

Scale Development and Validation of Leadership and Management Practices at Isabela State University

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Abstract

This study developed and examined the preliminary validity of the Leadership and Management Practices Scale for Isabela State University. Using a cross-sectional scale-development design, data were collected from 239 full-time faculty members across different colleges and campuses. The initial instrument contained 80 items rated on a five-point Likert scale. Exploratory factor analysis was conducted through principal-axis factoring with Promax rotation, while parallel analysis was used to determine the number of factors. The data were suitable for factor analysis, with a Kaiser–Meyer–Olkin value of 0.912 and a significant Bartlett’s test of sphericity, $\chi^2(3160) = 32,291.21$, $p < .001$. Six factors were retained, explaining 76.51% of the total variance. After applying the criteria for factor loading, cross-loading, and communality, 48 items were retained. The factors were labeled Supportive and Performance-Oriented Management, Strategic Leadership and Faculty Development, Policy Governance and Institutional Support, Participatory and Equitable Administration, Faculty Networking and Role Balance, and Student-Centered Teaching Innovation. Reliability estimates ranged from 0.878 to 0.971. The findings provide initial support for a multidimensional measure of university leadership and management practices. Further item development and confirmatory factor analysis using an independent sample are recommended before the scale is used for high-stakes institutional assessment.

Keywords: Exploratory factor analysis, higher education leadership, management practices, scale development, institutional governance

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INTRODUCTION

Universities are expected to provide quality instruction, produce relevant research, serve their communities, maintain academic standards, and use public resources responsibly. These responsibilities have become more demanding because higher education institutions now operate amid rapid technological change, tighter budgets, growing accountability requirements, and increasingly diverse student and faculty populations. In this setting, institutional performance depends not only on formal policies but also on how leaders set priorities, communicate goals, distribute resources, support employees, and involve academic personnel in decision-making. Recent global evidence emphasizes that effective educational leadership combines clear direction, collaboration, people development, ethical practice, and sensitivity to institutional context (Global Education Monitoring Report Team, 2024).

Leadership has long been understood as a process of influencing people toward shared goals, while management focuses more directly on the structures, procedures, and resources needed to achieve those goals. Burns (1978) framed leadership as a relational process capable of raising the motivations and commitments of leaders and followers, while Bass (1985) further explained how transformational leaders move people beyond routine expectations. In universities, however, leadership and management are difficult to separate completely. Academic leaders must establish a vision, but they must also manage workloads, budgets, policies, performance systems, professional development, and daily administrative processes.

The nature of universities makes these responsibilities particularly complex. Unlike many conventional organizations, universities contain professional groups with specialized expertise, considerable autonomy, and multiple academic interests. Birnbaum (1988) described colleges and universities as complex organizational systems shaped by collegial, bureaucratic, political, and symbolic processes. Consequently, effective university leadership cannot rely only on formal authority. It also requires consultation, trust, shared governance, communication, and respect for academic expertise. Ramsden (1998) similarly argued that academic leadership must create conditions in which faculty members can work productively and remain committed to teaching, research, and institutional goals.

This view is consistent with distributed leadership, which recognizes that leadership practice is not confined to those holding senior administrative positions. It is also exercised through interactions among administrators, department heads, faculty members, committees, and other institutional actors (Spillane, 2006). In higher education, faculty members contribute directly to curriculum development, instruction, research, extension, student support, quality assurance, and institutional governance. Their experiences therefore provide important evidence about whether leadership and management practices are supportive, transparent, participatory, and responsive.

The need to assess these practices is especially relevant in multi-campus universities. Common policies may be implemented across campuses that differ in academic programs, personnel, resources, and local conditions. Leadership and management must therefore provide institutional direction while remaining responsive to variation across academic units. Isabela State University represents this context as a multi-campus public university whose faculty members work in disciplines such as education, information and communication technology, agriculture, criminology, hospitality management, and the social sciences. Its management practices encompass strategic leadership, faculty development, participatory governance, resource management, accountability, empowerment, and collaborative policy support.

Although leadership and management practices are widely recognized as important, they are difficult to evaluate through a single question or a small number of general indicators. They involve several related but potentially distinct dimensions, including strategic direction, faculty support, administrative efficiency, fairness, participation, performance management, resource allocation, student-centeredness, and policy governance. A multidimensional scale can provide a more systematic account of how faculty members experience these practices. However, an instrument should not be considered valid merely because its items appear relevant or produce a high reliability coefficient.

Modern measurement theory treats validity as the extent to which evidence and theoretical reasoning support the interpretations made from assessment scores (American Educational Research Association et al., 2014). Construct validity therefore requires a clear definition of the intended construct, adequate representation of its content, and empirical evidence that the items reflect the proposed dimensions rather than unrelated attributes.

Scale development must consequently be systematic and iterative. Clark and Watson (1995, 2019) emphasized the importance of clearly defining the construct, developing a sufficiently broad initial item pool, carefully wording items, and examining whether related dimensions are empirically distinguishable. Boateng et al. (2018) likewise identified item development, scale construction, and psychometric evaluation as essential stages in producing a defensible measure.

Exploratory factor analysis is particularly useful during the early stage because it allows the observed data to reveal how items cluster rather than forcing them into predetermined categories (Fabrigar et al., 1999; Worthington & Whittaker, 2006).

Despite the importance of leadership and management in Philippine higher education, there remains a need for an instrument grounded in the actual experiences of faculty members within a multi-campus state university. Measures developed in other organizational or national settings may not fully capture local governance arrangements, resource conditions, faculty roles, and policy environments. A contextually appropriate scale could support institutional diagnosis, leadership development, policy review, and future research on faculty and organizational outcomes.

Research Objective

Accordingly, this study sought to develop and establish the preliminary validity of the Leadership and Management Practices Scale for Isabela State University. It aimed to identify the underlying dimensions represented by the proposed items, determine which items most clearly measured those dimensions, and establish the internal consistency of the resulting subscales.

METHODS

This study used a cross-sectional scale-development design to examine the factor structure and internal consistency of the proposed Leadership and Management Practices Scale. Exploratory factor analysis was employed to identify the underlying dimensions of the initial item pool and determine which items should be retained (Boateng et al., 2018; Worthington & Whittaker, 2006).

Participants and Setting

The study was conducted at Isabela State University, a multi-campus public university in Northern Philippines. The participants were full-time faculty members from different colleges and institutes, including Education, Information and Communication Technology, Agriculture, Criminology, Hospitality Management, and the Social Sciences. The related source study initially involved 250 faculty members and was conducted during the first semester of academic year 2025–2026. For the present scale-development analysis, the available dataset contained 239 complete respondent records for the Management Practices Scale. All participants had direct experience with university leadership, administrative processes, faculty development, resource allocation, performance management, and institutional policies.

Instrument

The initial instrument consisted of 80 positively worded items measuring faculty perceptions of institutional leadership and management practices. The items covered strategic leadership, faculty development, administrative support, institutional culture, performance management, student-centered practices, financial and resource management, and policy governance. Responses were recorded using a five-point Likert scale ranging from 1, strongly disagree, to 5, strongly agree. The original content groupings were treated only as the conceptual basis for item development and were not imposed on the exploratory factor solution.

Data Collection and Ethical Considerations

The questionnaires were administered during the first semester of academic year 2025–2026. Participation was voluntary, informed consent was obtained, and respondents were assured that their answers would remain confidential and be reported only in aggregate form.

Data Analysis

The dataset was screened for missing and invalid responses. Two blank responses and two out-of-range values were identified, treated as missing, and replaced using the median of the corresponding item. All 239 cases were retained.

The factorability of the data was assessed using the Kaiser–Meyer–Olkin measure of sampling adequacy, Bartlett’s test of sphericity, and item communalities. Exploratory factor analysis was then conducted using principal-axis factoring, which is appropriate when the objective is to identify latent constructs based on shared item variance (Fabrigar et al., 1999; Watkins, 2018).

The number of factors was determined through parallel analysis using 500 random datasets. Factors were retained when their observed eigenvalues exceeded the corresponding 95th-percentile random eigenvalues (Hayton et al., 2004; Horn, 1965). The retained solution was subjected to Promax oblique rotation because the dimensions of leadership and management practices were expected to correlate.

An item was retained when it had a primary pattern loading of at least 0.40, a communality of at least 0.30, and a difference of at least 0.20 between its two highest absolute loadings. Item-retention decisions also considered conceptual coherence and construct coverage (Boateng et al., 2018; Clark & Watson, 2019). Internal consistency was calculated only after item reduction. Cronbach’s alpha was used for factors containing at least three items. For factors represented by two items, the inter-item correlation and Spearman–Brown coefficient were reported (Eisinga et al., 2013).

RESULTS AND DISCUSSION

Factorability and Factor Retention

The initial 80-item Leadership and Management Practices Scale was analyzed using responses from 239 faculty members. Four missing or invalid entries were replaced using the median of the corresponding item, after which all cases were included in the exploratory factor analysis.

The Kaiser–Meyer–Olkin measure was 0.912, with item-level measures ranging from 0.751 to 0.958. Bartlett’s test of sphericity was statistically significant, $\chi^2(3160) = 32,291.21$, $p < .001$, while item communalities ranged from 0.595 to 0.887. These results indicated that the items shared sufficient common variance for factor analysis. The adequacy of factor analysis, however, depends not only on sample size but also on communalities, factor loadings, and the extent to which factors are represented by multiple items (de Winter et al., 2009; MacCallum et al., 1999, 2001; Mundfrom et al., 2005). The relatively high communalities supported the present analysis, although the respondent-to-item ratio remained modest for an 80-item pool.

Table 1. Factorability of the Initial Item Pool

Indicator	Result
Respondents	239
Initial items	80
Overall KMO	0.912
Item-level KMO range	0.751–0.958
Bartlett’s test, χ^2	32,291.21
Degrees of freedom	3,160
Bartlett’s test, p	< .001
Communality range	0.595–0.887

Principal-axis factoring was used because the purpose was to identify latent constructs underlying the shared variance of the items rather than merely reduce the variables into components. Promax oblique rotation was applied because dimensions of organizational leadership and management were theoretically expected to correlate. These decisions are consistent with methodological recommendations for exploratory scale development (Costello & Osborne, 2005; Fabrigar et al., 1999; Floyd & Widaman, 1995; Howard, 2016; Lloret-Segura et al., 2014; Schmitt, 2011; Watkins, 2018).

Parallel analysis based on 500 random datasets indicated six factors. The first six observed eigenvalues exceeded the corresponding 95th-percentile random eigenvalues, whereas the seventh

observed eigenvalue did not. Parallel analysis is generally more accurate than retaining factors solely through the eigenvalue-greater-than-one rule or visual inspection of a scree plot (Garrido et al., 2013; Hayton et al., 2004; Horn, 1965; O'Connor, 2000; Zwick & Velicer, 1986; Matt et al., 2022).

Table 2. Parallel Analysis and Variance Explained

Factor	Observed eigenvalue	Random eigenvalue	Variance (%)	Cumulative variance (%)
1	42.760	2.500	53.450	53.450
2	5.647	2.367	7.059	60.509
3	4.807	2.270	6.008	66.517
4	3.449	2.187	4.311	70.828
5	2.418	2.114	3.022	73.851
6	2.123	2.053	2.654	76.505
7	1.519	1.994	1.899	—

The six retained factors accounted for 76.505% of the total variance. The first factor explained 53.450%, indicating a strong general component across the item pool. Nevertheless, five additional factors exceeded the parallel-analysis criteria, supporting a multidimensional rather than strictly unidimensional representation of leadership and management practices.

Item Reduction and Factor Structure

Items were retained when they had a primary pattern coefficient of at least 0.40, a communality of at least 0.30, and a difference of at least 0.20 between their largest and second-largest absolute loadings. The combined use of loading magnitude, cross-loading separation, conceptual coherence, and adequate construct coverage is recommended because item-retention decisions should not be based on a single statistical criterion (Boateng et al., 2018; Clark & Watson, 1995, 2019; Hinkin, 1998; Worthington & Whittaker, 2006; Zainil et al., 2024). Of the original 80 items, 48 were retained, while 32 were removed because of weak primary loadings or substantial cross-loadings. The retained loadings ranged from 0.534 to 0.877.

Table 3. Retained Factor Structure

Factor	Proposed label	Retained items	Loading range
1	Supportive and Performance-Oriented Management	13	0.534–0.877
2	Strategic Leadership and Faculty Development	15	0.578–0.817
3	Policy Governance and Institutional Support	8	0.624–0.738
4	Participatory and Equitable Administration	8	0.686–0.842
5	Faculty Networking and Role Balance	2	0.757–0.770
6	Student-Centered Teaching Innovation	2	0.566–0.579
Total		48	0.534–0.877

Factor 1, Supportive and Performance-Oriented Management, contained items concerning administrative efficiency, workload management, open communication, faculty respect, academic freedom, well-being, developmental performance evaluation, recognition, performance support, flexible learning arrangements, and the use of student feedback. Its highest-loading item concerned the transparency and fairness of the performance-management system, $\lambda = 0.877$. The factor indicates that performance management was perceived as an integrated system involving fairness, recognition, supportive working conditions, and opportunities for improvement.

Factor 2, Strategic Leadership and Faculty Development, represented academic direction, institutional vision, faculty participation in goal setting and decision-making, measurable targets, responsiveness to academic challenges, innovation, mentoring, research support, and professional development. Its strongest items concerned leadership responses to emerging challenges, $\lambda = 0.817$,

and the promotion of innovation and continuous improvement, $\lambda = 0.816$. The convergence of leadership and faculty development suggests that institutional direction was closely associated with the support provided to faculty members to achieve organizational goals.

Factor 3, Policy Governance and Institutional Support, covered research and teaching resources, professional-development funding, policy communication, notification of policy changes, legal and ethical standards, policy training, participatory policy development, and policies supporting academic freedom. The factor combined formal governance processes with institutional resources, indicating that policies were evaluated partly through how they were communicated, implemented, and supported.

Factor 4, Participatory and Equitable Administration, included administrative support, constructive performance feedback, faculty participation, decisions promoting student success, equitable resource distribution, consistent policy implementation, and institutional fairness and transparency. The highest loadings concerned administrative support for faculty duties, $\lambda = 0.842$, and constructive performance feedback, $\lambda = 0.840$. This factor reflected faculty members' direct experience of whether institutional processes were inclusive, supportive, consistent, and fair.

Factor 5, Faculty Networking and Role Balance, consisted of academic networking and institutional support for balancing faculty roles. Factor 6, Student-Centered Teaching Innovation, comprised institutional encouragement to enhance student learning and use innovative teaching methods. Although the items within both factors were conceptually related, two-item factors provide limited construct coverage and may be unstable in subsequent samples. Scale-development literature recommends several well-performing indicators for each factor to represent the breadth of the construct adequately (Clark & Watson, 2019; Hinkin, 1998; Worthington & Whittaker, 2006; Arwin et al., 2024). Thus, Factors 5 and 6 should be considered provisional and require additional item development.

The removal of 32 items improved the statistical distinctiveness of the retained factors, but deleted items should not be rejected solely because of their performance in one sample. Items representing essential but underrepresented content may instead require revision and retesting. Scale development is an iterative process in which statistical parsimony must be balanced with content validity and construct breadth (Boateng et al., 2018; Clark & Watson, 1995; Worthington & Whittaker, 2006; Jusoh et al., 2023).

Factor Correlations

The factor correlations ranged from 0.211 to 0.645, supporting the use of oblique rotation. The strongest relationship occurred between Supportive and Performance-Oriented Management and Policy Governance and Institutional Support, $r = 0.645$, followed by the relationship between Supportive and Performance-Oriented Management and Strategic Leadership and Faculty Development, $r = 0.577$.

Table 4. Factor-Correlation Matrix

Factor	F1	F2	F3	F4	F5	F6
F1	1.000	0.577	0.645	0.437	0.457	0.434
F2	0.577	1.000	0.458	0.322	0.344	0.482
F3	0.645	0.458	1.000	0.318	0.396	0.443
F4	0.437	0.322	0.318	1.000	0.211	0.245
F5	0.457	0.344	0.396	0.211	1.000	0.440
F6	0.434	0.482	0.443	0.245	0.440	1.000

The positive correlations indicate that the factors measured related components of a broader institutional system without being statistically identical. The large first eigenvalue and moderate factor correlations also suggest that a higher-order leadership and management construct may be plausible. This possibility should be tested through confirmatory factor analysis rather than

concluded from EFA alone (Fabrigar et al., 1999; Floyd & Widaman, 1995; Worthington & Whittaker, 2006; Hiltrimartin et al., 2024).

Internal Consistency

Reliability was calculated only for the retained items within each factor. Cronbach's alpha was used for Factors 1–4. Because Factors 5 and 6 contained only two items, their inter-item correlations and Spearman–Brown coefficients were reported, as recommended for two-item measures (Eisinga et al., 2013).

Table 5. Internal Consistency of the Retained Factors

Factor	Items	Reliability estimate
Supportive and Performance-Oriented Management	13	$\alpha = 0.971$
Strategic Leadership and Faculty Development	15	$\alpha = 0.962$
Policy Governance and Institutional Support	8	$\alpha = 0.956$
Participatory and Equitable Administration	8	$\alpha = 0.942$
Faculty Networking and Role Balance	2	$r = 0.865$; Spearman–Brown = 0.927
Student-Centered Teaching Innovation	2	$r = 0.782$; Spearman–Brown = 0.878

The four multi-item factors demonstrated high internal consistency, with alpha coefficients ranging from 0.942 to 0.971. The two-item factors also produced high Spearman–Brown coefficients. However, high coefficients do not by themselves establish unidimensionality or adequate construct representation. Alpha is affected by test length, inter-item covariance, and assumptions that may not be fully satisfied; omega should therefore be considered during confirmatory validation (Dunn et al., 2014; McNeish, 2018; Sijtsma, 2009; Handrianto et al., 2025).

Overall, the EFA produced a preliminary 48-item, six-factor scale with adequate factor loadings and high internal consistency. The four larger factors were sufficiently represented, whereas the two two-item factors require expansion or reconsideration. The structure should be tested using an independent sample through confirmatory factor analysis, preferably with an estimator appropriate for ordinal responses. Such cross-validation is necessary before the instrument is considered fully validated or used for consequential institutional assessment (Boateng et al., 2018; Flora & Curran, 2004; Garrido et al., 2013; Worthington & Whittaker, 2006; Setiawati et al., 2025).

CONCLUSION

The study produced a preliminary 48-item Leadership and Management Practices Scale consisting of six related dimensions: Supportive and Performance-Oriented Management, Strategic Leadership and Faculty Development, Policy Governance and Institutional Support, Participatory and Equitable Administration, Faculty Networking and Role Balance, and Student-Centered Teaching Innovation. The data demonstrated strong factorability, and the retained items showed adequate factor loadings and high internal consistency. These findings provide initial evidence that leadership and management practices at Isabela State University are multidimensional and can be assessed through a contextually grounded faculty-perception measure. However, the instrument should still be regarded as preliminary rather than fully validated. Four factors were represented by sufficient numbers of items, whereas Faculty Networking and Role Balance and Student-Centered Teaching Innovation contained only two items each. Although these two factors produced acceptable reliability estimates, their limited item coverage may not fully represent the breadth of the intended constructs. It is recommended that additional items be developed for the two underrepresented dimensions and that the retained and revised items undergo further expert review for clarity, relevance, and content coverage. The revised instrument should then be administered to a larger and independent faculty sample and evaluated through confirmatory factor analysis. Subsequent studies should also examine convergent, discriminant, criterion-related, and measurement-invariance evidence across campuses, academic disciplines, ranks, and other faculty groups. Until such validation is completed, the scale may be used for exploratory research and institutional diagnosis, but not yet for high-stakes evaluation or administrative decision-making.

REFERENCES

- American Educational Research Association, American Psychological Association, & National Council on Measurement in Education. (2014). *Standards for educational and psychological testing*. American Educational Research Association.
- Arwin, A., Kenedi, A. K., Anita, Y., Hamimah, & Zainil, M. (2024). STEM-based digital disaster learning model for disaster adaptation ability of elementary school students. *International Journal of Evaluation and Research in Education (IJERE)*, 13(5), 3248-3259. <https://doi.org/10.11591/ijere.v13i5.29616>
- Bass, B. M. (1985). *Leadership and performance beyond expectations*. Free Press.
- Birnbaum, R. (1988). *How colleges work: The cybernetics of academic organization and leadership*. Jossey-Bass.
- Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quinonez, H. R., & Young, S. L. (2018). Best practices for developing and validating scales for health, social, and behavioral research: A primer. *Frontiers in Public Health*, 6, Article 149. <https://doi.org/10.3389/fpubh.2018.00149>
- Burns, J. M. (1978). *Leadership*. Harper & Row.
- Clark, L. A., & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment*, 7(3), 309–319. <https://doi.org/10.1037/1040-3590.7.3.309>
- Clark, L. A., & Watson, D. (2019). Constructing validity: New developments in creating objective measuring instruments. *Psychological Assessment*, 31(12), 1412–1427. <https://doi.org/10.1037/pas0000626>
- Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research & Evaluation*, 10, Article 7. <https://doi.org/10.7275/jyj1-4868>
- de Winter, J. C. F., Dodou, D., & Wieringa, P. A. (2009). Exploratory factor analysis with small sample sizes. *Multivariate Behavioral Research*, 44(2), 147–181. <https://doi.org/10.1080/00273170902794206>
- Dunn, T. J., Baguley, T., & Brunsden, V. (2014). From alpha to omega: A practical solution to the pervasive problem of internal consistency estimation. *British Journal of Psychology*, 105(3), 399–412. <https://doi.org/10.1111/bjop.12046>
- Eisinga, R., te Grotenhuis, M., & Pelzer, B. (2013). The reliability of a two-item scale: Pearson, Cronbach, or Spearman–Brown? *International Journal of Public Health*, 58(4), 637–642. <https://doi.org/10.1007/s00038-012-0416-3>
- Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods*, 4(3), 272–299. <https://doi.org/10.1037/1082-989X.4.3.272>
- Flora, D. B., & Curran, P. J. (2004). An empirical evaluation of alternative methods of estimation for confirmatory factor analysis with ordinal data. *Psychological Methods*, 9(4), 466–491. <https://doi.org/10.1037/1082-989X.9.4.466>
- Floyd, F. J., & Widaman, K. F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment*, 7(3), 286–299. <https://doi.org/10.1037/1040-3590.7.3.286>
- Garrido, L. E., Abad, F. J., & Ponsoda, V. (2013). A new look at Horn's parallel analysis with ordinal variables. *Psychological Methods*, 18(4), 454–474. <https://doi.org/10.1037/a0030005>
- Global Education Monitoring Report Team. (2024). *2024/5 Global Education Monitoring Report: Leadership in education—Lead for learning*. UNESCO.
- Hayton, J. C., Allen, D. G., & Scarpello, V. (2004). Factor retention decisions in exploratory factor analysis: A tutorial on parallel analysis. *Organizational Research Methods*, 7(2), 191–205. <https://doi.org/10.1177/1094428104263675>

- Hiltrimartin, C., Afifah, A., Pratiwi, W. D., & Rahman, M. A. (2024). Analyzing Students' Thinking in Mathematical Problem Solving Using Vygotskian Sociocultural Theory. *Revista de Gestão Social e Ambiental*, 18(1), e04802-e04802. <https://doi.org/10.24857/rgsa.v18n1-105>
- Hinkin, T. R. (1998). A brief tutorial on the development of measures for use in survey questionnaires. *Organizational Research Methods*, 1(1), 104–121. <https://doi.org/10.1177/109442819800100106>
- Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika*, 30(2), 179–185. <https://doi.org/10.1007/BF02289447>
- Howard, M. C. (2016). A review of exploratory factor analysis decisions and overview of current practices: What we are doing and how can we improve? *International Journal of Human-Computer Interaction*, 32(1), 51–62. <https://doi.org/10.1080/10447318.2015.1087664>
- Jusoh, A. J., Imami, M. K. W., Isa, A. N. M., Omar, S. Z., Abdullah, A., & Wahab, S. (2023). Verification the reliability and validity of a Malaysian version of rathus assertiveness schedule as drug prevention scale. *Islamic Guidance and Counseling Journal*, 6(2). <https://doi.org/10.25217/0020236369700>
- Lloret-Segura, S., Ferreres-Traver, A., Hernández-Baeza, A., & Tomás-Marco, I. (2014). Exploratory item factor analysis: A practical guide revised and updated. *Anales de Psicología*, 30(3), 1151–1169. <https://doi.org/10.6018/analesps.30.3.199361>
- MacCallum, R. C., Widaman, K. F., Preacher, K. J., & Hong, S. (2001). Sample size in factor analysis: The role of model error. *Multivariate Behavioral Research*, 36(4), 611–637. https://doi.org/10.1207/S15327906MBR3604_06
- MacCallum, R. C., Widaman, K. F., Zhang, S., & Hong, S. (1999). Sample size in factor analysis. *Psychological Methods*, 4(1), 84–99. <https://doi.org/10.1037/1082-989X.4.1.84>
- McNeish, D. (2018). Thanks coefficient alpha, we'll take it from here. *Psychological Methods*, 23(3), 412–433. <https://doi.org/10.1037/met0000144>
- Matt, D. G. F., Banseng, S., & Gerry, D. (2022). Effect of wordwall in teaching malay literature component amongst form one students. *International Journal of Education, Technology and Science*, 2(3), 279-287.
- Mundfrom, D. J., Shaw, D. G., & Ke, T. L. (2005). Minimum sample size recommendations for conducting factor analyses. *International Journal of Testing*, 5(2), 159–168. https://doi.org/10.1207/S15327574IJT0502_4
- O'Connor, B. P. (2000). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior Research Methods, Instruments, & Computers*, 32(3), 396–402. <https://doi.org/10.3758/BF03200807>
- Ramsden, P. (1998). *Learning to lead in higher education*. Routledge.
- Schmitt, T. A. (2011). Current methodological considerations in exploratory and confirmatory factor analysis. *Journal of Psychoeducational Assessment*, 29(4), 304–321. <https://doi.org/10.1177/0734282911406653>
- Setiawati, S., & Defi, T. A. C. (2025). *Pendidikan keluarga di era digital (Family education in the digital era)*. PT Mafy Media Literasi Indonesia.
- Sijtsma, K. (2009). On the use, the misuse, and the very limited usefulness of Cronbach's alpha. *Psychometrika*, 74(1), 107–120. <https://doi.org/10.1007/s11336-008-9101-0>
- Solfema, S., Sunarti, V., & Rahman, M. A. (2024). *Prinsip-prinsip andragogi dalam pelatihan orang dewasa (Principles of andragogy in adult training)*. Rajawali Pers.
- Spillane, J. P. (2006). *Distributed leadership*. Jossey-Bass.
- Watkins, M. W. (2018). Exploratory factor analysis: A guide to best practice. *Journal of Black Psychology*, 44(3), 219–246. <https://doi.org/10.1177/0095798418771807>
- Worthington, R. L., & Whittaker, T. A. (2006). Scale development research: A content analysis and recommendations for best practices. *The Counseling Psychologist*, 34(6), 806–838. <https://doi.org/10.1177/0011000006288127>

- Zainil, M., Kenedi, A. K., Rahmatina, & Indrawati, T. (2024). The influence of STEM-based digital learning on 6C skills of elementary school students. *Open Education Studies*, 6(1), 20240039. <https://doi.org/10.1515/edu-2024-0039>
- Zwicker, W. R., & Velicer, W. F. (1986). Comparison of five rules for determining the number of components to retain. *Psychological Bulletin*, 99(3), 432–442. <https://doi.org/10.1037/0033-2909.99.3.432>

APPENDIX

Leadership and Management Practices Scale: Preliminary 48-Item Version

Directions. Indicate your response to each statement by marking one number: 5 = Strongly Agree, 4 = Agree, 3 = Neither Agree nor Disagree, 2 = Disagree, and 1 = Strongly Disagree.

No.	Statement	Response
Supportive and Performance-Oriented Management		
1	Technology streamlines administrative tasks and reduces workload.	5 4 3 2 1
2	Administrative processes, such as grants and scheduling, are efficient.	5 4 3 2 1
3	Workload management optimizes balance across faculty roles.	5 4 3 2 1
4	Open communication between faculty and administration is encouraged.	5 4 3 2 1
5	Faculty feel respected and valued by the administration.	5 4 3 2 1
6	The institution promotes academic freedom and diverse ideas.	5 4 3 2 1
7	The working environment supports faculty well-being.	5 4 3 2 1
8	Performance evaluations support faculty development.	5 4 3 2 1
9	Faculty contributions are recognized and rewarded.	5 4 3 2 1
10	The performance management system is transparent and fair.	5 4 3 2 1
11	Support is provided to improve faculty performance.	5 4 3 2 1
12	The institution offers flexible learning environments for diverse student needs.	5 4 3 2 1
13	Student feedback is used to improve academic programs.	5 4 3 2 1
Strategic Leadership and Faculty Development		
14	Leadership provides clear direction for academic goals.	5 4 3 2 1
15	Leadership communicates the institution's vision to faculty.	5 4 3 2 1
16	Faculty contribute to developing institutional goals.	5 4 3 2 1
17	Leadership sets realistic and measurable academic targets.	5 4 3 2 1

18	Faculty feedback is considered in strategic decisions.	5	4	3	2
			1		
19	Leadership addresses emerging academic challenges.	5	4	3	2
			1		
20	Leadership fosters innovation and continuous improvement.	5	4	3	2
			1		
21	Leadership supports faculty initiatives aligned with institutional goals.	5	4	3	2
			1		
22	Leadership provides regular updates on strategic progress.	5	4	3	2
			1		
23	The institution offers ample faculty-development opportunities.	5	4	3	2
			1		
24	Faculty development addresses evolving faculty needs.	5	4	3	2
			1		
25	The institution provides resources for faculty research.	5	4	3	2
			1		
26	Faculty receive ongoing mentoring, especially early in their careers.	5	4	3	2
			1		
27	Faculty are encouraged to participate in conferences and workshops.	5	4	3	2
			1		
28	Faculty-development programs enhance teaching and research.	5	4	3	2
			1		
	Policy Governance and Institutional Support				
29	The institution allocates sufficient funds for faculty research and teaching.	5	4	3	2
			1		
30	The institution funds faculty-development and research activities.	5	4	3	2
			1		
31	The institution clearly communicates policies related to teaching and research.	5	4	3	2
			1		
32	Faculty are informed of changes in institutional policies.	5	4	3	2
			1		
33	The institution adheres to legal and ethical standards.	5	4	3	2
			1		
34	Faculty are provided with training on institutional policies.	5	4	3	2
			1		
35	Faculty are involved in developing policies affecting academic practices.	5	4	3	2
			1		
36	Policies promote academic freedom and innovation.	5	4	3	2
			1		
	Participatory and Equitable Administration				
37	Faculty workload allows time for professional growth.	5	4	3	2
			1		
38	Administrative processes support faculty academic duties.	5	4	3	2
			1		
39	Faculty feel empowered to voice opinions and contribute to decisions.	5	4	3	2
			1		
40	Faculty receive timely and constructive feedback on their performance.	5	4	3	2
			1		
41	Faculty are empowered to make decisions that benefit student success.	5	4	3	2
			1		

42	Resources are distributed fairly among departments.	5	4	3	2
			1		
43	Policies related to performance and ethics are consistently applied.	5	4	3	2
			1		
44	Faculty feel that institutional policies are fair and transparent.	5	4	3	2
			1		
Faculty Networking and Role Balance					
45	Faculty are encouraged to engage in academic networking.	5	4	3	2
			1		
46	The institution supports faculty in balancing their roles.	5	4	3	2
			1		
Student-Centered Teaching Innovation					
47	Faculty are encouraged to enhance student learning.	5	4	3	2
			1		
48	Faculty are encouraged to use innovative teaching methods.	5	4	3	2
			1		

Scoring note. All items are positively scored. Compute the mean of the items in each dimension; higher scores indicate more favorable perceptions. The two-item dimensions should be interpreted cautiously pending confirmatory validation.