



Development and Validation of the AEC-CS Instrument for English and Arabic Learning in Islamic Boarding Schools

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Abstract

Psychological assessment in Islamic boarding school (*pesantren*) contexts is frequently constrained by instruments with limited contextual relevance and insufficient empirical validation. This study addresses this gap by developing and validating the Attitudes, Engagement, Challenges, and Coping Strategies (AEC-CS) instrument, grounded in *pesantren* educational and spiritual values. Using a quantitative research and development design, the study was conducted in a *pesantren* in Pontianak City, Indonesia, involving 126 *santri* selected through simple random sampling. Content validity was assessed using Aiken's V coefficient, while construct validity was examined through Confirmatory Factor Analysis (CFA) using JASP version 0.95.4.0. Results indicate strong content validity, and CFA confirmed adequate model fit. The English version retained 38 items with significant factor loadings, whereas the Arabic version required removal of five items to achieve construct stability. These findings support a psychometrically robust and culturally responsive instrument for *pesantren* educators, enhancing understanding of students' attitudes, engagement, challenges, and coping strategies in learning English and Arabic.

Keywords: Language learning, *pesantren*, psychometric validation, CFA, student attitudes, coping strategies.

1. Introduction

1.1 Background

Foreign language learning success depends on both cognitive ability and language attitudes (Shishova, 2020). Positive attitudes foster motivation, persistence, and

sustained learning effort (Gardner, 2010), while affective factors such as anxiety influence learners' receptiveness to instruction (Larina & Smelianska, 2025). When overlooked, these factors may raise the affective filter and hinder language acquisition (Dörnyei & Ryan, 2015). Classroom participation is also a key indicator of communicative competence (Baker, 2011), as learners who are not actively engaged may acquire knowledge but struggle to use it effectively in real communication (Saito et al., 2024).

The *pesantren* (Islamic boarding school) environment presents a distinctive context in which *santri* (students) learn Arabic and English alongside an intensive religious curriculum. These dual language demands, combined with rigorous memorization activities, may create substantial academic pressure and require strong resilience (Subair et al., 2024). To cope, *santri* develop strategies shaped by the residential system and hierarchical relationships with religious authorities (Febriantje & Amelasasih, 2025). Guided by values such as *adab* (Islamic manners), *tawadhu'* (humility), obedience, and respect, these strategies are often grounded in spirituality and religious practice (K. Pargament et al., 2011). This context underscores the need for instruments that capture language-learning experiences beyond models developed in predominantly secular settings.

Current psychometric standards emphasize rigorous validation to ensure measurement quality and stability. Instruments should demonstrate both adequate model fit and accurate construct measurement before being used in research (Hair Jr et al., 2021). Recent research further highlights the importance of ecological validity, emphasizing the need for instruments that reflect the characteristics and experiences of specific populations (Suchy et al., 2024). Accordingly, effective instruments should be both psychometrically sound and culturally relevant, combining expert-reviewed content validity with empirically supported construct validity (Hu & Bentler, 1999).

1.2 Theoretical Foundations of the AEC-CS Instrument

The development of the Attitudes, Engagement, Challenges, and Coping Strategies (AEC-CS) instrument was grounded in established theories of foreign language learning. Rather than viewing language learning solely as a cognitive process, the instrument conceptualizes it as a multidimensional phenomenon shaped by learners' attitudes, engagement, perceived challenges, and coping strategies. These constructs were selected because they capture both motivational and adaptive dimensions of learning, particularly within the distinctive educational environment of *pesantren*.

Attitudes

The Attitudes construct is primarily based on the ABC Model of Attitude, which conceptualizes attitudes as comprising affective, behavioral, and cognitive components (Rosenberg et al., 1960). The model explains how emotions, behavioral tendencies, and beliefs toward a language influence learning behavior and achievement (Yuliani et al., 2023). This construct is further supported by Gardner's

Socio-Educational Model, which emphasizes the role of attitudes and motivation in second-language learning success (Gardner, 2010). In *pesantren*, attitudes toward Arabic and English are shaped not only by instrumental goals but also by religious values (Sabiq et al., 2022). Arabic is associated with understanding Islamic texts and worship (Muhammad & Purbani, 2024), whereas English is increasingly viewed as a medium for global communication and *da'wah* (Farid & Lamb, 2020). Accordingly, the Attitudes dimension incorporates both conventional and religiously informed motivations.

Engagement

The Engagement construct draws on multidimensional theories that define engagement as emotional, behavioral, cognitive, and social participation in learning (Fredricks et al., 2004). Emotional engagement reflects learners' interest and enjoyment; behavioral engagement involves effort and participation; cognitive engagement encompasses strategic learning and self-regulation; and social engagement refers to interactions with teachers and peers. This perspective aligns with Self-Determination Theory, which posits that engagement increases when learners' needs for autonomy, competence, and relatedness are fulfilled (Ryan & Deci, 2000). In *pesantren*, engagement extends beyond classroom activities to include vocabulary memorization, *muhadatsah* (conversation practice), and peer-assisted learning, making it an important indicator of sustained language-learning involvement.

Challenges

The Challenges construct is grounded in Sociocultural Theory, which emphasizes that learning is shaped by social interaction, cultural norms, and institutional contexts (Vygotsky, 1978). From this perspective, language-learning difficulties arise not only from individual factors but also from environmental conditions. Cognitive Load Theory further suggests that learning may be hindered when instructional demands exceed learners' cognitive resources (Sweller, 1988). In *pesantren*, students must balance language learning with religious studies, memorization activities, and institutional responsibilities, creating potential academic and sociocultural challenges. Consequently, this dimension captures social, cultural, pedagogical, and environmental barriers that may affect language-learning outcomes.

Coping Strategies

The Coping Strategies construct is grounded in Lazarus and Folkman's Transactional Theory of Stress and Coping, which distinguishes between problem-focused and emotion-focused coping strategies (Lazarus & Folkman, 1984). Research shows that effective coping contributes to resilience, persistence, and academic success. In language learning, students commonly employ planning, help-seeking, self-monitoring, and emotional regulation strategies. This perspective is complemented by Oxford's Language Learning Strategy framework, which highlights the role of

strategic behaviors in facilitating language acquisition (Oxford, 1990). Within *pesantren*, coping often includes spiritual practices such as prayer (*do'a*), *tawakkal* (trustful reliance on God), and religious reflection. These practices are consistent with religious coping theory, which recognizes spirituality as an important psychological resource for managing academic challenges (Pargament et al., 2011). Therefore, the Coping Strategies dimension integrates both conventional and spiritually oriented coping responses.

Integration of the Four Constructs

The AEC-CS instrument conceptualizes language learning as an interconnected process in which attitudes influence engagement, challenges may hinder learning, and coping strategies help learners manage difficulties. Together, these constructs provide a comprehensive framework for understanding language-learning experiences in *pesantren* while integrating established psychological theories with the sociocultural and spiritual realities of *pesantren*.

This study seeks to bridge established psychological theories and the unique educational context of *pesantren* by developing a psychometrically sound instrument for bilingual learners. Specifically, it examines the content validity, construct validity, and reliability of the AEC-CS instrument using Confirmatory Factor Analysis (CFA). CFA was employed to test whether the observed items adequately represent the predefined theoretical constructs and to evaluate the validity of the proposed measurement model within the *pesantren* context.

1.3 Research Gap

Research on the psychological experiences of *santri* has predominantly employed qualitative and descriptive approaches, with relatively few studies developing rigorously validated measurement instruments (Nurmila et al., 2025). Although some quantitative studies report reliability estimates, evidence of content and construct validity remains limited (Suryadi et al., 2023). Consequently, advanced psychometric methods are rarely applied in *pesantren* research, leaving the structure of key psychological constructs insufficiently examined (Jamil et al., 2025).

The application of established frameworks, such as the ABC Model and Coping Theory, also requires cultural adaptation. In *pesantren*, language learning is closely linked to spirituality, *da'wah* (Islamic outreach), and religious devotion (Farid & Lamb, 2020). Values such as *ibadah* (worship), *adab* (Islamic manners), and *tawakkal* (trustful reliance on God) may shape attitudes, engagement, and coping in ways not fully captured by conventional models (Abubakar & Arsyad, 2024). As a result, the lack of measurement frameworks that incorporate these values remains a significant limitation (Kasman, 2025).

Therefore, there is a need for culturally relevant and psychometrically robust instruments. Measurement indicators should reflect *pesantren*-specific experiences, including learning *Kitab Kuning* (traditional Islamic texts) and the influence of the

kyai (*pesantren* leader), to enhance contextual validity (Aziz et al., 2025). Confirmatory Factor Analysis (CFA) provides an appropriate approach for testing the proposed dimensions and identifying potential cultural bias (Nye, 2023).

2. Method

This pilot study employed a quantitative research and development design focusing on instrument standardization and validation. The procedures followed the five-phase scale and questionnaire development model by Meerah et al. (2012).

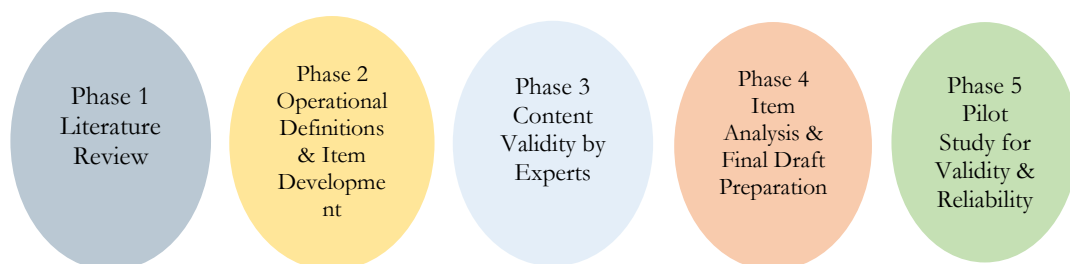


Figure 1. Five-phase Model adapted from Meerah et al. (2012) for the instrument development.

2.1 Location and Participants

This pilot study was conducted at Nahdlatul Syubban *Pesantren*, an Islamic boarding school located in Pontianak City, West Kalimantan, Indonesia. The *pesantren* provides secondary-level education within a residential environment where students undertake both religious studies and foreign language learning, particularly Arabic and English.

Participants were involved in two stages of instrument validation. First, three experts in English Language Education, Arabic Language Education, and Islamic Studies evaluated the content validity of the AEC-CS instrument. Second, a pilot study was conducted to examine construct validity and reliability using student responses.

The target population consisted of 240 secondary-level *santri* enrolled during the 2025/2026 academic year. Using simple random sampling, 126 students were selected from a complete list provided by the school administration, ensuring that each student had an equal chance of participation.

The final sample comprised 45 male students (35.7%) and 81 female students (64.3%), aged 15–18 years. Specifically, 10 students (7.9%) were aged 15 years, 68 (54.0%) were aged 16 years, 40 (31.7%) were aged 17 years, and 8 (6.3%) were aged 18 years. All participants were enrolled in secondary-level education and were studying both Arabic and English as part of the *pesantren* curriculum.

The sample represented 52.5% of the target population and was considered adequate for pilot-scale instrument validation. It exceeded commonly recommended minimum sample sizes for preliminary Confirmatory Factor Analysis (CFA) and satisfied the

suggested participant-to-item ratio of at least 3:1. Accordingly, the sample was deemed sufficient for estimating factor loadings, reliability coefficients, and model fit indices.

Prior to data collection, permission was obtained from the principal of Nahdlatus Syubban *Pesantren*. Participants were informed of the study's purpose, the voluntary nature of participation, and the confidentiality of their responses. Informed consent was obtained from all students before questionnaire administration.

Table 1. Demographic Characteristics of Participants (N = 126)

Characteristic	Category	n	%
Gender	Male	45	35.7
	Female	81	64.3
Age	15 years	10	7.9
	16 years	68	54.0
	17 years	40	31.7
	18 years	8	6.3
Educational Level	Secondary School	126	100.0

2.2 Item Development and Adaptation Process

The development of the Attitudes, Engagement, Challenges, and Coping Strategies (AEC-CS) instrument followed a systematic multi-stage process to ensure theoretical rigor and contextual relevance for language learning in *pesantren*.

Stage 1: Identification of Constructs and Theoretical Frameworks

The first stage involved identifying the key constructs based on established theories. Four constructs were selected: attitudes toward language learning, engagement, challenges, and coping strategies. The Attitudes construct was grounded in the ABC Model of Attitude (Rosenberg & Hovland, 1960), comprising affective, behavioral, and cognitive dimensions. Engagement was based on the multidimensional model of Fredricks et al. (2004), which includes affective, behavioral, cognitive, and social engagement. Challenges were grounded in Sociocultural Theory (Vygotsky, 1978), emphasizing social, cultural, resource-related, and instructional influences on learning. Coping Strategies were derived from Lazarus and Folkman's (1984) Coping Theory, focusing on problem-focused and emotion-focused coping.

Stage 2: Review of Existing Instruments and Item Selection

An extensive literature review was conducted to identify validated instruments and items relevant to each construct. Preference was given to instruments with

established psychometric properties and strong theoretical alignment. The initial item pool was compiled from multiple sources to ensure comprehensive construct coverage. All items were reviewed for conceptual relevance, clarity, and suitability for secondary-level students.

Stage 3: Contextual Adaptation for the Pesantren Environment

The selected items were adapted to reflect the sociocultural, religious, and educational characteristics of *pesantren* while preserving their original psychological meaning. General educational terminology was replaced with terms commonly used in *pesantren*. Learning activities were contextualized to include *pesantren* routines. Several items also incorporated Islamic values and motivations, including *da'wah*, *dhikr*, patience, and *tawakkal*. Challenge-related items were adapted to capture contextual realities such as limited exposure to English-speaking environments, competing academic demands, resource constraints, and the prioritization of Arabic and religious studies. These adaptations were intended to improve contextual relevance and ecological validity while maintaining construct integrity. The adaptation process is presented in Table 2.

Table 2. *Item Development and Adaptation*

A. Attitudes toward Learning English Based on ABC Model of Attitude (Rosenberg & Hovland, 1960)			
Reference	Original Item	Adapted Item	Remark
<i>Affective</i>			
De La Luz Hernández Salinas, 2024);	1. I enjoy learning English	I attend English lessons with a positive feeling in class.	Classroom-based focus.
	2. I feel proud when I can speak or write in English	I feel proud when I am able to speak English in front of my friends.	Peer-speaking focus.
	3. I have positive feelings toward learning English.	I love learning English pronunciation	Skill-specific focus.
Lemana et al. (2025);	<i>Behavioral</i>		
Yuliani et al. (2023)	4. I try to practice speaking English with my classmates.	I try to use English for conversation in daily activities.	Expanded interaction scope.
	5. I read English books, articles, or online content outside of class.	I read English texts outside of class.	Reflects self-directed practice.

	6. I will continue studying English in the future.	I will continue studying English for my future job opportunities.	Reflects instrumental motivation.
	Cognitive		
	7. I believe English is important for my future career or studies.	I believe English is important for learning modern knowledge.	Knowledge-oriented focus.
	8. English helps me understand other cultures and people better.	I believe English can broaden students' global perspectives.	Global perspective focus.
	9. Learning English is useful in everyday life	I believe English is useful for <i>da'wah</i> .	Religious communication focus.
B. Engagement in Learning English Based on Multidimensional Model of Engagement (Fredricks et al., 2004)			
Reference	Original Item	Adapted Item	Remark
Eerdemutu et al. (2024); Guo et al. (2022); Philp & Duchesne, (2016)	Affective Engagement		
	10. I feel interested and curious about the English activities we do.	I do English tasks enthusiastically in the dormitory	Reflects <i>pesantren</i> -based context.
	11. I feel happy and satisfied when I make progress in English.	I enjoy the challenge of interpreting English texts as an engaging activity	Reflects positive learning emotions.
	12. I attend English classes without feeling bored.	I engage in English activities such as <i>muhadharah</i> without feeling bored.	Focuses on public-speaking engagement.
	Behavioral Engagement		
	13. I pay attention during my English classes..	I pay close attention to English lessons delivered by the teacher during class.	Reflects attentive participation.
	14. I keep trying to understand English	I independently record new English	Reflects self-regulated learning.

	even when it is difficult.	vocabulary for later memorisation	
	15. I complete my English homework and assignments on time.	I complete English homework on time according to the submission deadline.	Reflects timely task completion.
	<i>Cognitive Engagement</i>		
	16. I try to understand the ideas in English deeply, not just memorize them.	I connect new English lessons with my existing general knowledge.	Links prior and new knowledge.
	17. I use strategies such as taking notes, reviewing, or asking for clarification.	I use context when trying to understand English texts	Reflects cognitive strategy use.
	18. I keep working on difficult English tasks until I understand them.	I keep practicing my English pronunciation	Reflects learning persistence.
	<i>Social Engagement</i>		
	19. I ask my teacher questions when I am confused about English lessons.	I ask my teacher questions when I am confused about English lessons.	Retained.
	20. I actively participate in pair or group work during English class.	I practise English conversation with friends during <i>muhadatsah</i> activities.	Contextualized to <i>muhadatsah</i> .
	21. I help my classmates when they have difficulties with English tasks.	I explain English material to friends who need help.	Reflects academic peer support.
C. Challenges in Learning English based on Sociocultural Theory (Vygotsky, 1978)			
Reference	<i>Original Item</i>	<i>Adapted Item</i>	<i>Remark</i>
Alkhudiry (2022) Panhwar & Ansari,	<i>Social Interaction Challenges</i>		
	22. I feel discouraged from speaking English because classmates or	I am afraid of speaking English because my grammar is bad.	Reflects communication anxiety.

(2016); Alshammari, (2024)	teachers may judge my mistakes.		
	23. I rarely have chances to use English in real conversations with more proficient speakers.	I have trouble finding a friend who is willing to sepak English with me.	Reflects limited peer interaction.
	24. Group work in English class is limited or not well supported.	I hesitate to speak English for fear of being perceived as 'English wannabe'	Reflects social pressure.
	<i>Cultural Challenges</i>		
	25. I find it difficult to understand the cultural references in English texts or videos.	I struggle to understand the Western culture in English materials.	Clarifies cultural barriers.
	26. Cultural differences make it difficult for me to relate to English learning materials.	Some cultural content in English lessons feel very different from <i>pesantren</i> values and traditions.	Reflects cultural-value differences.
	27. Because English is rarely used in my community, it feels distant from my real life.	I find it difficult to imagine foreign cultures presented in English textbooks.	Reflects cultural unfamiliarity.
	<i>Resource Challenges</i>		
	28. My school lacks sufficient up to date English books, audio visual materials, or technology.	I have difficulty using English videos or audio materials due to limited facilities.	Focuses on multimedia access.
	29. Large class sizes and limited time mean I receive little individual support in English.	I am distracted during English lessons because the classroom or dormitory environment is unsuitable.	Reflects environmental constraints.
	30. There are few chances to meet or communicate with	I have limited time for English practice within	Reflects limited practice opportunities.

	competent English speakers.	the busy English schedule.	<i>pesantren</i>
	<i>Instructional Challenges</i>		
	31. English lessons focus mainly on memorizing rules and translation rather than meaningful communication.	I find it difficult to understand my teacher's explanation of English grammar.	Reflects instructional difficulties.
	32. Classroom tasks rarely connect English to real life situations.	I participate less in English class because the activities are monotonous.	Reflects monotonous instruction.
	33. Teachers do not often use collaborative activities that let students help each other in English.	I find it difficult to improve my English speaking skills because feedback from teachers is not sufficiently detailed.	Highlights limited scaffolding.
D. Coping Strategies in Learning English based on Lazarus & Folkman Framework (Lazarus & Folkman,1984)			
Reference	Original Item	Adapted Item	Remark
<i>Problem-Focused Coping Strategies</i>			
Homoud Ibrahim (2023); Atrian et al. (2016); Suliman & Tadros (2011)	34. I practice English regularly by reading, writing, or speaking.	I study English harder by myself when my test score is bad.	Problem-solving coping
	35. I ask my classmates for help when I face difficulties in English.	I discuss English lessons with other students when I don't understand.	Highlights peer collaboration
	36. I create a personal study plan or glossary to solve problems in English class.	I use creative methods (such as flashcards) to overcome difficult English material	Reflects use of strategy
	<i>Emotion-Focused Coping Strategies</i>		
	37. I pray or rely on my religious/spiritual beliefs when English learning becomes stressful.	I rely on prayer as my main support to facilitate my English learning.	Reflects spiritual support.

38. I try to see my English difficulties as a chance to grow and improve.	I accept difficulties in learning English as challenges for self-improvement.	Reflects positive appraisal.
39. I stay calm and control my feelings when English tasks are difficult.	I try to remain calm and engage in <i>dhikr</i> when facing English oral examinations.	Uses Islamic spiritual practices for self-regulation.

Stage 4: Expert Validation

Three experts in English Education, Arabic Education, and Islamic Studies assessed each item for relevance, clarity, representativeness, and contextual fit in the *pesantren* setting. Feedback guided revisions to wording, clarity, and indicator-construct alignment. Content validity was quantified using Aiken’s V coefficient; only items meeting criteria proceeded.

Stage 5: Pilot Testing

The revised instrument was piloted on 126 secondary-level *santri* at Nahdlatul Syubban *Pesantren*. Construct validity and reliability were examined using Confirmatory Factor Analysis (CFA) and internal consistency analysis, providing empirical support for the measurement model and guiding final refinements to the AEC-CS instrument.

2.3 Data Analysis

Data analysis was conducted using JASP version 0.95.4.0 to evaluate the psychometric properties of the Attitudes, Engagement, Challenges, and Coping Strategies (AEC-CS) instrument through content and construct validation.

Content validity was assessed using Aiken’s V based on ratings from three experts in English Language Education, Arabic Language Education, and Islamic Studies. Experts evaluated item relevance, clarity, and representativeness. Aiken’s V was computed in Excel, and items were retained when exceeding recommended thresholds (0.60–0.80 or higher depending on raters and scale).

Construct validity and reliability were examined using data from 126 respondents. Although Exploratory Factor Analysis (EFA) was not conducted due to the theoretically defined four-factor structure (attitudes, engagement, challenges, coping strategies), Confirmatory Factor Analysis (CFA) was applied to test model fit. Fit indices included χ^2 , CFI, TLI/NNFI, IFI, RNI, GFI, RMSEA, and SRMR, with acceptable thresholds set at ≥ 0.90 for incremental fit indices and < 0.08 for RMSEA and SRMR (Hu & Bentler, 1999).

Item validity was assessed through standardized factor loadings (≥ 0.40). Convergent validity was evaluated using AVE (≥ 0.50), while discriminant validity was assessed using HTMT (< 0.85). Internal consistency was measured using Cronbach’s alpha and McDonald’s omega (≥ 0.70 acceptable; ≥ 0.80 good).

All analyses were conducted separately for the English and Arabic versions to assess stability across language versions.

3. Results And Discussion

3.1 Adaptation and Contextualization of Intrument

The AEC-CS instrument was systematically synthesized from established theoretical and empirical frameworks, maintaining theoretical fidelity while adapting content to the educational, religious, and sociocultural context of *pesantren* to enhance ecological validity. The final instrument comprises 39 items per language across four core variables, with items adapted to reflect religious values, boarding-school environment, and social norms shaping *santri* experiences as illustrated in Table 3.

Table 3. Matrix of Instrument Development

Variable & Dimensions	Number of Items	Theoretical Basis	Theoretical Retention	Contextual Adaptation
Attitudes • Affectif • Behavioral • Cognitive	9	ABC Model (Rosenberg et al., 1960)	Retains affective, behavioral, and cognitive attitude dimensions	Arabic reframed for religious learning and English for <i>da’wah</i> .
Engagement • Affectif • Behavioral • Cognitive • Social	12	Multidimensional Engagement (Fredricks et al., 2004)	adopts a multidimensional engagement framework (emotional, behavioral, cognitive, social).	Aligned with <i>pesantren</i> self-directed memorization and vocabulary study.
Challenges • Social • Cultural • Facility •Teacher support	12	Sociocultural Theory (SCT) (Vygotsky, 1978)	identifies learning barriers across psychological, infrastructural, pedagogical, and social dimensions.	Cultural-theological tensions and identity-based stigma with Western content.

Variable & Dimensions	Number of Items	Theoretical Basis	Theoretical Retention	Contextual Adaptation
Coping Strategies	6	Lazarus & Folkman's Coping Theory	Distinguishes problem-focused and emotion-focused coping.	spiritual coping via prayer alongside problem-solving strategies.
•Problem-Focus		(Lazarus & Folkman, 1984)		
•Emotion-Focus				
TOTAL	39			

As shown in Table 3, the AEC-CS instrument comprises 39 items across four variables, with each indicator measured by three items to ensure balanced measurement. Attitudes has nine items across three dimensions (affective, behavioral, cognitive); Engagement and Challenges each have twelve items across four dimensions; Coping Strategies has six items across two dimensions.

The items balance theoretical fidelity with contextual flexibility. While retaining the ABC Model, Attitudes shifts focus from practical benefits to religious-instrumental purposes (e.g., understanding *Kitab Kuning, da'wah*). Engagement and Challenges were adapted to *pesantren* life, incorporating activities like muhadathah and sociocultural concerns (e.g., stigma of being “overly pious” or an “English wannabe”). Coping Strategies integrate theological values through prayer and *tawakkal* as emotion regulation. These adaptations ensure both psychometric balance and cultural relevance.

3.2 Validity and Reliability

3.2.1 Content Validity

Content validity was established through an expert judgment process to ensure that the items accurately reflect the intended constructs and are relevant to the bilingual English-Arabic learning context. Given the nature of the four variables, namely Attitudes, Engagement, Challenges, and Coping Strategies, the expert panel was selected based on specific qualifications. Three experts served as raters, including senior academics in English Language Education, Arabic Language Education, and Islamic Studies.

To quantify the experts' evaluations, inter-rater agreement was assessed using Aiken's V coefficient (Aiken, 1985). The results showed strong evidence of content validity, with Aiken's V values ranging from 0.92 to 1.00 across all dimensions in both the English and Arabic versions. These values exceed commonly accepted standards, indicating a high level of agreement among the experts regarding the relevance and representativeness of the items. Based on these findings, all items were retained and

the instrument was considered suitable for subsequent field-based psychometric testing.

3.2.2 Construct Validity and Reliability

Internal structure analysis proceeded sequentially: overall model fit assessment, factor loadings evaluation (item–construct contribution), convergent validity using Average Variance Extracted (AVE), discriminant validity using the Fornell–Larcker criterion, and reliability estimation through Composite Reliability (ω) and Cronbach’s alpha (α). Rigorous verification at each stage was essential for both Arabic and English versions to ensure accuracy, robustness, and interpretability of the data.

Table 4. Goodness of Fit

Fit Criteria	Fit Index Value	
	Arabic	English
P. Chi-square test	0.000	0.000
Comparative Fit Index (CFI)	0.913	0.911
Tucker-Lewis Index (TLI)	0.900	0.900
Bentler-Bonett Non-normed Fit Index (NNFI)	0.900	0.900
Bollen’s Incremental Fit Index (IFI)	0.915	0.913
Relative Noncentrality Index (RNI)	0.913	0.911
Root mean square error of approximation (RMSEA)	0.071	0.064
Standardized root mean square residual (SRMR)	0.074	0.084
Goodness of fit index (GFI)	0.74	0.727

Table 4 shows adequate model fit for both language versions. All incremental fit indices (CFI, TLI, NNFI, IFI, RNI) met or exceeded the 0.90 threshold: CFI was 0.913 (Arabic) and 0.911 (English). RMSEA values (0.071 Arabic; 0.064 English) were below the 0.08 criterion. Although GFI was relatively low (0.740; 0.727) and SRMR for English slightly exceeded 0.08 (0.084), overall fit was deemed satisfactory as primary criteria were fulfilled, supporting internal validity for both versions.

Following global fit confirmation, factor loadings were inspected using a 0.40 practical significance threshold (Hair Jr et al., 2021) to verify each item’s contribution to Attitudes, Engagement, Challenges, and Coping Strategies. Table 5 presents a comparative summary of loading results for both versions.

Table 5. Factor Loadings

Factor	Indicator	Arabic	English
		Loading	Loading
Factor 1	i01	0.458	0.520
	i02	0.555	0.599
	i03	Deleted	0.482
	i04	0.810	0.539
	i05	0.888	0.758
	i06	0.932	0.436
	i07	0.763	0.431
	i08	0.472	0.469
	i09	Deleted	0.409
Factor 2	i10	0.674	0.655
	i11	0.696	0.632
	i12	0.696	0.642
	i13	0.644	0.689
	i14	0.700	0.555
	i15	0.614	0.516
	i16	0.732	0.603
	i17	0.678	0.596
	i18	0.767	0.655
	i19	0.730	0.572
	i20	0.771	0.705
	i21	0.743	0.627
Factor 3	i22	0.548	0.621
	i23	Deleted	0.700
	i24	Deleted	Deleted
	i25	0.468	0.440
	i26	Deleted	0.813
	i27	0.521	0.703
	i28	0.585	0.875

Factor	Indicator	Arabic	English
		Loading	Loading
Factor 4	i29	0.589	0.873
	i30	0.682	0.798
	i31	0.787	0.777
	i32	0.777	0.935
	i33	0.774	0.827
	i34	0.746	0.699
	i35	0.727	0.534
	i36	0.762	0.657
	i37	0.600	0.585
	i38	0.564	0.580
	i39	0.563	0.701

Table 5 reveals distinct item validity profiles between the two versions. The English version retained 38 items with factor loadings ranging from 0.409 to 0.935; only item i24 was eliminated (loading < 0.40). In contrast, the Arabic version required a rigorous purification procedure, removing five items (i03, i09, i23, i24, i26) that failed psychometric criteria. It was methodologically necessary to eliminate measurement noise and retain valid, reliable indicators.

Following item-level validation, construct-level evaluation assessed convergent validity using Average Variance Extracted (AVE) and reliability using both Cronbach’s alpha (α) and McDonald’s omega (ω), with omega providing a more accurate estimate in CFA contexts as it does not assume tau-equivalence. Table 6 presents a comparative summary of convergent validity and reliability indices for both versions.

Table 6. Validity Evidence and Reliability Estimates

Construct	Metric	English Version	Arabic Version	Threshold
Factor 1 (Attitude)	AVE	0.501	0.598	Valid
	McDonald’s (ω)	0.947	0.916	Reliable
	Cronbach’s Alpha (α)	0.879	0.894	Consistent
Factor 2 (Engagement)	AVE	0.624	0.629	Valid
	McDonald’s (ω)	0.927	0.942	Reliable

Construct	Metric	English Version	Arabic Version	Threshold
Factor 3 (Challenges)	Cronbach's Alpha (α)	0.955	0.954	Consistent
	AVE	0.537	0.532	Valid
	McDonald's (ω)	0.920	0.906	Reliable
Factor 4 (Coping Strategies)	Cronbach's Alpha (α)	0.923	0.905	Consistent
	AVE	0.636	0.593	Valid
	McDonald's (ω)	0.931	0.850	Reliable
Total Scale	Cronbach's Alpha (α)	0.904	0.909	Consistent
	McDonald's (ω)	0.980	0.973	Reliable
	Cronbach's Alpha (α)	0.925	0.916	Consistent

Table 6 shows strong psychometric soundness for both versions. Convergent validity exceeded the AVE threshold of 0.50 across all latent variables, with values ranging from 0.501 to 0.636 (English) and 0.532 to 0.629 (Arabic), confirming that each construct explains more variance in its indicators than measurement error.

Reliability estimates demonstrated exemplary internal consistency. Both McDonald's omega (ω) and Cronbach's alpha (α) for all dimensions substantially exceeded the 0.70 minimum, with most values above 0.90. Total scale reliability reached $\omega = 0.980$ (English) and $\omega = 0.973$ (Arabic), with omega providing a more accurate estimate by accommodating unequal factor loadings. These findings confirm strong convergent validity and robust reliability, supporting both instruments' suitability for structural model analyses.

4. Discussion

This study developed and validated the AEC-CS instrument as a psychometrically sound, culturally responsive tool for *pesantren*. Findings demonstrate that theoretical fidelity combined with contextual flexibility enables accurate measurement in this unique educational setting. Strong content validity and high internal consistency (Cronbach's $\alpha > 0.90$) confirm that adapting items from secular to religious-instrumental orientations is essential for measuring psychological constructs in faith-based education.

For Attitudes and Engagement, findings indicate that language learning in *pesantren* is driven by religious and spiritual motivations beyond economic or career goals commonly emphasized in the literature (Gardner, 2010). Items linking Arabic to *Kitab Kuning* comprehension and English to *da'wah* showed strong validity, consistent with research showing language learning in Muslim communities is tied to religious

identity. Inclusion of *pesantren* practices like *muhadatsah* captured engagement aspects underrepresented in general questionnaires.

A key contribution is the Challenges dimension, where learning barriers reflect not only cognitive but also sociocultural influences. Items addressing social stigma such as concerns about being labeled “overly pious” (Arabic) or “English wannabe” (English) demonstrated strong validity, supporting research that peer pressure increases language anxiety (Zhang & Lai, 2024). The instrument captures how social harmony concerns affect willingness to speak target languages.

The Coping Strategies dimension extends stress and coping theory (Lazarus, 1984; Folkman, 2013) by validating *do’a* (prayer) and *tawakkal* (trustful surrender to God) as active emotional regulation, consistent with Pargament & Park (2019) on religiosity as a psychological buffer in Islamic education.

Psychometrically, the English version retained 38 items (loadings: 0.409–0.935), while five Arabic items (i03, i09, i23, i24, i26) were removed to improve model fit, reflecting Arabic’s dual role as academic and sacred language and consistent with parsimony in model refinement (Hair Jr et al., 2021). This difference reflects careful attention to language-specific validity rather than instrument weakness.

Practically, the AEC-CS instrument provides educators with a structured diagnostic framework to identify students with low engagement, negative attitudes, significant challenges, or ineffective coping in learning English and Arabic beyond reliance on academic achievement alone. Low engagement scores may indicate need for interactive activities; high challenge scores may signal need for support or resource improvements; coping data can guide interventions combining problem-focused and spiritually grounded strategies.

The study contributes to bilingual and faith-based education literature by demonstrating that established psychological constructs (Gardner, 2010; Oga-Baldwin, 2019) can be meaningfully adapted to religious contexts without compromising psychometric quality. Validation of *da’wah*-oriented motivation, *Kitab Kuning* learning, prayer, and *tawakkal* shows language learning in *pesantren* is embedded in a spiritual-sociocultural framework, extending existing research on religious identity as motivational and coping resources.

Policy implications may include using the AEC-CS instrument for quality assurance and student development in Islamic education, helping institutions identify intervention areas and monitor program effectiveness. The findings support policies recognizing the integration of academic, psychological, and spiritual dimensions, contributing to holistic student development while preserving *pesantren*’s distinctive values.

5. Conclusion

By integrating established theoretical frameworks with Islamic educational values, this study developed and validated the Attitudes, Engagement, Challenges, and Coping Strategies (AEC-CS) instrument as a culturally responsive and psychometrically sound measure for English and Arabic language learning in *pesantren* contexts. The instrument bridges mainstream psychological constructs with the realities of *pesantren*-based learning. Results demonstrate strong evidence of content validity, construct validity, convergent validity, and reliability for both language versions. The English version retained 38 items, while the Arabic version required removal of five items to achieve optimal construct stability, indicating that Arabic learning experiences may be influenced by additional contextual, religious, or sociocultural factors requiring further investigation.

Findings show that attitudes, engagement, challenges, and coping strategies among *santri* are closely linked to religious identity, spiritual practices, and boarding-school culture. Accordingly, the AEC-CS instrument functions not only as a psychometric tool but also as a framework for understanding the psychological dimensions of bilingual learning in faith-based settings.

Practically, the instrument can support teachers, counselors, and administrators in identifying students who need academic, motivational, or psychosocial support, as well as in evaluating language programs and designing targeted interventions to enhance engagement and well-being. At the policy level, the findings support integrating psychological and spiritual dimensions into language education planning and evaluation in Islamic institutions.

Several limitations should be noted. The study was conducted in a single *pesantren* with a relatively modest sample size, limiting generalizability. Data were cross-sectional and self-reported, making them susceptible to response bias and unable to capture longitudinal change. The study also focused on internal validity and reliability, without testing predictive validity or measurement invariance across groups.

Future research should validate the instrument across diverse *pesantren*, regions, and educational levels to strengthen external validity. Longitudinal designs are needed to examine stability over time, alongside studies on measurement invariance across gender, age, and institutional types. Further research should also explore predictive relationships between AEC-CS dimensions and language achievement, and mixed-methods approaches combining surveys with interviews, observations, or learning journals may deepen understanding of bilingual learning in faith-based contexts.

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