



INTEGRATION OF THE CURRICULUM OF LOVE IN MADRASAH THROUGH HUMANISTIC AND MEANINGFUL CHEMISTRY LEARNING

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Abstract:

This study explores the integration of the Curriculum of Love within madrasah education through the implementation of humanistic and meaningful chemistry learning. The Curriculum of Love emphasizes compassion, empathy, and moral awareness as core values in developing students' holistic character. Using a qualitative descriptive approach, this research investigates how chemistry learning often viewed as abstract and formulaic can be transformed into a medium for nurturing love for God, humanity, and nature. Data were collected through classroom observations, interviews with teachers, and document analysis. The findings reveal that the integration of love-based values is effectively achieved when teachers design contextual learning experiences that connect chemical concepts with real life moral and environmental issues. Humanistic approaches such as dialogue, reflection, and cooperative learning foster students' affective engagement, while meaningful learning strategies enhance their understanding and appreciation of chemistry as a manifestation of divine order. The study concludes that embedding the Curriculum of Love within chemistry learning strengthens both cognitive mastery and emotional-spiritual intelligence, supporting the broader goal of madrasah education to produce knowledgeable and compassionate individuals.

Keywords: *Curriculum of Love, madrasah, humanistic learning, meaningful learning, chemistry education*

INTRODUCTION

In recent years, Indonesian madrasah education has witnessed increasing efforts to enrich curricula with moral, spiritual, and character values beyond pure academic achievement. Among these efforts is the introduction of the Love-Based Curriculum (Kurikulum Berbasis Cinta), which seeks to embed compassion, empathy, environmental stewardship, and other affective values into teaching and learning processes, particularly in Islamic education settings (Kementerian Agama Republik Indonesia, 2025; Basori, Zainuri, & Mahendra, 2025). The Ministry of Religious Affairs has stated that the Love-Based Curriculum is meant not to replace the national curriculum but to supplement it, adding character-driven, spiritual, and contextual dimensions to existing frameworks.

While the Love-Based Curriculum is being implemented in primary madrasah (Madrasah Ibtidaiyah) (Basori et al., 2025), challenges remain in translating its values into subjects of high conceptual and technical complexity such as chemistry. Chemistry is often taught with heavy emphasis on formulas,

theoretical constructs, and procedural knowledge, which risks disconnecting students from the personal, moral, and spiritual dimensions of education. In many cases, Islamic values integrated within science learning are limited or under-developed, leading to reduced student interest and lower engagement with chemistry topics (Salsabila & Aznam, 2025; Firmansyah, Fadlullah, & Purwaningatmaja, 2024).

Educational theory suggests that humanistic and meaningful learning approaches can serve as bridges for integrating value-based curricula into technical subjects. A humanistic approach regards learners as whole persons not just cognitive beings—but entities whose emotions, values, and spiritual beliefs play a central role in learning (Rogers, 1969; recent adaptations in science teacher education). Meanwhile, meaningful learning theory maintains that comprehension and retention deepen when new knowledge is linked to learners' prior knowledge, lived experiences, and values (Ausubel, 1963; recent empirical studies in science education in Indonesia). Although direct research combining these theories, chemistry education, and the Love-Based Curriculum in madrasah settings remains scarce, related studies provide important insights. For example, Salsabila and Aznam (2025) found a strong need among chemistry teachers for contextually designed modules that integrate Islamic values when teaching hydrocarbon materials; similarly, Elvi Yenti, Nazir, and Zein (2024) reported nearly unanimous support among lecturers and students for teaching materials in chemical bonding that embed religious values.

This study aims to fill the gap in empirical research by investigating how the Curriculum of Love can practically be integrated into chemistry learning in madrasah through humanistic and meaningful strategies. Specific objectives include: (1) identifying pedagogical strategies that teachers employ to embed love-based values into chemistry instruction; (2) exploring the challenges and barriers to such integration; and (3) examining the effects of this integration on students' understanding of chemistry concepts, learning motivation, and character development. By doing so, the research seeks to propose a model of chemistry teaching in madrasah that is not only cognitively rigorous but also morally, emotionally, and spiritually enriching.

RESEARCH METHODS

Research Design

This study employed a qualitative case study design to obtain an in-depth understanding of how the Curriculum of Love (Kurikulum Berbasis Cinta) is integrated into chemistry teaching and learning at Madrasah Aliyah Negeri 1 Tuban (MAN 1 Tuban). Case study design is appropriate for exploring contemporary educational phenomena within their real-life contexts and for answering “how” and “why” questions about implementation (Yin, 2018).

Research Site and Participants

The research site was Madrasah Aliyah Negeri 1 Tuban, a state Islamic senior high school with a demonstrated profile of religiosity and academic programs (MAN 1 Tuban, n.d.). Purposeful sampling was used to select participants who were directly involved in or knowledgeable about the implementation of the Curriculum of Love in chemistry instruction. Participants included:

- Three chemistry teachers at MAN 1 Tuban who had been involved in curriculum planning or piloting love-based approaches; and
- Twenty students (classes X–XII) selected purposively to represent a range of academic achievement and involvement in religious/character activities.

Selection criteria for teachers included at least two years' teaching experience at MAN 1 Tuban and involvement in any school initiatives related to Kurikulum Berbasis Cinta (Kementerian Agama, 2025).

Data Collection Techniques

Multiple qualitative data sources were used to ensure depth and triangulation:

1. Classroom observations.
Non-participant observations of chemistry lessons (6 lessons per teacher, total 18 lessons) focused on pedagogical practices that reflect humanistic and meaningful learning strategies (e.g., reflective prompts, contextualization to students' lives, collaborative tasks, moral/ethical discussion). An observation protocol adapted from humanistic pedagogy checklists was applied (Rido et al., 2024).
2. Semi-structured interviews.
In-depth interviews with the three chemistry teachers (approx. 60–90 minutes each) explored teachers' understanding of the Curriculum of Love, lesson planning decisions, enactment of humanistic strategies, perceived outcomes, and barriers. Focus group interviews with students (four groups of 5 students; 45–60 minutes each) probed learners' experiences of meaningfulness, motivation, and affective/spiritual responses to chemistry lessons.
3. Document analysis.
Collection and analysis of relevant documents: lesson plans (RPP), teaching materials, student worksheets, assessment instruments, and school policy documents regarding Kurikulum Berbasis Cinta (including the Kemenag Panduan Kurikulum Berbasis Cinta). Document review examined explicit and implicit value integration, learning outcomes, and assessment alignment (Kementerian Agama, 2025).
4. Reflective teacher journals. Participating teachers were invited to keep short reflective journals across a six-week teaching period to capture immediate reflections about integrating love-based values, instructional decisions, and student responses.

Instruments and Measures

Observation checklist/items were developed from literature on humanistic pedagogy and meaningful chemistry learning (Rido et al., 2024; ACS Journal of Chemical Education, 2025) and pilot-tested in two non-study classes to improve clarity.

Interview protocols for teachers and students were semi-structured to allow comparability across cases while enabling emergent issues to surface.

A document analysis rubric was created to score presence of value integration, alignment with meaningful learning principles (contextualization, prior knowledge activation, personal relevance), and assessment of affective outcomes.

Data Analysis

Data were analyzed using thematic analysis (Braun & Clarke, 2006). Analysis steps included transcription and familiarization with interview and observation data, open coding of meaningful segments, axial coding to link codes to broader categories (e.g., pedagogical strategies, affective responses, constraints), and theme development that addressed the research aims (how teachers integrate Curriculum of Love; what humanistic/meaningful strategies are used; observed student responses; barriers and enablers).

Triangulation across observations, interviews, documents, and teacher journals was used to increase credibility. Where appropriate, quantitative counts (e.g., frequency of value-focused activities in lesson plans) were reported to complement qualitative themes and illustrate prevalence.

RESULTS AND DISCUSSION

Overview of data and analytic approach

Data from classroom observations (18 lessons), semi-structured interviews with three chemistry teachers and four student focus groups (20 students), reflective teacher journals, and document analysis (RPPs, worksheets, assessment rubrics) were analyzed thematically (Braun & Clarke, 2006). Four main themes emerged: (1) pedagogical strategies for embedding the Curriculum of Love; (2) affective and cognitive outcomes for students; (3) enabling conditions and teacher agency; and (4) persistent challenges in assessment and scalability. Each theme is presented below and discussed in relation to current literature on humanistic pedagogy, meaningful learning, and value-based curriculum integration.

1. Pedagogical strategies for embedding the Curriculum of Love

Teachers at MAN 1 Tuban enacted a cluster of interrelated strategies that operationalized the Curriculum of Love within chemistry lessons. Prominent strategies included: (a) contextualization of chemical concepts to moral and environmental issues (e.g., pollution, waste management, halal/haram materials), (b) guided reflection and value dialogues at the start or close of lessons, (c) cooperative problem-based learning activities that emphasized care and mutual responsibility, and (d) laboratory tasks reframed as stewardship practices (e.g., safe disposal, minimizing chemical waste).

These strategies align with humanistic teaching principles that treat learners as whole persons and intentionally attend to affective and moral dimensions of learning. Teachers reported adapting standard chemistry topics (stoichiometry, acids–bases, redox) by embedding scenarios that required students to make value judgments or consider ecological consequences. This finding corroborates prior studies showing that contextualization and value framing in science learning increase relevance and ethical reasoning (Holbrook & Rannikmäe, 2009; Karpudewan et al., 2015).

Importantly, the meaningful learning principle linking new concepts to students' prior knowledge and lived experience—was explicitly used. Teachers activated local examples (river contamination near Tuban, household chemicals) so abstract chemical principles became personally meaningful. According to Ausubel's meaningful learning model, such linkage supports deeper cognitive integration and retention (Holbrook & Rannikmäe, 2009); the present findings show teachers used both cognitive linking and affective framing to accomplish this.

2. Affective and cognitive outcomes for students

Triangulated evidence indicates positive shifts on both affective and cognitive dimensions. Affective outcomes included increased student motivation to learn chemistry, stronger sense of responsibility toward the environment, and reports of greater empathy during collaborative tasks. Several students described chemistry tasks as “meaningful” because they connected to family and community practices; others noted an increased willingness to discuss ethical implications of chemical use.

Cognitively, teachers and student pre-/post concept probes (informal) reported improvement in students' conceptual explanations—students moved from algorithmic, rote problem-solving toward explanations that integrated cause-effect relationships and contextual implications. This pattern echoes literature indicating that meaningful, context-rich instruction improves conceptual understanding in chemistry (Johnstone, 2010; Karpudewan et al., 2015).

A notable finding was the co-development of moral reasoning alongside conceptual learning. When students were asked to design a local mitigation plan for household chemical waste, they demonstrated use of chemical concepts (e.g., neutralization of acids) while explicitly articulating duties toward neighbors and creation—an integration of *akhlakul karimah* with science content. This confirms the potential for science education in madrasah contexts to foster both religious/spiritual values and scientific literacy (Hidayat, 2022).

3. Enabling conditions and teacher agency

Several enabling conditions supported successful integration. First, teacher commitment and reflective practice were crucial: teachers who maintained weekly reflective journals and collaborated in planning were more likely to design lessons that fused values and content coherently. This finding aligns with professional learning literature emphasizing teacher agency and reflection as drivers of curricular innovation (Darling-Hammond et al., 2017).

Second, leadership support from school administration and alignment with the madrasah's mission to develop character created space for experimenting with value-infused pedagogies. Where the school officially recognized the Curriculum of Love and allowed time for teacher collaboration, lessons tended to be richer in affective activities.

Third, availability of contextual teaching materials (locally relevant case studies, worksheets that prompt ethical reflection) eased the teacher workload. Teachers who adapted or developed such materials reported greater confidence in implementing the approach.

4. Challenges: assessment, time, and scalability

Despite positive outcomes, several persistent challenges emerged. Teachers cited assessment as the most significant difficulty: existing assessment frameworks focused largely on cognitive, standardized outcomes and offered no clear rubric for affective or spiritual learning. Consequently, teachers found it difficult to document and report student growth in "love-based" competencies in a way that aligned with formal school reporting (Kementerian Agama, 2025). This problem replicates findings from other value-integration studies where affective learning lacks reliable, accepted metrics (Noddings, 2013; Salsabila & Aznam, 2025).

Time constraints were another barrier. Designing contextualized lessons, preparing reflective prompts, and conducting extended discussions require more classroom time than procedural instruction. Teachers reported difficulty balancing curriculum coverage demands with depth of value-oriented activities. This tension between depth and breadth has been observed in other curriculum reform contexts (Timperley, 2011).

Finally, scalability and teacher preparedness pose challenges. Not all chemistry teachers at MAN 1 Tuban felt equally prepared to facilitate value dialogues or design meaningful laboratory experiences emphasizing stewardship. Professional development especially practice based PD that models humanistic facilitation as identified as essential for broader implementation (Desimone & Garet, 2015).

Integrative discussion and implications for practice

The findings indicate that integrating the Curriculum of Love into chemistry at MAN 1 Tuban is both feasible and pedagogically fruitful when enacted through humanistic and meaningful learning strategies. In practice, this requires intentional lesson design (contextualized problems, reflection prompts), supportive leadership, and targeted professional development for teachers. The observed co-development of conceptual understanding and ethical sensitivity suggests that science instruction in madrasah can simultaneously serve cognitive and character goals without sacrificing disciplinary rigor.

To address assessment challenges, the study suggests adopting mixed assessment models: (a) cognitive assessments (concept inventories, performance tasks), (b) rubric-based evaluation of affective competencies (empathy, stewardship), and (c) portfolio and reflective artifacts (student journals, community projects). Rubrics should be co-constructed with teachers and aligned with both national reporting requirements and the madrasah's mission. Prior work supports the use of performance tasks and portfolios to capture complex, affective learning outcomes.

Professional development implications include establishing sustained, collaborative PD that integrates content knowledge, pedagogical practice, and

facilitation of value dialogues. Modeling, peer observation, and coaching have been shown to be effective in helping teachers transfer new practices to their classrooms.

This study's single-site, qualitative design limits generalizability; findings should be interpreted as contextually rich insights rather than representative claims. Future research could adopt mixed-methods or quasi-experimental designs across multiple madrasah to measure the effects of love-based, humanistic chemistry instruction on standardized learning outcomes and validated measures of moral/ethical development. Longitudinal studies would also clarify whether observed affective gains persist over time and translate into community level behavioral change.

CONCLUSION

Overall, the integration of the Curriculum of Love at MAN 1 Tuban when mediated by humanistic and meaningful chemistry instruction demonstrated promising improvements in student engagement, conceptual understanding, and moral awareness. Institutional support, teacher agency, and assessment innovation are key levers for sustaining and scaling such practices across madrasah settings.

the study affirms that integrating the Curriculum of Love through humanistic and meaningful chemistry learning not only enhances students' understanding of science but also cultivates compassion, ethical awareness, and social responsibility. It demonstrates that scientific literacy and moral development are not separate goals but mutually reinforcing dimensions of quality Islamic education. The experience of MAN 1 Tuban offers an inspiring example of how a madrasah can embody the principles of love, humanity, and meaningful learning in its daily practice.

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