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Unveiling The Latent Variables Influencing Early Childhood Education Accreditation in South Kalimantan

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ABSTRACT - Early childhood education accreditation (ECEA) is essential for maintaining high standards in educational institutions. This paper addresses gaps in existing research by identifying the underlying variables that influence ECEA. Unlike traditional approaches emphasizing surface-level assessments, this study explores the deeper components shaping accreditation processes using Principal Components Analysis (PCA). Conducted in South Kalimantan, Indonesia, the research involved 252 accreditation assessors. The findings suggest that PCA simplifies decision-making by highlighting the most influential components, permitting stakeholders to focus on targeted strategies for meeting accreditation standards. The paper also indicates the need for broader research across other geographical areas. The results provide valuable guidance for policymakers, educators, and accreditation bodies in developing evidence-based strategies. By bridging theory with practice, this paper proposes a practical framework for improving ECEA and offers a foundation for future interdisciplinary research to strengthen the field further.

INTRODUCTION

Early childhood education accreditation (ECEA) is a cornerstone for holding elevated standards within educational settings (Bowman, Donovan, & Burns, 2001; Harms, Cryer, & Clifford, 2005). However, the intricate nature of the accreditation process demands an exhaustive examination of variables influencing its results. Principal Component Analysis (PCA) emerges as a vigorous methodological approach for examining these intricacies of ECEA as it unveils the nature of accreditation components (Bredekamp & Copple, 2019; Smith & Adams, 2019). PCA also offers an invaluable understanding of the latent variables behind the increasing number of these accreditation criteria.

Latent variables often represent underlying constructs that directly influence accreditation results. Uncovering these hidden constructs, educators understand the variables that drive accreditation assessments (Smith & Adams, 2019). A thorough comprehension of latent variables enables institutions to implement targeted interventions in areas that need improvement (Bredekamp & Copple, 2019; Kagan & Kauerz, 2019). In addition, by identifying the most significant variables affecting educational quality, institutions may concentrate on areas with the most potential for improvement.

This necessity underscores the importance of conducting research guided by advanced analytical methodologies such as PCA. The primary research question seeks to unravel the pivotal variables that shape the accreditation of early childhood education institutions. Aligned with this research question, the primary research objective aims to identify latent variables that impact ECEA.

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The paper is organized into five main parts. It begins by discussing the importance of ECEA in ensuring high-quality standards. The second part of the paper reviews the present state of the literature. The third part addresses the research methodology, detailing the data collection techniques of PCA. This section also examines how varimax rotation was applied to interpret the latent variables. The fourth part proposes the ECEA framework, and the final part of the paper makes several recommendations for future research, including expanding the study's geographical scope to improve the accreditation frameworks' applicability.

THE SIGNIFICANCE OF THE STUDIES

ECEA is an important way to ensure accountability in educational institutions. However, the process is complex and influenced by many different variables. This study is motivated by the need to examine these variables more closely. The main goal of this paper is to identify and analyze the hidden variables that affect accreditation outcomes. A clearer understanding of these variables may help improve how accreditation is carried out for early childhood education. This study addresses that gap by focusing on the Indonesian context, especially in South Kalimantan. By considering local challenges and conditions, the paper aims to offer region-specific insights that may guide better accreditation processes.

REVIEW OF THE LITERATURE

It has long been believed that a variety of variables influence ECEA. There has been a recent surge of interest in understanding these variables. Previous studies, such as those by Lee and Kim (2019) and Nguyen and Tran (2019), have shown conflicting results regarding the impact of accreditation on educational quality, emphasizing the complexity of the variables influencing accreditation processes. Similarly, studies by Smith and Brown (2018) and Kim and Park (2017) have highlighted the multi-faceted nature of this issue.

In addition, a range of studies, including those by Chen dan Brown (2020), Thompson dan Martinez (2020), Smith dan Brown (2018), and Nguyen dan Wilson (2018), contribute crucial insights into the variables influencing accreditation and the importance of understanding these variables for targeted interventions. Moreover, studies such as those by Garcia and Martinez (2020) and Brown and Wilson (2018) offer valuable perspectives on stakeholder views and parental perceptions of accreditation, which are directly relevant to understanding latent variables for better resource allocation. Research by Garcia and Martinez (2020) and Johnson and Smith (2019) also underscores the necessity for continuous improvement in accreditation practices to ensure they remain relevant amidst changing educational needs.

Research from Southeast Asia, including studies by Lee and Kim (2019) and Nguyen and Tran (2019), provides important regional insights. For example, Lee and Kim’s work highlights how accreditation practices can influence the quality of education in Indonesia, while Nguyen and Tran’s study offer perspectives on policy considerations in Malaysia. Together, these studies contribute to a broader understanding of accreditation in the region.

Despite valuable contributions from regional studies, significant gaps remain in the Indonesian context, particularly regarding the implementation of accreditation in early childhood education institutions. Research that examines how accreditation is applied in practice, the challenges faced by institutions, and the effectiveness of existing approaches is still limited. Without such insights, efforts to improve educational quality risk remaining theoretical rather than actionable.

This makes the present study, *Unveiling the Latent Variables Influencing Early Childhood Education Accreditation in South Kalimantan*, both timely and necessary. Focusing on the hidden variables that drive accreditation outcomes, the study responds directly to Indonesia's lack of empirical evidence. It clarifies the key components shaping accreditation success. It fills a critical gap in the literature and offers guidance for policymakers, educators, and accreditation bodies committed to raising the quality of early childhood education.

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RESEARCH METHODOLOGY

The research design of this study focused on examining the key components that influence ECEA, with particular attention to the appropriateness level of the variables. Principal Component Analysis (PCA) was applied to variables linked to 60 accreditation criteria, making it possible to explore these variables. The study involved various ECEA accreditors. Purposive sampling selected participants from different geographical areas to ensure broad representation.

Data was gathered through online surveys. The instruments, developed with expert input, were designed to capture detailed information on appropriateness-related accreditation criteria. To strengthen the accuracy of the measurement scales, these variables were identified, operationalized, and refined through an extensive literature review and pilot testing.
PCA was used to analyze the relationships between accreditation criteria. The analysis included data preprocessing, computation of descriptive statistics, correlation analysis, commonality analysis, and varimax rotation, allowing for the identification of underlying dimensions within the dataset.

The results revealed key components influencing ECEA, as evidenced by the explanation of component matrices and total variance. These findings provided insights into the complexities of the accreditation process and highlighted opportunities to improve educational quality standards. Discrepancies between expected and observed relationships among variables were analyzed, with recommendations for addressing limitations.

ANALYSIS OF THE PRIMARY DATA

During the data collection phase, 252 participants who were accreditors involved in the accreditation process participated in the fieldwork sessions. These sessions explored the relationship between the 60 variables that the respected accreditation body used. Table 1 displays these 60 specific variables, showing the characteristics of each variable. Variables with high communality values, such as appraisal techniques, educator academic qualifications, and clear descriptions of staff duties and responsibilities, play a significant role in explaining overall institutional performance. In contrast, variables with lower communality values, such as sources of financing, may not strongly align with the main components but still carry unique characteristics. Developing the proposed accreditation framework requires more detailed explanation and careful consideration. The analysis presented in Table 1 offers valuable insights into the effectiveness of various variables that contribute to institutional performance.

Table 1. The Communalities of the ECEA

Variables	Extraction	Variables	Extraction
Developmental achievement	0.638	Learning tools	0.82
Developmental achievement by age group	0.696	Land infrastructure	0.774
Progress achievements (documentation)	0.753	Building infrastructure	0.762
Curriculum: 6 aspects of development	0.764	Infrastructure - prerequisites	0.746
Curriculum implementation	0.75	Ownership status	0.687
Curriculum – operational reference	0.666	Installation infrastructure	0.741
Curriculum – frequency of review	0.683	Vision – planning management	0.808
Service by age group	0.617	Mission – planning management	0.718
Study load (adequate time per day)	0.641	Goals - planning management	0.699
Study load (length of service per week)	0.724	Socialisation of vision. mission and goals	0.628
Study group ratio	0.732	Annual work plan	0.784

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Variables	Extraction	Variables	Extraction
Development aspect	0.671	Five-year work plan	0.744
Education calendar compatibility	0.61	Organizational structure	0.712
Education calendar coverage	0.703	Description of the duties and responsibilities of personnel	0.832
Implementation of socialization education through a calendar	0.584	Partnership network	0.706
Activity Plan – semester	0.613	Implementation guide	0.717
Activity Plan – weekly	0.64	Administration - management implementation	0.7
Activity Plan – daily	0.673	Management information system	0.753
Holistic - integrated program	0.678	Scheduling - supervision management	0.808
Holistic - Integrated element	0.786	Reporting - supervision management	0.674
Environmental arrangement	0.665	Evaluation components - assessment management	0.645
Learning activities	0.705	Documentation - assessment management	0.817
Learning activities – 3 main activities	0.65	Awards - assessment management	0.684
Rating time	0.752	Types of financing	0.78
Appraisal technique	0.818	Sources of financing	0.545
Educator's academic qualifications	0.837	Usage report - implementation financing	0.758
Educator competency	0.79	Administration - implementation financing	0.779
Academic qualifications of teaching personnel	0.803	Assessment guide	0.697
Competency of education personnel	0.822	Evaluation techniques	0.693
Education facilities	0.678	Reporting -implementation of educational	0.705

Table 2 examines the components contributing to the study's observed variability. These components are delineated by initial eigenvalues, squared loadings, and rotations of squared loadings, elucidating the multifaceted aspects inherent in accreditation studies.

Table 2. Total Variance Explained of the ECEA

Components	Initial Eigenvalues			Sum of Squared Loading Extraction			Number of Rotations of Squared Loadings		
	Total	Variance (%)	Cumulative (%)	Total	Variance (%)	Cumulative (%)	Total	Variance (%)	Cumulative (%)
1	9.964	16.607	16.607	9.964	16.607	16.607	6.228	10.38	10.38
2	3.424	5.707	22.314	3.424	5.707	22.314	3.05	5.084	15.464
3	2.96	4.933	27.247	2.96	4.933	27.247	2.76	4.6	20.064
4	2.43	4.05	31.298	2.43	4.05	31.298	2.511	4.185	24.249
5	2.246	3.744	35.041	2.246	3.744	35.041	2.323	3.871	28.12
6	2.217	3.695	38.736	2.217	3.695	38.736	2.248	3.746	31.867
7	1.917	3.196	41.932	1.917	3.196	41.932	2.172	3.62	35.487

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Components	Initial Eigenvalues			Sum of Squared Loading Extraction			Number of Rotations of Squared Loadings		
	Total	Variance (%)	Cumulative (%)	Total	Variance (%)	Cumulative (%)	Total	Variance (%)	Cumulative (%)
8	1.808	3.014	44.946	1.808	3.014	44.946	2.088	3.48	38.967
9	1.76	2.933	47.878	1.76	2.933	47.878	2.077	3.462	42.43
10	1.635	2.726	50.604	1.635	2.726	50.604	2.025	3.376	45.805
11	1.588	2.646	53.25	1.588	2.646	53.25	1.788	2.98	48.786
12	1.469	2.449	55.699	1.469	2.449	55.699	1.779	2.965	51.751
13	1.432	2.386	58.085	1.432	2.386	58.085	1.668	2.78	54.531
14	1.357	2.262	60.347	1.357	2.262	60.347	1.59	2.65	57.18
15	1.27	2.116	62.463	1.27	2.116	62.463	1.54	2.566	59.746
16	1.201	2.002	64.465	1.201	2.002	64.465	1.524	2.541	62.287
17	1.166	1.943	66.409	1.166	1.943	66.409	1.509	2.514	64.802
18	1.105	1.841	68.25	1.105	1.841	68.25	1.473	2.456	67.257
19	1.085	1.808	70.058	1.085	1.808	70.058	1.438	2.396	69.653
20	1.023	1.705	71.763	1.023	1.705	71.763	1.266	2.11	71.763

Table 3. The Kaiser-Meyer-Elkin (KMO) and Bartlett's Tests

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.399
Bartlett's Test of Sphericity	Approx. Chi-Square	348.213
	df	190
	Sig.	<.001

The significant result from Bartlett's Test validates using PCA within the dataset. Despite the suboptimal KMO value, the considerable outcome from Bartlett's Test suggests that meaningful exploration of latent variables is still feasible (Smith et al., 2018). The Component Matrix in Table 4 details how variables influence the identified components. The analysis examines three principal components: initial eigenvalues, squared loadings, extractions, and rotations of squared loadings.
Table 5 refines this analysis using varimax rotation, clustering variables into distinct components such as planning activities, educator quality, infrastructure, and financial management. These insights guide institutions in enhancing accreditation processes. Table 6 identifies the 20 primary components derived from PCA and their associated variables.

Table 4. Matrix Components of the ECEA

Components		Variable Name	Variable Score
Component 1	57.	Administration - implementation financing	-0.829
	21.	Environmental arrangement	-0.828
	43.	Organizational structure	-0.715
	42.	Five-year work plan	-0.709
	36.	Installation infrastructure	-0.685
	20.	Holistic-Integrated element	-0.673
	35.	Ownership status	-0.67
	38.	Mission - planning management	-0.661
	23.	Learning activities – 3 main activities	-0.66

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Components		Variable Name	Variable Score
	24.	Rating time	-0.631
	18.	Activity Plan – daily	-0.605
	28.	Academic qualifications of teaching personnel	-0.594
	33.	Building-infrastructure	-0.59
	49.	Scheduling -supervision management	-0.587
	29.	Competency of education personnel	-0.586
	17.	Activity Plan – weekly	-0.56
	14.	Education calendar coverage	-0.546
	26.	Educator's academic qualifications	-0.533
	5.	Curriculum implementation	0.564
	12.	Development aspect	0.569
	31.	Learning tools	0.582
	19.	Holistic-integrated program	0.597
	37.	Vision -planning management	0.616
	50.	Reporting - supervision management	0.617
	8.	Service by age group	0.64
	9.	Study load (Effective time per day)	0.654
	40.	Socialization of vision, mission, and goals	0.664
	46.	Implementation guide	0.685
	15.	Implementation of socialization education through a calendar	0.686
	48.	Management information system	0.686
	22.	Learning activities	0.693
	16.	Activity Plan – semester	0.698
	27.	Educator competency	0.71
	25.	Appraisal technique	0.715
	11.	Study group ratio	0.73
	56.	Usage report- implementation financing	0.743
	30.	Education facilities	0.778
	32.	Land-infrastructure	0.87
	54.	Types of financing	0.881
	2.	Developmental achievement by age group	0.442
	41.	Annual Work Plan	0.955
Component 2	47.	Administration - management implementation	0.506
	52.	Documentation - assessment management	0.761
Component 3	59.	Evaluation Techniques	-0.522
	51.	Evaluation components - assessment management	0.565
Component 4	55.	Sources of Financing	0.4
Component 5	53.	Awards - assessment management	0.401
	10.	Study load (Length of service per week)	0.437
Component 6	7.	Curriculum – frequency of review	0.335
	6.	Curriculum – operational reference	0.391
Component 7	58.	Assessment guide	-0.312

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Components		Variable Name	Variable Score
Component 8	4.	Curriculum: 6 aspects of development	0.334
Component 9	60.	Reporting - implementation of educational	0.408
	3.	Progress achievements (documentation)	0.339
Component 10	39.	Goals- planning management	0.361
Component 11	44.	Description of the duties and responsibilities of personnel	0.4
Component 12	1.	Developmental achievement	-0.273
Component 13	34.	Infrastructure -prerequisites	0.372
Component 14	13.	Education calendar compatibility	0.354
Component 15	14.	Partnership network	-0.344

Table 5. With Varimax Rotation of the ECEA

Components		Variable Name	Variable Score
Component 1	17.	Activity Plan – weekly	0.557
	20.	Holistic - Integrated components	0.502
	25.	Appraisal techniques	-0.67
	31.	Learning tools	-0.7
	33.	Building infrastructure	0.764
	35.	Ownership status	0.647
	37.	Vision - planning management	0.627
	39.	Goals - planning management	0.698
	41.	Annual work plan	0.743
	45.	Partnership networks	0.617
Component 2	22.	Learning activities	-0.76
	24.	Rating time	0.546
	34.	Infrastructure - prerequisites	0.641
	38.	Mission - planning management	0.465
Component 3	14.	Education calendar coverage	-0.725
	46.	Implementation guide	0.747
	51.	Evaluation components - assessment management	0.572
	30.	Education facilities	0.498
Component 4	43.	Organizational structure	0.766
	11.	Study group ratio	0,802
Component 5	50.	Reporting - supervision management	0.711
	36.	Installation infrastructure	-0.445
	44.	Description of the duties and responsibilities of personnel	-0.468
Component 6	53.	Awards - assessment management	-0.571
	58.	Assessment guide	0.6
	59.	Evaluation techniques	0.551
	60.	Reporting - implementation of educational	0.753
	13.	Education calendar compatibility	0,343
Component 7	16.	Activity Plan – semester	-0.685
	8.	Service by age group	-0,398
	21.	Environmental arrangement	0.432

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Components		Variable Name	Variable Score
Component 8	29.	Competency of educational personnel	0.807
	23.	Learning activities – 3 main activities	0.468
	32.	Land infrastructure	0.467
	40.	Socialization of vision, mission, and goals	0.384
Component 9	28.	Academic qualifications of teaching personnel	0.787
	27.	Educator competency	-0.484
	54.	Types of financing	0.588
Component 10	55.	Sources of financing	-0.691
	56.	Usage report - implementation financing	0.705
	57.	Administration - implementation financing	-0.502
	48.	Management information system	0.429
Component 11	49.	Scheduling - supervision management	0.833
	52.	Documentation - assessment management	0.744
Component 12	42.	Five-year work plan	-0.685
	47.	Administration - management implementation	0.729
Component 13	26.	Educator's academic qualifications	0.836
Component 14	9.	Study load (adequate time per day)	0.645
	19.	Holistic - integrated program	0.674
Component 15	1.	Developmental achievement	0.744
Component 16	5.	Curriculum implementation	-0.815
	18.	Activity PlaSn – daily	0.399
Component 17	12.	Development aspect	0.75
	10.	Study load (length of service per week)	-0.402
	15.	Implementation of socialization education through a calendar	0.371
Component 18	2.	Developmental achievement by age group	0.774
	3.	Progress achievements (documentation)	-0.576
Component 19	7.	Curriculum – frequency of review	0.729
	6.	Curriculum – operational reference	-0.457
Component 20	4.	Curriculum: 6 aspects of development	0.806

A PCA with varimax rotation reveals that ECEA is a multidimensional concept shaped by several interrelated variables rather than being defined by a single element. A credible accreditation framework integrates four key areas.

Strategic Planning and Management: The foundation of effective ECEA lies in robust planning and operational structure. This involves creating clear learning plans, organizing the educational environment, and managing human resources effectively (Component 1). It also includes efficient daily implementation, such as maintaining appropriate study group ratios and a clear organizational structure (Component 3). Key supporting elements are strategic long-term planning, age-based service segmentation (Component 6), consistent educational calendars (Components 7, 20), and effective schedule management and supervision (Component 10).

Educator Quality and Competency: The quality of educators is a critical determinant of success. This dimension emphasizes not only academic qualifications and teacher competency (Component 2, 14) but also how well educators are socialized into the institution's mission and practices (Components 8, 9). High-quality teaching depends on a well-prepared and integrated staff.

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Curriculum and Child Development: A focus on child-centered outcomes is essential, driven by a well-designed curriculum. This includes a deep understanding of developmental milestones (Component 11) and the ability to address developmental challenges (Component 18). Success in this area requires effective curriculum implementation (Component 13), holistic curriculum development (Component 19), and clear methods for measuring developmental attainment and evaluating the curriculum itself (Components 15, 16).

Financial and Administrative Integrity: Transparency and sustainability are supported by strong financial and administrative systems. This area covers sound financial management, accountability, and transparency (Components 4, 5, 12). It also underscores the importance of thorough, high-quality documentation for both financial and administrative processes (Components 4, 17).

In short, the findings show that a robust ECEA system depends on the seamless integration of these four pillars: strategic planning, educator capacity, curriculum quality, and financial stewardship. Each component is vital for creating a comprehensive and credible accreditation framework that ultimately fosters children's growth.

DISCUSSIONS

The significant result from Bartlett's Test of Sphericity confirms that meaningful relationships exist among the variables, strengthening confidence in the analysis. In addition, the combined use of commonality checks, total variance explained, and component matrices add to the overall validity of the study. The application of varimax rotation helps simplify the interpretation of component loadings, though it is important to note that this technique may also influence how results are viewed. Comparing the effects of rotated and unrotated components can therefore provide a deeper understanding of the structure of accreditation variables. The components identified in this study highlight the complex and interconnected nature of ECEA, showing how multiple variables work together to shape accreditation performance. This insight encourages educators to adopt a holistic approach in program development. It supports more comprehensive evaluations of institutions, moving beyond surface-level checks to focus on the deeper variables that truly affect accreditation outcomes (see Table 6).

Table 6. Latent Variables and Suggested Actions for the ECEA

Latent Variable	Components	Suggested actions
Administration – Financial Implementation	Adequate financing is necessary for implementing educational initiatives and supporting program goals.	Accreditors should evaluate the administration of finances to ensure resources are allocated efficiently to support program objectives.
Curriculum Implementation	Effective implementation of curriculum guidelines and educational programs is indispensable for meeting accreditation standards.	Accreditors should assess how well the curriculum is implemented and aligned with educational goals.
Documentation - Assessment Management	Accurate documentation is critical for assessing a program.	Accreditors should review documentation related to assessment management to ensure it provides evidence of program effectiveness.
Educator Academic Qualifications	This variable reflects the qualifications and competencies of educators, which are fundamental for ensuring the quality of early childhood education programs.	Accreditors should closely examine the academic qualifications and professional development of educators.
Evaluation Components - Assessment Management	Accurate evaluation is essential for monitoring program quality and identifying areas for improvement.	Accreditors should review evaluation components and assessment management practices to ensure they provide meaningful insights into program effectiveness.

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Financial Management	Sound financial practices, including transparency, accountability, and efficient resource allocation, are essential for sustaining early childhood education programs.	Accreditors should scrutinize financial management practices to ensure resources are used effectively to support educational objectives.
Goals - Planning Management	Setting clear goals and planning are essential for guiding program development and improvement.	Accreditors should assess the clarity and alignment of goals with accreditation standards to ensure they drive continuous improvement in early childhood education programs.
Infrastructure Building	The provision of infrastructure facilities is essential for creating conducive learning environments and supporting effective teaching and learning practices.	Accreditors should assess the adequacy and quality of infrastructure to ensure it meets the needs of early childhood education programs.
Organizational Structure	The organizational setup of educational institutions profoundly impacts decision-making processes.	Accreditors should evaluate the organizational structure to ensure it facilitates efficient operations and supports the delivery of high-quality education.
Study Group Ratio	Accurate evaluation and assessment are essential for monitoring program quality.	Accreditors should review evaluation components and assessment management practices to ensure they provide meaningful insights into program effectiveness.

Principal Component Analysis (PCA) with varimax rotation was used to reduce the 60 accreditation variables into 20 meaningful components that represent the key dimensions of ECEA. PCA works by examining correlations among these variables to identify those that move together, which suggests the same underlying construct influences them. Through this process, the analysis extracted principal components that explained most of the variance in the dataset, with only those having significant explanatory power retained.

In this study, 20 components were found to account for nearly three-quarters of the total variance, providing a solid statistical basis for interpretation. To make the results more straightforward, varimax rotation was applied, which sharpened the associations by ensuring that each variable strongly loaded onto one component while minimizing weaker overlaps. This rotation allowed variables such as vision, mission, goals, annual work plan, and partnership networks to cluster together under strategic planning and management, while others, like educator qualifications and competencies, were grouped under educator quality. Similarly, financial reporting, supervision, and documentation practices clustered under financial and administrative integrity, while developmental achievements, curriculum evaluation, and study load reflected child outcomes.

By uncovering these hidden patterns, PCA transformed a complex set of 60 criteria into 20 transparent and interpretable components. These components were then further organized into four broader layers: foundation, process, outcomes, and integration, forming a structured and credible accreditation framework (see Figure 1). The foundation layer establishes the structural base of institutions, covering planning and management elements such as vision, mission, goals, annual and five-year work plans, alongside infrastructure, organizational structure, study group ratios, information systems, ownership status, and partnership networks.

The process layer focuses on implementing educational quality through educator competencies and qualifications, curriculum design and delivery, structured activity planning, varied learning activities, the use of appropriate learning tools, socialization of institutional goals, appraisal techniques, and systematic assessment and evaluation practices. The outcomes layer captures the ultimate purpose of accreditation by emphasizing children's developmental achievements across age groups, documentation of progress, developmental aspects, adequate study load, calendar-based socialization, and the alignment and coverage of education calendars.

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Finally, the integration layer ensures that these elements work together through mechanisms such as reporting and supervision, documentation, financial management, and awards in assessment management, all tied to continuous improvement feedback loops. Collectively, these layers demonstrate that ECEA functions not as isolated criteria but as an interconnected system where planning, implementation, results, and integration reinforce one another to achieve accountability of child-centered educational excellence.

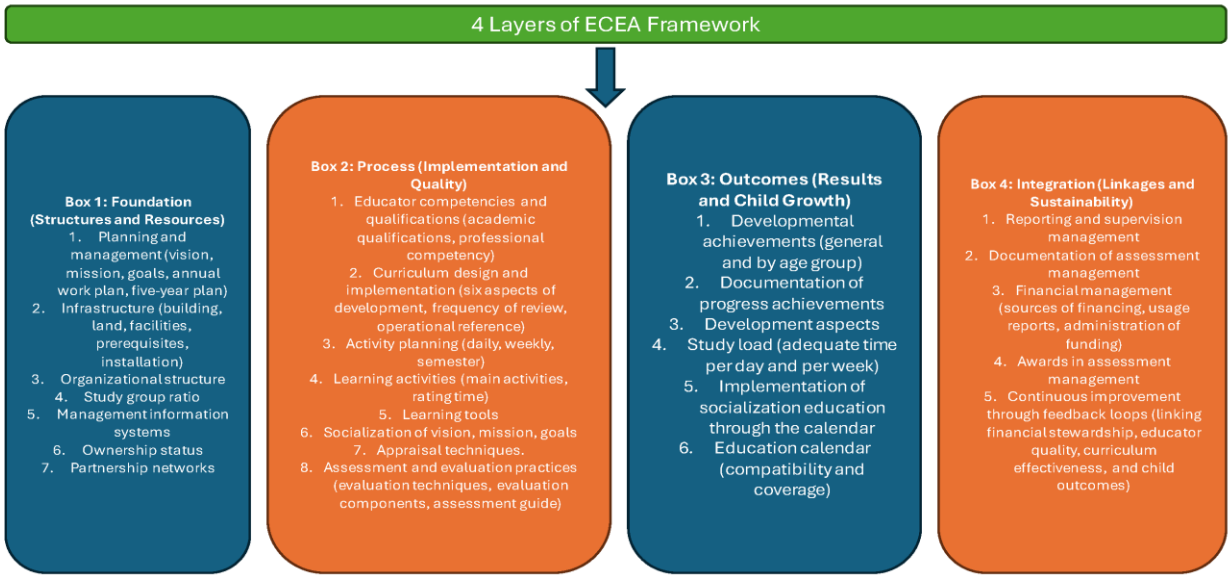

Figure 1. Conceptual Framework of Early Childhood Education Accreditation (ECEA) Based on PCA Components

LIMITATIONS OF THE STUDIES

Several strategies may be employed to enhance the generalizability of the data. Firstly, conducting additional studies across diverse regions of Indonesia would provide a more comprehensive understanding of the variables influencing ECEA. Secondly, collaboration with national educational authorities could yield more critical insights to ensure the applicability of the findings. In short, while the study offers meaningful insights into components affecting ECEA, caution is warranted when attempting to generalize these findings to the national level.

CONTRIBUTION AND IMPLICATION OF THE STUDIES

The analysis condensed 60 accreditation variables into 20 components, delivering a finer understanding of the variables driving accreditation strategies. This study enriches ECEA by significantly contributing to various stakeholders in Southeast Asia. The findings have three key implications for the accreditors. Firstly, the understanding gained from the PCA enhances the evaluation criteria used in ECEA. Accreditors can refine these criteria to cover essential components. Secondly, identifying knowledge gaps among accrediting personnel based on the study's latent variables enables targeted support initiatives. Lastly, the study encourages continuous modification within accrediting bodies by identifying areas for enhancement.

FUTURE RESEARCH DIRECTIONS

There are several promising avenues for future research in ECEA. Firstly, researchers could examine the components identified through PCA to better understand their impact on accreditation standards. This could affect conducting qualitative studies to explore stakeholders' experiences with these components. Secondly, longitudinal research is needed to evaluate accreditation initiatives' long-term

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sustainability in improving the quality of early childhood education. Thirdly, methodological advancements in accreditation research, such as developing creative measurement tools, may further improve our understanding of accreditation processes. Lastly, interdisciplinary research collaborations involving educators, policymakers, and accreditation agencies can facilitate the co-creation of knowledge and the development of evidence-based strategies to improve ECEA practices.

CONCLUSIONS

The PCA analysis has converted the accreditation process by reducing 60 variables to 20 meaningful components, offering insights into ECEA. Components, including educator quality, financial accountability, curriculum administration, and developmental milestones, provide clearer insight into the variables affecting accreditation. Varimax rotation refined the analysis by clustering related variables into distinct groups, forming an actionable framework. This approach simplifies decision-making, enabling stakeholders to implement targeted strategies to enhance program quality. With fewer variables, stakeholders may concentrate on evidence-based policies, ensuring a streamlined approach aligned with evolving educational needs. The contributions extend beyond South Kalimantan to Southeast-Asia and the wider academic communities, and future research should be built upon these foundations.

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