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EDITED BY
Eduardo Hernández-Padilla,
Autonomous University of the State of Morelos, Mexico

REVIEWED BY
Elsa Gabriel Morgado,
Escola Superior de Educação, Portugal
Vali Ilie,
University of Craiova, Romania

*CORRESPONDENCE
Rahma Yusuf Haji Mohamud
samiihayusuf@gmail.com

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Value myths scale—teacher form: a validity and reliability study

Derya Kayıran[1] and Rahma Yusuf Haji Mohamud[2]*

[1]Department of Child Care and Youth Services, Kahramanmaraş Sütçü İmam University, Kahramanmaraş, Türkiye, [2]Health Services Manager, Yardimeli Specialist Hospital, Mogadishu, Somalia

The purpose of this study is to develop the *Value Myths Scale—Teacher Form* (VMS-TF), designed to assess teachers' myth-based, traditionalist, and essentialist beliefs about values education, and to examine the psychometric properties of the scale. The scale development process followed a systematic, multi-stage procedure including the establishment of a theoretical framework, item pool construction, expert review, pilot testing, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and reliability analyses. The study was conducted using data obtained from 206 teachers. Results of the EFA indicated that the scale has a four-factor structure. These factors were labeled as: *Traditional and Family-Centered Conceptions of Values*, *The Role of School and Teachers in Values Education*, *Developmental and Experience-Based Conceptions of Values*, and *Positioning Values Outside Formal Education and Beliefs in Immutability*. CFA results demonstrated that the four-factor model yielded acceptable fit indices and showed an adequate level of fit to the data. Reliability analyses revealed that Cronbach's alpha coefficients for the subscales ranged from.70 to.78, while the coefficient for the overall scale was.77. These findings indicate that the scale demonstrates satisfactory internal consistency both at the subscale level and as a whole. Overall, the findings provide initial evidence supporting the validity and reliability of the VMS-TF. The scale may be considered a promising instrument for assessing teachers' beliefs about values education, although further validation across independent samples, different educational contexts, and larger populations is recommended.

KEYWORDS
moral myths, scale development, teacher beliefs, value myths, values education

Introduction

Values education occupies a persistent and often contested position within school policy and practice, as it encompasses both cognitive and non-cognitive aims that teachers are expected to enact in classroom settings (Waters and Russell, 2014). Historical and contemporary analyses indicate that values including goals related to citizenship, morality, and character are routinely embedded in curriculum reforms and teacher selection instruments, and that the translation of these values into classroom practice depends in part on teachers' beliefs and dispositions (Kayıran and Bağçeci, 2025; Metzger and Wu, 2008). Empirical research on teachers' perceptions and assessment cultures further demonstrates that teachers' values and ethical orientations shape their assessment practices, pedagogical choices, and interpretations of student behavior, thereby linking values directly to everyday instructional decision-making processes (Martínez-Lalangui et al., 2024).

Collectively, this body of work underscores the practical importance of clearly conceptualizing and rigorously measuring teachers' beliefs about values education.

At the same time, the methodological literature on measuring teachers' beliefs has matured considerably. A substantial body of instrument development and validation research has demonstrated the feasibility and utility of psychometrically rigorous scales for capturing teachers' beliefs across diverse domains, including constructivist pedagogy, inquiry-based practices, inclusivity, and professional belief systems (White et al., 2019). Standard practices within these validation programs typically include multi-stage item development, expert review, exploratory and confirmatory factor analyses, and the reporting of internal consistency and construct validity indices (Oppell and Aldridge, 2020). Meta-methodological discussions have further emphasized the need for transparent reporting of reliability indices such as Cronbach's alpha alongside complementary statistics including composite reliability and average variance extracted (AVE) as an integral component of scale validation studies (Taber, 2017). Taken together, these developments suggest that the field possesses both the theoretical motivation and the methodological prerequisites necessary to establish a domain-specific, psychometrically grounded measure of teachers' beliefs regarding values education.

Operationalizing teachers' beliefs about values as measurable constructs enables several critical functions in both research and practice. First, validated instruments allow for the descriptive mapping of prevalent beliefs and misbeliefs or "myths" held by teachers, which constitutes a prerequisite for targeted professional learning and curriculum design (Lacruz-Pérez et al., 2024). For instance, research on neuromyths and related misconceptions has shown that identifying specific erroneous beliefs among educators is a crucial step in designing effective interventions and assessing their impact (Bonilla-Algovia et al., 2024). Second, measurement facilitates the evaluation of pre-service and in-service teacher education programs by providing outcome variables that capture changes in beliefs, self-efficacy, and intended practices associated with educational interventions (Katz-Buonincontro et al., 2020). Empirical studies on belief change in areas such as creativity education and inclusive practices indicate that instruments can reveal differential effects of professional development on belief-related components including self-efficacy and core epistemic beliefs thereby informing improvements in instructional design (Lohmann et al., 2023). Third, robust measurement supports research on the predictive and mediating roles of teacher beliefs: validated scales make it possible to test whether specific beliefs including mythological or absolutist conceptions are associated with pedagogical behaviors, assessment practices, or student outcomes, and thus whether modifying such beliefs constitutes a viable lever for educational improvement (Miralles-Cardona et al., 2021).

Finally, the explicit measurement of "value myths" that is, beliefs that present contested or erroneous propositions about the nature, teachability, or neutrality of values in schooling as fixed truths addresses a clear practical need. Domain-specific myth scales, such as those assessing stereotypical beliefs about gender-based violence or neuromyths, have proven useful for estimating prevalence and for informing the design of corrective educational strategies (Lacruz-Pérez et al., 2024).

Similarly, the *Value Myths Scale—Teacher Form* (VMS-TF) is intended to enable the systematic identification of specific misconceptions that hinder evidence-based values education and to provide outcome measures for interventions aimed at aligning teachers' beliefs with contemporary conceptualizations of values as teachable, contextual, and ethically situated constructs (Bonilla-Algovia et al., 2024).

Despite the recognized importance of teacher beliefs in values education (Kayıran and Bağçeci, 2025) and a well-established tradition of psychometric instrument development in related domains (Kayıran, 2025), the recent literature lacks a focused, validated tool that specifically measures teachers' myth-based, traditionalist, and essentialist beliefs about values education. A wide range of validated teacher belief instruments target content-specific pedagogies (e.g., mathematics, science, physical education, inquiry-based learning) as well as cross-cutting orientations such as inclusivity and culturally responsive pedagogy, demonstrating both conceptual breadth and methodological rigor in the field (Gavora and Wiegerová, 2019). However, existing instruments do not explicitly operationalize the construct of "value myths," understood here as teacher beliefs that frame values as unquestionable, innate, or pedagogically neutral. Given the influential role such beliefs may play in the classroom enactment of values-oriented curricula, this omission represents a clear empirical gap (Bonilla-Algovia et al., 2024).

The methodological and substantive rationales underpinning the development of the VMS-TF are closely intertwined. From a methodological perspective, recent best practices in scale construction emphasize the importance of multi-stage validation processes including theory- and practice-driven item generation, expert content validation, EFA and CFA, and the reporting of internal consistency as well as convergent and discriminant validity alongside the transparent reporting of multiple reliability and validity indices (e.g., Cronbach's alpha, composite reliability, AVE, and, where feasible, test–retest reliability) (Oppell and Aldridge, 2020). Notably, emerging research on myths and misconceptions in education (e.g., neuromyths, gender-based violence myths) demonstrates that domain-specific myth scales are both feasible and consequential, enabling the design and evaluation of corrective pedagogical interventions (Bonilla-Algovia et al., 2024). Moreover, the literature on teacher beliefs consistently shows that educators often hold simultaneously contradictory or hybrid epistemic positions for example, endorsing both fixed and developmental conceptions of creativity or learning highlighting the complexity that any VMS-TF must be capable of capturing through multidimensional measurement models (Kayıran, 2026; Lohmann et al., 2023).

An instrument focused on value myths therefore meets a clear need for a psychometrically defensible tool suitable for prevalence studies and program evaluation. It allows for the elucidation of the structural dimensions of teachers' value myths and supports investigations into the relationships between such myths and instructional practices, policy enactment, and student experiences. By applying contemporary scale development protocols to the theoretically grounded and practically salient measurement of teachers' myth-based, traditionalist, and

essentialist beliefs about values education, the present study directly addresses these methodological and substantive gaps (Gavora and Wiegerová, 2019).

Accordingly, the aim of this study is to develop the *Value Myths Scale—Teacher Form* (VMS-TF), designed to measure teachers' myth-based, traditionalist, and essentialist beliefs regarding values education, and to examine the psychometric properties of the scale.

Method

Research design

This study is a quantitative scale development research aimed at developing the *Value Myths Scale—Teacher Form* (VMS-TF), designed to measure teachers' reductionist, absolutist, and scientifically weakly grounded beliefs regarding values education, and to examine the psychometric properties of the instrument. The study adopts a methodological research design in which a descriptive survey model is integrated with psychometric modeling approaches.

The scale development process was structured in line with the multi-stage procedures recommended in the methodological literature. Accordingly, the process comprised the following stages: (a) construction of the theoretical framework and development of the item pool, (b) establishment of content validity through expert review, (c) pilot administration, (d) exploratory factor analysis (EFA), (e) confirmatory factor analysis (CFA), and (f) reliability analyses (DeVellis, 2017; Worthington and Whittaker, 2006).

Within the theoretical model of the study, four latent dimensions are specified under the overarching construct of "value myths":

1. Traditional and Family-Centered Conceptions of Values (F1),
2. The Role of School and Teachers in Values Education (F2),
3. Developmental and Experience-Based Conceptions of Values (F3),
4. Positioning Values Outside Formal Education and Beliefs in Immutability (F4).

This structure is grounded in the assumption that widespread yet weakly substantiated beliefs such as reducing values education solely to family, tradition, or religious institutions; minimizing the role of schools and teachers; and construing values as immutable and unmeasurable can be conceptualized as "value myths." The model seeks to determine the extent to which teachers endorse these myths.

In the research model, the factor structure of the items was first explored using EFA, followed by CFA to test the adequacy of the four-factor structure. During the CFA process, the loadings of each item on its respective latent variable, the inter-factor relationships, and the overall model fit were examined. Model fit was evaluated using multiple goodness-of-fit indices, including χ^2/df, RMSEA, SRMR, CFI, NNFI/TLI, GFI, and AGFI (Kline, 2016; Schermelleh-Engel, Moosbrugger, and Müller, 2003).

Another key aspect of the research model concerns the interpretation of the total scale score as an indicator of teachers' overall level of endorsement of value myths. In this regard, items within the F3 dimension, which conceptually reflect anti-myth or developmentally oriented perspectives, were reverse-coded to ensure that all items functioned in the same directional manner. Consequently, higher total scores indicate stronger endorsement of value myths. This approach enhances the conceptual coherence and interpretability of the scale (DeVellis, 2017).

In summary, the research model constitutes a structural measurement framework aimed at validly and reliably assessing teachers' beliefs regarding value myths based on a four-dimensional measurement model. The model was explored through EFA and examined through CFA, and the findings were supported by analyses of reliability, convergent validity, and discriminant validity. Given the use of a single dataset, the psychometric evidence is interpreted as preliminary and in need of further validation with independent samples.

Administration of the scale

The *Value Myths Scale—Teacher Form* (VMS-TF) developed in this study was administered to determine teachers' levels of myth-based and reductionist beliefs regarding values education. The administration process was conducted in accordance with the approval obtained from the relevant institutional ethics committee prior to the commencement of the study and with the authorization of the participating institutions.

Before data collection, the purpose and scope of the study, as well as the voluntary nature of participation, were explained to participants both verbally and in written form. Teachers were informed that participation was entirely voluntary, that they could withdraw from the study at any time without penalty, and that their responses would be kept confidential. Informed consent was obtained from all participants, and care was taken not to collect any personally identifiable information.

The scale was administered either in face-to-face settings using a printed questionnaire or, where appropriate, via an online digital form. Prior to completion, teachers were explicitly informed that the scale items had no correct or incorrect answers and that each item should be marked in a way that best reflected their personal views. Participants were encouraged to respond honestly and sincerely, and it was emphasized that such responses were essential for the scientific quality of the research.

The VMS-TF consists of 14 items rated on a five-point Likert scale, with an average completion time of approximately 8–10 min. Appropriate physical conditions were ensured to allow participants to read and respond to the items comfortably, and efforts were made to minimize potential distractions during administration.

During the data collection process, questionnaires were screened for incomplete or invalid responses. Forms with a substantial number of missing responses or those displaying systematic response patterns (e.g., marking the same option for all items) were excluded from the dataset. This procedure was adopted to enhance the overall quality of the data used in the analyses.

All collected data were transferred to an electronic format for scientific purposes only. At no stage were participant identities included in the data files. The data were stored in password-protected digital environments and retained in accordance with ethics committee guidelines following the completion of the study.

Throughout the administration process, principles of research ethics, voluntariness, confidentiality, and data security were strictly observed. Standardized administration conditions were maintained to ensure that the data obtained could be analyzed in a valid and reliable manner.

Data analysis

Data analysis was conducted using a multi-stage procedure consistent with established principles of scale development and psychometric evaluation. Initially, the dataset was entered into a computerized environment, and checks were performed for missing and erroneous data. For items with a low proportion of missing values, mean substitution was applied. Outliers were examined using z-scores and Mahalanobis distance, and observations deemed likely to distort the results were excluded from the dataset.

Prior to factor analysis, the suitability of the data for factor extraction was assessed using the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity. A KMO value above.60 and a statistically significant Bartlett's test ($p < .05$) indicated that the data were appropriate for factor analysis (Tabachnick and Fidell, 2013).

Exploratory Factor Analysis (EFA) was conducted to identify the underlying factor structure of the scale. Principal components analysis with varimax rotation was employed. The determination of the number of factors was based on a combination of criteria, including eigenvalues greater than 1, inspection of the scree plot, and theoretical interpretability. Items with factor loadings below.40, items exhibiting substantial cross-loadings, or items lacking theoretical coherence were removed from the scale.

The four-factor structure suggested by the exploratory analyses was subsequently examined through Confirmatory Factor Analysis (CFA). Because the total sample size was limited to 206 teachers, the same dataset was used for both exploratory and confirmatory procedures. Therefore, the CFA findings were interpreted cautiously and were not presented as evidence of full cross-validation. Rather, the CFA was used to provide preliminary confirmation of the theoretically derived four-factor structure. Model fit was evaluated using multiple fit indices, including χ^2/df, RMSEA, SRMR, CFI, NNFI/TLI, GFI, and AGFI, rather than relying on a single criterion. CFA was conducted using LISREL 8.80 with the Maximum Likelihood estimation method. Acceptable and good fit criteria were considered in assessing the validity of the model (Kline, 2016).

In addition, given the use of a single dataset, the results of the CFA should not be interpreted as evidence of full cross-validation. Instead, the analysis is intended to provide preliminary support for the proposed factor structure. Future studies should employ independent samples to confirm the stability and generalizability of the model.

Scale reliability was assessed using Cronbach's alpha coefficients for internal consistency. In addition, Composite Reliability (CR) values were calculated to evaluate construct reliability, and Average Variance Extracted (AVE) values were computed to assess convergent validity. CR values greater than.70 and AVE values close to or exceeding.50 were considered indicative of adequate reliability and convergent validity (Fornell and Larcker, 1981).

Discriminant validity was examined by comparing the square root of each construct's AVE with its correlations with other constructs, with discriminant validity supported when the AVE square root exceeded the corresponding inter-factor correlations. Furthermore, inter-factor correlation coefficients below.85 were interpreted as evidence that the constructs did not exhibit excessive overlap.

Finally, to ensure the interpretability of the total scale score, reverse-coded items were recoded so that all items operated in the same directional manner. Descriptive statistics—including means, standard deviations, and minimum–maximum values—were calculated for both total and subscale scores. Teachers' levels of endorsement of value myths were interpreted on the basis of these scores.

Data Collection Instruments

In this study, data were collected using the *Value Myths Scale—Teacher Form* (VMS-TF), which was developed by the researcher. The scale is a multidimensional measurement instrument designed to identify teachers' scientifically weakly grounded, reductionist, and absolutist beliefs about values education, conceptualized as *value myths*.

During the scale development process, the national and international literature on values education, moral development, the role of teachers, and the social transmission of values was first reviewed comprehensively. Based on this theoretical framework, an initial item pool consisting of 86 items was generated. The items were constructed to cover key themes such as teacher authority, family- and tradition-centered conceptions of values, the role of the school, and beliefs regarding the mutability, measurability, and teachability of values.

The initial item pool was then submitted to expert review by academics with expertise in educational sciences, measurement and evaluation, and values education. The items were evaluated in terms of linguistic clarity, content relevance, and the degree to which they represented the targeted constructs, with a view to establishing content validity. Based on expert feedback, items with overlapping content, ambiguous wording, or insufficient representation of the intended constructs were either removed or revised. Following this process, the scale was finalized for pilot administration.

Based on the results of the Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) conducted after the pilot application, the scale assumed a structure consisting of 14 items across four subdimensions:

1. *Traditional and Family-Centered Conceptions of Values* (F1)—3 items

2. *The Role of School and Teachers in Values Education* (F2)—5 items
3. *Developmental and Experience-Based Conceptions of Values* (F3)—3 items
4. *Positioning Values Outside Formal Education and Beliefs in Immutability* (F4)—3 items

All items were rated on a five-point Likert scale (1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree).

Although the scale does not include explicitly reverse-worded items, the *Developmental and Experience-Based Conceptions of Values* (F3) dimension is conceptually opposed to value myths. Accordingly, items within this subdimension were reverse-scored when calculating the total scale score. As a result, higher total scores indicate stronger endorsement of value myths.

Reliability analyses yielded Cronbach's alpha internal consistency coefficients of.74 for F1,.78 for F2,.71 for F3,.70 for F4, and.77 for the overall scale. These values indicate that the scale demonstrates acceptable levels of internal consistency.

With regard to construct validity, the calculated Composite Reliability (CR) and Average Variance Extracted (AVE) values indicated that convergent validity was established for the factors, while the examination of inter-factor correlations demonstrated that discriminant validity was at an acceptable level.

Taken together, these findings provide preliminary support for the reliability and construct validity of the VMS-TF. However, given the relatively weak convergent and discriminant validity evidence for some dimensions, the psychometric properties of the scale should be interpreted cautiously and require further validation using independent and more diverse samples.

Scoring and Interpretation

The *Value Myths Scale—Teacher Form* (VMS-TF) is a multidimensional measurement instrument developed to assess teachers' levels of myth-based, reductionist, and absolutist beliefs regarding values education. The scale consists of 14 items rated on a five-point Likert scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*).

The scale comprises four subdimensions:

1. *Traditional and Family-Centered Conceptions of Values* (F1)—3 items
2. *The Role of School and Teachers in Values Education* (F2)—5 items
3. *Developmental and Experience-Based Conceptions of Values* (F3)—3 items
4. *Positioning Values Outside Formal Education and Beliefs in Immutability* (F4)—3 items

Subscale scores are calculated by summing or averaging the scores of the items within each respective dimension. The total scale score is obtained by summing or averaging the scores across all items.

The scale does not include explicitly reverse-worded items. However, the *Developmental and Experience-Based Conceptions of Values* (F3) dimension is conceptually opposed to value myths. Accordingly, items in this subdimension are reverse-scored when computing the total scale score. Reverse scoring is conducted using the standard five-point Likert transformation (1 → 5, 2 → 4, 3 → 3, 4 → 2, 5 → 1).

Following this procedure, all items become interpretable in the same directional manner. Higher total scores indicate stronger endorsement of value myths, whereas lower scores reflect a more scientific, developmental, and pedagogically grounded approach to values education.

Subscale scores are interpreted in a comparable way. Higher scores on the F1, F2, and F4 dimensions indicate stronger traditionalist, reductionist, and essentialist orientations toward values. For the F3 dimension, higher scores after reverse coding indicate weaker endorsement of developmental and experience-based conceptions of values.

In the absence of sample-based norms or empirically established cut-off scores, the interpretation of total and subscale scores should be based on relative rather than absolute levels. Accordingly, when classifying teachers' levels of endorsement of value myths as low, moderate, or high, researchers should consider the sample mean and standard deviation and conduct comparative analyses across relevant variables such as gender, teaching experience, and subject area.

This scoring and interpretation framework is consistent with contemporary principles of psychometric assessment and supports the scientific, coherent, and meaningful use of scores derived from the scale.

Interpretation of score levels

Scores obtained from the *Value Myths Scale—Teacher Form* (VMS-TF) reflect teachers' levels of endorsement of *value myths* at both the subscale and overall scale levels. Rather than relying on absolute cut-off scores, score interpretation is based on relative, sample-dependent comparisons. However, for practical purposes, mean score ranges derived from the five-point Likert scale may be classified as follows:

- 1.00–1.80 → Very Low
- 1.81–2.60 → Low
- 2.61–3.40 → Moderate
- 3.41–4.20 → High
- 4.21–5.00 → Very High

These ranges may be applied to both subscale means and the overall scale mean.

1. Traditional and Family-Centered Conceptions of Values (F1)
   - Low mean: The teacher believes that values are open to inquiry, shaped by multiple sources, and constructed through pedagogical processes. Family and tradition are not viewed as the sole determinants of values.
   - High mean: The teacher believes that values are primarily determined by family and tradition and that the school plays a limited role in this process. A traditionalist and authority-centered conception of values predominates.

2. The Role of School and Teachers in Values Education (F2)
   - Low mean: The teacher believes that schools, teachers, and pedagogical practices play an effective role in values education. Educational activities, assessment practices, and school climate are considered important.
   - High mean: The teacher does not regard values education as a core responsibility of schools or teachers and considers instructional methods, activities, assessment, and the school environment to be unnecessary or ineffective.
3. Developmental and Experience-Based Conceptions of Values (F3—reverse scored)

This dimension is reverse-coded in the computation of the total scale score.

- Low mean (after reverse scoring): The teacher believes that values can develop over time through experience and interaction and adopts a developmental and pedagogically grounded perspective.
- High mean (after reverse scoring): The teacher tends to view values as fixed, stable, and resistant to development, and regards experiential learning as having a limited contribution to values development.

4. Positioning Values Outside Formal Education and Beliefs in Immutability (F4)
   - Low mean: The teacher believes that schools and educational processes are effective in fostering values and that values can change through education.
   - High mean: The teacher positions values outside the educational process, explaining them primarily through religion, family, character, or immutable personal attributes.

Overall scale (total VMS-TF score)

The total score is derived from the combined scores of F1, F2, and F4, together with the reverse-coded items from F3.

- Low overall mean: The teacher approaches values education from a scientific, pedagogical, and developmental perspective, believing that values are teachable, malleable, and shaped within school contexts.
- High overall mean: The teacher endorses a myth-based conception of values, viewing them as innate, family- or tradition-derived, and largely immutable, while attributing a limited role to schools. This pattern indicates a strong presence of reductionist and absolutist beliefs regarding values education.

This interpretive framework supports consistent and theoretically grounded use of VMS-TF scores in both research and applied educational settings.

Ethics Approval

This study was conducted in accordance with ethical standards and received approval from the relevant institutional Ethics Committee prior to data collection. Ethical approval was granted for the research entitled "*Value Myths Scale—Teacher Form (VMS-TF): A Validity and Reliability Study*" (Decision No. 7, December 2025).

Participation was entirely voluntary. All participants were informed about the purpose and scope of the study, and informed consent was obtained prior to participation. No personally identifiable information was collected, and all data were used exclusively for scientific purposes. Confidentiality and privacy of participant data were ensured throughout the research process, in line with ethical guidelines and applicable data protection regulations.

Results

The results of the Confirmatory Factor Analysis (CFA) for the four-factor structure of the *Value Myths Scale—Teacher Form* (VMS-TF) are presented in the table below. The table reports the standardized factor loadings for each item on its respective factor, the corresponding t values indicating the statistical significance of these loadings, and the R^2 values representing the proportion of variance in each item explained by the associated factor. t values exceeding $|1.96|$ indicate that the items significantly represent their intended factors. Factor loadings of.50 or higher are considered acceptable, while loadings of.70 or higher indicate strong item–factor relationships. The R^2 values reflect the extent to which each item is explained by the corresponding latent construct, with values of.20 or above regarded as sufficient.

The CFA item loadings, t values, and explained variances are presented in Table 1. According to the results of the confirmatory factor analysis, the factor loadings of all items range between.49 and 1.01, and all loadings are statistically significant ($t > 1.96$). The proportions of variance explained by the items (R^2) range from.17 to.85. Items associated with the F1 factor demonstrate relatively high explanatory power, whereas Item73 within the F3 factor exhibits comparatively weaker representational strength. Nevertheless, the overall pattern of factor loadings provides preliminary support for the proposed structure, although certain items and dimensions may require further refinement.

Indicators of convergent validity and composite reliability for the subdimensions of the *Value Myths Scale—Teacher Form* (VMS-TF) are presented in the table below. Convergent validity was evaluated using the Average Variance Extracted (AVE), with values of.50 or higher considered ideal and values around.40 interpreted as marginally acceptable. Composite Reliability (CR) coefficients of.70 or higher indicate adequate internal consistency for the corresponding dimension.

For each factor, the table reports the number of items, AVE values, and CR coefficients, together with an overall evaluation based on these indicators. Considering AVE and CR jointly provides evidence regarding both the reliability of the dimensions and the extent to which the items adequately represent their respective latent constructs.

TABLE 1 Confirmatory factor analysis item loadings, t values, and explained variances for the value myths scale.

Factor	Item	Factor load	t value	R^2
F1	Item 33	.91	11.98	.58
	Item 31	1.01	15.42	.85
	Item 37	.76	9.93	.43
F2	Item 70	.69	8.52	.36
	Item 75	.84	9.82	.46
	Item 82	.57	7.15	.27
	Item 66	.70	8.94	.39
	Item 83	.77	10.29	.49
F3	Item 79	.75	10.09	.49
	Item 73	.49	5.71	.17
	Item 62	.67	8.36	.35
F4	Item 64	.74	9.49	.47
	Item 59	.76	9.51	.47
	Item 42	.62	7.11	.28

TABLE 2 Validity and reliability indicators (composite reliability and average variance extracted).

Factor	Number of Items	AVE	CR	Comment
F1	3	.62	.83	Very good
F2	5	.39	.76	Reliability is good, convergent validity is borderline
F3	3	.34	.59	Weak convergent validity
F4	3	.41	.67	Acceptable

AVE, average variance extracted; CR, composite reliability.

Convergent validity and composite reliability indicators are presented in Table 2. Composite reliability (CR) values exceed the acceptable threshold (.70) for the F1 and F2 factors. The F4 factor falls at a marginally acceptable level (.67), whereas the F3 factor demonstrates relatively weak reliability (.59).

With respect to convergent validity, only the F1 factor meets the AVE >.50 criterion. The AVE values for the F2, F3, and F4 factors are below.50, indicating that the evidence for convergent validity is not uniform across all dimensions. While the F1 factor demonstrates satisfactory AVE and CR values, the F2 and F4 factors remain at borderline levels, and the F3 factor exhibits relatively weak convergent validity. Therefore, the psychometric properties of the scale should be interpreted with caution. In particular, the F3 dimension may require further refinement in terms of item composition and construct representation. Future studies are recommended to re-examine the factor structure and improve convergent validity using larger and independent samples. Given that the analyses were conducted on a single dataset, the findings should be considered preliminary and subject to further validation.

The goodness-of-fit indices obtained from the four-factor confirmatory factor analysis of the *Value Myths Scale* are presented in the table below. The obtained values were evaluated by comparison with commonly accepted cutoff criteria in the literature to assess the degree of model–data fit.

Model fit indices obtained from the CFA are presented in Table 3. The fit indices obtained from the confirmatory factor analysis indicate that the four-factor structure demonstrates a good level of fit to the data. The chi-square to degrees of freedom ratio ($\chi^2/df = 2.25$) falls below the recommended upper threshold, suggesting good model fit. The RMSEA value (.078) lies within the acceptable range, and the upper bound of the 90% confidence interval remaining below.10 further supports the adequacy of model fit.

Incremental fit indices, including CFI (.94), NNFI (.92), and IFI (.94), all exceed the.90 criterion, indicating good model fit. An SRMR value of.069 suggests a low discrepancy between the observed and estimated covariance matrices. In addition, the GFI (.90) and AGFI (.85) values fall within acceptable limits.

Taken together, these findings suggest that the proposed four-factor structure of the Value Myths Scale demonstrates an overall acceptable fit to the data and provides preliminary support for the construct validity of the model.

Discriminant validity of the subdimensions of the *Value Myths Scale—Teacher Form* (VMS-TF) was evaluated using the Fornell–Larcker criterion. The diagonal values in the table represent the square roots of the Average Variance Extracted (AVE) for each factor, whereas the off-diagonal values represent the inter-factor correlation coefficients.

According to the Fornell–Larcker criterion, the square root of the AVE for each factor is expected to be greater than its correlations with other factors. Meeting this condition indicates that each dimension is empirically distinguishable from the others and that the factors included in the scale are conceptually distinct.

Discriminant validity results are presented in Table 4. According to the Fornell–Larcker criterion, for a factor to demonstrate discriminant validity, the square root of its AVE ($\sqrt{AVE}$) is expected to be greater than its correlations with the other factors. The internal consistency reliability of the subdimensions and the total score of the *Value Myths Scale* was assessed using Cronbach's alpha coefficients. In the literature, values of.70 and above are considered acceptable, whereas values of.80 and above indicate good reliability. The results indicate that discriminant validity was not fully supported for all dimensions. In particular, the correlations between F3 and F4, and between F2 and F3, are relatively high and approach or exceed the square root of AVE values for these factors. This suggests potential conceptual overlap among these dimensions and indicates that discriminant validity should be interpreted with caution. Future research should further examine whether these factors are empirically distinct or whether a higher-order or bifactor structure may better represent the construct.

Reliability coefficients are summarized in Table 5. Examination of the Cronbach's alpha coefficients indicates that all subdimensions of the scale have values of.70 or higher. This finding demonstrates that the subdimensions exhibit acceptable to good levels of internal consistency reliability. In particular, the coefficients obtained for the F2 (.78) and F1 (.74) dimensions

TABLE 3 Confirmatory factor analysis fit indices for the value myths scale.

Conformity index	Value obtained	Accepted reference value	Evaluation
χ^2 (df)	159.98 (71)	—	—
χ^2/df	2.25	≤ 3 good; ≤ 5 acceptable	Good
RMSEA	.078	≤.05 very good;.05–.08 acceptable; ≤.10 weak	Acceptable
RMSEA %90 GA	.062 –.094	≤.10	Acceptable
SRMR	.069	≤.08 good	Good
CFI	.94	≥.90 good; ≥.95 very good	Good
NNFI (TLI)	.92	≥.90 good	Good
NFI	.90	≥.90 acceptable	Acceptable
IFI	.94	≥.90 good	Good
RFI	.87	≥.85 acceptable	Acceptable
GFI	.90	≥.90 good	Good
AGFI	.85	≥.85 acceptable	Acceptable

TABLE 4 Discriminant validity (Fornell–Larcker Criterion).

Factor	F1	F2	F3	F4
F1	**.79**			
F2	.37	**.62**		
F3	.65	.70	**.58**	
F4	.08	.54	.79	**.64**

The bold values represent the square roots of the average variance extracted (AVE) for each factor and were used in accordance with the Fornell-Larcker criterion to assess discriminant validity.

TABLE 5 Summary indicators of reliability and construct validity for the value myths scale.

Dimension	Number of items	Cronbach's Alpha (α)	Evaluation
F1	3	.74	Good
F2	5	.78	Good
F3	3	.71	Acceptable
F4	3	.70	Acceptable
General scale	14	**.77**	Good

indicate that the items within these subscales consistently measure the same underlying constructs. The Cronbach's alpha coefficient calculated for the overall scale (.77) further indicates that the *Value Myths Scale* is a reliable measurement instrument when considered as a whole. When the reliability findings are evaluated together with the results of the confirmatory factor analysis, the scale appears to demonstrate acceptable levels of internal consistency, while evidence for construct validity should be interpreted as preliminary.

The figure below presents the results of the Confirmatory Factor Analysis (CFA) for the four-factor structure of the *Value Myths Scale—Teacher Form* (VMS-TF). The model displays the standardized factor loadings of each item on its respective factor, the error variances, and the correlations among the factors. Key model fit indices, including the chi-square and RMSEA values, are reported beneath the figure.

As illustrated in the Figure 1, the model comprises four latent variables: F1, F2, F3, and F4. Each factor is represented by its respective items in a manner consistent with the theoretical framework and the results of the prior exploratory analyses.

F1 (Traditional and Family-Centered Conceptions of Values).

The standardized factor loadings of Item33, Item31, and Item37 on F1 are approximately.76,.92, and.65, respectively. As all loadings exceed the.50 threshold, these items can be considered to represent the factor adequately. In particular, the very high loading of Item31 suggests that this item functions as a strong and central indicator of the construct. The relatively low error variances indicate limited measurement error and support the reliability of these indicators.

F2 (Devaluing the Role of School and Teachers in Values Education).

The loadings of Item70, Item75, Item82, Item66, and Item83 on F2 range approximately from.52 to.70. Item66 and Item83 emerge as the strongest indicators, whereas Item82 shows a comparatively lower loading (around.52), though still above the acceptable cutoff. Overall, these results indicate that F2 is represented consistently by its items.

F3 (Developmental and Experience-Based Conceptions of Values).

Item79, Item73, and Item62 load on the F3 factor with approximate values of.70,.42, and.59, respectively. Item73 displays a noticeably lower loading than the other items, suggesting a more limited contribution to the factor, although it remains a meaningful indicator. By contrast, Item79 appears to be the strongest indicator of this dimension.

F4 (Positioning Values Outside Formal Education and Beliefs in Immutability).

The standardized loadings of Item64, Item59, and Item42 on F4 are approximately.68,.69, and.53, respectively. These values indicate that the items represent the factor at a moderate to high level. The fact that all loadings exceed.50 suggests that the factor is adequately defined in measurement terms.

The figure also shows statistically significant correlations among the factors. The association between F1 and F2 is approximately.37, indicating a moderate relationship. The correlation between F1 and F3 is relatively high (around.65), suggesting both a conceptual tension and a substantive association between traditional/family-centered and developmental conceptions of values. The correlation between F2 and F3 is approximately.70, which is notably high and indicates a stronger-than-expected relationship between devaluing the school's role and developmental conceptions of values; this finding warrants careful consideration in terms of discriminant validity. The correlation between F3 and F4 is approximately.79, which is very high and suggests that these two dimensions are perceived as conceptually closely related; this

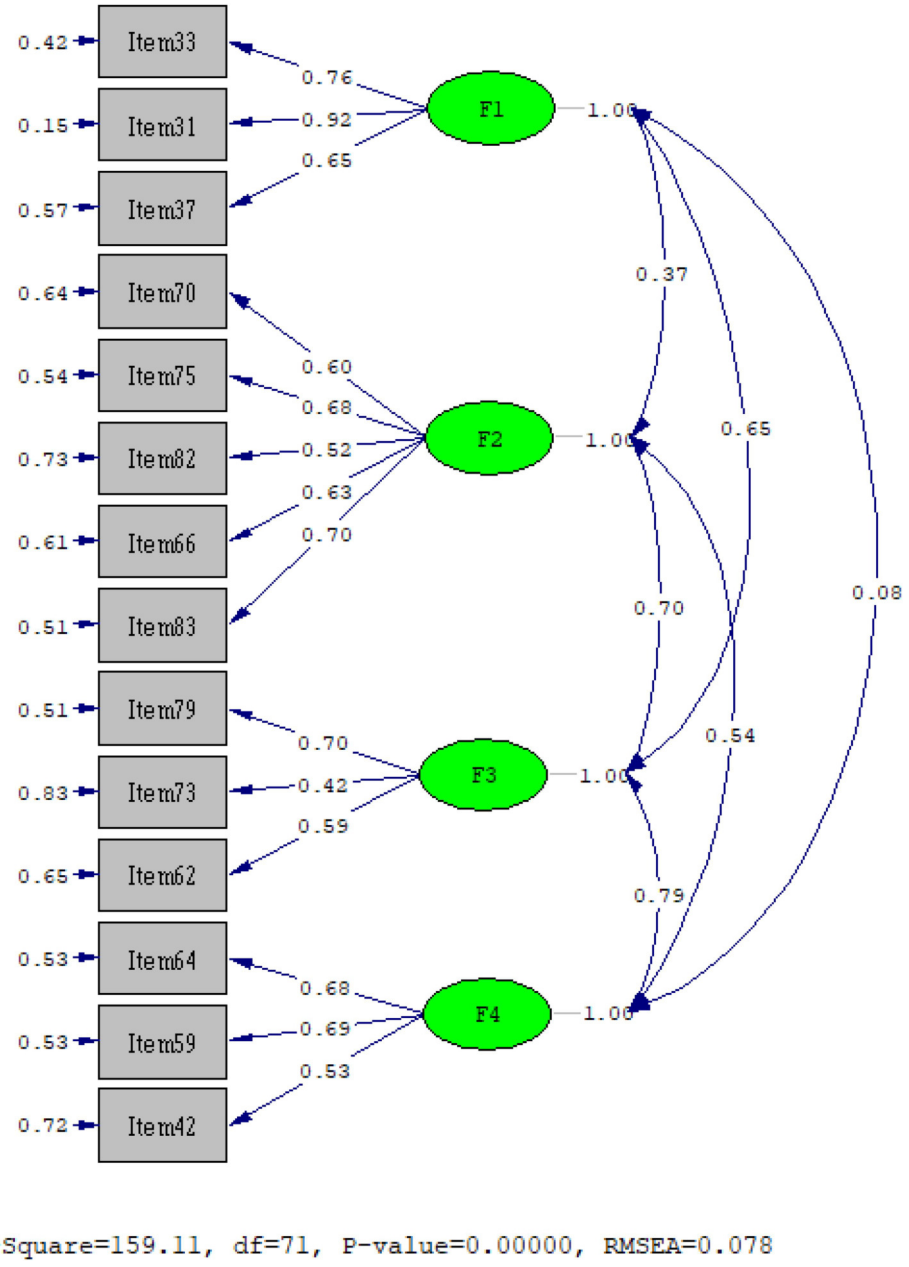

FIGURE 1
Confirmatory factor analysis (CFA) for the four-factor structure of the *Value Myths Scale—Teacher Form* (VMS-TF).

issue should be addressed explicitly in the discussion section with reference to theoretical considerations. In contrast, the relationship between F1 and F4 is very weak (approximately.08), indicating good differentiation between these two dimensions.

For the overall model, the reported fit statistics are $\chi^2 = 159.11$, df = 71, $p < .001$, and RMSEA = .078. The significant chi-square value is expected in samples of this size and does not, by itself, indicate poor model fit. An RMSEA value below.08 indicates an acceptable level of fit. Taken together, these findings suggest that the four-factor structure demonstrates an overall satisfactory fit to the data and that the theoretical structure of the scale is supported by the confirmatory factor analysis.

The figure indicates that the four-dimensional structure of the VMS-TF is statistically supported. The majority of items load on their respective factors at moderate to high levels. The inter-factor correlations suggest that some dimensions particularly F3 with F4 and F2 with F3 are perceived as closely related, a finding that warrants further discussion with respect to discriminant validity. Nevertheless, the overall model fit indices fall within acceptable ranges, suggesting that the proposed structure demonstrates preliminary evidence of construct validity.

Discussion

This discussion evaluates the theoretical coherence, psychometric evidence, and practical implications of the *Value Myths Scale—Teacher Form* (VMS-TF), which was developed to

assess teachers' beliefs about values education. The VMS-TF yielded a four-dimensional structure *traditional and family-centered conceptions of values; devaluing the role of school and teachers; developmental and experience-based conceptions of values; and positioning values outside education through beliefs in immutability* supported by both exploratory and confirmatory factor analyses, alongside acceptable internal consistency for the subscales and the overall instrument. Although the overall model fit indices support an acceptable four-factor structure, the evidence for convergent and discriminant validity was not uniformly strong across all dimensions. In particular, the relatively low AVE and CR values for F3, together with the high correlations observed between some factors, suggest that the structure requires further refinement and replication. Therefore, the VMS-TF should be regarded as a promising instrument with initial psychometric evidence rather than a fully established scale.

The four-factor solution reported for the VMS-TF aligns with contemporary conceptualizations of values education as a multi-sourced and multi-layered process involving family, school, society, the individual, and developmental influences. Multi-level and systemic accounts of values and family–school interactions emphasize that beliefs about values emerge from family processes, institutional curricula, and individual developmental trajectories, thereby underscoring the theoretical appropriateness of a multidimensional measurement approach (Bonilla-Algovia, 2021). Family-centered and tradition-oriented beliefs correspond to constructs described in models of family- and culture-based value transmission (Walsh, 2016), whereas dimensions that downplay the role of schools and teachers, together with those emphasizing developmental and experience-based formation, reflect theoretically distinct orientations regarding where values are located and how they are acquired. These conceptual distinctions occupy a central place in contemporary educational theory (Bonilla-Algovia, 2021).

Accordingly, the dimensional content of the VMS-TF is consistent with prevailing theoretical distinctions concerning both the *sources* of value formation (family, school, and the individual) and the *properties* of values (mutable vs. immutable; developmentally shaped vs. fixed). This alignment provides theoretical support for the proposed structure of the scale and suggests that the VMS-TF may capture potentially meaningful variations in teachers' underlying assumptions about values education (Bonilla-Algovia, 2021).

In addition, the inter-factor correlations reported in the results section indicate that some dimensions are relatively strongly associated with each other. In particular, the relatively high correlations between F3 and F4, as well as between F2 and F3, suggest that these constructs may not be fully distinct. This finding may reflect a degree of conceptual proximity between developmental beliefs and beliefs regarding the immutability or external positioning of values. While such overlap can be theoretically meaningful, it also raises concerns regarding discriminant validity. Therefore, future studies should further examine the distinctiveness of these dimensions using more advanced modeling approaches, such as higher-order or bifactor models, and consider potential refinements at the item level.

The researchers' use of a sequential Exploratory Factor Analysis (EFA) followed by Confirmatory Factor Analysis (CFA) is consistent with recommended best practices in scale development employing EFA for construct exploration and CFA for confirmatory testing and aligns with established methodological precedents in educational and health measurement research (Wang et al., 2024). Statements indicating that items load "substantially and adequately" on their respective dimensions should be interpreted in light of standard factor-loading thresholds and principles of construct validity: factor loadings exceeding conventional cutoffs (typically $\geq$.30–.40) indicate acceptable item–factor relationships and interpretable latent dimensions (Chu et al., 2021). The researchers' report that CFA fit indices fall within "acceptable to good" ranges suggests that the four-factor measurement model provides an empirical representation that is consistent with the underlying theoretical structure. In psychometric practice, model fit is interpreted with reference to multiple indices (e.g., CFI, TLI, RMSEA, SRMR) rather than a single statistic, particularly given the well-documented effects of sample size and model complexity on fit measures. The combined use of EFA and CFA to examine the factor structure follows established sequences for preliminary scale validation in educational research (Wang et al., 2024).

The evidence of internal consistency reported as acceptable Cronbach's alpha coefficients for both the subscales and the total scale represents an expected and necessary psychometric indicator for newly developed instruments. Cronbach's alpha continues to be widely used as an index of internal consistency, and scale validation studies commonly adopt conventional thresholds (typically $\alpha \geq .70$) as indicators of adequacy. Accordingly, the conclusion that the VMS-TF demonstrates sufficient internal consistency is consistent with standard psychometric practice (Voultsos et al., 2023). Moreover, the observation that the subscales capturing (a) beliefs that devalue the role of schools and teachers and (b) beliefs in the immutability of values exhibit particularly stable reliability suggests that these constructs reflect coherent and distinguishable belief systems among teachers. Such patterns are frequently observed when attitudinal structures correspond to distinct and well-established traditions of thought (Voultsos et al., 2023).

Methodologically, the researchers' decision to incorporate the developmental and experience-based dimension into the total score through reverse-scored items serves two important psychometric purposes. First, it helps reduce acquiescence bias by capturing variance from perspectives that conceptually oppose *value myths*. Second, it allows the total score to represent a meaningful continuum ranging from myth-based/absolutist beliefs about values education to contemporary, pedagogically grounded beliefs. The use of reverse-scored items to represent opposing poles of a construct or to control for response tendencies is a well-established practice in the development of attitude and belief scales (Ghazanfari et al., 2010). When reverse-coded items are theoretically justified and empirically supported through factor analysis, the resulting instrument can assess both the presence of myth-based beliefs and proximity to contemporary pedagogical orientations, thereby enhancing the interpretability and utility of the total score for both diagnostic and evaluative research purposes (Ghazanfari et al., 2010).

The finding that teachers' beliefs are not homogeneous across the dimensions of family/tradition, the role of school and teachers,

and developmental orientations underscores the notion that teacher cognition consists of multiple, and sometimes internally inconsistent, belief systems that jointly shape practice. The educational literature consistently emphasizes that teachers' implicit beliefs exert a substantial influence on classroom practices and student outcomes; instruments that make such beliefs visible facilitate targeted professional development and curriculum design aimed at addressing deeply held assumptions (Kılıç and Öztürk, 2019). In this respect, the VMS-TF functions as a diagnostic tool capable of identifying belief profiles that either support or constrain pedagogically contemporary approaches to values education.

Given that belief systems are educationally consequential yet open to change through reflective, evidence-based practice, a validated instrument such as the VMS-TF can guide both pre-service and in-service interventions by identifying prevalent myth-based or absolutist orientations and tracking changes over time (Demir and Aküzüm, 2023). Scale-based diagnosis thus constitutes a practical prerequisite for teacher education research and program evaluation, as validated measurements provide actionable evidence to inform curriculum redesign and targeted coaching efforts (Demir and Aküzüm, 2023).

The preliminary evidence of construct validity and reliability further suggests the potential usefulness of the VMS-TF in quantitative correlational and predictive research. For example, the scale may be used to examine associations between teachers' belief profiles and classroom climate, students' value development, or instructional strategies. Methodological research suggests that validated scales enable rigorous hypothesis testing regarding relationships between beliefs and outcomes and can be integrated into mixed-methods designs to enrich the qualitative interpretation of belief structures (Megías et al., 2017). Accordingly, the authors' positioning of the instrument as applicable to both quantitative and mixed-methods research is methodologically sound and consistent with widely accepted practices in educational measurement (Wang et al., 2024).

In summary, the VMS-TF demonstrates theoretical coherence, as its dimensions correspond to constructs discussed in the literature on value transmission and teacher beliefs (Walsh, 2016), and methodological consistency with preliminary scale development procedures, reflected in the sequential use of EFA and CFA, the reporting of internal consistency, and the theoretically grounded inclusion of reverse-scored items in line with established psychometric practices (Wang et al., 2024).

Practical Implications and Limitations

From a practical perspective, the instrument addresses an applied educational issue with clear implications for teacher education and policy namely, teachers' beliefs about values education (Nas and Çetin, 2022). By making such beliefs visible and measurable, the VMS-TF provides a foundation for diagnostic assessment, targeted professional development, and evidence-informed decision-making in both pre-service and in-service teacher education contexts.

It should also be acknowledged that reverse-scored items may introduce method variance or give rise to separate method factors. Accordingly, reverse coding should be implemented with carefully worded items and, where sample sizes permit, supplemented by additional analyses such as the examination of method factors or bifactor modeling (Sari et al., 2022). Although the authors' decision to incorporate the developmental dimension through reverse scoring is defensible, future research would benefit from explicitly testing potential method effects using more advanced CFA specifications.

Beliefs about values are culturally situated. Instruments that assess beliefs rooted in family and tradition require careful cross-cultural adaptation and validation when applied beyond their original context. In such cases, standard procedures including translation and back-translation, expert review, and replication of the factor structure are necessary to ensure validity across cultural and linguistic settings (Demir and Aküzüm, 2023). Consequently, broader use of the VMS-TF in different cultural or language contexts will require systematic adaptation processes.

In addition, the relatively small sample size and the lack of cross-validation using independent samples limit the generalizability of the findings. Future research should include larger and more diverse samples, as well as longitudinal and cross-cultural validation studies.

In summary, the VMS-TF appears to be a theoretically coherent and promising instrument for assessing teachers' beliefs about values education. Its four-dimensional structure reflects key distinctions in the literature regarding the sources and properties of value formation, and the authors' use of EFA, CFA, and internal consistency analyses aligns with accepted standards in scale development (Wang et al., 2024). Subject to further replication, measurement invariance testing, and longitudinal or intervention-based research, the VMS-TF holds substantial potential to contribute both to applied teacher education practices (e.g., diagnostic assessment and targeted training) and to empirical research on how teacher belief systems interact with classroom processes and students' value development (Nas and Çetin, 2022).

Conclusion and Recommendations

This study examined the validity and reliability properties of the *Value Myths Scale—Teacher Form* (VMS-TF), which was developed to assess teachers' myth-based, traditionalist, and essentialist assumptions regarding values education. The scale development process followed a systematic, multi-stage procedure encompassing the construction of a theoretical framework, item writing, expert review, pilot administration, exploratory and confirmatory factor analyses, and reliability testing.

Exploratory factor analysis indicated that the scale has a four-factor structure. These factors were labeled as *Traditional and Family-Centered Conceptions of Values* (F1), *Devaluing the Role of School and Teachers in Values Education* (F2), *Developmental and Experience-Based Conceptions of Values* (F3), and *Positioning Values Outside Education and Beliefs in Immutability* (F4). The resulting factor structure was found to be consistent with traditional, pedagogical, and essentialist approaches to values education discussed in the relevant literature.

The results of the confirmatory factor analysis demonstrated that the four-factor model yielded acceptable fit indices. CFI, NNFI, IFI, and NFI values at or around.90 indicated that the model showed an overall good fit to the data, while RMSEA and SRMR values within acceptable ranges further supported the adequacy of the proposed structure. Taken together, these findings provide preliminary empirical support for the construct validity of the VMS-TF.

Reliability analyses revealed that Cronbach's alpha coefficients for the subscales ranged from.70 to.78, while the coefficient for the overall scale was.77. These values indicate that the scale demonstrates sufficient internal consistency at both the subscale and total score levels. Accordingly, the VMS-TF may be regarded as a promising instrument with acceptable preliminary reliability evidence for assessing teachers' beliefs related to value myths.

From a substantive perspective, the subdimensions reflect distinct belief orientations. The F1 dimension captures teachers' tendencies to accept tradition, family, and social norms without critical examination; the F2 dimension reflects beliefs that downplay the role of schools, teachers, and pedagogical methods in values education; the F3 dimension represents contemporary views emphasizing that values can develop through experience and be shaped by educational interventions; and the F4 dimension reflects perspectives that locate values outside the educational process, privileging family and religious institutions and construing values as immutable. This structure enables a multidimensional assessment of teachers' diverse—and at times internally conflicting—belief systems regarding values education.

When considered jointly, the validity and reliability findings suggest that the *Value Myths Scale—Teacher Form* is a theoretically grounded and promising instrument that may help differentiate teachers' myth-based, traditionalist, and developmental orientations toward values education. The scale is suitable for use in quantitative research on values education, in the evaluation of teacher education programs, and in in-service professional development contexts aimed at identifying teachers' value-related belief profiles.

Nevertheless, the study has certain limitations. The validity and reliability analyses were conducted using a single sample. Future research should re-examine the psychometric properties of the scale across different regions, school types, and socio-cultural contexts. In addition, further studies may investigate the relationships between VMS-TF scores and teachers' classroom practices, approaches to values education, and student behaviors, thereby providing additional evidence for criterion-related validity.

In conclusion, the findings suggest that the Value Myths Scale—Teacher Form provides initial evidence of validity and reliability for assessing teachers' beliefs about values education. However, further studies using larger and independent samples are needed to confirm the factor structure, strengthen convergent and discriminant validity, and establish the robustness of the scale across diverse educational contexts.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

This study was conducted in accordance with ethical standards and received approval from the relevant institutional Ethics Committee prior to data collection. Ethical approval was granted for the research entitled "Value Myths Scale—Teacher Form (VMS–TF): A Validity and Reliability Study" (Decision No. 7, December 2025). The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

DK: Writing – original draft, Writing – review & editing, Conceptualization, Investigation, Methodology, Supervision. RM: Writing – original draft, Writing – review & editing.

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2026.1805674/full#supplementary-material

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