

INSTITUTIONAL CAPACITY DILEMMAS IN DUAL CURRICULUM: A PESANTREN CASE STUDY

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Abstract:

Islamic boarding schools in Indonesia are increasingly adopting a dual curriculum system by integrating the national curriculum and the *diniyah* (religious) curriculum—to produce competent graduates in the academic and religious domains. However, this integration creates institutional capacity pressures that are rarely systematically analyzed. This study identifies and explains the capacity trade-off that arises in the implementation of the dual curriculum in Islamic boarding schools, proposing the Triad Bottleneck Capacity Trade-Off model as a new analytical framework. A qualitative instrumental single case study was carried out at the Al-Anwar Modern Islamic Boarding School, Pacitan, East Java. Data was collected through semi-structured interviews with kiai/pesantren caregivers, KMI Directors, madrasah heads, *ustadz/ustadzah*, and students; supported by participatory and non-participatory observations, as well as documentation analysis. Thematic analysis follows the framework of Miles & Huberman and Braun & Clarke with triangulation of sources, techniques, and time. The findings reveal three interrelated capacity bottlenecks: (1) student workload recovery-workload capacity, dual curriculum load reduces recovery time and triggers academic fatigue; (2) the pedagogic bridging capacity of teachers, teachers lack the competence to bridge the *salafiyah* and modern pedagogic approaches; and (3) the capacity of assessment-evaluation alignment, the difficulty of harmonizing the assessment system of two different evaluative traditions. The Triad Bottleneck Capacity Trade-Off model explains why structurally successful dual curriculum integrations often fail operationally. Sustainability is determined not by curriculum design alone, but by institutional capacity to manage trade-offs in all three dimensions simultaneously.

Keywords: *dual curriculum integration; Islamic boarding schools; capacity trade-off; student workload; teacher pedagogic capacity; assessment alignment; hybrid organization*

INTRODUCTION

Pondok pesantren is an original Islamic educational institution in Indonesia that combines the functions of education, da'wah, and community empowerment, pesantren have undergone significant institutional transformation over the past three decades. If in the era before independence Islamic boarding schools almost exclusively taught classical religious sciences through the study of the yellow book (*kutub al-turath*), then more and more contemporary Islamic boarding schools are integrating the national curriculum into their education system (Isbah, 2020; Lukens-Bull, 2001) The integration of

the dual curriculum, namely the implementation of the national curriculum (under the Ministry of Education or the Ministry of Religion) simultaneously with the early curriculum of Islamic boarding schools, is now the dominant strategy in *khalaf* (modern) Islamic boarding schools and some *salaf* (traditional) Islamic boarding schools that are transforming (Nurtawab & Wahyudi, 2022)

This drive for integration is multidimensional. In terms of policy, Law Number 18 of 2019 concerning Islamic Boarding Schools provides a legal basis for Islamic boarding schools as a formal education path recognized by the state. Sociologically, parents of students want graduates who have "dual competences": religious and academic (Hosaini et al., 2024) Institutionally, pesantren need academic legitimacy to maintain attractiveness in the midst of competition with public schools and integrated Islamic schools (Suyatno et al., 2022) This transformation does not occur in a vacuum, but rather is a response to complex social, political, and economic changes. Since the Dutch colonial era, pesantren have become a fortress of cultural resistance as well as an institution for the transmission of Islamic knowledge. Significant changes began in the New Order era when the government began to regulate Islamic education through modernization policies. The post-1998 reform era brought liberalization that allowed pesantren to experiment with different models of curriculum integration.

A review of the Scopus indexed literature and international academic databases identified four relevant study clusters. The first cluster discussed the integration and alignment of the curriculum in Islamic education. (Hosaini et al., 2024) makes an important contribution by identifying that successful integration requires three conditions: philosophical alignment between Islamic and national educational goals; teachers' capacity to teach across domains; and assessment systems that can capture holistic learning. However, their study did not explore what happens when these conditions are not met.

The second cluster examines the modernization of Islamic boarding schools and institutional changes. Lukens-Bull (2001) in his extensive ethnographic study argues that the modernization of pesantren is not linear from "traditional" to "modern" but is a complex negotiation in which the kiai selectively adopt elements of modernity while retaining elements of tradition that are considered essential. Isbah (2020) deepens this analysis by showing that modern Islamic boarding schools such as Gontor do not simply adopt a national curriculum but create a distinct "Islamic modernity", a creative synthesis between Islamic values and modern educational methods. Dhofier (1994, 2011) documented that traditional pesantren have distinctive characteristics: charismatic kiai leadership, the teaching of the yellow book as the core curriculum, the dormitory system as a total learning environment, and the *sorogan* and *bandongan* teaching methods. Steenbrink (2015) noted that government policies encourage Islamic boarding schools to adopt a national curriculum as a condition for formal recognition. Azra (2010) revealed that many traditionalist kiai see the national curriculum as a

threat to the autonomy of Islamic boarding schools and the purity of classical Islamic teaching.

The third cluster discusses learning load, academic fatigue, and student welfare. Salmela-Aro & Upadyaya (2014) establish a demands-resources framework that explains how learning demands predict school burnout. OECD (2020) reports that curriculum overload by adding new content without eliminating old content, is stressful for students and teachers. The transferability of these findings to the context of pesantren needs to be cautious. Islamic boarding school students not only face academic demands but also spiritual, social, and physical demands.

The fourth cluster examines teacher capacity and professional development. Memon (2011) identifies a critical gap: there are no accredited teacher education programs that specifically train Islamic pedagogy. Wang & Sang (2024) found that teachers tend to think in disciplinary silos and have difficulty integrating content across curricula. In the context of Islamic boarding schools, this obstacle is exacerbated by differences in pedagogic traditions. Early teachers are trained in the tradition of Islamic boarding schools with the *sorogan*, *bandongan*, and *halaqah* methods. Formal teachers are trained in the Western pedagogical tradition with an emphasis on student-centered learning. These two traditions are not only methodologically but also epistemologically.

The fifth cluster discusses the alignment of assessment and evaluation. Suhayib & Ansyari (2023) reveal the phenomenon of "cognitiveness" in Islamic religious education, where assessment is dominated by the cognitive dimension by ignoring character formation and holistic development. In the context of the dual curriculum of Islamic boarding schools, this problem is multiplied. Pesantren must meet national assessment standards while maintaining traditional pesantren assessments.

Although the five clusters above have provided a rich empirical and conceptual foundation, there are significant gaps: no studies have systematically analyzed how institutional capacity constraints create trade-offs in the implementation of the pesantren's dual curriculum. The literature has answered the question "how is dual curriculum integrated?" but has not answered: "why is structurally successful integration often proving to be operationally unsustainable?"

This article proposes the capacity trade-off lens as a new framework for analysis. This lens departs from the premise that each pesantren has a limited institutional capacity. When pesantren run two curricula simultaneously, capacity distribution becomes a zero-sum game that creates trade-offs in three dimensions called the Triad Bottleneck: student workload recovery capacity bottleneck; bottleneck of teachers' pedagogical bridging capacity; and bottleneck of assessment-evaluation alignment capacity.

This study uses an integrative theoretical framework that combines three complementary theories. Open Systems Theory (Katz & Kahn, 1978) views an

organization as an entity that is dynamically interconnected with its environment. Institutional Theory (DiMaggio & Powell, 1983; Scott, 2013) focuses on how the legitimacy and survival of an organization depends on conformity with institutional norms and expectations. Transformational Leadership Theory (Bass, 1985) explains how leaders inspire organizational change through vision articulation, intellectual stimulation, and individual consideration. These three theories are integrated to provide multi-level analysis: the macro level explains regulatory and normative pressures; the macro level describes the organizational process of managing capacity distribution; the micro level explains the practice of leadership navigating traditional-transformation tensions.

Based on these gaps, this study aims to: (1) describe the architecture of dual curriculum integration in case pesantren cases; (2) identify *capacity trade-offs* on the dimensions of student load, teacher pedagogic bridging, and assessment alignment; and (3) propose a conceptual model of the Triad Bottleneck Capacity Trade-Off. Three research questions were asked: How is the architecture of dual curriculum integration organized in Islamic boarding schools? What capacity trade-offs arise in the dimensions of student load, teacher pedagogic bridging, and assessment alignment? How do these three trade-offs interact to form a bottleneck that affects the sustainability of the integration?

METODE

This study uses a qualitative approach with a single instrumental case study design (Merriam, 2010; Yin, 2017) to explore the process and factors of implementing strategic management based on tradition-transformation integration at Al-Anwar Pacitan Modern Islamic Boarding School. The single case study design allows researchers to dig deep into the context and provide a holistic understanding of complex phenomena in the field.

The research was carried out at the Al-Anwar Pacitan Modern Islamic Boarding School, which is located on Jl. KH. Hasyim Asy'ari No. 41, Ploso Village, Pacitan District, Pacitan Regency, East Java. This Islamic boarding school was chosen based on three considerations: the geographical and cultural conditions of Pacitan demand a strategic management framework that is sensitive to tradition as well as adaptive technology; the form of adaptation of the curriculum and organization of the pesantren to the environment reflects the reconfiguration process studied; limitations and digital initiatives in Pacitan provide a real context to analyze how strategies are designed and implemented in specific field conditions.

Data was collected from various categories of informants through *purposive sampling*. Informants include: kiai/caregiver of the pesantren (vision, mission, traditional values), director of KMI (planning and evaluation process), head of madrasah (curriculum integration), *ustadz/ustadzah* (teaching methods and innovation), and students (experience and expectations). Non-participatory observation was used to obtain direct empirical data on the daily activities of

Islamic boarding schools. In-depth interviews were used to explore the subjective meanings and social constructions of key informants regarding the strategies and values carried out by the pesantren. Documentation studies are used to track and corroborate factual data through analysis of formal documents and institutional archives.

Data analysis uses a qualitative-based thematic analysis approach that aims to identify, analyze, and interpret patterns of meaning in the data obtained. The analysis was carried out through a combination of frameworks developed by Miles et al. (2014) which included three streams of activity: data reduction, data presentation, and conclusion drawn. To deepen the analysis of patterns of meaning in the data, this study refers to the steps of Thematic Analysis from Braun & Clarke (2006) which include: familiarization with the data, initial code, theme search, theme review, naming and definition of themes, and structuring the narrative of findings. To increase the validity of the data, triangulation strategies are used: source triangulation (comparing information from kiai, administrators, teachers, students, guardians of students), technical triangulation (comparing data from interviews, observations, documentation), and time triangulation (collecting data in different periods and atmospheres).

HASIL

The findings are presented in four main themes that align with three capacity bottlenecks and one architectural theme.

Integration Architecture: How Two Curricula Are Organized

PPM Al-Anwar implements a parallel dual curriculum architecture with strategic temporal separation and selective content integration. Table 1 presents a curriculum integration matrix.

Table 1. Dual Curriculum Integration Matrix at PPM Al-Anwar Pacitan

Curriculum Components	National Curriculum (MTs/MA)	<i>Diniyah</i> Curriculum (Madin)	Strategic Integration	Field/Challenge Notes
Time Structure	Afternoon (07:00–13:00)	Evening-evening (15:30–21:00)	Scheduling is made so that students can follow both without overlapping	Busy schedule, limited break time; potential physical fatigue of students
Subject Matter	Arabic & English, Mathematics, Science, Fiqh, Aqidah, SKI	Book Day: <i>Fathul Qarib</i> , <i>Ta'lim Mutaallim</i>	Fiqh and Aqidah materials are synergized; Arabic supports the	Not all teachers are able to relate the general content and the <i>diniyah</i>

			understanding of the book	
Learning Approach	Textbooks, syllabus of the Ministry of Religion, classical and modern methods	Traditional methods: <i>bandongan</i> , <i>sorogan</i> , <i>halaqah</i>	Strengthening life skills and textual reasoning through mixed methods	The early learning method has not been entirely associated with an active learning approach
Evaluation & Assessment	Daily review, PTS/PAS, portfolio, project assignments	Book exams, book reading practice, basic memorization	Separate assessments but reported together in the pesantren internal report card	Early evaluation still depends on memorization and traditional tests
Language of Instruction	Indonesian, Arabic and English (programmed for language lessons)	Arabic (text reading), Javanese (informal explanation in <i>sorogan</i>)	—	—
Expected Output	Graduates with formal diplomas and national academic competencies	Graduates with the basics of classical Islamic science and the ability to read books	—	—

Sources: Field observations, interviews with the Director of KMI and the Head of MTs, internal curriculum documents.

Interview and observation data revealed that students followed both systems in full. Some materials (such as *fiqh*, creed, Arabic) are taught in both systems, but with different approaches and references. However, there is no official integrated curriculum document that combines the two systems in the form of an integrated syllabus or shared achievement indicators. Curriculum evaluation is still carried out separately by each unit, with report cards and exams that are differentiated between formal and early childhood pathways.

The first bottleneck: the capacity of the Recovery Capacity and the Workload of the Student Population

Interview data with teachers and caregivers revealed that the dual curriculum creates significant capacity pressure on students. First, the compressed recovery time. Students must attend a full day of formal learning (07:00-13:00) followed by early classes (15:30-21:00). Break time between sessions is limited. Field records document busy schedules, limited rest time; Potential for physical fatigue of students. The tight time structure makes students have to

divide their time between learning activities, worship, and dormitory activities, so that rest time and personal time are limited.

An analysis of this time structure revealed that from 24 hours per day, students have a structured commitment of around 16-17 hours (formal learning 6 hours + 5.5 hours of early morning + 2 hours of compulsory worship + 1.5 hours of meals + 1-2 hours of dormitory activities), leaving only 7-8 hours for sleep, study preparation, and personal time. It is within the recommended minimum sleep threshold for adolescents (8-10 hours according to the National Sleep Foundation).

Second, indicators of academic fatigue. An interview with the Head of MTs stated: the learning load of students is relatively high, considering that they have to follow two curricula with a busy schedule. Non-participatory observations in the classroom documented signs of fatigue: some students showed drowsiness (head down, eyes closed occasionally) especially in the evening-evening class.

Third, the trade-off of explicit workload-recovery. The time allocated for the formal curriculum cannot be used for early learning preparation. The time for early classes reduces the period of sleep and rest. Extracurricular activities (Friday afternoon sports, Saturday night *hadroh* exercises, student council activities) further reduce free time. The dormitory schedule documentation reveals that students have only about 2-3 hours of unstructured free time per day (14:30-15:30 and 21:00-22:00), which must be divided for bathing, washing, preparation for study, and socialization. Further analysis revealed that these trade-offs were uneven across the learning stages. Ahead of the semester exam (formal or early), the temporal load increases exponentially.

The Second Bottleneck: Teachers' *Pedagogic Bridging Capacity*

The data reveals significant capacity constraints in teachers' ability to bridge traditional and modern pedagogic approaches *salafiyah*. Field records document: not all teachers have the pedagogic capacity to effectively bridge the *salafiyah* approach and modern learning systems.

Field records show that the pedagogic bridging process is not evenly distributed: some teachers are starting to develop more interactive learning and active learning practices, but the capacity to apply new methods and the use of technology is not the same for all teachers. At the same time, early learning still relies on traditional methods (*bandongan*, *sorogan*, memorization, *halaqah*) which are effective for the transmission of *turats* but are relatively less interactive. The absence of an official integrated syllabus and not all teachers are able to relate the general content and *early* strengthen this bridging bottleneck.

Second, the challenge of content integration. Table 1 notes: not all teachers are able to relate between general content and education. Observation of Fiqh learning in formal and early classes reveals clear fragmentation. In formal classes (Fiqh as part of Islamic Religious Education), teachers teach *Fiqh* with a thematic approach based on the 2013 Curriculum, using textbooks published by the

Ministry of Religion, emphasizing the application of *fiqh* in daily life, using group discussion methods and case studies. In the early class, the teacher teaches Fiqh through the reading of the book of *Fathul Qarib*, the *bandongan* method in which the *ustadz* reads Arabic texts and translates them into Indonesian/Javanese, students listen and take notes, emphasizing the memorization of *matn* (main text) and understanding of *sarah* (explanation).

Analysis of the syllabus of the two classes of Fiqh revealed significant overlap in content (both discuss prayer, zakat, fasting, hajj), but without explicit coordination. Interviews with the two Fiqh teachers confirm: they never met to harmonize teaching; there are no cross-line coordination meetings; There is no unified syllabus that shows how formal and early learning complement each other. As a result, students learn the same topic twice with different approaches, which paradoxically does not deepen understanding but creates confusion.

Third, methodological fragmentation. Early childhood pedagogy is dominated by traditional methods (*bandongan*, *sorogan*, *halaqah*) where the teacher is the center of information and the student is the listener/copyist. Observations in *six early classes* recorded a consistent pattern: *ustadz* sat in front, read the book in a clear voice, translated per sentence or per phrase, students sat around or facing each other, listened while writing notes in the margins of their books. Verbal interaction is almost entirely one-way (*ustadz* to students). Questions from students are rare, and if there are any, they are usually for clarification of the meaning of words, not for substantive discussion of concepts. A senior *ustadz* explained: "This method is effective for classical text-based materials. Students learn not only content but also manners – how to sit, how to listen, how to take notes. It is a complete transmission of knowledge, not only cognitive but also affective and spiritual. However, I admit that this method is less interactive and does not necessarily facilitate the development of critical power". In contrast to formal paths where learning tries a student-centered approach: group discussions, presentations, projects, problem-based learning. However, observations reveal that the implementation is uneven and often superficial.

Fourth, professional development. The interview data noted that the process of aligning materials, evaluation methods, and training of teaching staff is an aspect that continues to be developed in this implementation stage.

Third Bottleneck: Assessment-Evaluation Alignment Capacity

The data reveal persistent challenges in aligning assessment systems from two different evaluative traditions. Table 1 documents that the assessment was carried out separately, but reported together in the pesantren's internal report card. The formal path implements daily reviews, PTS/PAS, portfolios, and project tasks; Meanwhile, the *Diniyah* pathway applies book exams, book reading practices, and basic memorization. Curriculum evaluation is still carried out separately by each unit, so that the alignment of assessments and evaluations is an operational challenge in the dual curriculum system.

PEMBAHASAN

Research findings can be interpreted through the lens of hybrid organizations (Battilana & Lee, 2014). Hybrid organizations combine a pluralistic form of organization and a dual institutional logic. Within this framework, pesantren that run a dual curriculum are hybrid organizations: they combine a religious institutional logic (spiritual formation, mastery of the yellow book, teacher-centered transmission) with a bureaucratic-state logic (competency standards, standardized tests, student-centered learning). Besharov & Smith (2014) identified that when both logics are equally central but the compatibility is low, the organization faces high internal conflicts. Al-Anwar's PPM challenge exemplifies this: temporal separation is a structural response to incompatibility; the parallel evaluation system reflects the inability to reconcile different assessment philosophies; Teacher specialization shows acceptance of logical separation rather than integration.

Pache & Santos (2013) suggest that hybrid organizations can use selective coupling—adopting elements from each logical domain rather than full integration. PPM Al-Anwar demonstrates selective coupling through: content synergy where possible (*fiqh, aqidah, Arabic*), maintaining a distinctive methodology in each path, and creating a bridging mechanism (joint report cards, shared facilities). Critical insights: selective coupling succeeds when institutional capacity is adequate; fragmented when capacity is limited.

Our findings reveal that capacity limitations create a zero-sum trade-off in three dimensions. The first trade-off is the time and energy of the students. Total institutional contact hours are approximately 12 hours per day (07:00-13:00 + 15:30-21:00). Zero-sum allocation: decreasing formal learning time means decreasing early preparation time means decreasing recovery time. Results: physical fatigue, cognitive overload, selective strategic presence. This is in line with the demands-resources Salmela-Aro & Upadyaya (2014) when demands exceed resources, burnout occurs.

The second trade-off is on the pedagogical expertise and flexibility of teachers. Teachers have *salafiyah* or modern pedagogic skills, rarely both. Developing bridging competencies requires time that competes with teaching tasks. Zero-sum allocation: the time for early teaching excellence decreases if the time for modern pedagogical training increases. The result: pedagogic fragmentation, missed integration opportunities. This expands on the findings Wang & Sang (2024) on teacher disciplinary silo thinking. Our data show: early teachers think in the silo of book mastery; formal teachers think in the silo of competence of the national curriculum.

The third trade-off is the comprehensiveness of the assessment and the administrative burden. Integrated assessment requires the development of new rubrics, training evaluators, reconciling standards. Zero-sum allocation: the time for maintenance of separate assessments decreases means the time for integration development decreases. Result: parallel systems are maintained indefinitely,

integration is delayed. OECD (2020) warns against curriculum overload through additive logic. Al-Anwar's PPM demonstrates assessment overload through additive logic: instead of an integrated assessment, two complete systems run in parallel, doubling the administrative burden.

Based on the findings and theoretical dialogue, we propose a Triad Bottleneck Capacity Trade-Off Model (see Figure 1). The conceptual model shows how limited institutional capacity creates three interconnected bottlenecks in the integration of dual curricula in Islamic boarding schools. The model illustrates that the integration of the dual curriculum mobilizes limited institutional capacity in three dimensions: student workload recovery capacity (trade-off of time allocation between study and rest); the pedagogic bridging capacity of teachers (trade-off of skill development between depth and breadth); and the capacity of assessment-evaluation alignment (trade-off of system integration between standardization and comprehensiveness).

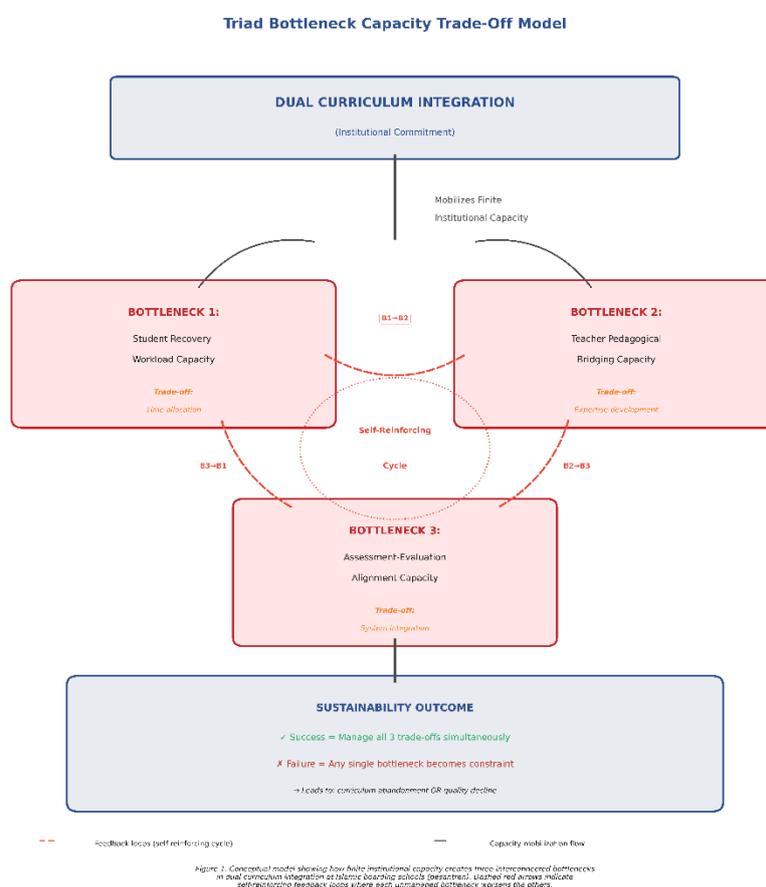


Figure 1. Triad Bottleneck Capacity Trade-Off Model

Model dynamics include potential bottleneck interconnections: B1→B1→B2 (schedule density and potential fatigue → reduced adjustment of learning → bridging practices); B2→B3 (weak pedagogic bridging → parallel fixed assessments → difficult alignment); B3→B1 (dual assessment → evaluation

load increases → time pressure increases). This cycle means any unmanaged bottleneck tends to exacerbate the others.

The determinant of sustainability is not the quality of curriculum design but the institutional capacity to manage trade-offs: Can students' schedules be optimized to reduce burnout while maintaining rigor? Can teachers be trained in pedagogic bridging without compromising the quality of teaching? Can the assessment system be integrated without burdening the evaluator?

Our model is in line with the existing literature: Salmela-Aro & Upadyaya (2014) on the dual demands of predicting burnout – confirmed by the workload bottleneck; OECD (2020) on curriculum overload warnings – extended to assessment overload; Memon (2011) on the lack of teacher education programs to train Islamic pedagogy – we show this creates an unbridgeable capacity gap Wang & Sang (2024) on teachers thinking in disciplinary silos – we extend it to the siloes of pedagogic traditions.

Our model expands the literature by integrating three previously siloed phenomena (student load, teacher capacity, assessment challenges) into an integrated framework; showing they are manifestations of the same fundamental problem: limited institutional capacity under the demands of a dual curriculum; proposing a capacity trade-off as a binding obstacle, not the quality of curriculum design. Our model differs from an optimization approach by rejecting the assumption that "perfect integration design" solves the problem; emphasizing capacity management over design improvement; highlighting trade-offs as inherent, not eliminable.

The trade-off of recovery-student workload operates through a "temporal time compression" mechanism. Students have 24 hours per day that must be allocated for sleep (6-7 hours physiological minimum), formal learning (6 hours), early learning (5.5 hours), compulsory meals and worship (3 hours), and free time (2.5-3.5 hours left). In this temporal structure, any addition of demands in one domain must subtract the allocation in the other. The critical thing is that the recovery time becomes an adjustment variable. When the demands of the formal curriculum increase, students reduce their recovery time. When the demand for diniyah increased, the students again reduced the recovery time. As a result, recovery time is compressed to below physiological and psychological thresholds, triggering chronic fatigue. These findings resonate with the allostatic load theory of McEwen and Stellar (1993) which refers to the biological price of chronic adaptation to stress.

The trade-off of teachers' pedagogic expertise operates through the "depth-breadth dilemma". Teachers have limited time for professional development. They can invest this time to deepen expertise in one pedagogic tradition or extend expertise to another. The first option results in pedagogic excellence in a single domain but fragmentation between domains. The second option results in pedagogic flexibility but has the potential to reduce depth in each domain. Depth requires "expert time", an estimated 10,000 hours of deliberative practice

(Ericsson et al., 1993). Teachers trying to master two different pedagogic traditions in depth require double the investment of time, which is unrealistic given their teaching load. What compounds this dilemma is that the pedagogy of *salaf* and modernity is not only methodologically but also epistemologically different. Pedagogy *salaf* is rooted in the epistemology of transmission—knowledge is something that the teacher owns and is transmitted to the student. Modern pedagogy is rooted in constructivist epistemology—knowledge is something that learners construct through interaction with the environment.

The trade-off of alignment of assessments operates through the "standardization-contextualization dilemma". Standardized assessments facilitate cross-contextual comparisons and external accountability, but tend to reduce learning to easy-to-measure aspects. Contextual assessments capture holistic learning but are difficult to compare and report to external stakeholders. In the context of the dual curriculum of Islamic boarding schools, this dilemma is acute. The national assessment requires high standardization to ensure that Islamic boarding school graduates are on par with public school graduates. Early assessment requires high contextualization because the assessment of spiritual and character aspects cannot be standardized without losing meaning.

The most critical aspect of the Bottleneck Triad Model is that these three bottlenecks are not independent but interconnected through reinforcing feedback loops. Mechanism B1→B2: when students experience chronic fatigue, they show sleepiness in class, decreased concentration, reduced participation, and resistance to complex tasks. The teacher, faced with exhausted students, responded by simplifying the pedagogy—reducing complex tasks, avoiding in-depth discussions, returning to the passive lecture method. This simplification reduces teachers' efforts for pedagogic bridging because bridging requires an active learning method that demands high energy from students. B2→B3 mechanism: when teachers do not have the skills to integrate content and methods across the curriculum, learning remains segmented. Assessments reflect this segmentation—each curriculum track is assessed according to its own logic without cross-reference. Teachers who are not trained in integrative pedagogy are also not trained in integrative assessment. B3→B1 mechanism: when the assessment remains fragmented in two parallel systems, students must prepare themselves for two different evaluation formats with different criteria. This is not just doubling the burden of assessment but multiplying it because students have to "switch cognitive mode"—from memorization and text reproduction mode to analysis and application mode. This switching cost consumes additional cognitive energy, exacerbating already chronic fatigue.

The capacity trade-off analysis has profound implications for pesantren policies at the national and institutional levels. Today, pesantren regulations focus on content standards and processes—what should be taught and how learning is organized. However, our findings suggest that the main challenge is not curriculum design but implementation capacity. We propose that pesantren regulations need to be supplemented with minimum capacity standards. This

includes: the standard of student learning load (maximum limit of institutional contact hours per day and per week); teacher qualification standards (minimum percentage of teachers with pedagogical bridging training, adequate teacher-student ratio); assessment standards (documentation of integrated assessment frameworks); infrastructure standards (adequate classrooms, library resources, student counseling services). This capacity standard is not intended as an obstacle to pesantren access to formal recognition, but as a roadmap for capacity development. Islamic boarding schools that have not met the standards can be granted "in development" status with a gradual capacity building plan supported by government funding, technical assistance, and peer learning networks.

Theoretical implications include: for Open Systems Theory, confirming the importance of throughput processes and demonstrating feedback loops driving organizational adaptation or downgrading; for Institutional Theory, demonstrating how competing institutional logic creates capacity tension and demonstrating selective coupling as a pragmatic response; for Transformational Leadership Theory, unveils capacity management as a key leadership challenge and suggests transformational leaders should strategically manage capacity allocation.

KESIMPULAN

This study provides seven contributions: a theoretical contribution in the form of a capacity trade-off lens as a new analytical perspective; a conceptual contribution in the form of the Triad Bottleneck Model as a diagnostic framework; an empirical contribution in the form of an in-depth description of how capacity constraints are manifested in the context of Indonesian Islamic boarding schools; policy implications in the form of the need for minimum capacity standards in pesantren regulations; governance implications in the form of audit of institutional capacity prior to the adoption of a dual curriculum; Professional development implications in the form of an urgent need for pedagogical bridging training programs ; Implications of assessment in the form of an integrated evaluation framework that combines cognitive, spiritual-affective, and skills dimensions.

Research limitations include: single case studies so transferability needs to be tested in different contexts; The Triad Bottleneck model is conceptual-inductive, has not been validated deductively; the perspective data of students can be further deepened; the data is cross-sectional; there is no quantitative measurement of trade-offs.

The single case studies we conducted have inherent strengths and limitations. Its strength lies in the depth of contextual understanding. By spending extensive time at PPM Al-Anwar, we were able to capture nuances that were missed in large-scale surveys or comparative studies of the surface. The case study approach allows us to uncover the causal mechanisms that link limited capacity to observed trade-offs. For example, we not only found that "teachers

have difficulty integrating the curriculum" but can track why – because there is no training program, because the teaching load does not allow time for professional learning, because the organizational structure separates early and formal teachers.

The main limitation is generalizability. The findings from PPM Al-Anwar may not be directly transferred to other Islamic boarding schools with different characteristics. However, we argue that although the specific manifestations of the bottleneck may differ, the basic structure of the capacity trade-off is transferable. Every pesantren with a dual curriculum faces a fundamental reality: limited capacity must be distributed to meet the dual demands. How this distribution occurs will vary, but the existence of the trade-off itself is a structural consequence of curriculum duality and capacity finitude.

The second limitation is that our data is cross-sectional—a portrait at a single point in time. We can't track how trade-offs evolve over time, how pesantren learn to manage bottlenecks, or how specific interventions change dynamics. Future longitudinal studies can fill this gap, tracking cohorts of students and teachers over several years to understand individual and institutional trajectories. The third limitation is that we do not measure trade-offs quantitatively. We don't have numerical metrics for the "magnitude" of each bottleneck or to compare the relative severity between bottlenecks.

Five future research directions are proposed: multi-case comparative studies to test the Triad Bottleneck Model in various Islamic boarding schools; longitudinal studies to track the evolution of trade-offs; quantitative validation through the development of the Capacity Trade-Off Index; design-based research to develop and test pedagogical bridging training interventions; international comparisons with other Muslim-majority contexts.

The Triad Bottleneck model we propose is diagnostic – identifying where problems are located and how they are interrelated. The next logical step is the transition from diagnosis to intervention: developing, testing, and scaling strategies to manage bottlenecks. We propose a design-based research agenda Anderson & Shattuck (2012) in which researchers collaborate with Islamic boarding schools to design specific interventions for each bottleneck, implement them in iterative cycles, analyze results, revise interventions, and iterate.

Examples of interventions that can be tested: for student load bottlenecks, "flipped classroom" programs where basic content is learned independently through videos or modules, reducing direct contact hours and class time focused on discussion, application, and clarification, improving learning efficiency; for teacher bottlenecks, professional learning community programs where teachers are *diniyah* and formally meet regularly to share practices, design integrated learning, and observe each other's teaching; For the assessment bottleneck, the development of a "holistic rubric" that evaluates competencies is integrated with criteria that respect both domains of knowledge.

Each intervention will be tested on a small scale, data on implementation and outcomes is collected, analysis is carried out collaboratively with practitioners, revisions are made, and cycles are repeated. After several iterations, interventions that have proven to be effective and feasible can be documented as "design principles" that can be adapted by other Islamic boarding schools. International comparative research will also enrich understanding. Other Muslim-majority countries, Malaysia with a public religious school system, Pakistan with a madrasah system, Nigeria with an *almajiri* system, Turkey with imam hatip schools, all face similar challenges in integrating Islamic education with the national curriculum. Comparative studies can reveal: whether the same bottlenecks arise in different contexts, how different regulatory systems affect the emergence and management of bottlenecks, what innovative practices can be studied across contexts.

Research on "success cases"—Islamic boarding schools that successfully integrate a dual curriculum without severe trade-offs—can uncover "protective factors" or "enabling conditions" that facilitate effective bottleneck management. Does the size of the pesantren matter? Does kiai leadership with a strong integrative vision make a difference? Does access to external funding or partnerships with universities provide additional capacity? Understanding success cases not only gives hope but also provides "proof of existence" that sustainable integration is possible.

Practical recommendations for policymakers: develop minimum institutional capacity standards for dual curriculum licensing; provide targeted funding for capacity building; create a national pedagogic bridging certification program. For pesantren leaders: conduct an institutional capacity audit before expanding the dual curriculum; prioritize capacity building over curriculum expansion; implement a student workload monitoring system; Create a professional learning community for teachers. For teacher educators: develop a bridging pedagogy course that integrates *salaf* and modern methods; create a dual certification pathway for Islamic pedagogues. For researchers: develop validated instruments for measuring capacity trade-off; test the effectiveness of interventions in managing specific bottlenecks; map capacity building best practices in successful dual curriculum pesantren

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