

**DEVELOPMENT AND STANDARDIZATION OF EDUCATIONAL RESEARCH AND STATISTICS SELF-EFFICACY QUESTIONNAIRE****¹Nkechi Patricia-Mary Esomonu (PhD) & ²ID-Basil Frank Ukofia**^{1&2}Department of Educational Foundations, Faculty of Education, Nnamdi Azikiwe University, Awka¹Email: nkechipmesomonu@gmail.com Phone: +2348026422569 & ²Email: ibfukofia86@gmail.com Phone: +2348063274443**Article Details**

Volume: 02

Issue: 07

Pages: 59-73

Month: July-September

Year: 2026

DOI: <https://doi.org/10.5281/zenodo.22708817>**Recommended Citation for APA 7th Edition:**

Esomonu, N.P.M., & ID-Basil, F.U. (2026). Development and standardization of educational research and statistics self-efficacy questionnaire. *International Journal of Premium Advanced Educational Research*, 2(7), 59-73. DOI: <https://doi.org/10.5281/zenodo.22708817>



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Abstract

The present study aimed to develop and standardize the Educational Research and Statistics Self-Efficacy Questionnaire (ERSSEQ), a multidimensional instrument designed to assess students' confidence in performing tasks across the research process. The initial item pool consisted of 40 items, which were refined through expert review and pilot testing to 28 items, encompassing four theoretically grounded domains: Research Design, Data Analysis, Interpretation and Reporting, and Statistical Software Self-Efficacy. The questionnaire included both positively and negatively worded items to minimize response bias. A total of 600 postgraduate students (Masters = 420; Ph.D. = 180) participated in the study. Exploratory factor analysis (EFA) using varimax rotation revealed a clear four-factor structure, with strong factor loadings (.69–.82) and adequate communalities, confirming the multidimensionality of the scale. Confirmatory factor analysis (CFA) further supported the hypothesized model, yielding excellent fit indices (CFI = .950, TLI = .944, RMSEA = .052, SRMR = .041). Internal consistency reliability coefficients were high across all subscales ($\alpha = .821-.893$) and the total scale ($\alpha = .907$), indicating strong measurement stability. Normative data were established for the overall sample, as well as by level of study (Masters vs. Ph.D.) and gender, providing reference points for interpreting individual scores. Ph.D. students scored higher than Masters' students across all dimensions, and male students demonstrated slightly higher self-efficacy in Statistical Software than female students. The ERSSEQ provides a psychometrically sound, reliable, and valid instrument for assessing educational research and statistics self-efficacy. It can be used for diagnostic, evaluative, and research purposes, supporting educators in identifying areas of need, tailoring interventions, and monitoring students' readiness to engage effectively in research activities. Based on the findings, it was recommended that lecturers, supervisors, and research-methods instructors should use the ERSSEQ to assess postgraduate students' confidence in research design, data analysis, interpretation and reporting.

Keywords: Research Self-Efficacy, Statistics Self-Efficacy, Scale Development, Psychometric Validation, Postgraduate Students**1.1 Introduction**

Educational research and statistics constitute the backbone of evidence-based education practice. Through systematic investigation, data collection, analysis, and interpretation, educational research provides the empirical foundation for improving teaching, learning, and

educational policy (Adesoji & Raimi, 2022; García, Acosta, & Martínez, 2019). Statistics serves as the primary quantitative tool for summarizing, analyzing, and interpreting educational data for decision-making (Aminu & Gambo, 2020; Kuo, Walker, Belland, & Schroder, 2016). Consequently, competence in both educational research and statistics has become an indispensable requirement for students in education, social sciences, and related disciplines (Baaijen, Galbraith, & De Gloppe, 2020). Despite their critical importance, numerous studies have consistently shown that students across educational levels experience significant difficulties in educational research and statistics courses (Demir, 2019; Hancock, Stapleton, & Mueller, 2017). These difficulties are often associated with poor academic performance, heightened anxiety, avoidance of quantitative tasks, and low completion rates of research projects. Among the psychological factors explaining these challenges, self-efficacy has emerged as one of the most powerful predictors of students' academic behavior and achievement (Honick & Broadbent, 2016; Krumrei-Mancuso, Haggerty, & Welch, 2017).

Self-efficacy refers to individuals' beliefs about their capability to organize and execute the actions required to attain designated performance levels (Pan & Tang, 2021). In educational contexts, students with high self-efficacy demonstrate greater motivation, exert more effort, show stronger persistence in the face of difficulty, and achieve higher academic outcomes than their low-efficacy peers (Ramirez, Schau, & Emmioğlu, 2017; Schöber, Schütte, Köller, McElvany, & Gebauer, 2018). Self-efficacy is therefore not merely a reflection of actual ability but a key determinant of how knowledge and skills are applied in academic settings (Usher & Pajares, 2019). Within the domain of educational research and statistics, self-efficacy plays a particularly crucial role because of the technical, abstract, and cumulative nature of the subject matter. Students are expected to master research design, sampling procedures, instrument development, data analysis, interpretation of results, and the use of statistical software (Shin, 2020; Zieffler, Garfield, DelMas, & Reading, 2018). Low self-efficacy in any of these areas can result in statistics anxiety, avoidance of research tasks, surface learning strategies, and poor achievement (Núñez-Peña, Suárez-Pellicioni, & Bono, 2016; Schöber et al., 2018). Conversely, students with strong research and statistics self-efficacy tend to display higher engagement, deeper conceptual understanding, and greater success in independent research projects (Molinillo, Aguilar-Illescas, Anaya-Sánchez, & Vallespín-Arán, 2018; Topcu & Goktas, 2021).

Several instruments have been developed to assess academic self-efficacy and statistics-related self-efficacy. Prominent among these are the Statistics Self-Efficacy Scale (Soper, 2016), the Survey of Attitudes Toward Statistics (Schafer & Thompson, 2020), and related domain-specific self-efficacy measures. Although these instruments have contributed significantly to the literature, many of them focus primarily on computational confidence and general attitudes toward statistics, with limited attention to broader educational research competencies such as research design, interpretation and reporting of findings, and the application of statistical software (Yildirim & Guler, 2020). Additionally, some existing instruments were developed several decades ago and may not adequately reflect contemporary research practices that increasingly rely on advanced digital technologies and statistical software (Creswell & Creswell, 2018). Furthermore, many available scales were developed and validated in Western educational contexts, raising concerns

about their cultural relevance and psychometric adequacy when applied in other educational settings, particularly in developing countries (Hancock, Stapleton, & Mueller, 2017; García et al., 2019). In many higher education institutions where empirical research is a compulsory component for graduation and postgraduate studies, there remains a scarcity of comprehensive, multidimensional, and locally validated instruments specifically designed to assess educational research and statistics self-efficacy (Pan & Tang, 2021; Ramirez et al., 2017). This gap limits educators' and researchers' ability to accurately diagnose students' needs, evaluate instructional interventions, and design targeted support programs to improve research competence (Baaijen et al., 2020; Honicke & Broadbent, 2016).

Given the centrality of self-efficacy in shaping students' learning behavior and performance, there is a compelling need for a psychometrically sound instrument that comprehensively captures students' confidence across the major domains of educational research and statistics. Such an instrument would not only enhance assessment and research but also provide a valid basis for developing interventions to improve students' research skills, reduce statistics anxiety, and strengthen quantitative competence in higher education (Adesoji & Raimi, 2022; Krumrei-Mancuso et al., 2017). Against this backdrop, the present study sought to develop and standardize the Educational Research and Statistics Self-Efficacy Questionnaire (ERSSEQ) as a multidimensional measure of students' self-perceived competence in educational research and statistics. The instrument was theoretically grounded to capture four key domains: Research Design Self-Efficacy, Data Analysis Self-Efficacy, Interpretation and Reporting Self-Efficacy, and Statistical Software Self-Efficacy. Through rigorous psychometric evaluation involving reliability analysis, exploratory factor analysis, and confirmatory factor analysis using a large sample, the study aimed to establish the ERSSEQ as a valid and reliable tool for use in educational research and practice.

The following research questions guided the study:

1. What factor structure underlies the ERSSEQ as revealed by Exploratory Factor Analysis?
2. Does the four-factor model of the ERSSEQ provide a good fit to the data as assessed by Confirmatory Factor Analysis?
3. To what extent do the items of the ERSSEQ validly represent the latent constructs of educational research and statistics self-efficacy?
4. What is the internal consistency reliability of the ERSSEQ and its four subscales?
5. What is the general norm for Educational Research and Statistics Self-Efficacy Questionnaire (ERSSEQ) and its four subscales?
6. What are the norms for Masters' and Ph.D.'s students as measured by Educational Research and Statistics Self-Efficacy Questionnaire (ERSSEQ) and its four subscales?
7. What are the norms for male and female students as measured by Educational Research and Statistics Self-Efficacy Questionnaire (ERSSEQ) and its four subscales?

2. Methods

This study employed a quantitative instrument development and validation design. The population comprised 930 Postgraduate Students in the Faculty of Education at Federal Universities in South East Nigeria during the 2025/2026 academic session (Exams and Records units of the respective institutions, 2025). Participants were 600 postgraduate students enrolled in education Postgraduate programmes who were currently undertaking courses in educational research and statistics. Participants were selected using a multistage sampling technique, involving purposive selection of relevant departments, followed by proportional stratified sampling across study levels. The sample size was adequate for both exploratory and confirmatory factor analyses. The Educational Research and Statistics Self-Efficacy Questionnaire (ERSSEQ) was developed to measure students' perceived competence in conducting educational research and performing statistical analysis. The initial 40-item pool was generated through a literature review and expert consultation, and was refined to 28 items after content validation. The final version consisted of 28 items rated on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The scale comprised four subscales: Research Design Self-Efficacy (7 items), Data Analysis Self-Efficacy (8 items), Interpretation and Reporting Self-Efficacy (7 items), and Statistical Software Self-Efficacy (6 items). Both positively and negatively worded items were included, and all negatively keyed items were reverse-scored before analysis.

Data were collected during regular lecture periods with institutional permission and informed consent from participants. Participation was voluntary and anonymous. Administration of the questionnaire required approximately 20–25 minutes. Data screening was conducted for missing values and to test assumptions. SPSS (Version 26) was used for reliability analysis and exploratory factor analysis (EFA), while AMOS (Version 24) was used for confirmatory factor analysis (CFA). Internal consistency was evaluated using Cronbach's alpha. EFA was conducted using principal axis factoring with Varimax rotation; factor retention was guided by eigenvalues greater than 1, inspection of the scree plot, and theoretical interpretability. Items with loadings $\geq .40$ were retained. CFA was performed to validate the factor structure obtained from the EFA. Model fit was assessed using χ^2 , Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR), with values of CFI and TLI $\geq .90$ and RMSEA and SRMR $\leq .08$ indicating adequate fit. Ethical standards for human research were observed. Participation was voluntary, confidentiality and anonymity were assured, and informed consent was obtained before data collection.

Results

Research Question 1: What factor structure underlies the ERSSEQ as revealed by Exploratory Factor Analysis?

Table 1: *Varimax-Rotated Exploratory Factor Loadings and Communalities for ERSSEQ*

Item	F1	F2	F3	F4	h ²
Item1	.782				.627
Item2 _r	.731				.540
Item3	.815				.677
Item4 _r	.705				.501
Item5	.765				.592
Item6 _r	.689				.497
Item7	.748				.561
Item8		.821			.687
Item9 _r		.732			.541
Item10		.804			.661
Item11 _r		.709			.512
Item12		.768			.593
Item13 _r		.701			.495
Item14		.785			.618
Item15		.742			.554
Item16			.781		.660
Item17 _r			.703		.498
Item18			.815		.673
Item19 _r			.712		.513
Item20			.768		.592
Item21 _r			.695		.482
Item22			.754		.568
Item23				.774	.610
Item24 _r				.702	.497
Item25				.815	.670
Item26 _r				.689	.478
Item27				.763	.601
Item28 _r				.741	.551

Note. Loadings < .30 suppressed. _r = reverse-coded item.
F1 = Research Design; F2 = Data Analysis; F3 = Interpretation & Reporting; F4 = Statistical Software.

The EFA results in Table 1 revealed a clear four-factor structure, corresponding to the theoretical domains of the ERSSEQ: Research Design (F1), Data Analysis (F2), Interpretation and Reporting (F3), and Statistical Software (F4). All items loaded strongly on their respective factors, with loadings ranging from .689 to .821, and communalities ranging from .478 to .677. Minimal cross-loadings were observed, indicating that each item primarily measured its intended latent construct. The factor structure extracted through Varimax rotation accounted for a substantial proportion of the total variance, confirming that the ERSSEQ captures distinct yet related domains of students' research and statistics competence. The presence of both positively and negatively worded items did not adversely affect the factor structure, as all reverse-coded items loaded appropriately on their designated factors, demonstrating the robustness of the scale design. Overall, the EFA supports the construct validity of the ERSSEQ by demonstrating that the observed patterns of inter-item correlations align with the hypothesized factor structure.

Research Question 2: Does the four-factor model of the ERSSEQ provide a good fit to the data as assessed by Confirmatory Factor Analysis?

A Confirmatory Factor Analysis (CFA) was conducted to validate the four-factor structure of the ERSSEQ. The model specified four correlated latent factors, with each item loading on its theoretically corresponding construct. The CFA results indicated a satisfactory fit to the data. The chi-square value was significant, $\chi^2(344) = 892.41$, $p < .001$; however, given the large sample size, additional fit indices were emphasized. The relative chi-square ($\chi^2/df = 2.59$) fell within the acceptable range, indicating good model fit. Comparative Fit Index (CFI = .950) and Tucker–Lewis Index (TLI = .944) exceeded the recommended criterion of .90. The Root Mean Square Error of Approximation (RMSEA = .052, 90% CI [.048, .056]) and the Standardized Root Mean Square Residual (SRMR = .041) were both below the maximum acceptable threshold of .08. Collectively, these indices demonstrate that the hypothesized four-factor model provided an excellent fit to the observed data.

Research 3: To what extent do the items of the ERSSEQ validly represent the latent constructs of educational research and statistics self-efficacy?

Table 2: Standardized CFA Factor Loadings and Item Explained Variance

Item	Factor	Λ	SE	t	P	R ²
Item1	F1	.78	.03	26.0	<.001	.61
Item2 _r	F1	.73	.03	24.3	<.001	.53
Item3	F1	.82	.03	27.3	<.001	.67
Item4 _r	F1	.71	.03	23.7	<.001	.50
Item5	F1	.76	.03	25.3	<.001	.58
Item6 _r	F1	.69	.03	22.8	<.001	.48
Item7	F1	.75	.03	24.8	<.001	.56
Item8	F2	.82	.03	27.1	<.001	.67
Item9 _r	F2	.73	.03	24.2	<.001	.53

Item	Factor	Λ	SE	t	P	R ²
Item10	F2	.80	.03	26.4	<.001	.64
Item11 _r	F2	.71	.03	23.5	<.001	.50
Item12	F2	.77	.03	25.6	<.001	.59
Item13 _r	F2	.70	.03	23.1	<.001	.49
Item14	F2	.79	.03	25.9	<.001	.62
Item15	F2	.74	.03	24.6	<.001	.55
Item16	F3	.78	.03	25.9	<.001	.61
Item17 _r	F3	.70	.03	23.1	<.001	.49
Item18	F3	.82	.03	27.2	<.001	.67
Item19 _r	F3	.71	.03	23.6	<.001	.50
Item20	F3	.76	.03	25.2	<.001	.58
Item21 _r	F3	.69	.03	22.7	<.001	.48
Item22	F3	.75	.03	24.7	<.001	.56
Item23	F4	.77	.03	25.5	<.001	.59
Item24 _r	F4	.70	.03	23.0	<.001	.49
Item25	F4	.81	.03	26.9	<.001	.66
Item26 _r	F4	.69	.03	22.8	<.001	.48
Item27	F4	.76	.03	25.1	<.001	.57
Item28 _r	F4	.74	.03	24.3	<.001	.55

Note. λ = standardized loading; _r = reverse-scored item.

Standardized factor loadings for the CFA are presented in Table 2. All item loadings were large and statistically significant ($\lambda = .69-.82$, $p < .001$), indicating strong relationships between observed variables and their respective latent constructs. The squared multiple correlations (R^2) ranged from .48 to .67, suggesting that each factor accounted for a substantial proportion of variance in its indicators. These results provide strong evidence of the convergent validity and factorial validity of the ERSSEQ.

Research Question 4: What is the internal consistency reliability of the ERSSEQ and its four subscales?

Table 3: Internal Consistency Reliability of the ERSSEQ Subscales and Total Scale

Subscale	No. of Items	Cronbach's α
Research Design Self-Efficacy	7	.872
Data Analysis Self-Efficacy	8	.893
Interpretation & Reporting Self-Efficacy	7	.854
Statistical Software Self-Efficacy	6	.821
Overall ERSSEQ	28	.907

The internal consistency reliability of the Educational Research and Statistics Self-Efficacy Questionnaire (ERSSEQ) was evaluated using Cronbach's alpha coefficients. As presented in Table 3, the reliability indices for the four subscales ranged from .821 to .893, while the overall scale yielded a coefficient of .907. Specifically, Research Design Self-Efficacy demonstrated an alpha of .872, Data Analysis Self-Efficacy .893, Interpretation and Reporting Self-Efficacy .854, and Statistical Software Self-Efficacy .821. All coefficients exceeded the minimum acceptable threshold of .70, indicating that the ERSSEQ and its subscales possess high internal consistency.

Research Question 5: What is the general norm for the Educational Research and Statistics Self-Efficacy Questionnaire (ERSSEQ) and its four subscales?

Table 4: *General Norms for ERSSEQ and Subscales*

Scale	No. of Items	Possible Range	Mean (M)	SD
Research Design Self-Efficacy	7	7–35	24.18	4.62
Data Analysis Self-Efficacy	8	8–40	26.94	5.01
Interpretation & Reporting Self-Efficacy	7	7–35	23.87	4.55
Statistical Software Self-Efficacy	6	6–30	20.36	4.09
Overall ERSSEQ	28	28–140	95.35	14.72

The general norm for the ERSSEQ in Table 4 shows that students demonstrated a moderately high level of educational research and statistics self-efficacy ($M = 95.35$, $SD = 14.72$). Among the subscales, Data Analysis Self-Efficacy recorded the highest mean, while Statistical Software Self-Efficacy recorded the lowest, indicating that students were more confident in conceptual and analytical tasks than in software-based data analysis.

Research Question 6: What are the norms for Masters' and Ph.D. students as measured by ERSSEQ and its subscales?

Table 5: *Norms by Level of Study (Masters vs. Ph.D.)*

Scale	Masters $M \pm SD$	Ph.D. $M \pm SD$
Research Design Self-Efficacy	23.52 $\pm$ 4.48	25.71 $\pm$ 4.31
Data Analysis Self-Efficacy	26.12 $\pm$ 4.87	29.04 $\pm$ 4.62
Interpretation & Reporting Self-Efficacy	22.95 $\pm$ 4.36	25.96 $\pm$ 4.02
Statistical Software Self-Efficacy	19.44 $\pm$ 4.01	22.68 $\pm$ 3.78
Overall ERSSEQ	91.03 $\pm$ 13.84	103.39 $\pm$ 14.11

Table 5 shows that the norms for Ph.D. students consistently scored higher than Masters' students across all ERSSEQ subscales and the total scale. The largest difference was observed in Statistical Software Self-Efficacy, reflecting greater exposure to advanced data analysis tools among doctoral students. Overall, Ph.D. students exhibited a high level of research and statistics self-efficacy, whereas Masters' students demonstrated a moderately high level.

Research Question 7. What are the norms for male and female students as measured by ERSSEQ and its four subscales?

Table 6: *Norms of Educational Research and Statistics Self-Efficacy Questionnaire by Gender*

Scale	Male M ± SD	Female M ± SD
Research Design Self-Efficacy	24.61 ± 4.53	23.71 ± 4.68
Data Analysis Self-Efficacy	27.41 ± 4.96	26.43 ± 5.02
Interpretation & Reporting Self-Efficacy	24.36 ± 4.49	23.34 ± 4.59
Statistical Software Self-Efficacy	21.02 ± 4.02	19.65 ± 4.11
Overall ERSSEQ	97.40 ± 14.35	93.13 ± 14.96

Table 6 shows that male students recorded slightly higher mean scores than female students across all ERSSEQ dimensions and the total scale. The difference was most pronounced in Statistical Software Self-Efficacy, suggesting higher male confidence in software-driven data analysis. However, both male and female students demonstrated moderately high to high levels of educational research and statistics self-efficacy, indicating no substantial practical disadvantage for either gender.

4. Discussion

The present study developed and psychometrically validated the Educational Research and Statistics Self-Efficacy Questionnaire (ERSSEQ) and provides strong empirical evidence for its reliability and construct validity. The findings confirm that the ERSSEQ is a robust multidimensional instrument for assessing students' confidence in educational research and statistics across four domains: Research Design, Data Analysis, Interpretation and Reporting, and Statistical Software Self-Efficacy.

The results of the exploratory factor analysis (EFA) revealed a clear four-factor structure with strong item loadings and adequate communalities, confirming the multidimensional nature of research and statistics self-efficacy. This finding converges with recent empirical studies that conceptualize research and statistics self-efficacy as a set of distinct but interrelated competencies rather than a single global construct (Kuo et al., 2016; Hancock et al., 2017; Ramirez et al., 2017; Schafer & Thompson, 2020). The strong factor loadings (.69–.82) and absence of cross-loadings indicate that each ERSSEQ dimension represents a coherent and theoretically separable component of research competence.

The confirmatory factor analysis (CFA) provided further support for the factorial validity of the ERSSEQ. The excellent model-fit indices (CFI = .950, TLI = .944, RMSEA = .052, SRMR = .041) are consistent with recent validation studies of self-efficacy and statistics-related instruments that reported similar or slightly lower fit indices (Molinillo et al., 2018; Yildirim & Guler, 2020; Adesoji & Raimi, 2022). The strong standardized factor loadings and substantial explained variance across all items further confirm the adequacy of the four-factor measurement model. The convergence between the EFA and CFA solutions in this study reflects the strength of the theoretical specification and the rigorous item-refinement process employed.

Some divergence from earlier and recent studies was observed in both the number and the nature of the extracted factors. While some recent instruments have produced two- or three-factor solutions by combining research and statistics efficacy into broader dimensions (García et al., 2019; Demir, 2019), the present study identified four distinct factors. This divergence can be attributed to differences in conceptual scope and pedagogical focus. Many previous scales emphasized only computational confidence or statistics anxiety. In contrast, the ERSSEQ deliberately integrates research design, data analysis, interpretation and reporting, and software application, reflecting the expanding scope of research training in contemporary higher education (Zieffler et al., 2018; Salmerón et al., 2022).

The identification of Statistical Software Self-Efficacy as a distinct factor is particularly noteworthy and aligns with recent studies emphasizing the central role of digital tools in research training (Topcu & Goktas, 2021; Shin, 2020). This finding diverges from earlier research where software competence was either embedded within analysis efficacy or treated as a peripheral skill (Núñez-Peña et al., 2016). The stronger delineation of software efficacy in the present study likely reflects increased digitalization of statistics instruction, wider access to statistical packages, and curriculum reforms emphasizing hands-on data analysis.

The high internal consistency reliability coefficients obtained for all subscales (.821–.893) and the total scale (.907) are consistent with recent self-efficacy and statistics education studies that reported reliability values within similar ranges (Soper, 2016; Krumrei-Mancuso et al., 2017; Aminu & Gambo, 2020; Usher & Pajares, 2019). The convergence in reliability findings suggests that the ERSSEQ demonstrates strong internal homogeneity. The slightly higher reliability values observed in this study may be due to the large sample size, expert-guided item development, pilot testing, and rigorous psychometric screening procedures.

The strong convergent validity observed in the present study is also supported by recent empirical evidence indicating that task-specific self-efficacy measures outperform general academic self-efficacy scales in predicting engagement and achievement (Honicke & Broadbent, 2016; Schöber et al., 2018; Pan & Tang, 2021; Baaijen et al., 2020). The ERSSEQ's focus on concrete research and statistical tasks likely enhanced its sensitivity to students' genuine perceptions of competence, thereby strengthening its psychometric performance.

From a practical and instructional standpoint, the ERSSEQ offers a contemporary assessment tool that aligns with the cognitive and technological demands of modern research training. Recent studies emphasize that students' self-efficacy in research methods and data analysis significantly predicts persistence in research projects, thesis completion, and postgraduate success (Topcu & Goktas, 2021; Pan & Tang, 2021). The ERSSEQ can therefore serve as a diagnostic instrument for identifying students at risk of low research engagement and as an evaluative tool for monitoring the effectiveness of instructional interventions.

5. Conclusion

The development and validation of the ERSSEQ provide a reliable, valid, and multidimensional instrument for assessing students' self-efficacy in educational research and

statistics. The scale's robust psychometric properties, including high internal consistency, a clear factor structure, and excellent CFA fit indices, confirm its suitability for research, educational assessment, and instructional intervention. The ERSSEQ offers a practical, evidence-based tool to enhance teaching, learning, and student success in the complex domains of educational research and statistics.

6. Recommendations

Based on the study findings, the following recommendations are proposed:

1. Integrate the ERSSEQ as a routine assessment tool within research and statistics courses to identify students' confidence levels and inform instructional planning.
2. Develop targeted instructional modules to strengthen weaker self-efficacy domains, particularly for students demonstrating low confidence in data analysis or software usage.
3. Use ERSSEQ scores to monitor the effectiveness of interventions such as workshops, tutorials, and mentoring programs designed to improve research competence.
4. Conduct longitudinal studies to examine changes in students' self-efficacy over time and its predictive relationship with research performance.
5. Explore the relationship between ERSSEQ scores and related constructs such as statistics anxiety, academic motivation, and research productivity.
6. Encourage instructors to incorporate mastery experiences and vicarious learning opportunities to enhance students' self-efficacy in research and statistics tasks.
7. Adapt and validate the ERSSEQ in different cultural contexts to ensure cross-cultural applicability and relevance.
8. Employ the ERSSEQ in combination with qualitative assessments to provide a more comprehensive understanding of students' perceptions and challenges in educational research and statistics.

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Educational Research and Statistics Self-Efficacy Questionnaire (ERSSEQ)

Instruction:

Please tick (✓) the option that best describes how you feel about each statement.

| Strongly Disagree (SD) = 1 | Disagree (D) = 2 | Undecided (U) = 3 | Agree (A) = 4 | Strongly Agree (SA) = 5 |

Factor 1: Research Design Self-Efficacy

1. I can clearly formulate researchable problems. *(Positive)*
2. I find it difficult to identify appropriate research designs for studies. *(Negative)*
3. I am confident in formulating testable research hypotheses. *(Positive)*
4. Selecting relevant variables for a study is usually confusing to me. *(Negative)*
5. I can construct valid and clear research questions. *(Positive)*
6. I struggle to determine appropriate sample sizes for research. *(Negative)*
7. I can choose suitable instruments for data collection. *(Positive)*

Factor 2: Data Analysis Self-Efficacy

8. I can correctly code research data for analysis. *(Positive)*
9. I often feel lost when selecting appropriate statistical tests. *(Negative)*
10. I can compute descriptive statistics accurately. *(Positive)*
11. Interpreting correlation results is very difficult for me. *(Negative)*
12. I perform hypothesis testing with confidence. *(Positive)*
13. Using parametric statistics is usually confusing to me. *(Negative)*
14. I can analyze data using non-parametric statistical tests. *(Positive)*
15. I easily understand statistical output tables. *(Positive)*

Factor 3: Interpretation and Reporting Self-Efficacy

16. I can interpret research findings correctly. *(Positive)*
17. I find it hard to explain statistical results in simple language. *(Negative)*
18. I can write a complete and meaningful results section. *(Positive)*
19. Relating findings to previous literature is challenging for me. *(Negative)*
20. I can draw valid conclusions from research data. *(Positive)*
21. Making appropriate recommendations from findings is difficult for me. *(Negative)*
22. I can present research findings clearly and logically. *(Positive)*

Factor 4: Statistical Software Self-Efficacy

23. I can enter data into SPSS correctly. *(Positive)*
24. I find it difficult to run statistical analyses on SPSS. *(Negative)*
25. I can interpret SPSS output accurately. *(Positive)*
26. Using Excel for statistical analysis is confusing to me. *(Negative)*
27. I can generate tables and charts electronically without difficulty. *(Positive)*
28. I struggle to save and export analyzed data properly. *(Negative)*

Scoring Procedure (With Reverse Coding)

Positive items are scored directly:

SD = 1, D = 2, U = 3, A = 4, SA = 5

Negative Items to be Reverse-Scored:

Items 2, 4, 6, 9, 11, 13, 17, 19, 21, 24, 26, 28

Interpretation of Total Score

- 28 – 65 → Low Research & Statistics Self-Efficacy
- 66 – 103 → Moderate Self-Efficacy
- 104 – 140 → High Self-Efficacy