DEVELOPMENT AND VALIDATION OF SELF-EFFICACY SCALE IN ADVENTIST EDUCATION

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ABSTRACT

This study aimed to develop and validate a self-efficacy scale specific to Adventist education, a faith-based setting that emphasizes spirituality and values. The research sought to create a reliable and valid instrument to measure self-efficacy among Adventist students. A total of 239 students participated in the study, which involved the development of an 80-item questionnaire, guided by a comprehensive literature review and theoretical understanding of self-efficacy. Careful analysis using credible software, SPSS and SmartPLS, reduced the scale to 15 items across three dimensions: Motivation (7 items), Growth (4 items), and Faith (4 items). Reliability and validity tests, including convergent and discriminant analyses, confirmed the scale's suitability for assessing self-efficacy within this context. Cronbach's alpha values ranged from 0.712 to 0.854, with model fit indices meeting acceptable standards. The findings support the scale's effectiveness in measuring self-efficacy in Adventist education, with potential implications for student and teacher development. The study recommends further data collection to enhance the scale's robustness and generalizability. This instrument is expected to contribute significantly to Adventist schools by promoting both academic and spiritual growth.

Keywords: Self-efficacy Scale, Adventist education, EFA, CFA

INTRODUCTION

Self-efficacy, a core concept within social learning theory, significantly impacts individual behavior and academic performance. Bandura (1997) describes self-efficacy as the belief in one's capabilities to achieve specific tasks. This belief, influenced by various factors such as personal experiences, vicarious experiences, and social persuasion, plays a crucial role in determining a student's academic success (Meza et al., 2020; Van Zyl et al., 2022). Research confirms that high academic self-efficacy is linked to better academic performance and wellbeing (Gale et al., 2021). In the context of Adventist education, understanding and measuring self-efficacy is particularly important. Despite the general recognition of its impact

on academic achievement (Klomegah, 2007; Doménech-Betoret et al., 2017), there is a notable absence of a validated self-efficacy scale tailored for Adventist educational settings. Existing scales, developed for various domains (e.g., healthcare, academic performance), do not address the unique context of Adventist education (Colditz, 2014). This study aims to address this gap by developing and validating a self-efficacy scale specifically for Adventist education institutions. By creating a tool that accurately measures self-efficacy beliefs within this context, the research seeks to enhance understanding of factors influencing academic success and personal growth among Adventist students (Bryant, 2017). The study will use quantitative methods to assess the reliability and validity of the proposed scale and explore its applicability in improving educational outcomes. In summary, this research will provide a valuable tool for educators and researchers, offering insights into student self-efficacy within Adventist schools and contributing to better support strategies for enhancing academic performance.

LITERATURE REVIEW

Self-Efficacy in Educational Context

Self-efficacy, defined by Bandura (1997) as an individual's belief in their capability to execute behaviors necessary to achieve specific performance goals, plays a crucial role in education. It influences students' motivation, learning, and academic success. Klassen and Usher (2010) demonstrated that self-efficacy is a predictor of academic success, mediating the effects of prior achievements and intelligence. Schunk and DiBenedetto (2020) further noted that self-efficacy affects student engagement and persistence, with interventions to boost self-efficacy leading to improved academic outcomes. Usher et al. (2019) highlighted that students with high self-efficacy are more likely to set challenging goals and utilize effective learning strategies. Instruments like the Self-Efficacy for Self-Regulated Learning (SESRL) scale assess students' beliefs in their ability to manage learning (Zimmerman, 2000), while Huang (2022) validated the Academic Self-Efficacy Scale (ASES) for diverse populations.

Self-Efficacy

Bandura (1977) identified four key sources of self-efficacy: mastery experiences, vicarious experiences, verbal persuasion, and physiological arousal. These sources significantly impact educational settings, including Adventist education, which emphasizes holistic development.

Mastery Experiences

The most potent source of self-efficacy, mastery experiences are fostered through academic, extracurricular, and community activities in Adventist education. Successful

participation enhances self-efficacy, while early failure can be detrimental (Bandura, 1997). The holistic approach in Adventist education integrates faith and practice, reinforcing self-efficacy through reflection and achievement (Smith, 2002; Kwarteng, 2021).

Vicarious Experiences

Observing the success of peers and mentors influences self-efficacy. Adventist schools promote a supportive environment where students learn from each other through cooperative learning and mentorship (Zhou et al., 2017; Ogle et al., 2017). Witnessing peers succeed in similar contexts enhances motivation and self-efficacy (Herawati & Purwanti, 2018; Pajares & Urdan, 2006).

Verbal Persuasion

Encouragement and positive reinforcement from teachers and mentors are crucial for building self-efficacy. Adventist education emphasizes character development, with teachers providing affirmations and feedback (Zetou et al., 2012; Wang et al., 2021). The credibility of the encourager enhances the effectiveness of verbal persuasion (Bang & Reio, 2017).

Physiological Arousal

Emotional states impact performance. Adventist education promotes well-being through physical education and spiritual practices, helping students manage stress and maintain positive emotions, which support self-efficacy (Jones et al., 2002; Blascovich, 1992; Craig, 2014; Damasio, 1999; Golland et al., 2014).

Student Self-Efficacy

Self-efficacy is vital for student motivation and academic performance. Cebu (2023) found high levels of self-efficacy among college students, significantly associated with academic year level but not age or gender. Educators are encouraged to implement programs to enhance self-efficacy. Honicke et al. (2023) explored the reciprocal relationship between academic success and self-efficacy, noting that while achievement can improve self-efficacy, initial task performance and difficulty also play roles. Musa (2020) identified a significant association between academic performance and self-efficacy, suggesting that universities should adopt strategies to enhance self-efficacy.

Instrument Development and Validation

Many self-efficacy scales are integrated into larger measurement tools, such as the Patterns of Adaptive Learning Scale (Midgley et al., 2000). Existing scales often focus on a single source of self-efficacy (Harter, 1985; Pintrich & De Groot, 1990; Jinks & Morgan, 1999;

Midgley et al., 2000; Anderman et al., 2005). Studies by Do-Hong et al. (2015) and Huang (2013) developed and validated academic self-efficacy scales for Asian cultures, primarily focusing on mastery experiences. Validation is critical for ensuring measurement accuracy and reliability (Zaki, 2017). Reliable scales must use appropriate methods, such as structural equation modeling, and consider cultural relevance (Abad et al., 2011; Crawford et al., 2010). A comprehensive self-efficacy instrument helps identify students needing support and tailor interventions (Cooper, 2015). DeVellis (2017) provides guidance on scale development, emphasizing rigorous psychometric evaluation. Recent studies, including Worthington and Whittaker (2019) and Klassen and Usher (2019), stress the need for context-specific instruments in faith-based education settings, reflecting academic and spiritual components.

Adventist Education

Adventist education integrates faith with learning, aiming to connect students with Jesus Christ (Appiah & Wa-Mbaleka, 2015). The Adventist Education Network, established over a century ago, has expanded significantly, especially in Brazil, contributing to church growth and discipleship (Ferreira & Souza, 2018; Riapolov, 2021; Florez, 2021). The philosophy emphasizes holistic development, preparing students for academic, moral, and spiritual growth (Knight, 2019). Research supports the positive impact of Adventist education on academic success, faith engagement, and overall well-being (Thompson et al., 2021; White & Brown, 2022). Teachers in Adventist schools, who are expected to be experienced Christians, play a crucial role in nurturing students' faith and character (Rao, 2008; Rao, 2009; White, 1995). Developing a self-efficacy scale tailored to Adventist education is essential for measuring students' confidence in applying biblical principles and making ethical decisions. Such a scale would aid in assessing students' internalization of Adventist values and support their holistic development (Espinoza, 2012). Developing and validating a self-efficacy scale specific to Adventist education is crucial for supporting students' holistic development. This tool would enhance educational outcomes by fostering confidence and resilience, aligning with Adventist education's core principles and mission.

Theoretical Framework

The development of a self-efficacy instrument for Adventist education is based on Bandura's Self-Efficacy Theory, which asserts that self-efficacy affects motivation, behavior, and performance (Bandura, 1997). The framework integrates Bandura's components—mastery experiences, vicarious experiences, verbal persuasion, and physiological states—with the unique aspects of Adventist education, including faith integration and holistic development. The study aims to reflect how self-efficacy is experienced by Adventist students. Bandura (1997) identifies four sources of self-efficacy beliefs: 1.Mastery Experiences: Successes and failures that inform individuals about their capabilities. 2.Vicarious Experiences: Observations

of others' achievements that influence self-efficacy through modeling and social comparison. 3. Verbal Persuasion: Encouragement from credible sources that can boost self-efficacy. 4. Physiological and Affective States: Physical and emotional responses during performance that can either enhance or diminish self-efficacy beliefs, especially under stress. The study aims to create an instrument that captures these dimensions within the context of Adventist education.

METHODS

The methodology includes sampling, data collection, variable measurement, target population, and data analysis. The study aimed to validate the Sources of Self-Efficacy Scale in Adventist Education. The sample population consisted of students from South Philippine Adventist College, Matutum View Academy, and Adventist College of Technology. The target population included 239 students from Grades 7, 11, and first-year college in Adventist schools. The individual students were the units of analysis. Convenience sampling was used to ensure that the researchers could efficiently gather respondents and conduct the survey, aligning with the study's practical needs and constraints. Respondent profile: Grade 7 from SPAC: 38 students Grade 7 from MVA: 34 students Grade 11 from SPAC: 56 students Grade 11 from MVA: 64 students First-year college from SPAC: 37 students First-year college from ACT: 10 students Total: 239 respondents Data collection was conducted through a structured questionnaire following Creswell (2014). Most of the measures operate in a 0.00 to 1.00 range with larger values ideal for the CFI, IFI, TLI, NFI, and MCI. Values closer to 0.00.

The questionnaire, specifically designed for this study, was validated by a panel of experts to ensure its alignment with the research goals and its ability to measure self-efficacy. The researcher-made questionnaire focused on students' perceptions of self-efficacy and used a four-point Likert scale, ranging from "Not Much" to "A Lot." After obtaining permission from school officials and ethical clearance, the questionnaire was distributed to the selected respondents. Informed consent was secured, ensuring voluntary participation, confidentiality, and adherence to ethical standards. The consent process involved providing each respondent with a consent form outlining the purpose of the study, ensuring their anonymity, and confirming voluntary participation. Variable measurement: The dependent variable was the students' self-efficacy, while the independent variables were the sources of self-efficacy assessed through various questionnaire items.

Reliability testing was conducted using Cronbach's alpha to ensure internal consistency, providing a quantitative measure of the instrument's reliability (Frost, 2019). Validity testing was done using factor analysis, including both Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), to verify that the instrument accurately measured the intended dimensions of self-efficacy. The Likert scale used for responses: 1.00–1.50: Not Much 1.51–2.50: A Little 2.51–3.50: Some 3.51–4.00: A Lot Data analysis involved various statistical techniques: - Exploratory Factor Analysis (EFA) was used to identify latent variables and ensure the dimensionality of the scale. - Confirmatory Factor Analysis (CFA) was

employed to confirm the factor structure derived from the EFA. - Cronbach's alpha was used to assess the internal consistency of the questionnaire items, ensuring the instrument's reliability in measuring the sources of self-efficacy. The Structural Equation Modeling (SEM) was employed to test the hypothesized model of self-efficacy within the context of Adventist education (Kline, 2015). This approach provided a comprehensive framework for understanding how self-efficacy develops and influences student outcomes in this educational environment. As explained by Krebsbach (2013), the structural equation modeling (SEM) is used in social science research, but not much is known about how it works with small samples. Usually, a sample size of 200 or more is recommended, but the researcher explored how SEM works with smaller samples (like 50, 100, and 200). He used two studies to look at different ways to check if the model fits and how confidence intervals (CIs) can be used to improve the results when the sample size is small.

RESULTS AND DISCUSSION

Reliability ensures the consistency and stability of measurement results. It includes methods such as internal consistency, test-retest reliability, and inter-rater reliability. Cronbach's alpha is a commonly used statistic for assessing internal consistency, with values above 0.70 considered acceptable, and 0.80 or higher preferred (Cortina, 1993). Validity measures how accurately a tool assesses what it intends to. Key types include: Face Validity whether the tool seems to measure the intended construct. Content Validity Whether the tool covers all relevant aspects. Construct Validity whether the tool measures the underlying concept. Criterion Validity whether the tool correlates with external criteria.

Reliability is evaluated using Cronbach's alpha, with higher values indicating better reliability. It's crucial for ensuring the consistency of the measurement tool. Validity involves expert reviews and analyses, such as factor analysis, to confirm that the tool measures the intended constructs accurately. Face, content, construct, and criterion validity are assessed to ensure comprehensive measurement. Exploratory Factor Analysis (EFA) was used to refine the questionnaire from 80 items to 15, identifying relevant factors and discarding those with low loadings or cross-loadings. This process aimed to align the questionnaire with the theoretical dimensions of self-efficacy.

Table 1.
Factor Loadings from EFA (SPSS result)

Indicators	1	2	3
68. Seeing how service projects affect people motivates me to volunteer.	.716		
74. Other classmates told me I could be successful.	.712		
69. Seeing how role models balance life inspires me to do the same.	.670		
76. Being trusted as a classroom leader empowers me to believe I	.662		

can lead next time.			
79. Impact of service projects motivates me to get involved.	.642		
67. I learned how to be a good student form certain teachers.	.637		
63. Witnessing the academic excellence of others encourages me to set higher goals.	.632		
47. Encouragement inspires me to take on new challenges.	.624		
58. My teacher advises me on how to improve in class	.567		
36. Role models' academic excellence motivates me to strive for the same.	.502		
66. Watching others apply spiritual principles motivates me to do the same.	.417		
27. Managing stress improves my academic performance.	.709		
28. Community connection boosts my self-esteem.	.622		
26. Physical well-being boosts my confidence.		.617	
50 .Reduced stress improves my performance.		.541	
10. My mistakes serve as lesson for me to grow		.532	
32. Emotional management improves my focus on academics.		.516	
16. Positive impacts of service activities encourage my participation.		.507	
05. Giving feedback helps me improve and grow		.492	
03. Supportive comments make me feel more confident		.404	
37. Good grades are a result of Jesus' guidance.			.710
33. Trusting Jesus, I'm certain His plan surpasses immediate outcomes			.681
44. Jesus helps me be a good student in class and in life			.680
41. With Jesus' help, I excel in difficult assignments			.671
52. Successful moments in class are thanks to Jesus' guidance and Adventist principles.			.549

The study used Confirmatory Factor Analysis (CFA) to align items with three hypothesized factors: Motivation, Growth, and Faith. Items with cross-loadings above 0.32 were removed to improve the distinctiveness of the factors. The resulting factor loadings were strong for Motivation (0.417-0.716), Growth (0.404-0.709), and Faith (0.549-0.710), showing clear associations with their respective constructs. Cronbach's alpha values exceeded 0.70, indicating reliable internal consistency. The study's rigorous statistical testing confirmed the validity and reliability of the factor structure, providing a solid basis for future research.

Table 2.
SPSS Internal Consistency

Components	Cronbach Alpha
Motivation	.874
Growth	.768
Faith	.738

The results in Table 2 show Cronbach's alpha values of 0.874 for "Motivation," 0.768 for "Growth," and 0.738 for "Faith," indicating good internal consistency for all components. While the reliability is acceptable, a deeper analysis of construct validity was conducted using SmartPLS to assess both convergent and discriminant validity. Convergent validity ensures the same trait is measured across methods, while discriminant validity ensures traits are distinct.

SmartPLS offered more detailed item elimination suggestions compared to SPSS, enhancing the model's validity. The findings emphasize the importance of CFA in verifying factor structures and ensuring reliable theoretical models.

Table 3.
Motivation

Latent Construct	Items	Factor Loadings	Number of items	Cronbach Alpha	Composite reliability	Reliability coefficient Rho	AVE
Motivation	m 2	.728	7	.854	.889	.856	.533
	m 3	.750					
	m 4	.751					
	m 5	.747					
	m 7	.687					
	m 8	.717					
	m 1	.729					

The latent construct "Motivation" was evaluated using Confirmatory Factor Analysis (CFA), revealing strong factor loadings for its seven items (m1, m2, m3, m4, m5, m7, m8), ranging from 0.687 to 0.751. These items showed high internal consistency, with a Cronbach's alpha of 0.854, well above the accepted 0.70 threshold. Items rm6, m9, and m11 were identified for potential removal due to weaker associations. The composite reliability was 0.889, and the Rho coefficient was 0.856, further confirming the scale's robustness. The Average Variance Extracted (AVE) was 0.533, surpassing the 0.50 threshold, affirming the convergent validity. These results indicate the "Motivation" construct is reliable and valid, providing a strong foundation for future research.

Table 4
Growth

Latent Construct	Items	Factor Loadings	Number of items	Cronbach Alpha	Composite reliability	Reliability coefficient Rho	AVE
Growth	g21	.704	4	.712	.820	.721	.533
	g22	.761					
	g23	.705					
	g24	.748					

The latent construct "Growth" was assessed using Confirmatory Factor Analysis (CFA), with four items (g21, g22, g23, g24) showing strong factor loadings (0.704 to 0.761) and good internal consistency (Cronbach's alpha of 0.712). Composite reliability was 0.820, and Rho was 0.721, both affirming the reliability of the construct. The Average Variance Extracted (AVE) was 0.533, confirming convergent validity. Five items (g25, g26, g27, g28, g29) were removed due to weak or cross-loadings, improving the construct's robustness. The results

demonstrate that the remaining items provide a valid and reliable measure of "Growth," ensuring a solid foundation for future research

Table 5
Faith

Latent Construct	Items	Factor Loadings	Number of items	Cronbach Alpha	Composite reliability	Reliability coefficient Rho	AVE
Faith	f31	.672	4	.716	.823	.737	.539
	f32	.792					
	f33	.682					
	f34	.782					

The latent construct "Faith" was evaluated using Confirmatory Factor Analysis (CFA), with four items (f31, f32, f33, f34) showing strong factor loadings (0.672 to 0.792) and good internal consistency (Cronbach's alpha of 0.716). The composite reliability was 0.823, and Rho was 0.737, both affirming the construct's reliability. The Average Variance Extracted (AVE) was 0.539, indicating strong convergent validity. One item (f35) was removed due to weak factor loading, improving the model's fit and reliability. Overall, the results confirm that the remaining items provide a valid and reliable measure of "Faith."

Table 6
Fornell-Larcker criterion – Inter-construct correlations and squared AVE

	AVE	Growth	Faith	Motivation
Growth	.533	**.730**		
Faith	.539	.362	**.734**	
Motivation	.533	.504	.433	**.730**

The Fornell-Larcker criterion was applied to assess discriminant validity, confirming that the constructs are distinct and not overly correlated. Table 6 shows that the squared AVE values for Role Model (0.533), Managing Stress and Building Resilience for Success (0.533), and Faith in God's Guidance and Support (0.539) all exceed their inter-construct correlations, meeting the discriminant validity standard. This confirms that the constructs are distinct. The high factor loadings, internal consistency, and composite reliability, along with the confirmed discriminant validity, validate the robustness of the "Faith" construct, providing a strong foundation for future research.

Table 7.
Model Fit summary

Criteria	**Achieved Values**
SRMR	0.075

NFI	0.794

The model fit for the Self-Efficacy Scale indicates a satisfactory fit to the data. As stated by Hu & Bentler (1999); Schermelleh-Engel et al., (2008); Karagoz (2019), the acceptable fit (0.05<SRMR<0.08). However, the SRMR value of 0.075, within the acceptable range of 0 to 0.08, shows small residuals, indicated a good fit. The NFI value of 0.794, within the acceptable range of 0.60 to 0.90, further supports the fit. Overall, the scale demonstrates good internal consistency, construct validity, discriminant validity, and model fit, confirming that it is a reliable and valid measure of student self-efficacy in Adventist education.

SELF-EFFICACY SURVEY

"Development and Validation of Self-Efficacy Scale in Adventist Education," addresses the need for a self-efficacy measure tailored to the Adventist educational context. Originally composed of 80 items, the analysis using SPSS and SmartPLS efficiently reduced the questionnaire to 15 items, categorized into Motivation, Growth, and Faith. This validated tool emphasizes the role of spirituality, personal growth, and academic motivation, aiming to support self-efficacy assessment for both students and educators in Adventist institutions.

Indicators	Not Much	A little	Some	A lot
Motivation	**1**	**2**	**3**	**4**
1. Other classmates told me I could be successful				
2. Seeing how role models balance life inspires me to do the same.				
3. Being trusted as a classroom leader empowers me to believe I can lead next time.				
4. Impact of service projects motivates me to get involved.				
5. Witnessing the academic excellence of others encourages me to set higher goals.				
6. Encouragement inspires me to take on new challenges.				
7. Seeing how service projects affect people motivates me to volunteer.				
Growth	**1**	**2**	**3**	**4**
8. Managing stress improves my academic performance.				
9. Community connection boosts my self-esteem				
10. Physical well-being boosts my confidence				
11. Reduced stress improves my performance				
Faith	**1**	**2**	**3**	**4**
12. Trusting Jesus, I'm certain His plan surpasses immediate outcomes.				
13. Good grades are a result of Jesus' guidance.				
14. Jesus helps me be a good student in class and in life				
15. With Jesus' help, I excel in difficult assignments.				

CONCLUSION, IMPLICATION, SUGGESTION, AND LIMITATIONS

The study developed a reliable and valid Self-Efficacy Scale tailored to the Adventist educational context. The three-factor model—Motivation, Growth, and Faith—proved effective in measuring self-efficacy, integrating both psychological theory and faith-based values. This provides a deeper understanding of how Adventist beliefs influence students' self-efficacy in education. Implications: The scale offers a valuable tool for educators, mentors, and leaders to assess and support students' self-efficacy. Its focus on Motivation, Growth, and Faith highlights the importance of integrating academic, personal, and spiritual development. This approach can guide educational strategies to foster resilience, well-being, and spiritual growth, contributing to better academic and personal outcomes.

Educators and mentors should incorporate role modeling, stress management, and faith-based support into their curricula. Students are encouraged to seek positive role models, practice stress management, and build faith-based support systems. Workplace leaders should cultivate supportive cultures that prioritize employee well-being and resilience. Community leaders are urged to create programs that promote resilience, stress management, and faith-based support. Faith-based communities can offer spiritual guidance, counseling, and foster a sense of belonging. Policymakers should advocate for initiatives that prioritize mental health and resilience across educational, workplace, and community settings.

The study focused on Adventist educational settings, which may limit its applicability to non-faith-based contexts. The sample size and focus on specific Adventist institutions could also limit the generalizability of the findings. Further research is recommended to validate the scale in more diverse educational and cultural setting.

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