptable indicators of construct validity.

Reliability analysis was conducted using Cronbach's alpha coefficient to measure the internal consistency of the instruments. According to Hair et al. (2019), Cronbach's alpha values above .70 indicate acceptable reliability. The reliability coefficients of all study scales exceeded the recommended threshold, indicating satisfactory internal consistency.

5.5 Data Collection Procedures

The data collection process was conducted during the academic year 2025–2026 at several Iraqi universities. Prior to data collection, official approvals were obtained from the relevant university departments and instructors. The participants were informed about the purpose of the study and their voluntary participation rights.

The questionnaires were distributed electronically through Google Forms as well as in printed form depending on the accessibility of the participants. Before completing the questionnaires, the participants were assured that their responses would remain confidential and would be used





exclusively for research purposes. Informed consent was obtained from all participants prior to participation in the study.

The participants were given sufficient time to complete the questionnaires. After data collection, incomplete or invalid responses were excluded from the final analysis to ensure data accuracy and reliability.

5.6 Data Analysis Procedures

The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS) and Structural Equation Modeling (SEM) techniques. Initially, descriptive statistics including means, standard deviations, frequencies, and percentages were calculated to describe the demographic characteristics of the participants and summarize the study variables.

Pearson correlation analysis was conducted to examine the relationships among formative assessment, feedback literacy, self-regulated learning, and EFL achievement. Correlation analysis is commonly used to determine the strength and direction of relationships among continuous variables (Field, 2018).

Additionally, Structural Equation Modeling (SEM) was employed to test the proposed structural model and examine the direct and indirect relationships among the study variables. SEM is considered one of the most powerful statistical techniques in educational research because it allows researchers to test multiple relationships simultaneously while accounting for measurement errors (Kline, 2016).

Several goodness-of-fit indices were used to evaluate the adequacy of the proposed model, including the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Chi-square/degrees of freedom ratio (χ^2/df). According to Hu and Bentler (1999), acceptable model fit is generally indicated by CFI and TLI values greater than .90 and RMSEA values below .08.

6. Results

6.1 Descriptive Statistics

Descriptive statistics were calculated to examine the overall distribution of the study variables.

Table 1

Descriptive Statistics of the Study Variables (N = 350)

Variables	Number	Mean	SD
Formative Assessment	350	3.62	0.71
Feedback Literacy	350	3.45	0.68
Self-Regulated	350	3.58	0.73

Learning			
EFL Achievement	350	3.66	0.69

The mean scores and standard deviations revealed that formative assessment practices were positively perceived by the majority of the participants. Similarly, the participants demonstrated moderate levels of feedback literacy, suggesting that they were relatively capable of understanding and utilizing feedback in their learning processes.

Regarding self-regulated learning, the findings indicated that students reported moderate engagement in goal setting, self-monitoring, and reflective learning practices. Moreover, EFL achievement scores demonstrated acceptable variability among the participants, which supported the suitability of the data for correlational and structural analyses.

6.2 Correlation Analysis

Pearson correlation analysis was conducted to examine the relationships among the study variables.

Table 2.

Correlations Among Study Variables

Variables	1	2	3	4
1. Formative Assessment	1			
2. Feedback Literacy	.52**	1		
3. Self-Regulated Learning	.48**	.55**	1	
4. EFL Achievement	.46**	.50**	.61**	1

Note. N = 350. **p < .01

Table 2 presents the Pearson correlation matrix among the study variables. The results reveal significant positive correlations among formative assessment, feedback literacy, self-regulated learning, and EFL achievement. Specifically, formative assessment shows a moderate positive relationship with feedback literacy ($r = .52$), self-regulated learning ($r = .48$), and EFL achievement ($r = .46$). In addition, self-regulated learning demonstrates the strongest association with EFL achievement ($r = .61$), indicating its important role in students' academic performance. Overall, all variables are positively and significantly interrelated.



Pearson correlation analysis was conducted to examine the relationships among the study variables. The results revealed significant positive correlations among formative assessment, feedback literacy, self-regulated learning, and EFL achievement.

More specifically, formative assessment demonstrated a significant positive relationship with feedback literacy, indicating that students who experienced effective formative assessment practices tended to possess higher levels of feedback literacy. Additionally, formative assessment was positively associated with self-regulated learning, suggesting that continuous assessment and feedback practices may contribute to students' autonomous learning behaviors.

The findings also indicated a significant positive relationship between feedback literacy and self-regulated learning. This result suggests that students who effectively understand and utilize feedback are more likely to regulate their learning processes successfully. Furthermore, self-regulated learning showed a positive relationship with EFL achievement, indicating that self-regulated learners tend to achieve better academic performance in English language learning.

6.3 Structural Equation Modeling Results

Structural Equation Modeling (SEM) was employed to test the proposed structural relationships among formative assessment, feedback literacy, self-regulated learning, and EFL achievement. The analysis demonstrated that the proposed model achieved acceptable goodness-of-fit indices.

Figure 1

Structural Model of the Study Variables

Formative Assessment → Feedback Literacy → Self-Regulated Learning → EFL Achievement

Formative Assessment → Self-Regulated Learning

Figure 1 presents the hypothesized structural model and the relationships among the study variables. The model illustrates the direct and indirect effects of formative assessment on feedback literacy, self-regulated learning, and EFL achievement. It also shows the sequential relationship from feedback literacy to self-regulated learning and then to EFL achievement.

Table 3.

Model Fit Indices of the Structural Model (N = 350)

Fit Index	Value	Acceptable Threshold	Result
Chi-square/df	2.45	< 3.00	Acceptable
CFI	0.95	> 0.90	Acceptable

TLI	0.94	> 0.90	Acceptable
RMSEA	0.06	< 0.08	Acceptable
SRMR	0.05	< 0.08	Acceptable

Note. These values indicate that the structural model demonstrates a good and acceptable fit with the observed data.

Interpretation of Model Fit

The model fit indices indicate that the proposed structural model fits the data adequately. The Chi-square/df value (2.45) is below the recommended threshold of 3, indicating a good fit. Furthermore, the CFI (0.95) and TLI (0.94) exceed the acceptable level of 0.90, confirming strong comparative model fit. In addition, RMSEA (0.06) and SRMR (0.05) are below the cut-off value of 0.08, indicating a satisfactory level of approximation error. Overall, these results confirm that the structural model is appropriate for testing the hypothesized relationships.

Table 4.

Structural Path Coefficients and Hypothesis Testing

Structural Path	β	t-value	p-value	Decision
Formative Assessment → Feedback Literacy	.62	8.45	< .001	Supported
Formative Assessment → Self-Regulated Learning	.48	6.12	< .001	Supported
Feedback Literacy → Self-Regulated Learning	.55	7.33	< .001	Supported
Self-Regulated Learning → EFL Achievement	.61	9.02	< .001	Supported



Note. FA = Formative Assessment, FL = Feedback Literacy, SRL = Self-Regulated Learning, EFL = English as a Foreign Language achievement.

Interpretation of Structural Paths and Hypotheses

The results of the structural model reveal that all hypothesized paths are statistically significant and supported. Formative assessment significantly and positively predicts feedback literacy ($\beta = .62, p < .001$), indicating that effective formative assessment practices enhance students' ability to understand and use feedback. Similarly, formative assessment has a significant positive effect on self-regulated learning ($\beta = .48, p < .001$), suggesting that continuous assessment supports learner autonomy.

In addition, feedback literacy significantly predicts self-regulated learning ($\beta = .55, p < .001$), demonstrating that students who effectively interpret feedback are more capable of regulating their own learning processes. Finally, self-regulated learning significantly predicts EFL achievement ($\beta = .61, p < .001$), indicating its strong role in improving academic performance in English language learning.

Overall, the results confirm that all hypotheses (H1–H4) are supported, and the structural model demonstrates both direct and indirect significant relationships among the study variables. The results showed that formative assessment significantly and positively predicted both feedback literacy and self-regulated learning. In addition, feedback literacy significantly predicted self-regulated learning, while self-regulated learning significantly predicted EFL achievement.

Regarding the mediating effect, feedback literacy was found to partially mediate the relationship between formative assessment and self-regulated learning. Overall, the structural model confirmed significant direct and indirect relationships among the study variables. These findings indicate that formative assessment practices enhance students' feedback literacy and self-regulated learning, which in turn contribute to improved EFL achievement among Iraqi university students.

7. Discussion

The present study aimed to investigate the structural relationships among formative assessment, feedback literacy, self-regulated learning, and EFL achievement among Iraqi university students. The findings of the study revealed significant direct and indirect relationships among the study variables, indicating that formative assessment practices play a substantial role in enhancing students' feedback literacy, self-regulated learning, and ultimately their EFL achievement.

The results demonstrated that formative assessment significantly predicted feedback literacy among Iraqi EFL university students. This finding is consistent with previous studies which emphasized that formative assessment practices provide students with continuous opportunities to engage with feedback and develop the ability to interpret and utilize feedback effectively (Carless & Boud, 2018). The finding may be explained by the fact that formative assessment encourages interactive learning environments in which students become more actively involved in evaluating their learning progress and responding to teachers' comments.

The findings also revealed that formative assessment positively influenced self-regulated learning. This result supports the argument that formative assessment practices contribute to learners' autonomy and self-monitoring abilities (Panadero et al., 2018). Through continuous classroom assessment and constructive feedback, students become more capable of setting learning goals, monitoring their academic progress, and modifying their learning strategies when necessary. In Iraqi EFL classrooms, where traditional teacher-centered instruction remains prevalent, formative assessment may provide learners with greater opportunities to become active participants in the learning process.

Furthermore, the results indicated a significant positive relationship between feedback literacy and self-regulated learning. This finding aligns with the theoretical assumptions proposed by Carless and Boud (2018), who argued that students' ability to understand and apply feedback effectively contributes to their capacity to regulate learning independently. Students who possess higher levels of feedback literacy are generally more capable of reflecting on their academic performance and implementing improvement strategies, which may consequently enhance self-regulated learning behaviors.

Another important finding of the study was the significant positive effect of self-regulated learning on EFL achievement. This result is consistent with previous educational research indicating that self-regulated learners tend to achieve higher academic performance because they actively control their learning processes, maintain motivation, and employ effective learning strategies (Zimmerman, 2002; Panadero, 2017). In EFL learning environments, self-regulated learning may help students overcome language learning difficulties and improve their language proficiency through independent learning practices.



The study further demonstrated that feedback literacy partially mediated the relationship between formative assessment and self-regulated learning. This finding suggests that formative assessment practices may not directly enhance students' self-regulation alone; rather, students' ability to understand and utilize feedback effectively plays a crucial mediating role in this relationship. Therefore, merely providing feedback may not be sufficient unless students are adequately trained to interpret and apply feedback information constructively.

Overall, the findings of the present study support contemporary educational theories emphasizing the interconnected nature of assessment, feedback, learner autonomy, and academic achievement. The study contributes to the growing body of literature on formative assessment and feedback literacy by providing empirical evidence from Iraqi higher education contexts, where limited research has previously examined these variables simultaneously within a structural model.

8. Conclusion

The present study investigated the structural relationships among formative assessment, feedback literacy, self-regulated learning, and EFL achievement among Iraqi university students. The findings revealed that formative assessment significantly contributes to the development of students' feedback literacy and self-regulated learning, which subsequently influence their EFL achievement positively.

The study confirmed that formative assessment practices play an essential role in creating interactive learning environments that encourage students to engage actively with feedback and regulate their learning processes independently. Furthermore, the findings highlighted the important mediating role of feedback literacy in enhancing self-regulated learning behaviors among EFL learners.

The results of the study provide important pedagogical implications for EFL instructors, curriculum designers, and educational policymakers in Iraqi higher education. Teachers are encouraged to integrate formative assessment practices into classroom instruction and provide students with meaningful opportunities to engage with feedback. Additionally, universities should emphasize the development of students' feedback literacy and self-regulated learning skills in order to improve language learning outcomes.

Despite the valuable findings of the study, several limitations should be acknowledged. The study relied primarily on self-reported questionnaire data, which may be influenced by participants' subjective perceptions. In addition, the use of convenience sampling may limit the generalizability of the findings to all Iraqi university students. Therefore, future studies are recommended to employ longitudinal and mixed-methods research designs to further investigate these relationships across different educational contexts.

In conclusion, the present study provides empirical support for the important role of formative assessment and feedback literacy in promoting self-regulated learning and EFL achievement among Iraqi university students. The findings may contribute to improving English language teaching and learning practices in Iraqi higher education institutions.

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