



Sustaining character education in pesantren: A holistic and culturally embedded learning ecosystem

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ABSTRACT

Character education has become increasingly critical amid growing concerns over moral decline among youth in Indonesia and globally. Islamic boarding schools (pesantren) have long served as traditional institutions that cultivate character in a holistic, immersive environment. However, a comprehensive synthesis of how pesantren implement character education remains limited. Therefore, this study employs a Systematic Literature Review (SLR) methodology, drawing on 50 peer-reviewed articles retrieved from Scopus, Web of Science, and Google Scholar (2015–2025). The findings reveal four key character education models in pesantren: role modeling (uswah hasanah), habituation, curriculum and institutional integration, and pesantren culture as a hidden curriculum. Core character values developed include religious commitment, social responsibility, nationalism, discipline, and independence. Key challenges involve inconsistent curriculum integration, dependence on the kyai as a central role model, diversity of student backgrounds, and external pressures from globalization and digitalization. Theoretically, this study extends the Learning Ecosystems framework (Spencer-Keyse et al., 2020) by introducing pesantren culture as a latent regenerative mechanism that proposed the concept of the Pesantren Latent Regenerative Extension of Learning Ecosystems. These findings offer practical guidance for pesantren in sustaining character education without compromising their distinctive identity.

Keywords: hidden curriculum, Indonesia, Islamic boarding school, learning ecosystems, pesantren culture

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INTRODUCTION

Character education is essentially one of the main objectives in building the foundation system of the best education in the 21st century (Arthur, 2014; Bates, 2019). However, findings from various conditions in the world of education such as moral degradation (Hayati & Susatya, 2020), ethical crises (Affandy, 2019; Hayah, 2017), and the challenges of entering the era of digitalization potentially foster a culture of role-modeling crisis (Cooper et al., 2006; Sidik et al., 2024), weakened integrity, and increased violent behavior in the educational environment. Harahap and Herlambang (2025) reveal that the main key to facing the challenges of declining morals and character in education is through the integration of values such as honesty, responsibility, care, religiosity, discipline, and empathy into the school curriculum structure (Firdausiyah & Aisyah, 2024). This is because the educational process should not only focus on students' cognitive depth while neglecting the process of character transfer (Basith et al., 2025; Biantoro, 2019), which plays an important role in creating generations that are intellectually intelligent and strong in character (Ritchhart, 2004; Supriati et al., 2019).

In line with the existence of traditional Islamic educational institutions, pesantren have a primary focus on shaping national character in a consistent and sustainable manner (Zukdi et al., 2022) without neglecting the strengthening of students' cognitive and personal development.

Purwanto et al. (2021) reveals that pesantren have proven to be effective institutions in the process of character education, developing students' intellectual and emotional capacities (Zafi, 2021). In addition, community support (Fatah et al., 2025) and the boarding education model (Zaqiah et al., 2019), which can be effectively controlled and foster daily habituation for santri, become the key to the success of character education (Ma'arif & Rofiq, 2018; Mujahid, 2021). Izfanna & Hisyam, (2012) specifically provide data showing that pesantren are traditional Islamic educational institutions that continuously focus on the educational process, character development, and providing opportunities to train and shape santri character.

The consistency of pesantren in continuously providing long-term guidance in the process of santri character formation (Saifulloh, 2022) becomes a key success factor in preparing superior and well-characterized individuals. This is in line with the explanation of Muid et al. (2024) that pesantren Mathlabul Ulum maintain harmony and overcome conflict through the development of a comprehensive and systematic character education model of tolerance (Aisyah et al., 2025; Putro et al., 2019). In contrast, Maukib (2020) & Perdana (2015) reveal that the strategy of religious character education implemented in pesantren Nurul Jadid by optimizing three main aspects, namely: the khas pesantren curriculum (Ridlo et al., 2022), guidance and mentoring, as well as habituation (Islam & Aziz, 2020), becomes the best path in the process of fostering santri character. In addition, Arifin & Turmudi, (2019) note several character education methods implemented in pesantren, such as hidden curriculum, habituation, punishment, role modeling, and the blessing system. These conditions serve as evidence that pesantren remain relevant and adaptive, focusing on cognitive, affective, and practical dimensions (Musadad et al., 2025).

Various studies focusing on the process of cultivating character education in pesantren over the past decade have experienced a significant increase (Abdullah et al., 2024). For example, Miftahuddin et al. (2024) discusses how the process of cultivating honesty and integrity is carried out through integration into aqidah akhlak subjects, along with consistency in developing humanitarian values to ensure national unity (Anam, 2019; Firmansyah et al., 2025; Muhajir, 2022; Solihin et al., 2020). The success of pesantren in fostering character is optimally implemented through programmed education and incidental character education (Fatah et al., 2025; Purwanto, 2021). In line with Jaenullah et al., (2022), the resilience system of pesantren in character formation occurs because of the existence of a standardized system supported by the maintenance of culture (latency) as the pesantren value system (M. Huda, 2024; Rusmana, 2024).

Departing from the large number of studies focusing on the process of character education in pesantren, a research gap emerges to conduct a comprehensive study by mapping, classifying, and synthesizing various research findings themed on character education in pesantren. This is because existing studies are still partial in nature (Abdullah et al., 2024; Bagaskorowati, 2023) and mainly focus on case studies (N. H. Abdurrahman, 2016; Fatah et al., 2025; Miftahuddin et al., 2024; Muhajir, 2022; Rusmana, 2024; Zafi, 2021). Therefore, the systematic literature review research method becomes an important and urgent approach to systematically and objectively examine various research findings related to character education in pesantren, by focusing on three research questions: first, what character education models are implemented in pesantren? Second, what character values are developed through character education models in pesantren? And third, what are the challenges in implementing character education models in pesantren?

METHOD

This study employs a Systematic Literature Review (SLR) methodology, which was selected for its suitability in synthesizing existing evidence systematically and objectively across a defined body of literature (Sarin et al., 2025). The SLR approach is particularly appropriate given that research on character education models in pesantren, including the values they cultivate and the challenges they encounter remains fragmented, with no comprehensive synthesis to date. By mapping, classifying, and integrating findings from multiple studies, this method enables a more rigorous and holistic understanding of the phenomenon than individual case studies can provide. This study was conducted by searching for data using the Publish or Perish application to maintain accuracy and avoid bias in the article collection process within the period of 2015–

2025, using Boolean search keywords: (“character education” OR “moral education” OR “values education” OR “religious character” OR “moral development”) AND (“Islamic boarding school” OR pesantren OR “Islamic school” OR “Islamic education institution” OR “pondok pesantren”) AND (Indonesia OR Indonesian) AND (model OR implementation OR strategy OR approach OR program OR curriculum). In the article search process, the researchers focused on three global databases, namely Scopus, Web of Science, and Google Scholar. The results of data collection were then analyzed using PRISMA analysis, which involves identifying, evaluating, and interpreting data in accordance with the research questions.

At the subsequent stage, the researchers applied inclusion and exclusion criteria as boundaries to maintain the credibility of the data obtained. The detailed application of inclusion and exclusion criteria is presented in Table 1.

Table 1. Inclusion and exclusion criteria for research on character education in pesantren

No	Aspect	Inclusion	Exclusion
1.	Research theme	Character education in Pesantren, or moral/religious values in Pesantren in Indonesia	Study of character education in public schools, formal madrasas without the pesantren system or non-boarding institutions
2.	Publication Type	Peer-reviewed journal articles, full text	Conference articles, proceedings, book reviews and book chapters, reports, opinion papers.
3.	Time frame	Publications published in the 2015-2025 period	Publications published outside the 2015-2025 period
4.	Publication Language	Articles published in English	Articles published outside English
5.	Article data search	In searching for article data using the third-party application publish or perish version 8, in three databases: Scopus, Wos, Google scholar	Researchers do not carry out manual search processes on global databases (Scopus, WOS, and Google Scholar)

Based on the inclusion and exclusion criteria applied to the research conducted across three global databases (Scopus, WoS, and Google Scholar) on 10 August 2025, the researchers obtained the following data at Table 2.

Table 2. Article retrieval data from three global databases

No	Keywords (Boolean Model)	Years	Database	Amount
1.	(“character education” OR “moral education” OR “values education” OR “religious character” OR “moral development”) AND (“Islamic boarding school” OR pesantren OR “Islamic school” OR “Islamic education institution” OR “pondok pesantren”) AND (Indonesia OR Indonesian) AND (model OR implementation OR strategy OR approach OR program OR curriculum).	2015-2025	Scopus	15
2.	(“character education” OR “moral education” OR “values education” OR “religious character” OR “moral development”) AND (“Islamic boarding school” OR pesantren OR “Islamic school” OR “Islamic education institution” OR “pondok pesantren”) AND (Indonesia OR Indonesian) AND (model OR implementation OR strategy OR approach OR program OR curriculum).		Wos	4
3.	(“character education” OR “moral education” OR “values education” OR “religious character” OR “moral development”) AND (“Islamic boarding school” OR pesantren OR “Islamic school” OR “Islamic education institution” OR “pondok pesantren”) AND (Indonesia OR Indonesian) AND (model OR implementation OR strategy OR approach OR program OR curriculum).		Google Scholar	427
Count				446

The total number of articles obtained was 446 articles, and inclusion and exclusion were carried out using the Zotero application. After that, the researchers conducted a data export process and converted the data into RIS format. Subsequently, the researchers performed a visualization process by utilizing the VOSviewer application, as shown in Figure 1.

Figure 1 shows a fairly significant interrelationship among various research findings, especially regarding character education in relation to pesantren and Islamic education. In addition, the presence of the community has a close relationship with pesantren programs and santri independence. Based on the data above, the researchers conducted data analysis using PRISMA analysis in order to obtain valid and detailed data, which can be seen in Figure 2.

implemented in pesantren, (2) what character values are developed through those models, and (3) what challenges arise in their implementation. The selected articles span a decade of scholarship (2015–2025), reflecting the growing academic attention given to pesantren as sites of character formation in Indonesia. Notably, the majority of the retrieved literature consists of qualitative case studies conducted in specific pesantren contexts, which underscores both the richness of institutional diversity and the need for a synthesizing framework such as the one offered in this study. A thematic approach was applied during the classification process, allowing patterns, convergences, and divergences across studies to be identified and interpreted in relation to each research question. The findings are presented across three subsections corresponding to these questions, enabling a structured and comparative reading of the evidence.

Findings

Character education models in pesantren

Character education in pesantren basically operates in a sustainable and integrated manner. This condition indicates that pesantren remain capable of serving as the frontline foundation of the nation amid the continuous decline in adolescent morality caused by various factors, such as the environment, technology, and globalization (Shiddiq et al., 2024; Utaminingsih et al., 2017). In addition, pesantren implement character education through several models (Table 3).

First, the role-modeling (exemplary) model. Pesantren, as Islamic educational institutions deeply rooted in a long historical tradition, emphasize exemplary conduct. For example, the figure of the Prophet Muhammad SAW as *uswatun hasanah*, whose every behavior should be emulated (Arifin & Turmudi, 2019a; Fatah et al., 2025; Ma'arif & Rofiq, 2018). Muhyiddin et al., (2022) reveal that the position of the kyai and educators in pesantren is as heirs of the prophets; therefore, the daily behavior of the kyai (teachers) becomes a concrete example that must be followed and emulated in every aspect of conduct (Muid et al., 2024). This serves as clear evidence that pesantren education builds character through the exemplary conduct of kyai and teachers in an intensive and well-conditioned environment (Putro et al., 2019).

Second, the character education model implemented in pesantren is the habituation model. Several forms are carried out through habituation (Arifin & Turmudi, 2019a; M. Huda, 2024; Wiyanto & Herpratiwi, 2024), such as congregational prayers, studying classical Islamic texts (*ngaji kitab*), *khidmah*, and consistently maintaining good morals. In line with Baharun & Maryam (2018), the success of pesantren Nurul Jadid in shaping children's character is achieved through habituation supported by a positive environment. Fatah et al., (2025) provide an example from pesantren Lirboyo, where the main character education model is habituation training through practical responsibilities, such as maintaining cleanliness and serving as the personal driver of the kyai (Shiddiq et al., 2024). A similar condition occurs in pesantren Gontor, where the process of character education for santri emphasizes habituation through very strict disciplinary activities, such as the obligation to wake up at 03:30 every day, speaking only Arabic and English, and maintaining discipline (punctuality) in congregational prayers and schooling (Saifulloh, 2022). Zafi, (2021) notes that habituation is an important element of the social structure of pesantren; after the establishment of rules and enforcement, good character, if not trained through habituation, will be difficult to internalize as virtue (Firmansyah et al., 2025; Muhammad, 2020).

Third, character education models are integrated through institutional systems and learning processes within the curriculum (Jaenullah et al., 2022; Muid et al., 2024). One key to maintaining the consistency of character education is the formulation of official documents such as curricula (Prasetyo et al., 2025), extracurricular activities, and soft-skill programs (Utaminingsih et al., 2017), as implementation references (Perdana, 2015; Purwanto, 2021; Sodikin et al., 2020). For instance, Ma'arif & Rofiq, (2018) explain that pesantren Darut Taqwa strengthens santri character through the integration of formal curricula, diniyah education, and daily pesantren activities. Similarly, Manshuruddin et al. (2019) state that one of the advantages of boarding-based education is that every process of cultivating santri character can be optimally monitored and evaluated (Pamungkas & Bisri, 2025) as each individual is actively involved in every pesantren activity (Rois et al., 2023).

Table 3. Character education models in pesantren

No	Character Education Model	Key Findings	References
1.	Exemplary Model (Uswah Hasanah)	Character education in pesantren is built through the exemplary conduct of kyai and teachers as central figures. Kyai are positioned as heirs of the prophets; therefore, their behavior, attitudes, and daily practices become concrete examples emulated by santri. The well-conditioned pesantren environment further strengthens the internalization of values through intensive interactions.	Arifin & Turmudi (2019); Ma'arif & Rofiq (2018); Muhyiddin et al. (2022); Putro et al. (2019); Muid et al. (2024); Fatah et al. (2025)
2.	Habituation Model	Character is formed through the habituation of religious and social activities carried out consistently, such as congregational prayers, ngaji kitab, khidmah, maintaining proper conduct (<i>adab</i>), time discipline, and practical responsibilities. Major pesantren such as Nurul Jadid, Lirboyo, and Gontor demonstrate that strict habituation is effective in shaping santri discipline and independence.	Baharun & Maryam (2018); Arifin & Turmudi (2019); Saifulloh (2022); Zafi (2021); Shiddiq et al. (2024); Firmansyah et al. (2025); Muhammad (2020)
3.	Curriculum and Institutional Integration Model	Character education is integrated into the formal curriculum, <i>diniyah</i> curriculum, extracurricular activities, and soft skills programs. The existence of official documents such as curricula and pesantren programs serves as a key factor in ensuring consistent implementation. The boarding-based education system enables continuous monitoring and evaluation of santri character.	Jaenullah et al. (2022); Ma'arif & Rofiq (2018); Manshuruddin et al. (2019); Prasetyo et al. (2025); Utaminingsih et al. (2017); Pamungkas & Bisri (2025); Rois et al. (2023)
4.	Pesantren Cultural Model (Hidden Curriculum)	Pesantren culture becomes the main foundation for character formation through values that are embedded in traditions, norms, the founder's (kyai) vision, and value orientations derived from the Qur'an and Hadith. This culture functions as a hidden curriculum that indirectly shapes santri religious character, simplicity, <i>tawadhu'</i> (humility), and social responsibility.	Mujahid (2021); Muali et al. (2021); Utaminingsih et al. (2017)

Fourth, strengthening pesantren culture as a foundation for cultivating good character. Mujahid (2021) emphasizes that pesantren consistently build a culture of character based on the Qur'an and Hadith, the founding vision (kyai's ideals) (Muali et al., 2021), the pesantren vision, and the needs of the modern era.

Based on the research findings presented in Table 3, it shows that pesantren cultivate character education through a holistic and sustainable ecosystem. The pesantren ecosystem is developed by integrating personal role modeling, institutional structures, and pesantren culture as a hidden curriculum. The role-modeling approach positions kyai, administrators, and ustadz as the center of exemplary transmission based on real-life practices in the daily lives of santri, while habituation becomes a continuous internalization process for character development in santri's everyday activities. Meanwhile, to strengthen the cultivation of character education, pesantren integrate character development through curricula and institutional mechanisms. In addition, pesantren culture serves as the foundation of values and latency in implementing santri character formation. This condition demonstrates that pesantren remain capable of responding to the challenges of modernity and the moral degradation of youth by uniting pedagogical, structural, and cultural dimensions in character development.

Character values development in pesantren

Character values are attitudes, traits, and moral qualities that are expected to grow and develop in every santri within pesantren (Table 4).

Table 4. Character education values in pesantren

No	Character Values	Data (Evidence of Implementation in Pesantren)	References
1.	Religious	Religious practices are carried out naturally and in a structured manner through congregational prayers, istighosah, manaqib, diba'iyah, tahlil, and the commemoration of Islamic holy days. These activities strengthen santri understanding of the Qur'an, Hadith, and the scholarly traditions of ulama salaf, while simultaneously affirming pesantren as institutions that safeguard Islamic religious traditions.	Arifin & Turmudi (2019a); Baharun & Maryam (2018); Solihin et al. (2020); Sodikin et al. (2020); Saifulloh (2022); Rois et al. (2023); Zubaidi & Zerrouki (2024)
2.	Social	A peaceful, harmonious, and mutually supportive social environment is built through intensive interactions among santri. Values of compassion, tolerance, solidarity, and communication develop strongly as part of the collective life of pesantren, reflecting commitment to humanitarian values.	Manshuruddin et al. (2019); Hidayat (2016); Perdana (2015); Puspitarini et al. (2023); Azis & Tuanto (2024); Muhajir (2022)
3.	Nationalism	The strengthening of patriotism is carried out through obedience to the law, respect for cultural, racial, ethnic, and religious diversity, and the development of a moderate (wasathiyah) attitude. Nationalistic values are integrated with Islamic teachings without negating national identity.	Asti et al. (2021); Solihin et al. (2020); Muhajir (2022); Pamungkas & Bisri (2025)
4.	Discipline	The implementation of strict rules and daily routines, such as waking up early in the morning, attending classes punctually, and the obligation to use Arabic and English. Discipline functions as a self-regulation mechanism that strengthens learning ethos, consistency, and a productive academic culture.	Putro et al. (2019); Saifulloh (2022); Hidayat (2016); Perdana (2015)
5.	Independent	Santri are trained to manage their study time, handle personal needs, maintain personal and environmental cleanliness, and resolve daily matters independently. The boarding-based lifestyle enables independence to develop optimally while remaining grounded in spiritual values and moral responsibility.	Muhyiddin et al. (2022); Perdana (2015)

Their existence serves as evidence of both the process and outcomes of character education that operates optimally (A. Fauzi & Sudin, 2025; Pamungkas & Bisri, 2025). Several character values developed in pesantren include religious character (Arifin & Turmudi, 2019a; Baharun & Maryam, 2018; Fatah et al., 2025; M. Huda, 2024; Islamic et al., 2024; Purwanto, 2021; Shiddiq et al., 2024; Solihin et al., 2020), which represents a character that has naturally been practiced in pesantren. This includes activities such as congregational prayers, istighosah, manaqib, diba'iyah, tahlil, and the commemoration of Islamic holy days. These conditions demonstrate the position of pesantren as Islamic educational institutions that function to preserve religious traditions (Sodikin et al., 2020) through the understanding of the Qur'an, Hadith, and the heritage of ulama' salaf (Rois et al., 2023; Saifulloh, 2022; Zubaidi & Zerrouki, 2024).

Another character value that consistently grows and develops in pesantren is social character (Fatah et al., 2025; M. Huda, 2024; Islamic et al., 2024; Manshuruddin et al., 2019). Puspitarini et al., (2023) reveal that social character serves as evidence that pesantren consistently uphold humanitarian values such as compassion, tolerance, solidarity, and communication. The

santri community in pesantren is able to create a calm, peaceful, and mutually supportive social environment while recognizing future potential (Azis & Tuanto, 2024; Hidayat, 2016; Muhajir, 2022; Perdana, 2015). In addition, another character value that thrives in pesantren is nationalism (Asti et al., 2021), which includes several aspects such as obeying the law, respecting cultural, racial, ethnic, and religious diversity, moderation, and love for the homeland (Muhajir, 2022; Pamungkas & Bisri, 2025; Solihin et al., 2020).

Another character developed is discipline, one of the character traits that plays a primary role in the process of self-control, thereby strengthening a consistent learning ethos (Putro et al., 2019). Saifulloh, (2022) provides an example from pesantren Gontor, where santri are required to wake up at 03:30 every day, attend classes punctually, and maintain discipline in fulfilling the obligation to speak Arabic and English. The development of disciplined character demonstrates the institution's role in building a positive, conducive, safe, and productive culture (Hidayat, 2016; Perdana, 2015). In addition, another character developed value is independence. Santri in pesantren are required to be independent in managing their study time, taking care of themselves, and maintaining the surrounding pesantren environment (Muhyiddin et al., 2022). This condition has strategic significance in optimally developing independent character while remaining grounded in spiritual values (Perdana, 2015).

Based on Table 4, it is shown that pesantren develop character education through processes that are continuous, structured, and grounded in real-life experiences of santri. This process begins with the development of religious character values as the foundational basis and value framework for santri, which in turn strengthens the development of social character and nationalism. This is evident in the field, where pesantren are born and develop from santri with diverse cultural, racial, and ethnic backgrounds who nevertheless interact and synergize harmoniously. At the same time, pesantren continue to cultivate discipline and independence as essential provisions for santri in facing post-pesantren life challenges. This condition indicates that pesantren successfully build a binding and collective culture within the daily routines of santri that is contextual, transformative, and sustainable.

Challenges in implementing character education models in pesantren

The implementation of character education models in pesantren is inseparable from various challenges, both internal and external. Muhajir, (2022) states that internal challenges include consistency in integrating the curriculum and the absence of measurable character evaluation instruments (Izfanna & Hisyam, 2012; Jubba, 2021). In addition, reliance on the figure of the kyai (Hadi & Muhiid, 2022; Jaenullah et al., 2022; Muhyiddin et al., 2022; Putro et al., 2019), as the central role model has the potential to create inconsistency during leadership regeneration. Another internal challenge is the diversity of santri backgrounds (Azis & Tuanto, 2024), which requires pesantren to be able to standardize the rhythm of character habituation among santri (Baharun & Maryam, 2018).

Beyond internal challenges, pesantren also face several external challenges in implementing character education, particularly due to social changes, global flows, and digitalization (Prasetyo et al., 2025) which impact shifts in societal cultural systems (Utaminingsih et al., 2017). These conditions require pesantren to continuously adapt rapidly without losing their Islamic identity (Fatah et al., 2025; M. Huda, 2024; Purwanto, 2021). Based on data regarding these two factors (internal and external) in developing a culture of character education, building a balance between tradition and innovation, maintaining core values, and remaining adaptive to changing times become the key to pesantren success (Perdana, 2015; Sodikin et al., 2020). Zafi, (2021) adds that pesantren, in fostering santri character, must remain grounded in rules (formulation, enforcement, and habituation) in order to maintain social structure (pesantren culture) while adapting to the challenges encountered.

Discussion

The existence of pesantren as traditional Islamic educational institutions that consistently oversee the cultivation of character education within a single environment for a full 24 hours deserves appreciation (Hanafiah et al., 2022; Manshuruddin et al., 2019). This process begins

with effective guidance (I. Fauzi & Hosna, 2022; Hasmayni et al., 2019), mentoring, and unique approaches that are rooted in the culture of the surrounding community (Dabdoub et al., 2024). This aligns with Berkowitz & Bier, (2007) who argue that one of the ideal models of character education is optimizing a comprehensive approach that supports school culture and is service based (Was et al., 2006). Bronfenbrenner, (1979, 2005) in the Bioecological Systems Theory, notes that human development is based on direct, repeated, and increasingly complex interactions.

Based on these conditions, pesantren demonstrate a process of building a holistic and sustainable ecosystem (Bronfenbrenner, 2005). Through various models, such as the exemplary/uswatun hasanah model practiced by teachers toward students, Islamic methodology places exemplary noble behavior as a role model for others, especially for santri (Ruswandi et al., 2022). Kristjánsson, (2006) notes that the most effective character education movement can only be achieved by optimizing imitation and role modeling from teachers, because teachers' positive traits (Ulug et al., 2011) have a significant influence on students' personalities (Griffith & Main, 2021; Thornberg & Ögüz, 2013) In addition, the habituation model is highly appropriate to implement, as character education is not only based on individual knowledge and self-understanding (Setiawan & Iasha, 2024; Sutrisno et al., 2023), but also requires continuous practice and habituation (A. A. S. Huda et al., 2024; Lisnawati, 2016). Taufik, (2022) provides an example from pesantren Gontor, which enforces disciplinary regulations as a form of habituation, such as security discipline, punctual class attendance, and the use of English and Arabic (Noviani & Azkar, 2024).

Another model used by pesantren in developing character education is through curriculum and institutional integration. Stiff-Williams, (2010) states that character education cannot be positioned as a separate new subject (Lewis et al., 2011; Witz & MacGregor, 2003). Instead, character education must be integrated across all fields of study and routinely taught in classrooms by all teachers (Gilness, 2003; Harney, 2014). One distinguishing feature of character education in boarding-based institutions compared to non-boarding education is the presence of a hidden curriculum (Cubukcu, 2012) that operates continuously (24 hours a day) (A. Abdurrahman et al., 2025; Ishomuddin & Aziz, 2025). Gunawan et al., (2018) further reinforce evidence that character formation based on a hidden curriculum has a significant impact (Zaman et al., 2023).

The above conditions provide empirical evidence that pesantren maintain character education development through a holistic learning ecosystem, enabling the formation of collective advancement (Kowch, 2018). As explained by Spencer-Keyse et al., (2020) sustainable learning processes are illustrated as dynamic and regenerative life cycles consisting of four stages: birth/nascence, which represents the initial stage of the emergence of the learning ecosystem in pesantren through the exemplary role of the kyai as a catalyst for the pesantren vision (Walcutt & Schatz, 2019) followed by growth/expansion, where the kyai's exemplary conduct is referenced by teachers and subsequently by santri, eventually becoming habitual practices without coercion. To sustain the learning ecosystem, the maturity stage in Spencer-Keyse et al. (2020) framework serves as a parameter for maintaining stability and optimizing a mature system; in this context, pesantren integrate curricula and institutional structures as evidence of maintaining a more cohesive and sustainable ecosystem. This allows the renewal process of pesantren to adapt education to changing times without losing its spiritual essence. However, a distinct feature lies in pesantren culture as a hidden curriculum, which serves as evidence of a dominant latency process that permeates the first three cycles birth, growth, maturity as well as renewal.

The development of character education based on a four-dimensional approach and one latent dimension, as illustrated in Figure 3, shows that pesantren are able to maintain a character education ecosystem by strengthening latency. The findings above indicate the development of the learning ecosystem framework proposed by Spencer-Keyse et al., (2020) into the Pesantren Latent Regenerative Extension of Learning Ecosystems by adding pesantren culture (hidden curriculum) as a latent mechanism that shapes santri character. As a result, several character education values emerge, including religious character values (Hanafi et al., 2021; Susanto et al., 2023), social values, nationalism, discipline, and independence.

Although, in practice, the implementation of character education models in pesantren faces various challenges, these range from internal challenges such as the persistence of inconsistencies

in curriculum integration due to limited measurable evaluation instruments (Watz, 2011), Botezatu, (2024) states that the existence of an integrative curriculum must be strengthened by a continuous evaluation system to enhance strategies and achieve optimal learning outcomes (Howard et al., 2009). Another challenge lies in the position of the kyai as a role model and a central figure on whom santri depend; although this condition carries the potential for inconsistencies in practice, fostering a sustainable culture becomes a crucial aspect in maintaining social construction (Wagner & Andreas, 2012). In addition, the diversity of santri backgrounds becomes an important note for pesantren to standardize rhythms of character habituation (Arif et al., 2024; Ma'arif & Rofiq, 2018).

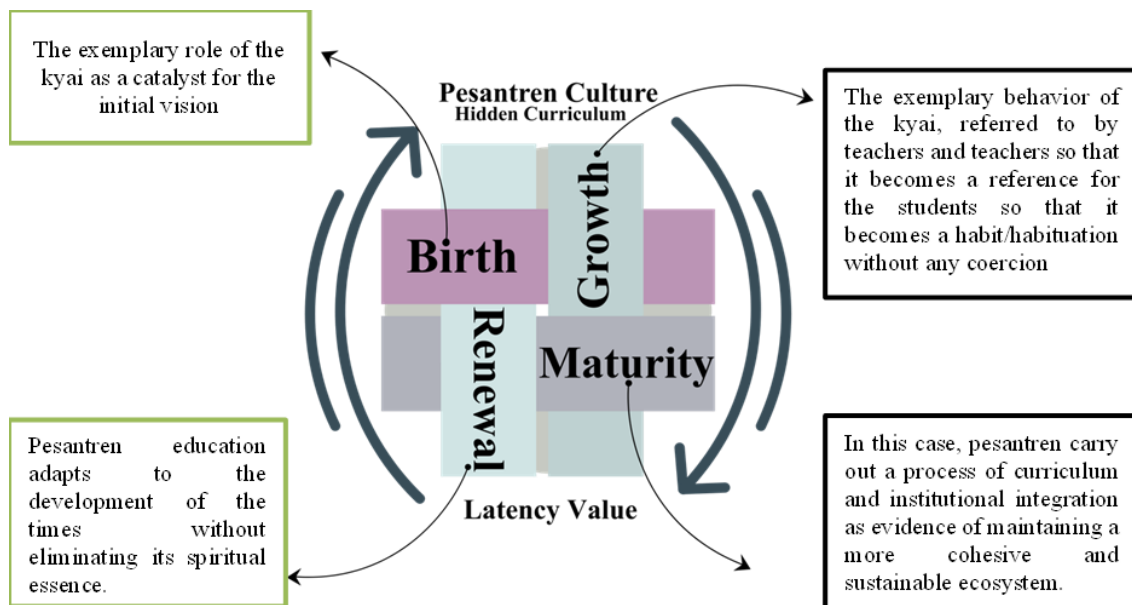


Figure 3. Pesantren Latent Regenerative Extension of Learning Ecosystems

Meanwhile, external challenges faced by pesantren include social change and the flow of globalization (Neubauer, 2007), which continue to develop (Choules, 2007) and indirectly impact societal structures as well as pesantren. Dewia & Alam, (2020) reveal that the advent of globalization makes the role of teachers as role models in safeguarding the transformation process of character education an irreplaceable urgency. This condition encourages students to continuously practice correct behaviors (Lickona, 1999) accompanied by clear and measurable educational policies (Walker et al., 2015), thereby enabling the creation of education that is engaging, interactive, and culturally relevant (Subandi et al., 2025).

CONCLUSION

In summary, pesantren implement character education through four interconnected models: role modeling (*uswah hasanah*), habituation, curriculum and institutional integration, and the cultivation of pesantren culture as a hidden curriculum. Together, these models constitute a holistic and self-sustaining character education ecosystem, conceptualized in this study as the Pesantren Latent Regenerative Extension of Learning Ecosystems, a framework that positions pesantren culture as a latent regenerative mechanism continuously shaping santri character across all stages of institutional life. Through this ecosystem, pesantren cultivate a broad constellation of character values in their students, encompassing religious commitment, social responsibility, nationalism, discipline, and independence. Collectively, these values reflect the pesantren's enduring capacity to produce graduates who are not only religiously grounded but also civically engaged and personally resilient, qualities that remain deeply relevant in the face of contemporary moral and social challenges.

However, in practice, pesantren face several challenges. First, internal challenges include inconsistencies in the curriculum integration process, the absence of measurable evaluation mechanisms, continued dependence on the kyai as the central figure of role modeling, and the diversity of santri backgrounds. Second, external challenges involve massive social change, globalization, and digitalization. Therefore, building a balance between tradition and innovation, maintaining core values, and remaining adaptive to the changing times become key factors in the successful implementation of character education in pesantren.

Based on the conclusions above, the theoretical implication of this study lies in the development of character education in pesantren through the Pesantren Latent Regenerative Extension of Learning Ecosystems, which involves adding pesantren culture (hidden curriculum) as a latent mechanism for shaping santri character, derived from the development of the Learning Ecosystems framework proposed by Spencer-Keyse et al. (2020). Meanwhile, the practical implication for pesantren is that this model can serve as a reference for developing santri character without losing institutional identity. Nevertheless, this study is limited to the conceptual and theoretical domain of learning ecosystems and hidden curriculum development. Therefore, future research is suggested to examine the integration process between pesantren culture and formal education policies, so that pesantren can contribute to the development of national character education without losing their distinctive identity.

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