

Validating and Profiling Lifelong Learning Attributes among Academic Staff in Malaysian Islamic Tertiary Institutions

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Abstract

This study validates and profiles lifelong learning attributes (LLA) among academic staff in Malaysian Islamic tertiary institutions. To address the absence of context-sensitive measures that integrate Islamic epistemological principles with contemporary lifelong learning theory, a cross-sectional survey was administered to 294 academic staff from two Islamic universities using a five-point Likert-scale instrument. Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were used to examine the psychometric structure of the LLA construct. The analyses supported a reliable five-factor, 20-item model encompassing goal setting, application of knowledge and skills, self-direction and evaluation, locating information, and adaptable learning strategies. The model demonstrated satisfactory fit indices, strong internal consistency, and clear evidence of convergent and discriminant validity. Descriptive findings indicated generally high levels of LLA, with the exception of locating information, which showed comparatively lower scores. The study contributes novel insights by developing and validating an Islamically informed measurement model for lifelong learning in higher education, thereby extending Knapper and Cropley's framework into an Islamic tertiary context. The validated instrument provides a robust tool for assessing LLA and offers actionable evidence to support academic staff development and institutional planning within Islamic higher education.

Keywords: *Lifelong learning attributes, Islamic higher education, Islamic epistemology, exploratory factor analysis, confirmatory factor analysis*

INTRODUCTION

Lifelong learning (LLL) has become a defining paradigm in contemporary higher education, emphasizing individuals' capacity to continuously acquire, apply, and renew knowledge across personal and professional contexts. In an increasingly dynamic global environment, universities serve not only as centers of knowledge transmission but also as catalysts for sustained learning among students, educators, and academic staff. International frameworks, notably the Education 2030 Incheon Declaration and Framework for Action (UNESCO, 2015), underscore the central role of lifelong learning within Sustainable Development Goal 4, positioning it as both an institutional obligation and an individual responsibility.

In Malaysia, national policy aligns strongly with this global agenda. The Blueprint on Enculturation of Lifelong Learning for Malaysia 2011–2020 highlights LLL as essential for national competitiveness, human capital development, and societal resilience (Ministry of Higher Education Malaysia, 2011). Within higher education, academic staff are pivotal in cultivating this culture of continuous learning. Despite this emphasis, empirical investigations examining lifelong learning attributes (LLLA) among Malaysian academic staff—particularly within Islamic tertiary institutions—remain limited.

International scholarship has expanded substantially, examining the determinants, practices, and enabling conditions of lifelong learning. Evidence links self-directed learning and motivational dispositions to educators' professional growth and instructional effectiveness (Abou Said & Abdallah, 2024), while reviews note that lifelong learning manifests through diverse competencies and modalities, though measurement approaches remain varied (Thwe & Kálmán, 2023; Verkooijen et al., 2024). Research further identifies personal, psychological, and contextual influences on LLL engagement. Teaching experience, regional context, and learning perceptions predict learning competencies among teacher educators (Thwe & Kálmán, 2023), whereas personality traits such as novelty seeking and self-transcendence are associated with sustained engagement in lifelong learning (Sörman et al., 2024). Supportive work environments likewise enhance staff engagement by fostering autonomy and learning opportunities, with LLL acting as a mediating factor (Assefa et al., 2023). Job demands and organizational climate similarly shape professionals' orientation toward lifelong learning, including in medical education settings (Lin et al., 2023; Verkooijen et al., 2024).

Among educators, LLL is closely associated with teaching beliefs, reflective practice, and professional values. Student-centered pedagogical orientations and openness to change strengthen lifelong learning tendencies (Şentürk & Baş, 2021), while motivation for success enhances professional competence and lifelong learning engagement (Ekşi et al., 2020). Studies among adult educators in Singapore further highlight the importance of institutional support, beliefs, and work experience in shaping participation in professional learning (Chen et al., 2024). However, digital competence remains uneven, particularly in information literacy and content creation, indicating a need for targeted professional support (Garzón-Artacho et al., 2021; Verkooijen et al., 2024).

Developments in LLL research also highlight the need for rigorous and validated measurement tools. Recent contributions emphasize improved psychometric methods for assessing lifelong learning mindsets, habits, and self-directed learning (Wongwanich et al., 2024). However, much of the existing measurement work is rooted in Western or secular contexts, raising questions regarding its cultural and epistemological applicability in Islamic educational settings.

These concerns are particularly relevant to Islamic higher education, where *ṭalab al-‘ilm* (pursuit of knowledge) is framed as a moral, spiritual, and lifelong obligation. Contemporary conceptions of lifelong learning align with this principle, yet existing empirical studies seldom integrate the ethical and spiritual dimensions central to Islamic epistemology into measurement frameworks for academic staff in Islamic tertiary institutions.

Consequently, two key gaps persist. First, a measurement gap remains, as no validated instrument has been developed to assess LLLA among academic staff in Malaysian Islamic tertiary institutions in a manner that meaningfully incorporates both educational theory and Islamic epistemological principles. Second, an empirical gap exists due to the lack of research examining how lifelong learning attributes manifest among academic staff in such institutions, limiting efforts to design evidence-based and contextually grounded staff development initiatives.

This study addresses these gaps by employing exploratory and confirmatory factor analyses to examine the structure of lifelong learning attributes among academic staff in Malaysian Islamic tertiary institutions. It builds upon established international scholarship (e.g., Abou Said & Abdallah, 2024; Assefa et al., 2023; Sörman et al., 2024; Thwe & Kálmán, 2023) while responding to the philosophical foundations and institutional realities of Islamic higher education.

The theoretical foundation for this study draws from Knapper and Cropley's (2000) model, which conceptualizes lifelong learning as a multidimensional process involving cognitive, metacognitive, and affective components that support sustained intellectual growth. Their model identifies five core attributes—goal setting, application of knowledge, self-direction and evaluation, locating information, and adaptable learning strategies—that collectively underpin autonomous and reflective learning. These dimensions serve as the conceptual basis for the present study's measurement model of lifelong learning attributes.

Contemporary research consistently affirms the significance of these attributes. Goal setting underpins self-regulated learning and is linked to professional development and reflective practice. Application of knowledge and skills highlights learners' ability to transfer learning across contexts and integrate new information into practice. Self-direction and evaluation involve planning, monitoring, and assessing learning progress. Locating information reflects information literacy and critical appraisal skills, essential in digitally mediated academic environments. Adaptable learning strategies encompass flexibility, resilience, and openness to change—competencies that support continued learning in dynamic contexts. Empirical studies in higher education and professional fields have repeatedly validated these dimensions as predictors of lifelong learning engagement (Abou Said & Abdallah, 2024; Assefa et al., 2023; Assefa et al., 2024; Wongwanich et al., 2024).

OBJECTIVES OF THE STUDY

This study has two primary objectives: to validate a contextually grounded measurement model of lifelong learning attributes (LLLA) for academic staff in Malaysian Islamic tertiary institutions by examining its psychometric properties through exploratory and confirmatory factor analyses, and to profile academic staff's levels across the five lifelong learning attributes—goal setting, application of knowledge and skills, self-direction and evaluation, locating information, and adaptable learning strategies—in order to generate evidence that can inform professional development and institutional planning within Islamic higher education. These objectives were addressed through a cross-sectional survey design, employing EFA and CFA for validation and descriptive analysis for profiling.

LITERATURE REVIEW

Concepts and Attributes of Lifelong Learning

Lifelong learning (LLL) is broadly defined as a continuous, self-directed, and intrinsically motivated process that spans formal, nonformal, and informal learning contexts across the lifespan (Edwards & Usher, 1998; Gonczi, 2007). International policy frameworks, particularly Sustainable Development Goal 4 (UNESCO, 2015), highlight its significance; however, scholarly work provides deeper insight into its conceptual and practical dimensions.

Classical theories depict lifelong learners as autonomous, reflective, and capable of adapting knowledge to new and complex situations (Candy et al., 1994; Knapper & Cropley, 2000). These foundations continue to shape contemporary perspectives that integrate 21st century competencies such as critical thinking, creativity, collaboration, and problem solving (Thwe & Kálmán, 2023). These competencies are increasingly important in higher education, where academic staff must navigate evolving pedagogical, disciplinary, and technological demands.

Recent empirical research emphasizes that lifelong learning is influenced by cognitive, motivational, dispositional, and contextual factors. Self-directed learning has been shown to strengthen professional growth and instructional effectiveness (Abou Said & Abdallah, 2024), while workplace dynamics—including autonomy, job demands, and social support—affect lifelong learning orientations across professional fields (Lin et al., 2023). In higher education contexts, faculty support and student engagement foster LLL tendencies (Okwuduba et al., 2022; Verkooijen et al., 2024), whereas personality traits such as novelty seeking and self-transcendence predict sustained learning engagement (Sörman et al., 2024). Educators' pedagogical beliefs also influence willingness to engage in continuous learning (Şentürk & Baş, 2021), and motivation for success enhances both professional competence and LLL dispositions (Ekşi et al., 2020).

Digital competence has emerged as an essential dimension of lifelong learning. While educators often demonstrate strengths in digital communication and collaboration, gaps remain in information literacy, content creation, and digital problem solving (Assefa et al., 2023; Garzón-Artacho et al., 2021). These disparities highlight the need for systematic and contextually grounded support to help academic staff navigate rapid digital transformation.

Collectively, these studies underscore lifelong learning as a multidimensional construct encompassing cognitive skills, metacognitive strategies, motivational dispositions, and contextual affordances—elements that align directly with the five lifelong learning attributes examined in this study.

Measurement Tools and Psychometrics in Lifelong Learning Research

Assessment of lifelong learning has evolved substantially over the past four decades. Early instruments—such as Guglielmino's Self-Directed Learning Readiness Scale—initiated systematic efforts to measure readiness for self-directed learning but faced concerns over construct validity and stability (Fisher et al., 2001). Subsequent tools, including the SDLRS for Nursing Education, demonstrated improved reliability and factor structure (Fisher & King, 2010; Assefa et al., 2024).

Building on Knapper and Cropley's model, Kirby et al. (2010) proposed a 14-item lifelong learning scale assessing curiosity, initiative, independence, persistence, and reflective application. Other tools, such as the Lifelong Learning Tendencies Scale (Gür Erdoğan & Arsal, 2016), have shown strong psychometric properties across adult education contexts. Recent research emphasizes psychometric rigor through advanced validity testing and the measurement of lifelong learning mindsets, habits, and self-directed learning (Wongwanich et al., 2024; Boeren, 2019).

Despite these advances, persistent limitations remain. Systematic reviews highlight inconsistent construct definitions, culturally variable factor structures, and insufficient use of advanced validation procedures (Thwe & Kálmán, 2023). More critically, existing instruments largely reflect Western and secular perspectives, omitting ethical, spiritual, and epistemological dimensions that are central to Islamic educational settings. Western tools focus on cognitive skill acquisition, whereas Islamic pedagogy requires spiritual intent (*niyyah*) and moral accountability (*amanah*). Constructs such as *ṭalab al-‘ilm* (pursuit of knowledge), integration of knowledge and practice (*‘amal*), and intentionality (*niyyah*) remain absent from conventional measures.

This gap underscores the need for a measurement model that is both psychometrically robust and contextually anchored in Islamic higher education. The present study responds to this need by integrating lifelong learning theory with Islamic epistemological principles.

Malaysian and Islamic Higher Education Context

Malaysia positions lifelong learning as a strategic priority for national development. The *Blueprint on Enculturation of Lifelong Learning for Malaysia 2011–2020* emphasizes its importance for human capital formation and societal resilience (Ministry of Higher Education Malaysia, 2011), calling for LLL to become a cultural norm across communities and institutions (Fadzil, 2014).

In Islamic educational philosophy, lifelong learning is grounded in the religious imperative of *ṭalab al-‘ilm*. Islamic epistemology emphasizes intentionality (*niyyah*), the integration of knowledge into practice (*‘amal*), ongoing self-evaluation (*muḥāsabah*), disciplined inquiry, and adaptive learning grounded in humility and openness—principles that align closely with contemporary conceptions of lifelong learning. Classical and contemporary scholarship conceptualizes education as a holistic process encompassing cognitive, ethical, and spiritual development, articulated through *tarbiyyah* (holistic nurturing), *ta’dīb* (moral cultivation), and *ta’līm* (instruction) (Hasan, 2020; Yasin & Jani, 2013). These principles reinforce modern LLL concepts while adding dimensions of moral accountability, intentionality, and spiritual purpose.

While Islamic epistemology encompasses a vast array of concepts—such as *tawḥīd* (Oneness of God), *ḥikmah* (wisdom), and *Adab* (discipline)—the selection of *niyyah*, *‘amal*, and *muḥāsabah* for this study is deliberate. These three constructs were chosen because they map directly onto the psychological processes of the learning cycle, serving as measurable attributes rather than abstract theological frameworks.

Classical and contemporary scholarship supports this tripartite structure. Al-Ghazali, in *Iḥyā’ ‘ulūm al-Dīn*, argues that knowledge acts as the bridge between the internal state of the soul and external conduct, necessitating a flow from Intent (*niyyah*) → Action (*‘amal*) → Reflection (*muḥāsabah*). Similarly, contemporary scholars like Hashim (2004) emphasize that while *Tawḥīd* provides the worldview, the operationalization of education requires the learner to purify their intent, apply their knowledge, and audit their progress. Therefore, these three constructs allow for the psychometric assessment of the learner's behavioral and cognitive engagement, distinct from their broader theological belief system.

Empirical studies provide evidence of strong foundations for LLL in Islamic educational environments. For instance, Rushami Zien et al. (2024) found high levels of awareness and institutional support for LLL among Islamic primary school teachers. School leadership, organizational culture, and professional development structures have also been shown to facilitate LLL engagement (Poom-Valickis et al., 2021). Although much of this work focuses on school settings, the insights are relevant for tertiary institutions, where academic staff face comparable expectations for continuous professional development, pedagogical innovation, and digital transformation.

However, research specifically examining LLL attributes among academic staff in Islamic tertiary institutions—such as IIUM and USIM—remains limited. This scarcity constrains the development of evidence-based policies and interventions tailored to the epistemic and cultural context of Islamic higher education.

A synthesis of current literature reveals three critical gaps:

1. Conceptual gap – many LLL frameworks reflect Western paradigms and overlook Islamic epistemological principles.

2. Measurement gap – existing instruments do not capture the ethical, spiritual, and motivational dimensions embedded in Islamic educational practice.
3. Empirical gap – little is known about how LLL attributes manifest among academic staff in Islamic higher education.

Addressing these gaps, this study develops and validates a contextually grounded measurement model of lifelong learning attributes (LLLA) for Malaysian Islamic tertiary institutions. By integrating Knapper and Cropley's framework with Islamic epistemological foundations, the study advances conceptual understanding while offering a robust diagnostic tool for academic staff development and institutional planning.

THEORETICAL AND CONCEPTUAL FRAMEWORK

To bridge the gap between secular measurements and the specific context of Islamic higher education, this study juxtaposes Knapper and Cropley's (2000) attributes with established Islamic epistemological constructs. **Table 1** illustrates how standard lifelong learning dimensions are enriched when interpreted through the lens of Islamic pedagogy, moving from purely cognitive processes to those encompassing spiritual intent (*niyyah*) and moral accountability (*muḥāsabah*).

Table 1

Theoretical Framework Matrix – Integration of Lifelong Learning Attributes and Islamic Epistemology

Lifelong Learning Attribute (Knapper & Cropley, 2000)	Western/Secular Focus	Islamic Epistemological Construct	Islamic Definition	Contextual
Goal Setting	Focuses on self-regulated learning, planning for professional development, and setting targets.	<i>Niyyah</i> (Intentionality)	Reframes goal setting as a spiritual intent; ensures learning is purposeful and aligned with moral obligations and the pleasure of God.	
Application of Knowledge & Skills	Emphasizes the transfer of learning across contexts and integrating new info into practice.	<i>'Amal</i> (Action/Integration)	The imperative to translate knowledge into righteous action; knowledge is not static but must be manifested in practice (<i>'amal</i>).	
Self-Direction & Evaluation	Involves planning, monitoring progress, and assessing one's own learning outcomes.	<i>Muḥāsabah</i> (Self-Accountability)	A rigorous process of spiritual and intellectual self-audit; continuous self-assessment of one's progress, sincerity, and deficits.	
Locating Information	Reflects information literacy, critical appraisal, and digital search skills.	Disciplined Inquiry / <i>Talab al-'Ilm</i>	The disciplined pursuit of truth; implies a systematic and ethical approach to seeking and verifying knowledge.	

Adaptable Learning Strategies	Encompasses flexibility, resilience, and openness to change in dynamic environments.	<i>Ijtihad</i> (Reasoning) & Humility	Openness to new ideas and the use of independent reasoning (<i>Ijtihad</i>) to adapt knowledge to new challenges while maintaining intellectual humility.
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Drawing from these theoretical and empirical foundations, the present study conceptualizes lifelong learning attributes (LLLA) as five correlated first-order factors: goal setting, application of knowledge and skills, self-direction and evaluation, locating information, and adaptable learning strategies. These dimensions reflect the cognitive, metacognitive, and behavioral processes that underpin lifelong learning among academic staff.

Each dimension contributes uniquely to lifelong learning behavior, yet the five factors function interdependently as components of a holistic process of continuous professional growth. This conceptualization aligns with the study's empirical findings, where the five factors emerged as distinct but related constructs rather than as indicators of a single higher-order factor.

The framework guided the study's validation procedures: the five dimensions, operationalized through 20 items, served as observable variables subjected to exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to assess construct validity, reliability, and model fit within the context of Malaysian Islamic higher education. This coherent structure provides a robust and contextually relevant foundation for profiling lifelong learning attributes among academic staff in Islamic tertiary institutions.

METHODOLOGY

Research Design

A quantitative, cross-sectional survey design was employed to validate the measurement structure of lifelong learning attributes (LLLA) and to profile their prevalence among academic staff in Malaysian Islamic tertiary institutions. This design was appropriate for collecting data from a large population within a specific timeframe and for conducting multivariate analyses required for psychometric validation, including Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) (Creswell & Creswell, 2018; Hair et al., 2019). Such an approach aligns with established standards for validating latent constructs in educational and behavioral research.

Sample

Inclusion and Exclusion Criteria

Eligible participants were full-time academic staff from the International Islamic University Malaysia (IIUM) and Universiti Sains Islam Malaysia (USIM). Inclusion was restricted to lecturers, assistant professors, associate professors, and professors who were directly involved in teaching and academic responsibilities. Administrative staff, part-time lecturers, visiting scholars, and research fellows without teaching duties were excluded to ensure the sample reflected the population central to the study's focus.

Sample Characteristics

A total of 294 academic staff participated in the study. Key demographic characteristics included gender, university affiliation, and nationality. **Table 2** summarizes the sample distribution. These

demographic variables were included to ensure representativeness across institutional and cultural contexts relevant to Islamic higher education.

Table 2

Sample Characteristics by Gender, University and Nationality (N = 294)

Characteristic	Category	Frequency	Percentage
Gender	Male	169	57.5
	Female	125	42.5
University	IIUM	178	60.5
	USIM	116	39.5
Nationality	Malaysians	232	78.9
	International	62	21.1

Sampling Procedures

A stratified convenience sampling technique was employed to balance feasibility with representativeness. Stratification was strictly applied by university (IIUM/USIM), gender, and nationality to ensure demographic representativeness. Staff directories from IIUM and USIM served as the sampling frames. Invitations, including an information sheet and a digital consent form, were distributed via official university email systems. Of the approximately 450 academic staff approached, 294 responded, yielding a response rate of approximately 65%. While the use of a non-probability sampling method limits the extent to which findings can be generalized compared to pure random sampling, strict stratification was applied to mitigate selection bias. This approach ensured that the final sample reflected the compositional diversity of the target population, supporting the transferability of the findings to similar Islamic tertiary institutions.

Sample Size, Power, and Precision. The achieved sample of 294 participants exceeded recommended minimum thresholds for factor-analytic procedures. The sample size meets the recommended ratio of 10 respondents per item (Hair et al., 2019) and exceeds the minimum N=200 for CFA (Kline, 2023). Consequently, the sample size provided sufficient statistical power and precision for stable parameter estimation.

Measures and Covariates

Instrumentation and Item Development

To assess lifelong learning attributes within an Islamic higher education framework, a deductive scale development approach was employed. Rather than adopting an existing scale verbatim, an initial pool of 35 items was drafted to operationalize the five attributes proposed by Knapper and Cropley (2000): goal setting, application of knowledge, self-direction, locating information, and adaptable learning strategies. The development process was detailed as follows:

1. Items were initially drafted in English, drawing upon empirical literature (e.g., Kirby et al., 2010).
2. These drafts were then reviewed by a panel of 10 experts in educational psychology, measurement, curriculum studies, and Islamic education for content validity, clarity, and theoretical fit.
3. Based on expert feedback, items were revised.
4. The revised instrument was piloted with 30 academic staff to assess clarity and cultural resonance.

5. Final revisions were made before full-scale administration.

This process simultaneously integrated Islamic epistemological constructs—specifically *niyyah* (intentionality), *'amal* (action), and *muḥāsabah* (self-evaluation)—to ensure the instrument possessed ecological validity for the target population.

Item Adaptation and Contextualization

To ensure construct validity, the item generation process moved beyond linguistic translation to cultural adaptation, reconstructing secular descriptors to resonate with the respondents' theological worldview. Generic psychological constructs were mapped onto their Islamic equivalents to capture the spiritual and ethical dimensions of learning. For instance, in the domain of **Goal Setting**, the concept was reframed as Intentionality (*niyyah*) and Public Interest (*Maslahah*); consequently, the original item "I set goals to achieve what I think is important" was adapted to "I set goals to ensure my work contributes to the greater good (*Maslahah*)". Similarly, items regarding the **Application** of knowledge were contextualized through the lenses of Righteous Action (*'Amal*), transforming "I apply what I learn in real life" into "I translate what I learn into righteous action (*'Amal*) in real life". Attributes of **Self-Direction** were elevated to a spiritual Trust (*amanah*), while **Locating Information** was aligned with the Qur'anic imperative of Verification (*tabayyun*) to distinguish truth from falsehood.

Validation and Refinement

Content validity was established through expert review. Construct validity was subsequently examined through Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), as presented in the Results section. The analysis supported a reliable 20-item, five-factor model with satisfactory fit indices and strong internal consistency, reducing the initial pool by removing items that failed to meet psychometric or cultural fit criteria.

Quality of Measurements. Prior to analysis, items were screened for missing data, normality, outliers, and corrected item–total correlations ($\geq .30$). Missing data (<1%) were handled using mean imputation for scale items. Reliability and validity were subsequently evaluated through EFA and CFA. Internal consistency was assessed using Cronbach's alpha and Composite Reliability (CR), while construct validity was examined through factor loadings, Average Variance Extracted (AVE), and discriminant validity (Fornell & Larcker, 1981).

Data Collection and Data Analysis

Data were collected using an online self-administered questionnaire. The use of a Google Form facilitated efficient distribution, confidentiality, and ease of access across faculties and departments. This method aligned with recommended practices for large-scale survey research (Creswell & Creswell, 2018). Data analysis was conducted using SPSS (Version 29) and AMOS (Version 29). Initial screening included assessments of missing data, univariate and multivariate normality, and inter-item correlations. Factorability was confirmed through the Kaiser–Meyer–Olkin (KMO) statistic and Bartlett's test of sphericity.

Exploratory Factor Analysis (EFA)

EFA using Principal Axis Factoring with Promax rotation was applied to identify the latent factor structure. Item retention followed established benchmarks: factor loadings $\geq .40$, communalities $\geq .30$, limited cross-loadings, and theoretical coherence (Hair et al., 2019). This process yielded a refined 20-item scale.

Confirmatory Factor Analysis (CFA)

CFA was used to validate the five-factor model. Model fit was assessed using χ^2/df , RMSEA, CFI, and TLI, following structural equation modeling guidelines (Byrne, 2016; Kline, 2023). Convergent validity was confirmed through factor loadings and AVE values, while discriminant validity was evaluated using the Fornell–Larcker criterion. Reliability was assessed using CR and Cronbach's alpha.

RESULTS

Lifelong Learning Attributes Among Malaysian Academic Staff

Descriptive statistics were computed to examine the overall levels of lifelong learning attributes (LLLA) among academic staff in Malaysian Islamic tertiary institutions. As detailed in **Table 3**, the mean scores across the five dimensions indicated generally high levels of LLLA.

Goal Setting demonstrated the highest mean ($M = 4.47$, $SD = 0.68$), followed by Self-Direction and Evaluation ($M = 4.41$, $SD = 0.64$), Application of Knowledge and Skills ($M = 4.40$, $SD = 0.69$), and Adaptable Learning Strategies ($M = 4.33$, $SD = 0.68$). In contrast, Locating Information yielded the lowest mean ($M = 3.84$, $SD = 0.89$), indicating greater variability and comparatively lower confidence in information-seeking behaviors among respondents.

Table 3

Descriptive Statistics of Lifelong Learning Attribute (LLLA) Factors (N = 294)

Factor & Items	Code	Mean	SD	Factor Mean (SD)
Factor 1: Goal Setting (<i>niyyah</i> & Purpose)				4.47 (0.68)
1) I set goals to ensure my work contributes to the greater good (<i>masalahah</i>).	GS1	4.34	0.75	
2) I have a plan for seeking beneficial knowledge (<i>'ilm nafi</i>).	GS2	4.38	0.73	
3) I renew my intentions (<i>niyyah</i>) for learning on a regular basis.	GS3	4.61	0.60	
4) Aligning my goals with my spiritual purpose is an important activity.	GS4	4.53	0.65	
Factor 2: Application of Knowledge (<i>'amal</i>)				4.40 (0.69)
1) I relate academic learning to solving problems faced by the <i>Ummah</i> .	AKS1	4.44	0.65	
2) I relate new learning to what I already know to deepen my wisdom.	AKS2	4.23	0.74	
3) I translate what I learn into righteous action (<i>'amal</i>) in real life.	AKS3	4.43	0.67	
4) I reflect on lessons (<i>ibrah</i>) from my own experience when studying.	AKS4	4.52	0.67	

5) I diligently practice the skills I learn to serve others best.	AKS5	4.36	0.72
Factor 3: Self-Direction (<i>amanah</i> & <i>muḥāsabah</i>)			4.41 (0.64)
1) I view learning as a trust (<i>amanah</i>) for which I am responsible.	SDE1	4.30	0.70
2) I need to continually relearn because life is a dynamic journey.	SDE2	4.49	0.59
3) I engage in self-accounting (<i>muḥāsabah</i>) regarding my development.	SDE3	4.44	0.62
Factor 4: Locating Information (Disciplined Inquiry)			3.84 (0.89)
1) I can easily locate truthful (<i>haqq</i>) information when needed.	LI1	3.91	0.83
2) I organize knowledge systematically to preserve it.	LI2	4.08	0.78
3) I revise my research plan to ensure verification (<i>tabayyun</i>) of facts.	LI3	3.77	0.95
4) I change my keywords if my search does not yield valid results.	LI4	3.49	1.04
5) I use critical thinking to distinguish truth from falsehood.	LI5	3.95	0.85
Factor 5: Adaptable Learning Strategies (<i>hikmah</i>)			4.33 (0.68)
1) My learning helps me think critically and wisely (<i>hikmah</i>).	ALS1	4.28	0.73
2) My strategies improve my ability to reflect deeply (<i>tafakkur</i>).	ALS2	4.26	0.70
3) I use flexible strategies to resolve learning challenges.	ALS3	4.45	0.62

Exploratory Factor Analysis

An Exploratory Factor Analysis (EFA) using Principal Axis Factoring (PAF) with Promax rotation was conducted to examine the latent structure of the LLLA scale. PAF is recommended for identifying underlying latent constructs when data may deviate from multivariate normality, while Promax rotation is appropriate when factors are theoretically expected to correlate (Hair et al., 2019). Preliminary diagnostics confirmed the suitability of the data for factor analysis. The Kaiser–Meyer–Olkin (KMO) value of 0.911 exceeded the recommended minimum of .80, indicating excellent sampling adequacy (Kaiser, 1974), and Bartlett's Test of Sphericity was significant, $\chi^2(190) = 2986.96$, $p < .001$, confirming sufficient inter-item correlations (Hair et al., 2019). All anti-image correlation values were above .50, and communalities exceeded the .30 threshold considered acceptable for factor retention (Costello & Osborne, 2005).

Initial extraction yielded eight components. Fifteen items were removed following established criteria—specifically, factor loadings below .40 and substantial cross-loadings—consistent with recommended psychometric practice (Hair et al., 2019). Beyond statistical considerations, item removal was also theoretically justified. The excluded items reflected secular-generic formulations that insufficiently operationalized Islamic epistemological constructs such as spiritual intention

(*niyyah*) and moral accountability (*amanah*). As Western-developed lifelong-learning instruments typically emphasize cognitive skill acquisition, items lacking explicit alignment with Islamic pedagogical principles were likely interpreted as culturally ambiguous, resulting in weaker factor loadings. Their removal strengthened both the cultural specificity and theoretical coherence of the instrument, thereby enhancing construct validity (DeVellis, 2017).

A subsequent EFA on the refined 20-item scale produced a coherent and theoretically aligned five-factor solution, with all eigenvalues exceeding 1.0—meeting the Kaiser criterion and reflecting meaningful factor structures (Hair et al., 2019). The five factors accounted for 57.2% of the total variance, an acceptable level within social science measurement and consistent with the theoretical model of Knapper and Cropley (2000). The factors represented: (1) Goal Setting (*niyyah*), reflecting purposeful planning and prioritization; (2) Application of Knowledge and Skills (*'amal*), indicating integration and practical enactment of learning; (3) Self-Direction and Evaluation (*amanah*), capturing responsibility and self-regulation in learning; (4) Locating Information (*tabayyun*), encompassing information search, verification, and organization; and (5) Adaptable Learning Strategies (*Hikmah*), representing cognitive flexibility and strategic problem solving. Factor loadings ranged from 0.419 to 0.920, and communalities exceeded .40, meeting recommended thresholds for constructive factor solutions (Hair et al., 2019).

Reliability Analysis

Reliability results showed strong internal consistency across the five factors, with Cronbach's alpha values ranging from 0.77 to 0.85, surpassing the minimum threshold of .70 (Nunnally & Bernstein, 1994). These findings indicate that the finalized 20-item LLLA scale demonstrates robust psychometric quality and is suitable for subsequent confirmatory factor analysis (CFA) procedures.

Table 4

Results of the Principal Axis Factoring (PAF) and Cronbach's Alpha

Factor and Items	Items	FL	COMM	EGV	VE (%)	Alpha
Factor 1: Goal Setting				1.305	4.64%	0.812
1) I set goals to ensure my work contributes to the greater good (<i>masalahah</i>).	GS1	.775	.639			
2) I have a plan for seeking beneficial knowledge (<i>'ilm nafi</i>).	GS2	.704	.534			
3) Aligning my goals with my spiritual purpose is an important activity.	GS4	.537	.573			
4) I renew my intentions (<i>niyyah</i>) for learning on a regular basis.	GS3	.441	.577			
Factor 2: Application of Knowledge and Skills				1.968	7.63%	0.854
1) I reflect on lessons (<i>ibrah</i>) from my own experience when studying.	AKS4	.920	.737			
2) I diligently practice the skills I learn to serve others best.	AKS5	.727	.518			
3) I translate what I learn into righteous action (<i>'amal</i>) in real life.	AKS3	.682	.577			
4) I relate new learning to what I already know to deepen my wisdom.	AKS2	.579	.536			
5) I relate academic learning to solving problems faced by the <i>Ummah</i> .	AKS1	.447	.474			

Factor 3: Self-Direction and Evaluation				1.043	2.42%	0.773
1)	I engage in self-accounting (<i>muḥāsabah</i>) regarding my development.	SDE3	.839 .684			
2)	I need to continually relearn because life is a dynamic journey.	SDE2	.635 .594			
3)	I view learning as a trust (<i>amanah</i>) for which I am responsible.	SDE1	.517 .407			
Factor 4: Locating Information				8.235	39.07%	0.834
1)	I change my keywords if my search does not yield valid results.	LI4	.844 .672			
2)	I revise my research plan to ensure verification (<i>tabayyun</i>) of facts.	LI3	.733 .521			
3)	I can easily locate truthful (<i>haqq</i>) information when needed.	LI1	.622 .465			
4)	I organize knowledge systematically to preserve it.	LI2	.604 .556			
5)	I use critical thinking to distinguish truth from falsehood.	LI5	.577 .497			
Factor 5: Adaptable Learning Strategies				1.164	3.45%	0.815
1)	My strategies improve my ability to reflect deeply (<i>tafakkur</i>).	ALS2	.872 .692			
2)	My learning helps me think critically and wisely (<i>hikmah</i>).	ALS1	.870 .747			
3)	I use flexible strategies to resolve learning challenges.	ALS3	.419 .486			

Note. Factors are presented in the standardized theoretical order established for this study. FL = Factor Loadings; COMM = Communalities; EGV = Eigenvalues; VE = Variance Explained.

Measurement Validity of Academic Staff's Lifelong Learning Attributes

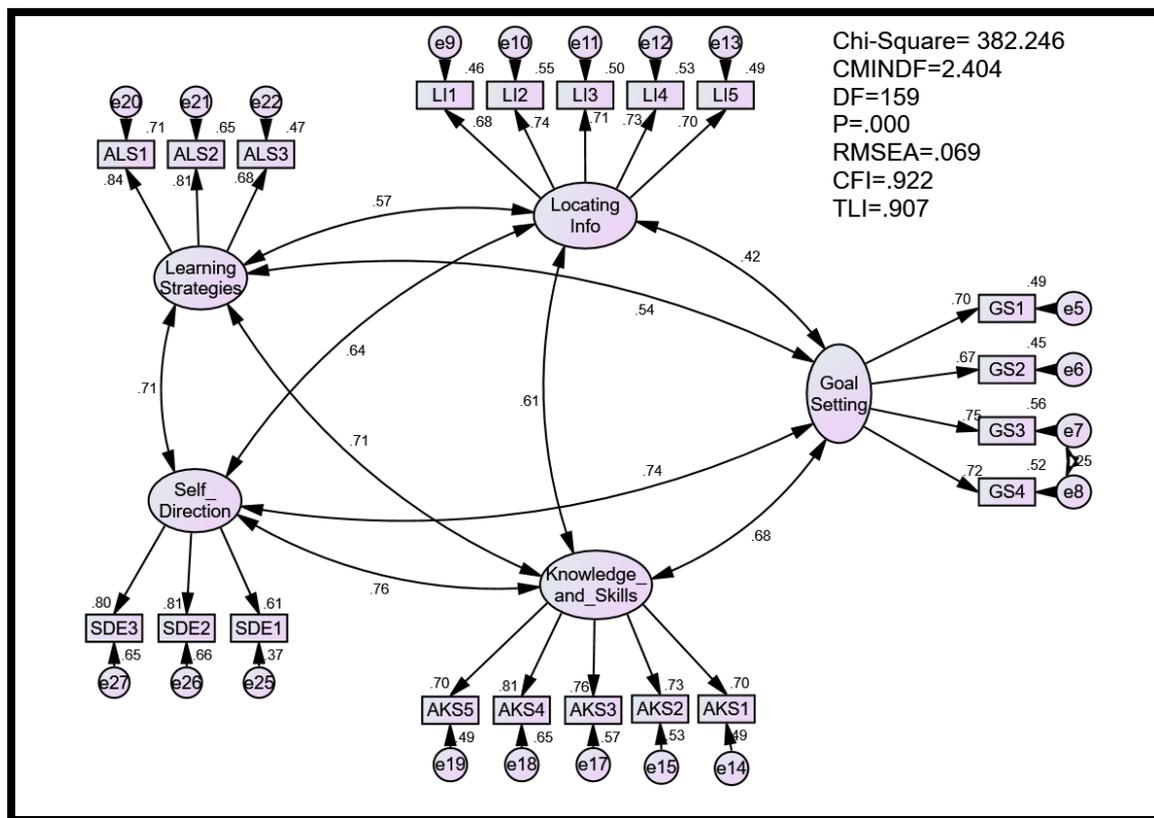
Confirmatory Factor Analysis (CFA)

Confirmatory Factor Analysis (CFA) was conducted to evaluate the construct validity and reliability of the five-factor measurement model of lifelong learning attributes (LLLA). The analysis examined whether the observed indicators adequately represented the latent constructs of Goal Setting, Application of Knowledge and Skills, Self-Direction and Evaluation, Locating Information, and Adaptable Learning Strategies. Using AMOS and following established structural equation modeling procedures, the CFA results indicated that the model demonstrated an acceptable fit to the data. The normed chi-square ($\chi^2/df = 2.404$) suggested an adequate level of model parsimony. The RMSEA value of .069 fell below the recommended threshold of .08, indicating a close approximate fit. In addition, incremental fit indices—CFI = .922 and TLI = .907—exceeded the .90 benchmark, further supporting the suitability of the model.

Collectively, these indices provide strong evidence that the five-factor structure is well specified and consistent with contemporary criteria for evaluating measurement models within SEM frameworks. Figure 1. Confirmatory Factor Analysis Model with Standardized Estimates illustrates the final model.

Figure 1

Confirmatory Factor Analysis Model with Standardized Estimates.



Psychometric Properties of the LLLA Measurement Model

The psychometric quality of the LLLA measurement model was assessed through convergent validity, discriminant validity, and composite reliability.

Convergent and Composite Reliability

Standardized factor loadings ranged from .61 to .84, all exceeding the recommended minimum of .50. All constructs demonstrated Average Variance Extracted (AVE) values above .50, indicating that each factor accounted for more than half of the variance in its indicator items. Composite Reliability (CR) values ranged from .790 to .857, surpassing the threshold of .70 and confirming adequate internal consistency across all five LLLA dimensions.

Table 5

Results of the Confirmatory Factor Analysis

Constructs	Items	Estimate	S.E.	C.R.	p	CR	AVE
1. Goal Setting	GS1	.702	---	---	---	0.805	0.508
	GS3	.750	.082	10.473	***		
	GS4	.723	.088	10.138	***		
	GS2	.674	.093	9.935	***		
2. Application of Knowledge and Skills						0.857	0.545

	AKS1	.697	---	---	---		
	AKS4	.809	.096	12.453	***		
	AKS3	.755	.095	11.725	***		
	AKS2	.726	.105	11.316	***		
	AKS5	.700	.102	10.944	***		
3. Self-Direction and Evaluation						0.790	0.560
	SDE1	.609	---	---	---		
	SDE2	.813	.109	10.410	***		
	SDE3	.805	.113	10.355	***		
4. Locating Information						0.837	0.506
	LI1	.679	---	---	---		
	LI2	.740	.095	10.796	***		
	LI4	.727	.126	10.641	***		
	LI3	.708	.114	10.417	***		
	LI5	.701	.103	10.323	***		
5. Adaptable Learning Strategies						0.823	0.610
	ALS1	.842	---	---	---		
	ALS2	.809	.064	14.478	***		
	ALS3	.683	.058	12.034	***		

Note. * $p < .001$. Factors are listed in the standardized theoretical order. *

Discriminant Validity

Discriminant validity was assessed using the Fornell–Larcker criterion, which compares each construct's AVE to the squared correlations shared with other constructs. Across all five factors, AVE values (represented by the square root of the AVE on the diagonal) exceeded the corresponding inter-factor correlations, confirming that each construct was empirically distinct.

Inter-factor correlations were below 0.80, indicating an absence of multicollinearity and supporting the uniqueness of the five lifelong learning dimensions. These results collectively demonstrate that while the LLLA constructs are related—as expected in a multidimensional learning framework—they remain statistically and conceptually distinct.

Table 6

Discriminant Validity of the Measurement Model

Construct	1	2	3	4	5
1. Goal Setting	0.753				
2. Application of Knowledge	0.678	0.739			
3. Self-Direction	0.744	0.756	0.768		
4. Locating Information	0.424	0.612	0.640	0.711	
5. Adaptable Learning Strategies	0.542	0.709	0.709	0.572	0.781

Note. Diagonal values (bolded) represent the square root of the Average Variance Extracted (\sqrt{AVE}); off-diagonal values represent inter-factor correlations

DISCUSSION

Overview of Key Findings

This study sought to validate a measurement model of lifelong learning attributes (LLA) and to profile these attributes among academic staff in Malaysian Islamic tertiary institutions. Both objectives were achieved. Findings from the EFA and CFA provided strong support for a **five-factor structure** of LLA, comprising goal setting, application of knowledge and skills, self-direction and evaluation, locating information, and adaptable learning strategies, consistent with Knapper and Cropley's (2000) framework and the Islamic epistemological principles that guided this study.

The validated 20-item scale demonstrated robust psychometric properties, including satisfactory model fit, strong internal consistency, and clear convergent and discriminant validity. Descriptive results indicated generally high levels of lifelong learning attributes, with the exception of locating information, which showed comparatively lower scores.

These results align with existing scholarship positioning lifelong learning as a multidimensional construct comprising cognitive, metacognitive, and dispositional elements (Candy et al., 1994; Thwe & Kálmán, 2023). The high performance in goal setting, self-direction, and application mirrors findings that educators typically exhibit strong motivational orientations, professional responsibility, and self-regulatory skills (Abou Said & Abdallah, 2024; Ekşi et al., 2020; Şentürk & Baş, 2021). In contrast, the comparatively lower score for locating information reflects well-known challenges related to digital information literacy among educators, particularly in evaluating and managing online resources (Garzón-Artacho et al., 2021; Verkooijen et al., 2024).

Interpretation of Results

Strengths in Goal Setting, Self-Direction, and Application

The high scores in goal setting and self-direction indicate that academic staff take responsibility for their learning, plan intentionally, and recognize the need for continuous knowledge renewal. These patterns align with theories of self-regulated learning and with Islamic epistemological principles such as *niyyah* (intentionality) and *muḥāsabah* (reflective self-evaluation). They are also consistent with empirical findings that link personal motivation and reflective practice to sustained professional learning among educators (Abou Said & Abdallah, 2024; Şentürk & Baş, 2021). The high score in Goal Setting reflects *niyyah* as spiritual intentionality, while lower Locating Information scores suggest a need to strengthen *tabayyun* (verification) in digital contexts.

Compared to secular institutions (e.g., Assefa et al., 2023), the study's sample showed higher goal-setting scores, possibly due to the influence of *niyyah* (spiritual intentionality) in shaping purposeful learning objectives within an Islamic academic environment.

Similarly, strong performance in the application of knowledge and skills suggests that staff actively transfer learning across teaching, research, and community contexts. This finding echoes work demonstrating that educators with strong application competencies are better able to integrate new knowledge, enhance instructional quality, and engage in meaningful professional development (Chen et al., 2024; Assefa et al., 2023). The Islamic concept of *'amal* (putting knowledge into practice) provides further theoretical grounding for this behavior.

Adaptable Learning Strategies

High scores in **adaptable learning strategies** reflect flexibility, openness to new approaches, and the ability to confront challenges through varied learning methods. These results align with research highlighting the role of adaptability, resilience, and critical thinking in lifelong learning (Sörman et al., 2024; Thwe & Kálmán, 2023). They also resonate with the Islamic tradition of *ijtihad*, which encourages thoughtful reinterpretation and adaptive reasoning.

Lower Scores in Locating Information

The lower mean for **locating information** underscores an area requiring institutional attention. This dimension encompasses the ability to search for, evaluate, and organize digital information—skills increasingly central to academic work. The finding is consistent with documented gaps in educators' digital information literacy and online research skills (Garzón-Artacho et al., 2021; Verkooijen et al., 2024). Addressing this gap is essential for strengthening research capacity, evidence-based teaching, and academic productivity.

Islamic Epistemological Integration

Viewing the findings within an Islamic educational framework deepens their significance. High performance in intentionality, self-regulation, and knowledge application aligns closely with *talab al-'ilm*, the religious imperative to pursue knowledge throughout life. Adaptability reflects intellectual humility and openness, while challenges in digital information management point to a need to connect traditional strengths in text-based scholarship with contemporary digital competencies.

Implications for Institutions and Policy

The findings have several concrete implications for institutional planning and professional development within Islamic higher education:

1. **Strengthening Digital and Information Literacy:** Implement mandatory workshops on digital literacy and source verification (*tabayyun*). Given the relatively lower scores for locating information, institutions should prioritise training in digital searching, database navigation, source evaluation, and research synthesis. Such training supports both teaching and research excellence.
2. **Embedding Islamic Epistemology into Professional Development:** Integrating concepts such as *niyyah*, *muḥāsabah*, *'amal*, and *ijtihad* into staff development programmes may enhance engagement and cultural relevance. For example, higher learning institutions should integrate *muḥāsabah* (self-accountability) into annual peer-review processes to foster reflective practice.
3. **Supporting Reflective and Self-Regulated Learning:** Workshops on goal setting, reflective journaling, and planning for professional growth can build on existing strengths in intentionality and autonomy.
4. **Promoting Application-Oriented Learning Opportunities:** Activities that connect learning to real academic tasks—curriculum design, research innovation, community engagement—can support continued growth across LLLA dimensions.
5. **Using the Validated LLLA Instrument for Institutional Planning:** The scale provides a reliable diagnostic tool for benchmarking, identifying development needs, monitoring progress, and evaluating professional development effectiveness.
6. **Encouraging Cross-Institutional and Cross-Cultural Research:** Replicating this study across public, private, and non-Islamic institutions will enhance generalizability and enable meaningful comparisons across educational contexts.

Limitations and Future Research

Several limitations should be noted. First, both EFA and CFA were conducted on the same sample, which may inflate fit indices. Cross-validation with a new sample is recommended. Second, data were collected from two Islamic universities, limiting the generalizability of results to secular or non-Islamic institutions, which may operate under different epistemological and organizational frameworks. Third, the cross-sectional design precludes causal or developmental interpretations. Fourth, reliance on self-report introduces potential social desirability and perceptual bias.

Future research should employ longitudinal designs, mixed-method approaches, and multi-source data (e.g., peer evaluations, teaching portfolios). Examination of higher-order LLLA models and measurement invariance across demographic groups would further strengthen insights into the structure and applicability of LLLA.

CONCLUSION

This study validated a five-factor measurement model of lifelong learning attributes (LLLA) and profiled these attributes among academic staff in Malaysian Islamic tertiary institutions. The resulting 20-item scale demonstrated excellent psychometric properties, confirming its suitability for assessing lifelong learning in Islamic higher education contexts.

Academic staff reported high levels of goal setting, application of knowledge, self-direction, and adaptable learning strategies, with comparatively lower performance in locating information. These findings extend Knapper and Cropley's (2000) model by demonstrating its applicability within an Islamic epistemological framework and by highlighting intersections between lifelong learning concepts and Islamic principles.

The validated instrument provides a context-sensitive, evidence-based tool that institutions can use for professional development, strategic planning, and quality enhancement. At the same time, the study underscores the importance of improving digital information literacy and expanding research on lifelong learning across diverse institutional and cultural settings.

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APPENDIX

FINALIZED MEASURE OF LIFELONG LEARNING ATTRIBUTES (LLLA-ISLAMIC CONTEXT)

Instructions: Please indicate the extent to which you agree with the following statements regarding your approach to learning and professional development. **Scale:** 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree.

Factor	No.	Item Statement
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1. Goal Setting (<i>niyyah</i> & Purpose)	1	I set goals to ensure my work contributes to the greater good (<i>maṣlahah</i>).
	2	I have a plan for seeking beneficial knowledge (<i>‘ilm nāfi</i>).
	3	I renew my intentions (<i>niyyah</i>) for learning on a regular basis.
	4	Aligning my goals with my spiritual purpose is an important activity.
2. Application of Knowledge (<i>‘amal</i>)	5	I relate academic learning to solving problems faced by the <i>ummah</i> .
	6	I relate new learning to what I already know to deepen my wisdom.
	7	I translate what I learn into righteous action (<i>‘amal</i>) in real life.
	8	I reflect on lessons (<i>ibrah</i>) from my own experience when studying.
	9	I diligently practice the skills I learn to serve others best.
3. Self-Direction (<i>amanah</i>)	10	I view learning as a trust (<i>amanah</i>) for which I am responsible.
	11	I need to continually relearn because life is a dynamic journey.
	12	I engage in self-accounting (<i>muḥāsabah</i>) regarding my development.
4. Locating Information (<i>tabayyun</i>)	13	I can easily locate truthful (<i>Haqq</i>) information when needed.
	14	I organize knowledge systematically to preserve it.
	15	I revise my research plan to ensure verification (<i>tabayyun</i>) of facts.
	16	I change my keywords if my search does not yield valid results.
	17	I use critical thinking to distinguish truth from falsehood.
5. Adaptable Learning Strategies (<i>hikmah</i>)	18	My learning helps me think critically and wisely (<i>hikmah</i>).
	19	My strategies improve my ability to reflect deeply (<i>tafakkur</i>).
	20	I use flexible strategies to resolve learning challenges.
