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Culturally Adaptive AI-Assisted Parenting Model: Integrating Indigenous Values into Smart Parenting Systems

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ABSTRACT
The rapid advancement of artificial intelligence (AI) has driven significant transformations in modern parenting practices through data-driven systems and digital interaction platforms. However, most existing technological developments have not fully integrated local cultural dimensions as an essential component of parenting practices. This gap highlights the need for a technology-based parenting approach that is not only functionally effective but also contextually relevant and culturally sensitive. This study aims to develop an AI-based parenting model that is adaptive to local wisdom values. The research employed a mixed-methods sequential exploratory design, beginning with a qualitative phase involving 20 participants to identify contextual needs through thematic analysis, followed by a quantitative phase with 45 participants using a pre-test and post-test design. Data analysis included descriptive statistics, normality testing, paired sample t-tests, and N-Gain analysis. The findings resulted in the development of the NURTURE–AI Parenting model, which integrates AI technology with Sundanese local wisdom values, namely silih asah, silih asih, and silih asuh. The implementation of the model demonstrated significant improvements in parenting competence, cultural value integration, and technology acceptance, with gains categorized at a moderate level. This study concludes that the proposed model has strong potential as an adaptive and contextual approach to modern parenting practices. The original contribution of this research lies in the development of a culturally integrated AI-based parenting model that positions technology as a pedagogical support system aligned with local cultural contexts.

KEYWORDS
AI parenting; cultural parenting; NURTURE–AI Model; Sundanese values; technology acceptance.

INTRODUCTION

The rapid advancement of artificial intelligence (AI) technologies has driven significant transformations in modern parenting practices through the utilization of data analytics, evidence-based recommendation systems, and natural language processing embedded in various digital applications (Bajwa et al., 2024; Shafik, 2025). However, most of these innovations have been developed within Western socio-cultural contexts, and thus have not fully accommodated the diversity of local cultural values (Hulus, 2026). Various digital parenting platforms, such as BabyCenter, Kinedu, and The Wonder Weeks, provide data-driven child development information, while AI-based chatbots such as ChatGPT enable real-time interaction and personalized recommendations (Klapow et al., 2024; Ponnuchamy et al., 2025). In the Indonesian context, the use of such technologies remains largely adaptive to global products and is primarily limited to social media platforms, online forums, and digital health applications for monitoring child development and vaccination reminders (Wahyudi & Allmark, 2024).

Preliminary findings indicate that although 62.2% of parents have utilized digital parenting applications and demonstrate relatively high levels of technological optimism (M = 3.78), there remains a cautious approach toward AI adoption. This hesitation is primarily associated with concerns regarding the alignment of technology with local cultural values, particularly the Sundanese principles of *silih asah, silih asih, and silih asuh*, which represent a holistic parenting framework grounded in reciprocal learning, compassion, and nurturing. In addition, concerns related to data privacy and system reliability further contribute to this cautious stance. These conditions reflect a gap between technological potential and the contextual needs of society, which may lead to the erosion of local wisdom in parenting practices, weakening of interpersonal family relationships, and suboptimal adoption of AI-based parenting technologies (Piombo et al., 2025). Therefore, there is a need to develop a Culturally Adaptive AI-Assisted Parenting model that systematically integrates indigenous wisdom, enabling technology to function not only as an informational tool but also as a pedagogical medium that is adaptive, contextual, and sustainable in strengthening culturally grounded parenting practices.

A review of previous studies indicates that culturally adaptive parenting interventions have developed progressively over the past decade, particularly from 2016 to 2026. Early studies by Kulis et al. (2016, 2020). through the Parenting in 2 Worlds program demonstrated that the integration of local cultural values significantly improved parenting practices and family cohesion within American Indian communities. Further development was shown by Keown et al. (2018) through Te Whānau Pou Toru, which confirmed the effectiveness of culturally grounded Māori approaches in improving child behavior and reducing parental stress. In the digital era, Loblay et al. (2025) began exploring cultural adaptation within digital parenting by developing a conceptual framework based on local values in Uzbekistan, while Qu et al. (2026) examined telehealth-based parenting interventions in China, which were found to enhance child

development and parental mental health. Although these studies reflect a transition from culturally based interventions toward digital integration, they remain limited to either cultural adaptation or partial digitalization, and have not yet comprehensively integrated AI technology into a culturally adaptive parenting model. This limitation highlights a significant research gap in the development of Culturally Adaptive AI-Assisted Parenting frameworks.

Based on the mapping of prior research, it can be identified that although progress has been made in integrating cultural values and digital technologies in parenting, there remains a need for a more comprehensive and contextually grounded approach. In this regard, the present study contributes by developing an approach that integrates AI technologies with Sundanese local wisdom values in West Java, Indonesia, into a culturally adaptive parenting model. More specifically, the novelty of this study lies in the systematic integration of AI-driven systems—such as natural language processing and personalized recommendations—with the Sundanese cultural principles of *silih asah* (mutual learning), *silih asih* (mutual compassion), and *silih asuh* (mutual nurturing). Unlike previous studies that primarily focus on cultural adaptation within conventional interventions (Keown et al., 2018; Kulis et al., 2016, 2020) or on partial digital adoption without embedding specific local cultural values (Loblay et al., 2025; Qu et al., 2026), this study proposes a model-based approach as a structured conceptual and operational framework, enabling systematic and replicable implementation. The selection of Sundanese culture is grounded in its strong, holistic, and living parenting values that remain embedded in social practices, making it a relevant foundation for developing a contextually rooted model. Therefore, the proposed model functions not only as a digital support tool but also as a pedagogical framework that bridges technological innovation with the preservation of local cultural values. Based on these considerations, the research question guiding this study is: To what extent does the Culturally Adaptive AI-Assisted Parenting model integrated with Sundanese local wisdom values improve parenting competence, cultural value integration, and technology acceptance in contemporary parenting practices?

THEORETICAL FRAMEWORK

Socio-Cultural Theory of Parenting

The Socio-Cultural Theory of Parenting positions parenting practices as socially constructed phenomena shaped by cultural values, social structures, and historical contexts. This perspective emphasizes that parenting is not universal but is formed through the interaction of cultural models, socialization goals, and parenting ethnotheories within specific communities (Keller, 2018; Lasi et al., 2024). Cultural orientations such as individualism and collectivism play a crucial role in shaping how parents conceptualize autonomy, relationships, and authority in child-rearing. For instance, Western societies tend to prioritize children's psychological autonomy, whereas non-Western societies emphasize relational interdependence and communal values as the foundation of child development (Lansford, 2022; Sehic et al., 2024). Furthermore, this theory highlights the influence of broader socio-economic and global

dynamics—such as modernization, migration, and digitalization—on contemporary parenting practices (Roubinov & Boyce, 2017). Although certain elements of parenting, such as warmth, acceptance, and cognitive stimulation, are considered universal, their expressions remain deeply embedded in culturally specific norms and values (Lansford, 2025). Consequently, effective parenting interventions must be contextually grounded by integrating local cultural values to ensure relevance and sustainability (Kurtz-Costes, 2015). Within this study, Sundanese local wisdom—embodied in the principles of *silih asah, silih asih, and silih asuh*—represents a concrete manifestation of a socio-cultural parenting framework that emphasizes reciprocal learning, compassion, and collective caregiving within family life.

In the context of rapid digital transformation and the emergence of AI, parenting practices are increasingly influenced not only by cultural factors but also by parents' acceptance and utilization of technology as part of the modern parenting ecosystem. Therefore, understanding how technology can be effectively adopted and integrated into parenting practices becomes essential. The Technology Acceptance and AI-Augmented Parenting framework serves as a conceptual bridge that connects cultural values with technological innovation, emphasizing that AI should function as an adaptive support system rather than a replacement for human parenting. This perspective highlights the importance of aligning technological functionalities—such as natural language processing and personalized recommendations—with culturally embedded parenting values, ensuring that AI-based systems remain contextually relevant, ethically grounded, and culturally responsive.

Technology Acceptance and AI-Augmented Parenting

The Technology Acceptance and AI-Augmented Parenting framework emphasizes how parents' adoption of technology is influenced by perceived usefulness, perceived ease of use, and attitudes toward technology, as conceptualized in the Technology Acceptance Model (Walker & Hong, 2017). In parenting contexts, empirical studies indicate that parents' positive attitudes toward technology—including AI-based tools such as chatbots—play a crucial role in fostering technology adoption among both parents and children (Quan et al., 2024). In addition, the perceived benefits of technology in enhancing children's skills and improving parenting effectiveness serve as key determinants of acceptance, although challenges such as limited infrastructure and digital literacy remain significant barriers (Aldayel & Alalwi, 2024). Contextual factors such as environmental support, social norms, and access to technology further mediate the process of technology adoption within parenting practices (Katz & Gonzalez, 2016).

Furthermore, the concept of AI-augmented parenting positions AI technologies as support systems that extend parental roles by providing cognitive, emotional, and reflective assistance. Recent studies demonstrate that AI-based chatbots and digital platforms can offer emotional support, enhance parental self-awareness, and assist in informed decision-making processes related to parenting (Meyer et al., 2026; Schwedler et al., 2025). However, critical concerns such as data privacy, emotional resistance, and the perceived intrusiveness of

technology within family spaces remain significant challenges for implementation (Han & Liu, 2026). Therefore, technology acceptance in parenting contexts cannot be explained solely by technical factors, but must also consider alignment with users' values, emotional responses, and social contexts (Lippold et al., 2022). In this regard, there is a need for a model that not only addresses technological acceptance but also explicitly integrates cultural dimensions, as proposed in the Culturally Adaptive AI-Assisted Parenting Model.

Culturally Adaptive AI-Assisted Parenting Model

The Culturally Adaptive AI-Assisted Parenting Model is a conceptual framework that integrates AI technologies with principles of cultural adaptation in parenting practices. This model is grounded in empirical findings demonstrating that parenting interventions rooted in local cultural values—such as Parenting in 2 Worlds and Te Whānau Pou Toru—are effective in improving parenting practices, strengthening family cohesion, and supporting child development (Keown et al., 2018; Kulis et al., 2016, 2020). Furthermore, culturally adaptive approaches that consider context-specific factors, including social pressures, extended family roles, and traditional values, have shown more optimal outcomes across diverse global settings (López-Zerón et al., 2020). In this context, the integration of AI enables the development of systems that provide personalized, adaptive, and data-driven parenting support while maintaining cultural values as the foundational basis of intervention (Bajwa, 2025).

Moreover, this model emphasizes the importance of synergy between technological innovation, cultural values, and community engagement in designing parenting systems that are both contextual and sustainable. Previous studies indicate that culturally adaptive interventions involving local stakeholders and aligning with social norms and practices significantly enhance the effectiveness of parenting programs (Costa-Cordella et al., 2025). However, challenges such as unequal access to technology, ensuring cultural relevance, and measuring intervention effectiveness remain critical issues in the development of AI-based parenting models (Hiratsuka et al., 2018). Therefore, the Culturally Adaptive AI-Assisted Parenting Model is proposed as an integrative synthesis of socio-cultural perspectives, technology acceptance principles, and model-based implementation, providing a comprehensive theoretical foundation for understanding and advancing technology-enhanced parenting practices that are adaptive to cultural contexts.

METHOD

Design and Procedure

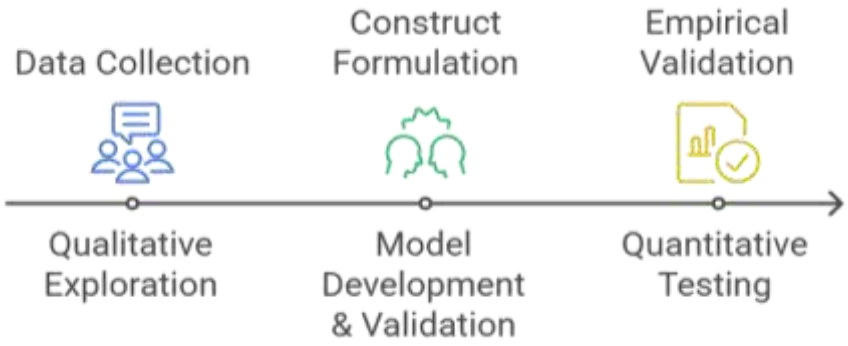
This study employed a mixed-methods design using a sequential exploratory approach, beginning with a qualitative phase to explore parents' needs, cultural values, and perceptions regarding the use of artificial intelligence (AI) in parenting practices, followed by a quantitative phase to empirically test and validate the findings. This design is based on the framework proposed by Creswell and Clark (2017), which emphasizes the importance of in-depth exploration in the initial stage as a foundation for developing contextually grounded

instruments and models prior to quantitative testing. The selection of this approach is grounded in the complexity of the phenomenon, which involves the interaction between socio-cultural and technological dimensions, thereby requiring a comprehensive contextual understanding before statistical generalization can be conducted (Creswell, 2014). The overall research design and procedural flow are illustrated in Figure 1.

The research procedure was carried out through three interconnected stages: qualitative exploration, model development and validation, and quantitative testing (see Figure 1). The first stage focused on qualitative data collection through in-depth interviews and focus group discussions to identify parenting needs, cultural values, and the contextual use of AI, with the aim of generating initial model constructs. The second stage involved the formulation of indicators, development of a conceptual model, and validation through expert judgment to ensure feasibility and content validity. The third stage employed a quantitative approach to examine the effectiveness, validity, and reliability of the developed model. Each stage was systematically designed in sequence, with the outcomes of the preceding phase informing the subsequent phase, thereby ensuring that the resulting model is empirically grounded, contextually relevant, and rigorously validated.

Figure 1.

Mix Method Research Procedure



Participants

The participants in this study were divided into two groups corresponding to the sequential exploratory mixed-methods design, namely the qualitative and quantitative phases. The qualitative phase employed purposive sampling to obtain in-depth and context-rich data, while the quantitative phase utilized stratified random sampling to ensure representativeness. A summary of participant characteristics is presented in Table 1.

The number of participants in the qualitative phase was determined based on the principle of data saturation, indicating that data collection was concluded when no new information emerged. Meanwhile, the sample size in the quantitative phase was established to meet the requirements for inferential statistical analysis, enabling the testing of validity, reliability, and model effectiveness on a broader scale. The combination of these two

approaches is expected to generate findings that are not only contextually rich but also possess adequate generalizability.

Table 1.

Participant Demographics

Aspect	Qualitative Phase	Quantitative Phase
Sample Size	20 participants	45 participants
Sampling Technique	Purposive Sampling	Stratified Random Sampling
Criteria	Parents of children aged 0–12 years, West Java	Parents of children aged 0–12 years, West Java
Age Range	25–45 years	25–50 years
Education Level	High School–Master's Degree	High School–Master's Degree
Occupation	Homemakers, formal sector, self-employed	Diverse

Data Collection

To clarify the flow and components of data collection in this study, the process is summarized in Table 2, which outlines the research phases, data collection techniques, instruments, and measurement objectives at each stage.

Table 2.

Data Collection Procedures

Phase	Data Collection Technique	Instrument	Number of Items/Questions	Measured Aspects	Procedure
Qualitative	In-depth interviews & FGDs	Semi-structured interview guide	10–12 questions	Parenting needs, Sundanese cultural values, perceptions of AI	Conducted face-to-face/online, recorded and transcribed for thematic analysis
Quantitative (Pre-test)	Online survey	Likert-scale questionnaire (1–5)	Items 1–35	Parenting competence, internalization of cultural values (*silih asah, silih asih, silih asuh*), technology acceptance	Distributed via Google Forms before model implementation
Quantitative (Post-test)	Online survey	Likert-scale questionnaire (1–5)	Items 1–35	Changes in parenting competence, cultural values, technology acceptance, as well as cultural compatibility and model effectiveness	Distributed via Google Forms after model implementation through researchers' networks

Table 2 indicates that data collection was conducted in a sequential and integrated manner, where the results of the qualitative phase served as the basis for the development of quantitative instruments, while the quantitative phase was used to assess changes and comprehensively evaluate the effectiveness of the proposed model.

Data Analysis

Data analysis in this study was conducted using a mixed-methods approach. Qualitative data obtained from interviews and focus group discussions were analyzed using Braun and Clarke's, (2006) six-step thematic analysis, including familiarization with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report to identify patterns related to parenting needs, cultural values, and parents' perceptions of AI use in parenting practices. This qualitative analysis was conducted to address research questions related to parenting needs, cultural values, and parents' perceptions of Artificial Intelligence (AI)-assisted parenting practices. Quantitative data were analyzed using descriptive statistics to summarize score distributions and inferential statistics through paired sample t-tests to examine differences between pre-test and post-test scores, complemented by N-Gain analysis to determine the magnitude and effectiveness of improvement across variables. These analyses were conducted to evaluate changes in parenting competence, integration of cultural values, and technology acceptance following the implementation of the model. The integration of qualitative and quantitative findings provided both exploratory insights and confirmatory evidence regarding the effectiveness and cultural relevance of the proposed model (Supriyadi et al., 2025, 2026).

Validity and Reliability

The validity and reliability of the instruments in this study were established in accordance with the characteristics of the sequential exploratory mixed-methods design, prioritizing evaluation in the qualitative phase followed by the quantitative phase (Creswell & Creswell, 2018). In the qualitative phase, the trustworthiness of the data and interview protocol was ensured through the criteria of credibility, transferability, dependability, and confirmability (Guba et al., 1994). Credibility was strengthened through triangulation and member checking, transferability through thick description of the research context, dependability through systematic documentation and audit trails, and confirmability through reflective evaluation and data verification procedures during the analysis process (Nowell et al., 2017). In addition, content validity of the interview protocol was established through expert judgment prior to data collection.

In the quantitative phase, the instrument was pilot-tested with 35 participants outside the main sample to assess item validity and reliability (DeVellis & Thorpe, 2021). Item validity was examined using Pearson Product-Moment correlation analysis, showing that all items exceeded the critical r-table value at a significance level of 0.05 (df = 33; r-table ≈ 0.344) with $p < 0.05$, indicating that all items were valid. Furthermore, reliability testing using Cronbach's

Alpha produced a coefficient of 0.73, exceeding the acceptable reliability threshold of 0.70 (Nunnally & Bernstein, 1994). Therefore, the instruments used in this study were considered valid, reliable, and appropriate for the main data collection process.

RESULTS

Qualitative Needs Analysis

The qualitative phase of this study aimed to identify contextual needs underlying the development of a Culturally Adaptive AI-Assisted Parenting model. Data obtained through in-depth interviews and focus group discussions with 20 participants were systematically analyzed using thematic analysis. The analysis resulted in five interrelated themes representing the dominant concerns and expectations expressed by participants regarding contemporary parenting practices. These themes include: (1) navigating the growing complexity of modern parenting, (2) struggling to access contextual and trustworthy parenting information, (3) between opportunity and anxiety: parents' ambivalent perceptions of Artificial Intelligence (AI), (4) preserving indigenous cultural values in contemporary parenting, and (5) expecting a parenting model that balances technology and human values. Collectively, these themes illustrate the interconnected social, cultural, and technological dimensions shaping contemporary parenting dynamics and reveal a gap between parents' contextual needs and the limitations of existing parenting approaches. Therefore, each theme is presented through thematic descriptions supported by participant excerpts, analytical interpretations, and their implications for the development of a culturally adaptive parenting model.

Thema 1: Navigating the Growing Complexity of Modern Parenting

The findings indicate that parents face increasingly complex challenges in parenting practices, influenced by social changes and technological advancements. This is reflected in the following participant experiences:

"Nowadays children are more influenced by gadgets, making them difficult to control." (P3)
"Sometimes I am confused about whether to be strict or flexible in raising my child." (P7)
"My time with my child is very limited due to work." (P12)
"Changing times have altered how we should educate children." (P5)
"Children today are more critical, so we must be wiser." (P9)

These findings suggest that modern parenting is increasingly complex and dynamic, requiring parents to continuously adapt to rapid social and technological changes. Parents no longer rely solely on personal experience or traditional parenting practices but increasingly require contextual, practical, and systematic support in making parenting decisions. The findings also indicate that uncertainty and emotional pressure have become integral parts of contemporary parenting experiences.

Theme 2: Struggling to Access Contextual and Trustworthy Parenting Information

Participants revealed that although parenting information is widely available, it is often not aligned with their contextual needs. This is illustrated in the following statements:

"There is a lot of parenting information, but it does not always fit our situation." (P2)
"I often search online, but I don't know which information is accurate." (P10)
"Parenting books are too theoretical and difficult to apply." (P14)
"Advice from others is often inconsistent, which is confusing." (P6)
"There is no truly practical guidance." (P1)

These findings indicate that the abundance of parenting information does not necessarily help parents make confident parenting decisions. Instead, inconsistent, overly theoretical, and non-contextual information often creates confusion, uncertainty, and difficulties in applying parenting guidance to real family situations. As a result, parents increasingly require practical, trustworthy, and personalized sources of parenting support that are responsive to their everyday contextual needs.

Theme 3: Between Opportunity and Anxiety: Parents' Ambivalent Perceptions of AI

Participants demonstrated ambivalent attitudes toward the use of technology, particularly AI, in parenting. While technology is perceived as helpful, it also raises concerns:

"Technology helps, but I'm afraid of becoming too dependent on it." (P8)
"AI can provide advice, but is it aligned with our values?" (P4)
"I worry about family data privacy." (P15)
"I'm concerned that children will become too dependent on digital devices." (P11)
"AI is interesting, but it cannot replace the role of parents." (P18)

These findings indicate that parents perceive AI as both a potential source of support and a source of concern in parenting practices. Parents' acceptance of AI is influenced not only by its functional usefulness but also by issues of trust, emotional security, family values, and the perceived risk of reducing human interaction within parenting relationships. This ambivalence suggests that the adoption of AI in parenting contexts is conditional and highly dependent on the extent to which technology aligns with parents' cultural and ethical expectations.

Theme 4: Preserving Indigenous Cultural Values in Contemporary Parenting

Participants emphasized that cultural values, particularly those of Sundanese culture, play a crucial role in shaping ideal parenting practices. This is reflected in the following statements:

"We were taught silih asah, silih asih, silih asuh since childhood." (P1)
"Values of compassion and mutual respect are very important." (P13)
"Parenting must align with our cultural values." (P6)
"Culture teaches balance in raising children." (P17)
"Parents must be role models, not just rule-makers." (P20)

These findings indicate that indigenous cultural values remain central to parents' understanding of ideal parenting practices despite rapid technological and social changes. The principles of *silih asah* (mutual learning), *silih asih* (mutual compassion), and *silih asuh* (mutual nurturing) function not only as cultural norms but also as moral and relational foundations that guide daily parenting behaviors. The findings further suggest that parents perceive cultural values as essential safeguards for maintaining emotional connection, mutual respect, and humanistic dimensions within contemporary parenting practices.

Theme 5: Expecting a Parenting Model that Balances Technology and Human Values

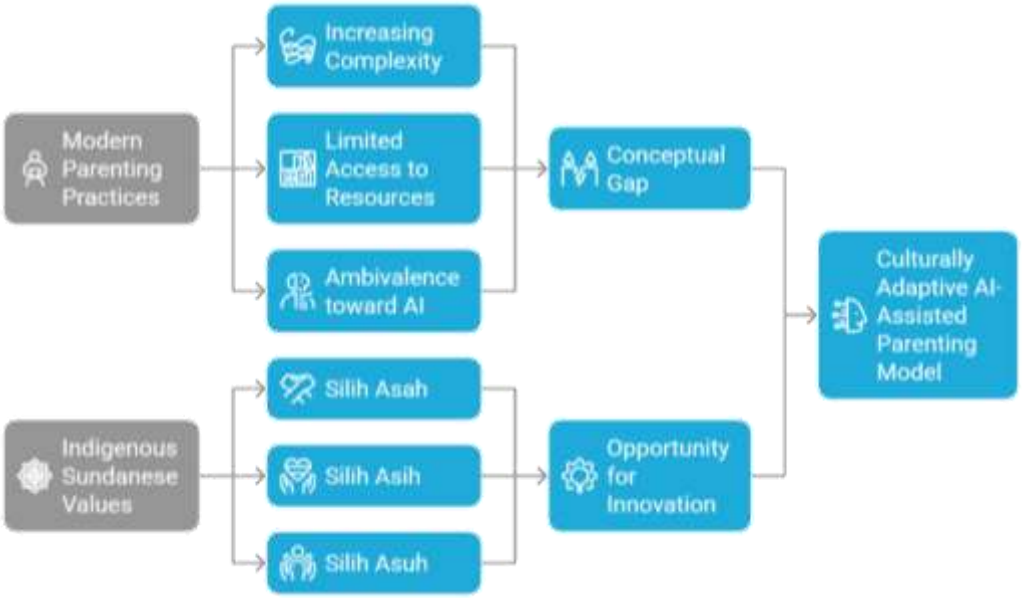
Participants explicitly expressed the need for a parenting model that integrates modern technology with local cultural values. This is reflected in the following statements:

"We need guidance that fits both our culture and modern times." (P2)
"If there is an application that understands our values, it would be very helpful." (P9)
"A parenting model should be flexible but rooted in culture." (P16)
"We need a system that provides recommendations relevant to family conditions." (P7)
"There must be a balance between technology and human values." (P12)

These findings highlight parents' expectations for a parenting model that is not only technologically adaptive but also culturally grounded and human-centered. Participants emphasized that technological innovation in parenting should function as a supportive system that strengthens, rather than replaces, emotional relationships, cultural identity, and parental roles within the family. The findings therefore suggest the importance of developing a culturally adaptive parenting model that systematically integrates technological support with indigenous cultural values in responding to contemporary parenting challenges.

Figure 2.

Convergence of Themes for Culturally Adaptive AI-Assisted Parenting



Overall, the qualitative findings indicate that contemporary parenting practices are increasingly shaped by social change, technological advancement, and the growing complexity of family life. Parents experience difficulties in accessing contextual and trustworthy parenting guidance while simultaneously negotiating feelings of opportunity and anxiety toward the use of Artificial Intelligence (AI) in parenting practices. At the same time, indigenous Sundanese values such as *silih asah* (mutual learning), *silih asih* (mutual compassion), and *silih asuh* (mutual nurturing) remain central moral and relational foundations in shaping holistic parenting approaches. The synthesis of these findings reveals that parents do not reject technology entirely; rather, they expect technological support that remains culturally grounded, relationally sensitive, and aligned with human values. As illustrated in Figure 2, the convergence of the five themes demonstrates the need for a parenting model that systematically integrates adaptive technological support with indigenous cultural values. These findings therefore provide a strong empirical and conceptual foundation for developing the Culturally Adaptive AI-Assisted Parenting model as a contextual and sustainable response to contemporary parenting challenges (Keown et al., 2018; Kulis et al., 2016; Loblay et al., 2025).

Model Development

The development of the model in this study was based on the synthesis of findings from the qualitative phase, which identified the need for a parenting approach that is adaptive, contextual, and grounded in local cultural values. Based on these needs, the N.U.R.T.U.R.E.–AI Parenting model was developed as both a conceptual and operational framework integrating artificial intelligence (AI) with Sundanese local wisdom. The acronym N.U.R.T.U.R.E. represents the model syntax consisting of seven interconnected stages: Navigate, Understand, Recommend, Tailor, Utilize, Reflect, and Evolve, designed as a cyclical and continuous intervention process. Each stage serves a specific function in supporting data-driven parenting practices while ensuring alignment with cultural contexts. Thus, the model is oriented not only toward technological effectiveness but also toward the meaningful integration of cultural values in parenting practices.

Operationally, each stage of the model is implemented through a mobile application platform equipped with an AI-based chatbot utilizing Natural Language Processing (NLP) and a machine learning–based recommendation system. Through this platform, parents can interact with the system in real time to identify parenting challenges, receive personalized recommendations, and access culturally grounded parenting content. The integration of Sundanese cultural values—*silih asah* (reciprocal learning), *silih asih* (mutual compassion), and *silih asuh* (collective nurturing)—is embedded throughout the model stages, particularly in the Tailor and Utilize phases, ensuring that recommendations are not only technologically relevant but also aligned with social norms and cultural practices. The detailed syntax, activities, and outputs of the N.U.R.T.U.R.E.–AI Parenting model are presented in Table 3.

The model is designed to be implemented through an intervention flow that begins with identifying the parenting context and progresses through reflection and continuous improvement. Initially, users input family data (Navigate), which are then analyzed to understand specific parenting needs (Understand). The system subsequently generates AI-based recommendations (Recommend), which are adapted to local cultural values (Tailor) before being implemented in daily parenting practices (Utilize). This process is complemented by user reflection (Reflect) and continuous adaptive refinement (Evolve), forming an iterative learning cycle. Accordingly, the N.U.R.T.U.R.E.–AI Parenting model is positioned as a technology- and culture-based conceptual framework with strong potential to support modern parenting practices, which will be further evaluated through empirical testing in subsequent research phases.

Table 3.

Syntax and Implementation Design of the N.U.R.T.U.R.E.–AI Parenting Model

Stage	Acronym	Main Activities	Media/AI Support	Output
1	Navigate	Identification of family context and initial data input	Mobile app, user profiling system	Initial parenting profile
2	Understand	Assessment of parenting needs and child conditions	AI assessment (NLP-based questions)	Parenting needs mapping
3	Recommend	AI-based recommendation delivery	Recommendation engine (ML-based)	Personalized parenting advice
4	Tailor	Adaptation to Sundanese cultural values (*silih asah, silih asih, silih asuh*)	Cultural adaptation module	Contextualized recommendations
5	Utilize	Implementation in daily parenting practices	Action-based guidance feature	Changes in parenting practices
6	Reflect	Evaluation of parenting experiences and outcomes	Parenting journal & feedback system	User reflection
7	Evolve	Continuous improvement based on data and experience	Adaptive AI learning system	Sustainable practice development

As part of the development process, the conceptual model underwent initial validation through expert judgment involving five experts, including specialists in family education, Sundanese culture, educational technology, artificial intelligence, and parenting practice. The validation process assessed the clarity of the model syntax, conceptual alignment, integration of cultural values, and implementation feasibility. The results indicated an average feasibility score of 3.62 on a 4.00 scale, categorized as “highly feasible,” with recommendations for improvement particularly related to the clarity of user interaction flow and the strengthening of cultural value integration during implementation. Therefore, the developed model meets the

criteria of conceptual feasibility as an initial prototype and is ready for further empirical testing in the subsequent phase of the study.

Effectiveness of Model Implementation

The quantitative phase of this study aimed to test the N.U.R.T.U.R.E.–AI Parenting model and to measure changes in parenting competence, the integration of Sundanese cultural values, and technology acceptance. The trial was conducted with 45 participants using a pre-test and post-test design, employing Likert-scale instruments. In addition, this phase evaluated cultural compatibility and overall model effectiveness at the final stage. Prior to further analysis, descriptive statistical analysis was conducted to identify data tendencies and provide an initial overview of the results. Therefore, the following section presents the findings of the descriptive analysis.

Descriptive Statistical Analysis

Descriptive analysis was conducted to provide a general overview of participants' score distributions across each research variable at both the pre-test and post-test stages. The statistics presented include minimum, maximum, mean, and standard deviation values. As shown in Table 4, the results indicate an overall increase in mean scores across all main variables following the implementation of the model.

Table 4.

Descriptive Statistics

Variable	Stage	N	Min	Max	Mean	Std. Deviation
Parenting Competence	Pre-test	45	2.40	4.20	3.21	0.46
Parenting Competence	Post-test	45	3.20	4.80	4.08	0.39
Integration of Sundanese Values	Pre-test	45	2.67	4.33	3.36	0.42
Integration of Sundanese Values	Post-test	45	3.33	4.89	4.17	0.36
Technology Acceptance	Pre-test	45	2.58	4.08	3.18	0.44
Technology Acceptance	Post-test	45	3.17	4.75	4.02	0.40
Cultural Compatibility	Post-test	45	3.25	4.75	4.11	0.38
Model Effectiveness	Post-test	45	3.20	4.80	4.15	0.37

Table 4 shows that the mean scores of all variables at the post-test stage are higher than those at the pre-test stage. The most notable increases are observed in parenting competence, integration of Sundanese cultural values, and technology acceptance. Furthermore, the mean scores for cultural compatibility and model effectiveness at the post-test stage exceed 4.00, indicating that the model is perceived as well-aligned with Sundanese cultural values and demonstrates a relatively high level of acceptance among participants.

Based on these descriptive findings, the next step involves testing the distributional assumptions of the data to ensure the appropriateness of parametric statistical analysis.

Therefore, a normality test was conducted on both pre-test and post-test data. The normality test aims to determine whether the data distribution meets the normality assumption required for parametric tests, particularly the paired sample *t*-test. In this study, the Shapiro–Wilk test was employed, considering the relatively small sample size (n = 45). The results of the normality test are presented in Table 5.

Table 5 indicates that all variables have Shapiro–Wilk significance values above 0.05, suggesting that the data are normally distributed. Therefore, the assumption of normality is satisfied, allowing subsequent inferential analysis to be conducted using parametric tests, specifically the paired sample *t*-test.

Table 5.

Shapiro–Wilk Normality Test Results

Variable	Stage	Statistic	df	Sig.
Parenting Competence	Pre-test	0.974	45	0.392
Parenting Competence	Post-test	0.968	45	0.261
Integration of Sundanese Values	Pre-test	0.971	45	0.341
Integration of Sundanese Values	Post-test	0.964	45	0.198
Technology Acceptance	Pre-test	0.969	45	0.287
Technology Acceptance	Post-test	0.973	45	0.375

Paired Sample *t*-Test Analysis

A paired sample t-test was conducted to determine whether there were statistically significant differences between pre-test and post-test scores in parenting competence, integration of Sundanese cultural values, and technology acceptance following the implementation of the N.U.R.T.U.R.E.–AI Parenting model. The results of the analysis are presented in Table 6.

Table 6.

Paired Sample t-Test Results

Variable	Mean Pre-test	Mean Post-test	Mean Difference	*t*	df	Sig. (2-tailed)
Parenting Competence	3.21	4.08	0.87	-11.246	44	p < .001
Integration of Sundanese Values	3.36	4.17	0.81	-10.384	44	p < .001
Technology Acceptance	3.18	4.02	0.84	-10.917	44	p < .001

Table 6 shows that all variables experienced statistically significant improvements following the implementation of the model, with significance values of 0.000 ($p < 0.05$). These findings indicate that the N.U.R.T.U.R.E.–AI Parenting model contributes significantly to enhancing parenting competence, strengthening the internalization of Sundanese cultural values, and increasing participants' acceptance of technology.

N-Gain Analysis

Following the inferential analysis, the next step was to identify the proportional level of improvement across each variable. Therefore, an N-Gain analysis was conducted to determine the effectiveness of improvement from pre-test to post-test. The interpretation criteria used were: high ($g > 0.70$), moderate ($0.30 \leq g \leq 0.70$), and low ($g < 0.30$). The results of the N-Gain analysis are presented in Table 7.

As shown in Table 7, all variables fall within the moderate N-Gain category, indicating that the implementation of the model resulted in meaningful improvements, although not yet reaching a high level of effectiveness. These findings suggest that the model has strong potential to enhance parenting quality and cultural value integration, while also indicating opportunities for further refinement in future implementation stages.

Table 7.

N-Gain Analysis Results

Variable	Mean Pre-test	Mean Post-test	N-Gain	Category
Parenting Competence	3.21	4.08	0.49	Moderate
Integration of Sundanese Values	3.36	4.17	0.49	Moderate
Technology Acceptance	3.18	4.02	0.46	Moderate

Overall, the quantitative findings demonstrate that the implementation of the N.U.R.T.U.R.E.–AI Parenting model led to increased mean scores across all main variables. The data met the normality assumption, allowing the appropriate use of parametric analysis through paired sample *t*-tests. The results of the *t*-test revealed statistically significant differences between pre-test and post-test scores, while the N-Gain analysis indicated that the level of improvement was within the moderate category. These findings suggest that the developed model holds promising potential to support more adaptive, culturally grounded, and technology-enhanced parenting practices.

DISCUSSION

The findings of this study indicate that contemporary parenting practices are increasingly shaped by the growing complexity of family life, difficulties in accessing contextual parenting guidance, and ambivalent perceptions toward the use of artificial intelligence (AI) in parenting practices. At the same time, indigenous Sundanese values such as *silih asah*, *silih asih*, and *silih asuh* remain central foundations in shaping holistic parenting approaches. Quantitatively, the implementation of the model also demonstrated improvements in parenting competence, cultural value integration, and technology acceptance. These findings reinforce the perspective that contemporary parenting is a multidimensional phenomenon shaped by the interaction of social, cultural, emotional, and technological factors (Keller, 2018; Lansford, 2022). Therefore, this discussion emphasizes how the N.U.R.T.U.R.E.–AI Parenting model functions as a culturally adaptive framework that integrates technological innovation with indigenous parenting values in responding to contemporary parenting challenges.

In relation to these findings, the qualitative phase further reveals that parents experience increasing pressures in parenting due to rapid social change, shifting family dynamics, and the digitalization of everyday family life. Parents not only face challenges related to children's exposure to digital technology but also experience uncertainty in making parenting decisions amid changing social expectations. These findings are consistent with previous studies suggesting that digital transformation has reshaped family interactions and necessitated adaptation in parenting practices (Raffaetà, 2016). However, this study extends the discussion by demonstrating that parenting challenges are not solely technological in nature but are also closely associated with contextual uncertainty and the growing need for adaptive and sustainable parenting support systems.

Furthermore, the identified limitations in parenting information sources point to a gap between the availability of information and the practical needs of parents. Although access to information has expanded significantly, its relevance and applicability in everyday parenting contexts often remain limited (Kurtz-Costes, 2015). In this regard, the N.U.R.T.U.R.E.–AI Parenting model offers a promising approach to addressing this gap through AI-based personalized recommendation systems, thereby enhancing the contextual relevance of parenting information.

The findings also reveal parental ambivalence toward the use of AI in parenting, reflecting a tension between the perceived benefits of technology and concerns about its potential impact. This result extends the Technology Acceptance Model (TAM), which traditionally emphasizes perceived usefulness and perceived ease of use (Or & Chapman, 2021), by demonstrating that trust and alignment with cultural values are equally critical factors in determining technology acceptance (Walker & Hong, 2017). Thus, this study contributes by introducing cultural compatibility as a key dimension in the adoption of family-oriented technologies.

Moreover, the findings on the importance of Sundanese cultural values—particularly *silih asah, silih asih, and silih asuh*—highlight that parenting practices cannot be separated from their socio-cultural context. This is consistent with socio-cultural parenting theory, which posits that values, norms, and socialization goals shape parenting practices (Garcia et al., 2020). However, this study advances the theoretical perspective by not only positioning culture as a contextual backdrop but also explicitly integrating it into the design of AI-based systems as a functional component.

Quantitatively, the results demonstrate significant improvements in parenting competence, integration of cultural values, and technology acceptance following the implementation of the model. These findings are consistent with prior research indicating that digital technologies can enhance engagement and interaction quality in educational and family contexts (Lippold et al., 2022; Quan et al., 2024). Importantly, this study extends existing literature by demonstrating that technological integration and cultural reinforcement can occur simultaneously, rather than being mutually exclusive processes.

From a conceptual perspective, the N.U.R.T.U.R.E.–AI Parenting model introduces a novel approach by positioning AI as a pedagogical and reflective support system rather than a substitute for parental roles. This aligns with the concept of augmented intelligence, which emphasizes collaboration between humans and technology in decision-making processes (Zhu, 2023). In this sense, the model shifts the paradigm of AI use in parenting from a purely informational tool toward an adaptive and continuous learning framework.

Overall, this study offers a new perspective in the development of parenting technologies by emphasizing the integration of artificial intelligence and local wisdom as the foundation of contextual innovation. The findings underscore that the success of technological interventions is determined not only by system sophistication but also by their capacity to accommodate users' cultural values. Therefore, this study answers the research question by demonstrating that the development of a culturally adaptive AI-assisted parenting model based on Sundanese values represents a relevant and promising approach to supporting modern parenting practices in a more contextual and sustainable manner.

CONCLUSION

This study concludes that the development of the N.U.R.T.U.R.E.–AI Parenting model is grounded in the contextual needs of parents in addressing the complexities of modern parenting, which are shaped by social dynamics, limited access to relevant information, and ambivalence toward technology. The integration of artificial intelligence with Sundanese local wisdom values *(silih asah, silih asih, silih asuh*) results in a conceptual framework that has strong potential to support more adaptive and contextually grounded parenting practices. Quantitative findings demonstrate improvements in parenting competence, internalization of cultural values, and technology acceptance, indicating that the developed model contributes positively to parenting practices. Therefore, this study affirms that a culturally adaptive AI-assisted parenting approach represents an innovative alternative for bridging the demands of modern parenting with the preservation of local cultural values.

Suggestion

Based on the findings, it is recommended that the development of the N.U.R.T.U.R.E.–AI Parenting model be extended to broader implementation stages involving more diverse samples in terms of demographic and geographical characteristics to test the consistency and scalability of the results. In addition, the development of AI-based applications should prioritize intuitive user interaction design, data security, and the enrichment of knowledge bases that incorporate diverse cultural contexts across Indonesia. Future research may also adopt longitudinal approaches to examine the long-term impact of the model on child development and family dynamics. From a practical perspective, collaboration among academics, technology developers, and policymakers is essential to ensure that the model can be implemented sustainably and remains relevant to societal needs.

Limitation

This study has several limitations that should be considered when interpreting the findings. First, the number of participants in the quantitative phase was relatively limited, thus restricting the generalizability of the results. Second, the implementation of the model was conducted over a relatively short period, which may not fully capture its long-term impact on parenting practices. Third, the evaluation of model effectiveness relied primarily on participants' self-reported data, which may be subject to response bias. Furthermore, the integration of cultural values in the model was limited to the Sundanese context and therefore does not fully represent the broader cultural diversity. Accordingly, future studies are needed to address these limitations through more comprehensive research designs and cross-cultural approaches.

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