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Learning-oriented assessment in the classroom: the contribution of self-assessment and critical thinking to EFL learners' academic engagement and self-esteem

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Abstract

The core of self-assessment (CSA) and critical thinking (CT) empower learners to observe and evaluate themselves. Although the literature on CSA and CT reflects a long history, little is known about their contributions to the learners' academic engagement (AE) and self-esteem (SE), particularly in the EFL context. Therefore, the present investigation intended to explore a structural model of English as a Foreign Language (EFL) university students' CSA, CT, and SE. Accordingly, the Core of Self-assessment Questionnaire (CSAQ), Watson–Glaser Critical Thinking Appraisal-form A (WGCTA), The SinAPSi Academic Engagement Scale (SAES), and The Foreign Language Learning Self-esteem Scale (FLLSES), were administered to 427 Iranian EFL university learners. The results of Structural Equation Modelling (SEM) indicated that EFL university students with high levels of CSA were more engaged and could build up high SE. Moreover, the effective role of CT in boosting AE and SE was also confirmed. The implications of this study may unveil new prospects for implementing learning-oriented assessment in the classroom and CT practices in language learning instruction and assessment.

Keywords: The core of self-assessment, Critical thinking, Academic engagement, Self-esteem, EFL university students, Structural Equation Modeling

Introduction

Assessment is an indispensable part of Instruction. Teachers' applied methodology and teaching style preferences, directly and indirectly, affect how they design and administer their assessments in the classroom. To ensure the educational and psychological well-being of the students, learning-oriented assessment in the classroom is highly recommended (Bachman, 2015). In CSA, learners are involved in critically evaluating their progress (Tavousi & Pour Sales, 2018). CSA is basically an integrated personality structure referring to the students' assessment and interpretation of their own learning (Guo Jie, 2021). Put it in other words, CSA is intended to activate the learners to feel more responsible and reflect on every step of their learning experiences (Wongdaeng, 2022).

Investment in CSA can improve learners' autonomy, emotion regulation, L2 grit, and social relationships (Heydarnejad et al., 2022; Jiang et al., 2022; Zhuoyuan, 2021).

CT is a higher-order thinking skill that is concentrated using intuition, insight, and artistry to decide about any affairs (Amirian et al., 2022; Heshmat Ghahderijani et al., 2021). According to Li et al. (2022), CT enables individuals to look back and forth to react efficiently in every situation. Thus, CT is a helpful attribution for the learners that guarantee a safe road for learning. While learning, students may face various chaos and complexities that ask for decisive reactions. They need to be armed with CT skills to help them apply their metacognition and cognition to act efficiently. CT allows learners to stop, step back, think deeply, and assess themselves (Syairofi et al., 2022; Zhang et al., 2020).

AE is an affective-motivational attribution highlighting learners' willingness, and involvement in educational activities (Shu, 2022). Engaged learners have high levels of dedication and they are completely immersed in the class activities (Burić & Macuka, 2017; Deng et al., 2022; Topchyan & Woehler, 2020). Today's continuously challenging environment calls for engaged learners to be self-initiated and self-reliant. Engagement can be regarded as an incentive to extend the level of motivation and progress in individuals' education. (Namaziandost, Heydarnejad, Rahmani Doqaruni, & Aziai, 2022). In other words, LE can be considered a measure that illustrates the extent and depth of students' participation in all aspects of their education.

SE as a psychological construct is individuals' beliefs about themselves and their emotional states. Smith and Mackie (2007) stated that "SE is the positive or negative evaluations of the self, as in how we feel about it." In the educational context, SE refers to the learners' confidence in their own worth or abilities. SE among learners is more likely to flourish in learning situations when self-assessment is encouraged (Faramarzadeh & Amini, 2017). Students with a healthy level of self-esteem work toward finding solutions when challenges arise; they also respect generally accepted social rules (Zhang, 2022a, 2022b). It is worth highlighting that practicing SE prepares learners to cope with the demands of the modern world (Mandokhail et al., 2018). Thus, prerequisite factors for the development and attainment of SE are necessary to be taken to the surface layer of educational research. Despite the potential role of CSA, CT, AE, and ES in the well-being of the learners, there remains a paucity of evidence on the extent and direction of the interplay among them. In seeking to understand their associations better, the present study set forth to fill this educational gap. In the following section, the related literature was critically reviewed.

Literature review

The Core of Self-assessment (CSA)

Assessment is the systematic basis for making inferences about students' progress and their learning (Bachman, 2015). Through the years, different methods were defined to facilitate assessment and increase its validity and reliability. CSA is a type of assessment in which learners are actively involved in the "assessment or evaluation of oneself or one's actions, attitudes, or performance. That is why each learner should be encouraged and trained to go through a process of self-assessment", (Bachman et al., 2010, p. 12). According to Andrade (2019), CT, metacognition, monitoring, and self-regulated

learning are the major principles of CSA. Furthermore, Judge et al. (1997) CSA is considered a type of higher-order trait involving self-esteem, generalized self-efficacy, neuroticism, and locus of control.

CSA can be generated intrinsically and extrinsically (Bourke & Mentis, 2007). External values, feedback from others, and grades define the extrinsic phase of CSA. Internal values and goal setting define the intrinsic phase of CSA. Sociocultural settings as well as the learner's self-determination and self-identity are critical in CSA formulation (Bourke & Mentis, 2007, 2013). Learners need to evaluate their learning process and be involved in solving problems. The high levels of CSA armed learners to overcome different challenges and decide thoughtfully (Al-Mamoory & Abathar Witwit, 2021). According to Hu (2022), CSA empowers learners to regulate their emotions. It means that self-assessment influences both cognitive and affective aspects of learners' educational lives. The high state of CSA, especially in language learning can manage emotional experiences and improve academic achievement (Bijani et al., 2022; Punpromthada et al., 2022).

As the literature on CSA echoes, practicing self-assessment inhibits cognitive and metacognitive skills among EFL learners (Heydarnejad et al., 2022; Nemati et al., 2021; Wei, 2020). Moreover, Jahara et al. (2022) found that levels of coping style among EFL learners change the state of CSA and stress management. It was also approved that self-assessment is affected by self-efficacy beliefs (Amirian et al., 2022; Zheng et al., 2022), academic emotion (Pekrun et al. 2017), metacognitive skills (Wei, 2020), and critical thinking (Zhang, 2022a, 2022b; Li et al., 2022). Additionally, the impact of L2 grit on CSA and foreign language learning anxiety was investigated by Heydarnejad et al. (2022). The results of SEM indicated that L2 grit increased the level of CSA. That is, gritter students are more powerful in self-monitoring. They can also control and manage the anxiety that may be experienced in language classes.

Critical thinking (CT)

The concept of CT was born about two centuries ago by Socrates, who assumed that reasoning, analyzing, and evaluating were the critical aspects of individuals' thinking (Fisher, 2001). Despite the long introduction and vast application of CT, no agreed-upon definition is suggested (Fasko, 2003; Halonen, 1995). As Paul (1988) and Halpern (2003) stipulated, CT is a higher-order thinking skill that activates mental processes and cognitive skills. Moreover, Dewey (1933) defined CT as dynamic processes of analysis, synthesis, and evaluation to get an acceptable conclusion. In the definition of CT by Ennis (1996), the intellectual and disciplined process of mind, which is developed by critical reflection, is highlighted. In the same line of inquiry, Thomas and Lok (2015) considered knowledge, skills, and disposition as the basis of CT.

The introduction of CT as an essential part of education was first done by Dewey (1933). Based on his proposal, higher-order thinking skills should be implemented in schools and universities. In this regard, Mason (2008) noted that CT strategies should be taught and teachers should learn how to apply them in the classroom. Reviewing the related literature on CT highlighted the crucial role of teachers in implementing and practicing CT. For instance, Heydarnejad, Fatemi, and Ghonsooly (2021) concluded that EFL teachers' attitudes toward CT and self-regulation influence their style of teaching. The contribution of CT to the identity formation of the teachers (Sheybani & Miri, 2019),

reflective thinking (Heydarnejad et al., 2018), self-efficacy (Amirian et al., 2022), L2 grit (Zheng et al., 2022), and emotion regulation (Namaziandost, Heydarnejad, Rahmani Doqaruni, & Aziai, 2022). When teachers are empowered with higher-order thinking skills, they are more able to help their students cultivate CT skills (Li et al., 2022).

Due to the immense influence of CT on learners' academic achievement, various studies attempted to investigate the practical strategies for implementing CT among learners. In this regard, Rashtchi and Khoshnevisan (2020) suggested practicing CT strategies by writing tasks among EFL learners. In another study by Sheikhy Behdani and Rashtchi (2019), the role of process writing and its contribution to fostering CT was highlighted. Moreover, Davoudi and Heydarnejad et al. (2022) practice reflective thinking among EFL learners and they found that reflective thinking as a higher-order thinking skill could enhance the student's language achievement. Zare et al. (2021) also documented that students' reading comprehension skills were improved with the help of developing dynamic assessment, which is based on CT. From another perspective, Wale and Bishaw (2020) confirmed that inquiry-based learning boosted CT skills in the EFL context. Additionally, Wahyudi et al. (2019) conducted a study to explore the effect of a discovery learning-based assessment module to enhance CT. Based on their findings, the discovery learning-based assessment could improve CT and creativity of the learners, especially in their speaking production.

Academic engagement (AE)

Engagement is a multidimensional construct and entails different aspects. It affects the motivation, cognition, behavior, and emotions of the learners (Robinson & Hullinger, 2008; Sharma & Bhaumik, 2013). Engagement in the domain of education was defined and studied from different perspectives: school engagement (Fredricks et al., 2004), study engagement (Schaufeli et al., 2002), student course engagement (Handelsman et al., 2005; Xu et al., 2022), and teacher engagement (Deng et al., 2022; Namaziandost, Heydarnejad, Rahmani Doqaruni, & Aziai, 2022). To describe engagement different models and theories were proposed. Fredricks et al. (2004) Model of Engagement and Schaufeli et al. (2002) Model of Engagement are the two comment models of engagement due to their reliability and usage in different empirical studies.

Fredricks et al. (2004) Model of Engagement defines engagement as a dynamic and malleable construct including behavioral, cognitive, and emotional dimensions. They believe that these three dimensions are integrated. Engagement from the eyes of Schaufeli et al. (2002) consists of absorption, vigor, and dedication. These two models assess different aspects of students' engagement, but they believe that engagement is one of the vital aspects of learners' academic engagement. In these two models, learners' cognitive engagement and enthusiasm are described as their involvement in school-related activities and willingness to learn (Rezai et al., 2022; Tuominen-Soini & Salmela-Aro, 2014). Fredricks et al. (2004) and Schaufeli et al. (2002) also conceptualize that AE increases learners' resilience, persistence, and positive attitudes toward learning.

Through the years, AE and its correlation were studied and its contributions to learners' well-being were highlighted in various empirical studies. For instance, Alonso-Tapia et al. (2022) discovered that AE positively relates to motivation, self-efficacy, emotion, self-regulation, and satisfaction. The reciprocal relationships between AE, school

engagement, and motivation were found by Hosseinmardi et al. (2021). Likewise, Amerstorfer and Freiin von Münster-Kistner (2021) conducted a study to investigate the factors that affect AE. As they discussed, AE depends on personal characteristics, the teacher, the teaching methodology, peers, and the learning atmosphere. They believed that cognitive, metacognitive, affective, social, task-related, and foreign language-related factors influence AE. In a recent study by Namaziandost, Heydarnejad, and Rezai (2022), the mediator role of emotion regulation in fostering engagement, self-efficacy, and anger in higher education was confirmed. They concluded that a healthy state of emotion regulation will guarantee a sense of engagement and self-efficacy among university teachers. In such a situation, they can better manage and regulate their anger.

Self-esteem (SE)

SE is *confidence* in one's own worth or abilities (Mackinnon, 2015). It is the offspring of the individual's beliefs about their skills, abilities, and social relationships (Wang & Ollendick, 2001). SE is associated with the generation of self-image and self-conscience. According to Manning et al. (2006), SE is linked to self-evaluation and involves cognitive appraisals relevant to self-worth and affective experiences. Additionally, Dörnyei and Ryan (2015) argued that SE is related to self-concept and self-evaluation. Self-concept refers to individuals' self-image and self-evaluation addresses the procedures involved in the formation of individuals' SE. More precisely, Lawrence (2006) defined self-concept as an umbrella term and includes SE, self-image, and ideal self.

SE influences students' learning and academic success. It means that learners with higher SE are more confident and define higher goals for themselves despite challenges and difficulties (Murk, 2006). Their persistence in attempts helps them to become more successful. SE can also foster self-regulatory strategies as well as the emotional states of individuals (Hosseinmardi et al., 2021). According to Brown (2000), "no successful activity can occur without some degree of self-esteem" (p.145). SE is related to students' autonomy and can increase their reading comprehension (Zhang, 2022a, 2022b). The mediator role of SE in shaping spoken skills among advanced and intermediate language learners was concluded by Faramarzadeh and Amini (2017). Based on their findings, language learners with high levels of self-esteem were more successful in total spoken words, total spoken turns, and interruptions in mixed groups. It was also documented that teachers' positive SE helps the development of positive SE in their students (Mandokhail et al., 2018).

Objectives of the present study

As the review of the existing literature reflected, CSA, CT, AE, as well as SE are student-attributed constructs that foster learning and learners' well-being. When learners are armed with CSA, CT, AE, and SE, they can act more skillfully and decide better, especially in the face of chaos and complexity. Despite their immense contributions, the possible relationships between CSA, CT, AE, and SE remained uncharted territories, particularly in the realm of language learning. Therefore, the present study intended to take a step forward and uncover the association between CSA, CT, AE, and SE among EFL university students. In this regard, a model was proposed (Figure 1) to picture the relationships between CSA, CT, AE, and SE with the aim of advancing more meaningful

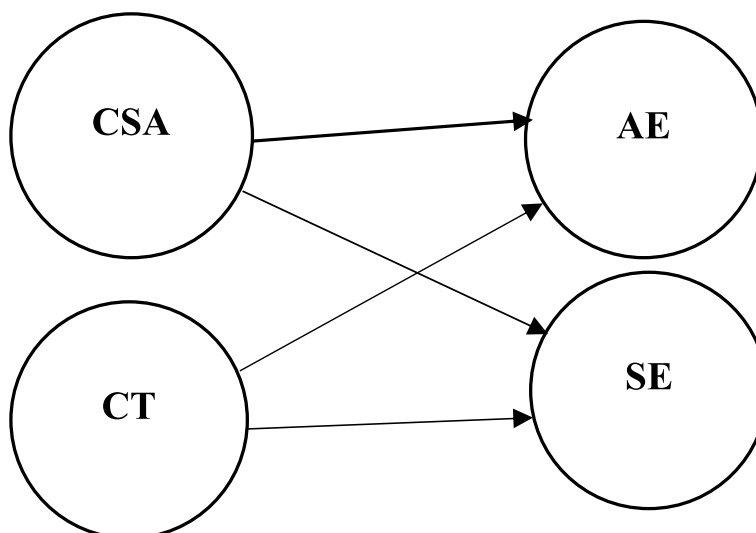


Fig. 1 Theoretical structural equation model

learning and initiating future research. This model, based on previous studies and relevant theories, proposed the possible association between CSA, CT, AE, and SE. Thus, the possible contributions of CSA and CT to AE and SE in the EFL context as well as higher education were explored in this study. In so doing, the suggested model was tested via Confirmatory Factor Analysis (CFA) and SEM. The outcomes of this research can both theoretically and empirically assist learners and teachers. Cultivating CSA and higher-order thinking skills can empower learners to be active in their learning processes and the procedures involved in their assessment. To reach these objectives, the following research questions were posed:

- RQ1: To what extent does EFL university learners’ CSA influence their AE?
- RQ2: To what extent does EFL university learners’ CSA influence their SE?
- RQ3: To what extent does EFL university learners’ CT influence their AE?
- RQ4: To what extent does EFL university learners’ CT influence their SE?

In this regard, the following null hypotheses were formulated:

- H01. EFL university learners’ CSA does not influence their AE.
- H02. EFL university learners’ CSA does not affect their SE.
- H03. EFL university learners’ CT does not influence their AE.
- H04. EFL university learners’ CT does not affect their SE.

Methodology

In this section, the methodological steps are described in detail:

Participants

This research was conducted among 427 university students (158 males and 269 females) at the MA level from Iran. They were studying different branches of English in state

universities of Iran. Among 427 participants, 221 students were studying English Teaching, 54 English Literature, and 152 were English Translation. The criteria for selecting the participants were convenience or opportunity sampling procedures.

Instruments

The Core of Self-assessment Questionnaire (CSAQ)

To investigate the level of EFL university students' CSA, the Core of Self-assessment Questionnaire (CSAQ) was employed. This instrument was developed by Judge et al. (2003) with 12 items on a five-point Likert scale. The range of obtained scores was from 12 to 60. High scores reflect high levels of self-assessment, while low scores indicate low levels of self-assessment. Based on the report of Cronbach's alpha ($\alpha = 0.879$), the reliability of this instrument in our study was acceptable.

Watson–Glaser Critical Thinking Appraisal-form A (WGCTA)

University students' CT was assessed via the Watson–Glaser Critical Thinking Appraisal Form A by Watson and Glaser (1980). This scale involves five sections: inference (16 items), recognizing assumptions (16 items), making deductions (16 items), interpretation (16 items), and evaluation (16 items). In this research, the report of Cronbach alpha was satisfactory ($\alpha = 0.865$).

The SInAPSi Academic Engagement Scale (SAES)

The SInAPSi (Services for active participation and inclusion of university students) Academic Engagement Scale (SAES) was designed and validated by Freda et al. (2021). This instrument aims to gauge university students' AE. This instrument comprises six dimensions on a five-point Likert scale as follows: (1) university value and sense of belonging (6 items), (2) perception of the capability to persist in the university choice (4 items), (3) value of university course (7 items), (4) engagement with university professors (4 items), (5) engagement with university peers (5 items), and (6) relationships between university and relational net (3 items). In the current investigation, the report of Cronbach was 0.891, which indicated acceptable reliability.

The Foreign Language Learning Self-esteem Scale (FLLSES)

To explore EFL university students' self-esteem, the Foreign Language Learning Self-esteem Scale (FLLSE) was used. This instrument was developed by Rubio (2007) on a five-point Likert scale (from 1—strongly disagree to 5—strongly agree). FLLSE includes 25 items in four dimensions: (1) language capability, (2) real in-class language utilization, (3) in-class correlations, and 4) attitude toward / behavior in the class of foreign language. The reliability of this instrument was estimated in this study and the result of the Cronbach alpha coefficient was ($\alpha = 0.851$) acceptable.

Procedures

This study was administered through a web-based platform. The data collection started in May and ended in August 2022. The university students at the MA level were asked to complete an electronic survey form including the CSEQ, WGCTA, FLLSES, and SAES via Google Forms. On the whole, 427 forms were received and the return rate was 85.2%.

No data were missed due to the design of the electronic survey that all parts should be linked necessarily. More importantly, in electronic surveys, researchers can gather data from different regions with varying age groups and sociocultural backgrounds.

Data analysis

Firstly, the normality of the data was examined through Kolmogorov-Smirnov Test. Due to the normal distribution of the data, parametric methods were suggested to analyze the data. Thus, CFA and SEM using LISREL (linear structural relationships) 8.80 were applied. As Hair et al. (1998) assert, CFA is used to validate the latent variables. Furthermore, SEM is a robust multivariate procedure to take a confirmatory hypothesis-testing approach for the proposed structural theory (Schreiber et al. 2006).

Results

The results of statistical analysis employed to gauge the relationships between CSA, CT, FLLSE, and SAE are displayed in this part. At first, the descriptive statistics were calculated and displayed in Table 1.

Table 1 Descriptive statistics

Instruments	Subscales	N	Minimum	Maximum	Mean	Std. deviation
The Core of Self-assessment Questionnaire (CSAQ)		427	12	60	39.129	11.076
. Watson–Glaser Critical Thinking Appraisal-Form A (WGCTA)	Inference	427	19	80	54.087	12.267
	Recognizing of assumptions	427	17	80	53.956	12.240
	Making deduction	427	17	80	53.845	12.752
	Interpretation	427	16	79	56.838	12.005
	Evaluation	427	7	30	20.386	4.784
The Foreign Language Learning Self-esteem Scale (FLLSES)	Language capability	427	9	30	21.813	5.662
	Real in-class language utilization	427	4	20	13.855	4.573
	In-class correlations	427	7	35	26.454	6.263
	Attitude toward behavior in the class of foreign language	427	4	20	13.932	4.305
The SInAPSi Academic Engagement Scale (SAES)	University value and sense of belonging	427	5	15	11.712	2.170
	Perception of the capability to persist in the university choice	427	46	145	105.836	23.410
	Value of university course	427	8	30	20.000	4.814
	Engagement with university professors	427	13	30	21.864	3.628
	Engagement with university peers	427	10	30	21.639	3.559
	Relationships between university and relational	427	12	35	26.546	4.579

Based on Table 1, the mean score of CSA was 39.129 (SD = 11.076). Among the subscales of CT, interpretation ($M = 56.838$, $SD = 12.005$) was at the highest level and evaluation was at the lowest level ($M = 20.386$, $SD = 4.784$). Furthermore, in-class correlations got the highest mean score ($M = 13.494$, $SD = 4.183$) and real in-class language utilization ($M = 13.494$, $SD = 4.183$) received the lowest mean score among the subscales of FLLSES. Considering the subscales of SAES, the highest mean score is related to the perception of the capability to persist in the university choice ($M = 13.494$, $SD = 4.183$) and the lowest mean score is related to university value and sense of belonging ($M = 11.712$, $SD = 2.170$).

Following this step, the normal descriptions of the data were explored via the Kolmogorov-Smirnov test to decide on applying convenient statistical methods. Table 2 reports the results of the Kolmogorov-Smirnov test.

Based on Table 2, the sig values for all the instruments and their subscales were higher than 0.05, which showed that the data were normally distributed and that applying parametric methods was logical. Therefore, the LISREL 8.80 statistical package was employed to explore the structural relationships among CSA, WGCTA, FLLSE, and SAE. The chi-square magnitude, the root mean squared error of approximation (RMSEA), the comparative fit index (CFI), and the normed fit index (NFI) were utilized to evaluate the model fit. Based on Jöreskog (1990), the chi-square/df ratio should be lower than three and the chi-square should be non-significant. The root means square error of approximation (RMSEA) is recommended to be lower

Table 2 The results of Kolmogorov-Smirnov test

Instrument	Subscales	Kolmogorov-Smirnov Z	Asymp. Sig. (2-tailed)
The Core of Self-assessment Questionnaire (CSAQ)		0.594	0.872
Watson–Glaser Critical Thinking Appraisal-Form A (WGCTA)	Inference	0.961	0.315
	Recognizing of assumptions	0.808	0.531
	Making deduction	1.094	0.182
	Interpretation	0.603	0.860
	Evaluation	0.749	0.628
The Foreign Language Learning Self-esteem Scale (FLLSES)	Language capability	0.930	0.353
	Real in-class language utilization	1.459	0.028
	In-class correlations	0.674	0.754
	Attitude toward behavior in the class of foreign language	0.904	0.387
The SInAPSi Academic Engagement Scale (SAES)	University value and sense of belonging	1.220	0.102
	Perception of the capability to persist in the university choice	0.939	0.341
	Value of university course	0.997	0.273
	Engagement with university professors	1.072	0.201
	Engagement with university peers	0.739	0.646
	Relationships between university and relational	1.354	0.051

Table 3 Model fit indices

Fitting indexes	χ^2	df	χ^2/df	RMSEA	GFI	NFI	CFI
Cut value			< 3	< 0.1	> 0.9	> 0.9	> 0.9
The First Model	889.79	319	2.789	0.065	0.921	0.917	0.952

than 0.1 (Jöreskog, 1990). Moreover, the cut values for the NFI, GFI, and CFI are assumed to be greater than 0.90 (Jöreskog, 1990).

As Table 3 presented, the chi-square/df ratio (2.789) and the RMSEA (0.065) were acceptable. Furthermore, GFI (0.921), NFI (0.917), and CFI (0.952) reached the acceptable fit thresholds.

The standardized estimates and *t* values were examined to inspect the strengths of the causal relationships among the variables. According to Fig. 2 and Fig. 3, the impact of CSA on FLLSE ($\beta = 0.70, t = 17.65$) and SAE ($\beta = 0.65, t = 17.65$) was statistically significant and in a positive direction. The influence of CT on FLLSE ($\beta = 0.89, t = 22.69$) and SAE ($\beta = 0.76, t = 18.66$) was significantly positive. In Table 4, the report of the fit indices in the second model was displayed. The chi-square/df ratio (2.915) and the RMSEA (0.067) presented the acceptable fit thresholds. In addition, GFI (0.916), NFI (0.913), and CFI (0.932) were acceptable.

The contributions of CSA and CT to FLLSE and SAE subscales are shown in Figs. 4 and 5 (model 2). Based on Figs. 4 and 5, CSA significantly and in a positive direction influenced language capability ($\beta = 0.89, t = 33.89$), real in-class language utilization ($\beta = 0.81, t = 30.74$), in-class correlations ($\beta = 0.73, t = 25.72$), attitude toward

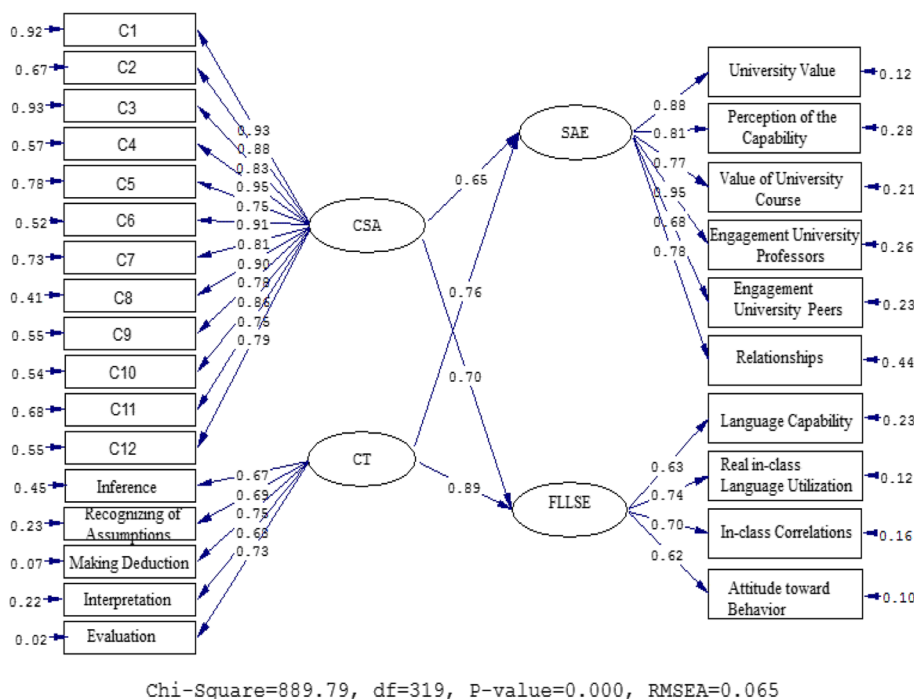
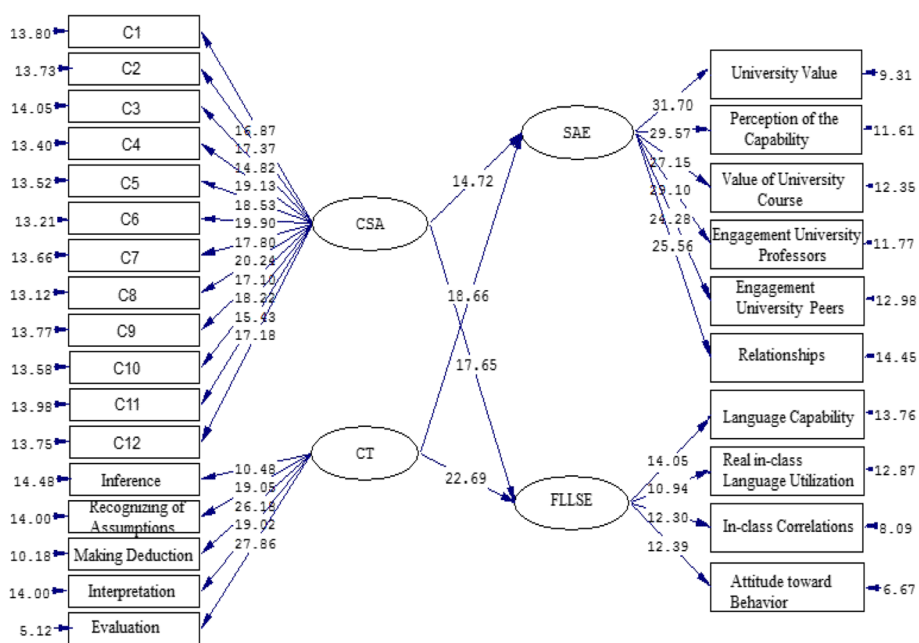


Fig. 2 Schematic representation of path coefficient values for the relationships between CSA, CT, FLLSE, and SAE (model 1)



Chi-Square=889.79, df=319, P-value=0.000, RMSEA=0.065

Fig. 3 T values for path coefficient significance (model 1)

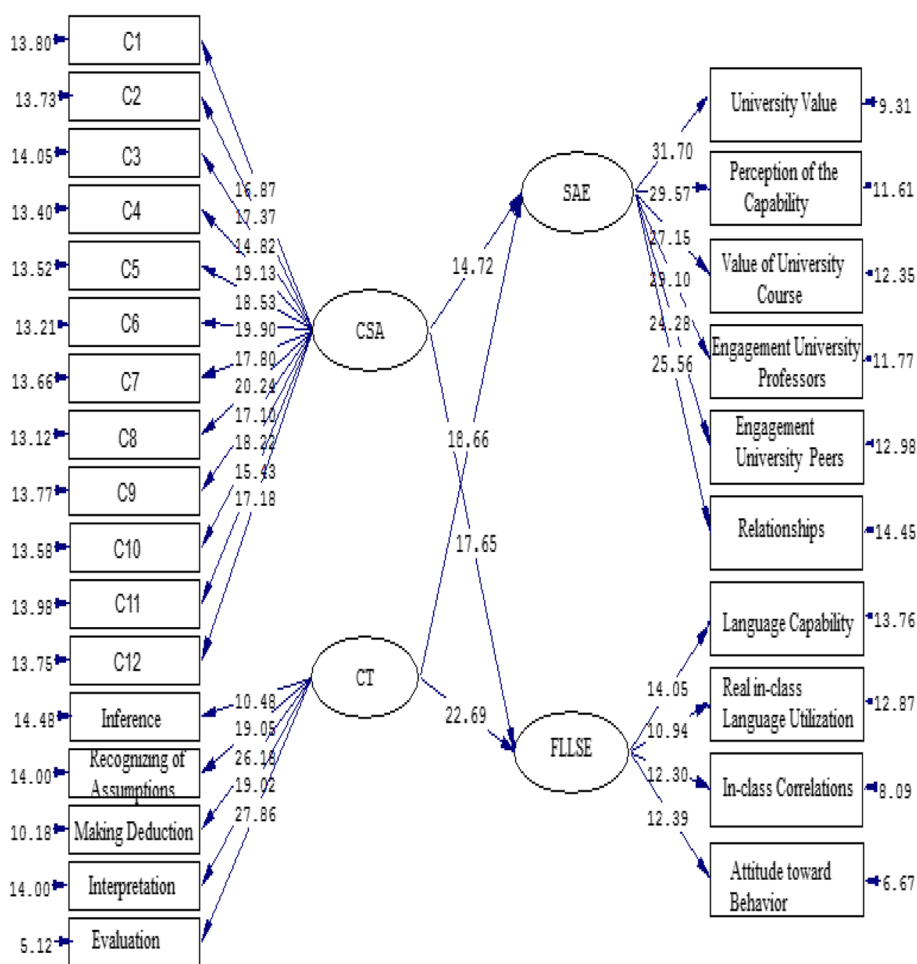
Table 4 Model fit indices

Fitting indexes	χ^2	df	χ^2/df	RMSEA	GFI	NFI	CFI
Cut value			<3	<0.1	>0.9	>0.9	>0.9
The second model	6979.46	2394	2.915	0.067	0.916	0.913	0.932

behavior ($\beta = 0.66, t = 16.64$), university value ($\beta = 0.62, t = 13.67$), perception of the capability ($\beta = 0.84, t = 29.60$), value of university course ($\beta = 0.76, t = 25.59$), engagement university professors ($\beta = 0.71, t = 20.70$), engagement university peers ($\beta = 0.69, t = 15.85$), and relationships ($\beta = 0.56, t = 12.80$). Moreover, the effects of CT on FLLSE and SAE subscales were as follows: language capability ($\beta = 0.78, t = 27.56$), real in-class language utilization ($\beta = 0.72, t = 21.71$), in-class correlations ($\beta = 0.63, t = 14.65$), Attitude toward Behavior ($\beta = 0.82, t = 31.85$), university value ($\beta = 0.61, t = 14.72$), perception of the capability ($\beta = 0.75, t = 25.63$), value of university course ($\beta = 0.79, t = 28.78$), engagement university professors ($\beta = 0.68, t = 15.66$), engagement university peers ($\beta = 0.57, t = 13.55$), and Relationships ($\beta = 0.52, t = 11.14$)

As the next step, a Pearson product-moment correlation was applied to explore the correlation between CSA, CT, FLLSE subscales, and SAE subscales.

Based on Table 5, CSA and CT correlated significantly and positively with FLLSE subscales and SAE subscales. The correlation between CSA and FLLSE subscales as well as SAE subscales was as follows: language capability ($r = 0.912, p < 0.01$), real in-class language utilization ($r = 0.853, p < 0.01$), in-class correlations ($r = 0.708, p < 0.01$), attitude toward behavior ($r = 0.752, p < 0.01$), university value ($r = 0.684, p < 0.01$), perception



Chi-Square=889.79, df=319, P-value=0.000, RMSEA=0.065

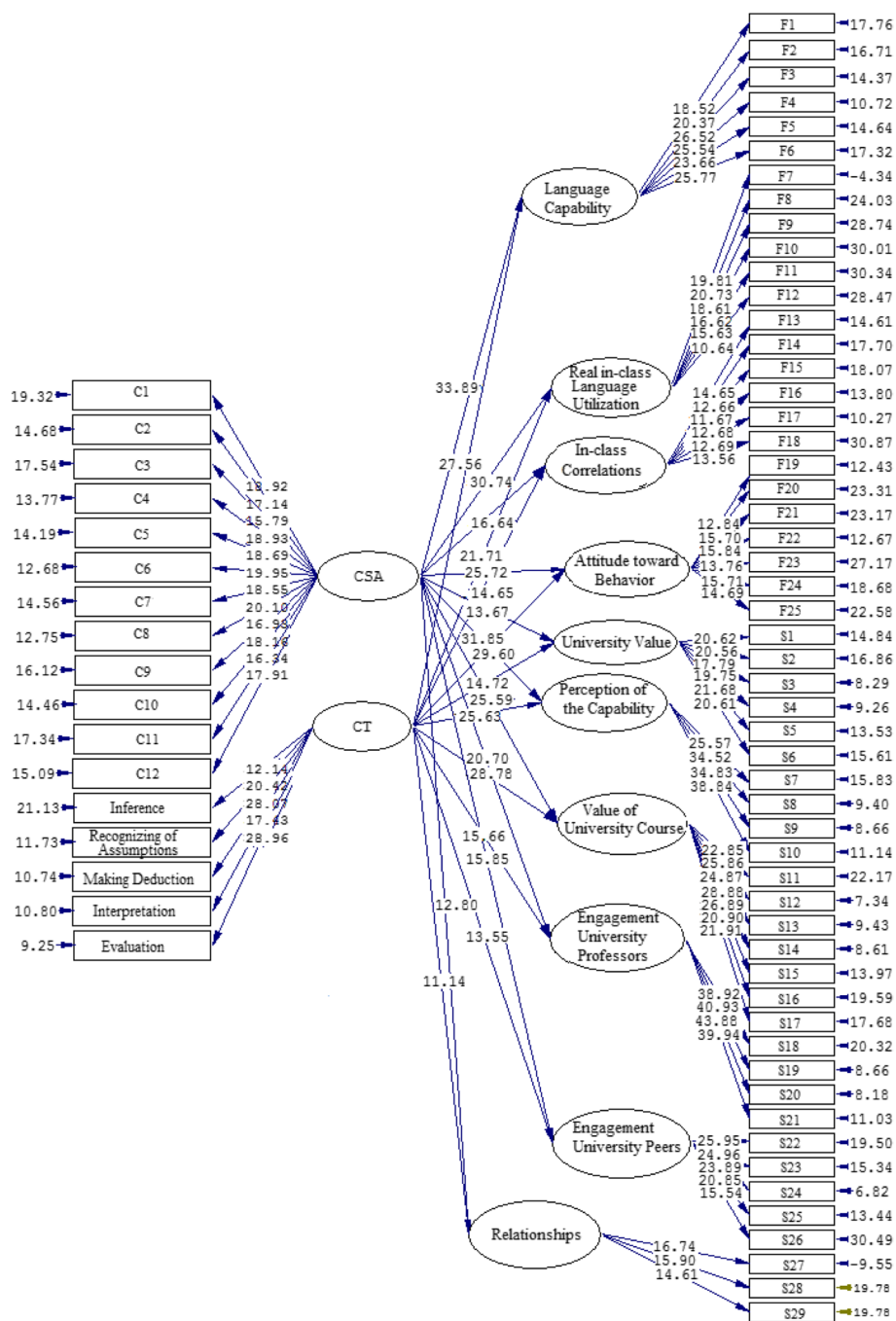
Fig. 4 Schematic representation of path coefficient values for the relationships between CSA, CT, FLLSE subscales, and SAE subscales (model 2)

of the capability ($r = 0.891, p < 0.01$), value of university course ($r = 0.802, p < 0.01$), engagement university professors ($r = 0.733, p < 0.01$), engagement university peers ($r = 0.712, p < 0.01$), and relationships ($r = 0.612, p < 0.01$).

Additionally, the correlation between CT and FLLSE subscales as well as SAE subscales were as follows: language capability ($r = 0.804, p < 0.01$), real in-class language utilization ($r = 0.744, p < 0.01$), In-class Correlations ($r = 0.689, p < 0.01$), attitude toward behavior ($r = 0.881, p < 0.01$), university value ($r = 0.683, p < 0.01$), perception of the capability ($r = 0.789, p < 0.01$), value of university course ($r = 0.812, p < 0.01$), engagement university professors ($r = 0.716, p < 0.01$), engagement university peers ($r = 0.603, p < 0.01$), and relationships ($r = 0.573, p < 0.01$).

Discussion

The current research intended to investigate the association between CSA, CT, AE, and SE in the Iranian EFL context. In so doing, the researchers of this study proposed a model to display the association between these constructs and it was tested via SEM.



Chi-Square=6979.46, df=2394, P-value=0.00000, RMSEA=0.067

Fig. 5 T values for path coefficient significance (model 2)

The outcomes of the survey reflected that CSA and CT could predict AE and SE significantly. Model 1 and model 2 portray their relationships and highlight the mediator roles of CSA and CT in fostering learner-oriented assessment in the classroom. Thereby, the first null hypothesis (EFL university learners' CSA does not influence their AE), the second null hypothesis (EFL university learners' CSA does not affect their SE), the third null

Table 5 The correlation coefficients between CSA, CT, FLLSE subscales, and SAE subscales

	CSA	CT	Language capability	Real in-class language utilization	In-class correlations	Attitude toward behavior	University value	Perception of the capability	Value of university course	Engagement university professors	Engagement university peers	Relationships
CSA	1											
CT	0.556 ^a	1										
Language capability	0.912 ^a	0.804 ^a	1									
Real in-class language utilization	0.853 ^a	0.744 ^a	0.553 ^a	1								
In-class correlations	0.708 ^a	0.689 ^a	0.476 ^a	0.611 ^a	1							
Attitude toward behavior	0.752 ^a	0.881 ^a	0.482 ^a	0.722 ^a	0.544 ^a	1						
University value	0.684 ^a	0.683 ^a	0.712 ^a	0.709 ^a	0.674 ^a	0.703 ^a	1					
Perception of the capability	0.891 ^a	0.789 ^a	0.677 ^a	0.841 ^a	0.691 ^a	0.663 ^a	0.689 ^a	1				
Value of university course	0.802 ^a	0.812 ^a	0.732 ^a	0.832 ^a	0.604 ^a	0.642 ^a	0.733 ^a	0.558 ^a	1			
Engagement university professors	0.733 ^a	0.716 ^a	0.800 ^a	0.756 ^a	0.732 ^a	0.723 ^a	0.838 ^a	0.571 ^a	0.745 ^a	1		
Engagement university peers	0.712 ^a	0.603 ^a	0.531 ^a	0.717 ^a	0.733 ^a	0.593 ^a	0.694 ^a	0.764 ^a	0.833 ^a	0.609 ^a	1	
Relationships	0.612 ^a	0.573 ^a	0.699 ^a	0.689 ^a	0.704 ^a	0.742 ^a	0.815 ^a	0.735 ^a	0.559 ^a	0.725 ^a	0.726 ^a	1

^a Correlation is significant at the 0.01 level (2-tailed)

hypothesis (EFL university learners' CT does not influence their AE), and the fourth one (EFL university learners' CT does not affect their SE) were rejected.

Based on the findings relevant to the first research question (To what extent does EFL university learners' CSA influence their AE?), the role of CSA on AE was statistically significant. It means that high levels of CSA enable EFL university learners to be more active in all class activities. In such a situation, university learners feel more responsible for their tasks and assessments. They invest more time in their evaluation, social interaction, and group works. They can cope with difficulties and feel less anxious. The class activities and learning-oriented assessment engage university learners. According to the second model, CSA influenced the subcomponents of AE positively. That is, CSA influenced university value and sense of belonging, perception of the capability to persist in the university choice, the value of university courses, engagement with university professors, engagement with university peers, and relationships between the university and relational net.

This outcome can be discussed theoretically. The idea of CSA is theoretically supported by self-determination and self-identity theories (Bourke & Mentis, 2007, 2013). It can be inferred that learner-oriented assessment explicitly and implicitly helps EFL university learners to achieve positive self-identity, which provides positive attitudes toward learning and educational values. It also affects the students' social relationships. Furthermore, this finding is in accord with Huang's findings (2022), who concluded that self-assessment contributes to self-regulation and self-efficacy. Up to now, no empirical studies have ever been conducted to inspect the relationships between CSA and AE and the current research is the first attempt.

Considering the second research question (To what extent does EFL university learners' CSA influence their SE?), the results indicated that CSA directs university learners' SE. It means that learners' attitudes toward self-assessment and self-monitoring affect how they perceive themselves. The more university students practice self-assessment, the higher they find their personal worth and values. It was also concluded and illustrated in the second model that CSA affected the subcomponents of SE (language capability, real in-class language utilization, in-class correlations, and attitude toward behavior in the class of foreign language).

Regarding the third research question (To what extent does EFL university learners' CT influence their AE?), it was also found that EFL university learners' CT influenced their AE. It means that higher levels of cognitive and metacognitive skills would guarantee learners' AE. This outcome can be investigated from the lens of CSA. According to the results of the first research question, CSA and learner-oriented assessment provide the situation for the learners to be involved directly in their assessment and learning procedure. University students, who are armed with higher-order thinking skills are more successful in evaluation, monitoring, and metacognition (Davoudi & Heydarnejad, 2020). Thus, it can be inferred that more investment in CSA increases students' engagement, especially in higher education. As Deng et al. (2022) concluded, self-monitoring makes individuals aware of the positive and negative aspects of their educational lives and increases self-efficacy and engagement. In the same line of inquiry, Namaziandost, Heydarnejad, and Rezai (2022) evidenced that higher-order thinking skills influence individuals' well-being to a great extent.

As the second model indicated, the effect of CT on the subcomponents of AE was great and in a positive direction. To put it another way, CT gives direction to learners' university value and sense of belonging, perception of the capability to persist in the university choice, the value of university courses, engagement with the university professors, engagement with university peers, and relationships between the university and relational net. This outcome seems logical considering the fact that CT skills open the minds of the learners. The findings of the study also displayed that CT could play a mediator role in university learners' SE (To what extent does EFL university learners' CT influence their SE?). It means CT skills give a better understanding of self. In other words, CT sets the tone of EFL university learners' self-image and SE. The more they practice CT strategies, the better they adjust their thoughts and beliefs. That is, CT enables learners to improve their SE. Additionally, the second model presented that CT influenced the subscales of SE (language capability, real in-class language utilization, in-class correlations, and attitude toward behavior in the class of foreign language). This result corroborates with those of Amirian et al. (2022), Heydarnejad, Hosseini Fatemi, and Ghonsooly (2021), and Xiyun et al. (2022). They evinced that higher-order thinking skills, self-regulatory strategies, SE, as well as self-efficacy beliefs are closely related.

Conclusion and implications

In a nutshell, this research documented the contribution of CSA and CT to AE and SE in EFL higher education. The findings pictured that CSA and CT facilitate learning-oriented assessment in the classroom. They promote learners' AE and SE. In other words, CSA and CT act like a compass for EFL learners and help them to focus on every step taken on the educational road. CSA and CT could have a significant impact on the personal growth and development of their SE. Moreover, CSA opens the eyes of learners in general and EFL learners in partiture. Learning-oriented assessment taps the actual use of language in language learning and deserves more attention from testing specialists. Actually, research on the relationship between CSA, CT, AE, and SE in the educational context, particularly in the EFL context, is quite rare and calls for more attention. The present research was the first attempt to portray the relationship between CSA, CT, AE, and SE. Therefore, the findings can open a new window in educational research and foster the implementation of learning-oriented assessment in the classroom, especially in the EFL domain.

Some pedagogical implications for educators, particularly in higher education are suggested. The provision of learning-oriented assessment in the classroom has received great emphasis. Thus, language learners need to develop and practice CSA and CT while at the same time respecting learners' attempts in making their own statements and conceptualization. This golden opportunity boost AE and encourage SE. Thus, language teachers need to acquire the related knowledge to implement CSA and CT in classes. In this regard, pre-service and in-service teacher training programs are strongly recommended. Teacher training courses can be developed to teach effective strategies for practicing learning-oriented assessment in the classroom. This awareness is also crucial for language teachers, language testers, as well as learners, especially those in higher education should become alert about the advantages of practicing CSA and CT. They also need to learn efficient strategies to practice

CSA and CT. The investment in higher-order thinking skills can be achieved through designing and developing appropriate educational materials and tasks as well as functional practice and assessment. Language learners should also learn that they play a crucial role in their process of AE and SE. Thus, they need to practice useful strategies to improve AE and SE.

Similar to other research in the realm of education, this study was limited in some aspects. Firstly, the current investigation is quantitative in nature, thus getting a deeper understanding of the causal links between CSA, CT, AE, and SE. Future studies can apply mixed-method approaches to complete the related outcomes. Secondly, demographic variables and their possible effects on CSA, CT, AE, and SE were not the targets of this study; therefore, they can be a recommendation for future research. Additionally, as a further research avenue, it is suggested to explore the influence of CSA, CT, AE, and SE on other learner-related constructs (i.e., academic buoyancy, self-efficacy, self-regulation, and evaluation apprehension).

Abbreviations

EFL	English as a Foreign Language
CSA	Core of Self-assessment
CSAQ	Core of Self-Assessment Questionnaire
CT	Critical thinking
WGCTA	Watson–Glaser Critical Thinking Appraisal-form A
AE	Academic engagement
SAES	The SInAPSi Academic Engagement Scale
SE	Self-esteem
FLLSES	The Foreign Language Learning Self-esteem Scale
GFI	Good Fit Index
LISREL	Linear structural relations
NFI	Normed Fit Index
RMSEA	Root-mean-squared error of approximation
CFA	Confirmatory factor analysis
SEM	Structural equation modeling

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Authors' contributions

All authors had equal substantial contributions to conception and design, acquisition of data, analysis and interpretation of data, and writing the manuscript. The authors read and approved the final manuscript.

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