Contextual Numeracy Learning in Tourism: A Systematic Literature Review and Its Implications for the Muara Enim Context

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Abstrak

Kajian ini secara sistematis menelaah penelitian-penelitian tentang pembelajaran numerasi kontekstual yang memanfaatkan konteks budaya dan pariwisata pada jenjang sekolah dasar, serta menganalisis implikasinya bagi pengembangan pembelajaran numerasi pada konteks pariwisata Muara Enim. Pembelajaran numerasi kontekstual memungkinkan siswa menghubungkan konsep matematis dengan situasi nyata sehingga pembelajaran menjadi lebih bermakna dan relevan. Systematic Literature Review (SLR) dilakukan menggunakan kerangka kerja PRISMA melalui tahap identifikasi, penyaringan, penilaian kelayakan, dan inklusi. Pencarian pada Google Scholar, ERIC, DOAJ, ScienceDirect, dan Garuda menggunakan kata kunci terkait numerasi, pembelajaran kontekstual, etnomatematika, dan pembelajaran berbasis pariwisata menghasilkan 426 studi awal. Setelah menerapkan kriteria inklusi publikasi tahun 2019–2024, fokus pada sekolah dasar, konteks budaya atau pariwisata, serta metode empiris atau pengembangan, sebanyak 28 studi dianalisis. Temuan menunjukkan bahwa pembelajaran numerasi berbasis konteks budaya dan pariwisata secara konsisten memperkuat pemahaman konsep, penalaran matematis, dan motivasi belajar peserta didik. Berdasarkan hasil sintesis tersebut, konteks pariwisata budaya Muara Enim, seperti tradisi melemang diidentifikasi memiliki potensi kuat sebagai sumber konteks autentik untuk pembelajaran numerasi.
Kata Kunci: *Numerasi; Pembelajaran Kontekstual; Pariwisata Muara Enim; Etnomatematika; RME/PMRI; Systematic Literature Review.*

Abstract

This study systematically reviews research on contextual numeracy learning that integrates cultural and tourism-based contexts at the elementary school level and examines its implications for numeracy learning within the tourism context of Muara Enim. Contextual numeracy learning enables students to connect mathematical concepts with real-life situations, thereby making learning more meaningful and relevant. A Systematic Literature Review (SLR) was conducted using the PRISMA framework, encompassing the stages of identification, screening, eligibility assessment, and inclusion. Searches across Google Scholar, ERIC, DOAJ, ScienceDirect, and Garuda using keywords related to numeracy, contextual learning, ethnomathematics, and tourism-based learning yielded 426 initial studies. After applying inclusion criteria publications from 2019–2024, elementary education focus, cultural or tourism contexts, and empirical or developmental methods 28 studies were included for analysis. The findings indicate that numeracy learning grounded in cultural and tourism contexts consistently enhances conceptual understanding, mathematical reasoning, and student motivation. Based on this synthesis, the cultural tourism context of Muara Enim, particularly the melemang tradition, is identified as a promising and authentic context for contextual numeracy learning.
Keywords: Numeracy; Contextual Learning; Muara Enim Tourism; Ethnomathematics; RME/PMRI; Systematic Literature Review.

I. INTRODUCTION

Numeracy has increasingly been recognized as a core component of foundational learning across global education systems (Sarumaha & Khasanah, 2025). In the twenty-first century, numeracy extends far beyond procedural computation and encompasses a broad set of cognitive abilities, including quantitative reasoning, problem-solving, interpretation of mathematical representations, and the ability to apply mathematical concepts in diverse real-world contexts (Han, Capraro, & Capraro, 2021; OECD, 2019; Marwiyah et al., 2025). In primary education, these competencies form the basis upon which higher-order mathematical thinking is constructed, making early numeracy development a critical priority for ensuring long-term academic progression (Kilpatrick, Swafford, & Findell, 2022; Mullis, Martin, & Foy, 2020). As such, improving primary school numeracy is central to international policy agendas aimed at strengthening human capital and reducing learning poverty (UNESCO, 2022; World Bank, 2021; Nuraida & Solihah, 2025).

However, despite global efforts to strengthen mathematics education, many countries including Indonesia continue to face persistent challenges in numeracy achievement. Findings from PISA 2018 and 2022 reveal that Indonesian students struggle particularly with items requiring contextual reasoning, real-world interpretation, and multi-step problem solving (OECD, 2019; OECD, 2023). These results are consistent with national data from the *Asesmen Nasional*, which show that a significant proportion of students remain at the lowest levels of numeracy proficiency, especially in tasks involving meaningful application rather than rote procedural execution (Kemdikbudristek, 2022; BSKAP, 2021). Scholars attribute these challenges to the dominance of traditional teaching approaches, which emphasize symbolic manipulation and memorization at the expense of contextual understanding, conceptual reasoning, and inquiry-based learning (Cahyani & Setyawati, 2022; Brodie, 2020).

To address these shortcomings, many reforms including Indonesia's *Merdeka Curriculum*, advocate for a shift toward contextual and student-centered learning paradigms. The curriculum emphasizes flexibility, authentic tasks, and the integration of local contexts as a means to foster meaningful learning and increase student engagement (Kemdikbudristek, 2021). Within this framework, *context-based mathematics learning* has gained prominence as a pedagogical strategy that situates mathematical ideas within real-life scenarios familiar to learners (Andersson & Palm, 2019; Jatnika, Agoestanto, & Mariani, 2025). A substantial body of research underscores the effectiveness of such approaches in promoting conceptual understanding, retention, and transfer of knowledge (Widjaja & Dolk, 2021; Ahmad et al., 2022; Yemini et al., 2023).

A closely related theoretical tradition is Realistic Mathematics Education (RME), adapted in Indonesia as Pendidikan Matematika Realistik Indonesia (PMRI). PMRI anchors mathematical learning in realistic, culturally grounded contexts, enabling students to reinvent mathematical concepts through guided discovery and progressive mathematization

(Gravemeijer & Doorman, 2020; Putra & Wijaya, 2020; Afriansyah & Turmudi, 2022). RME-based studies consistently demonstrate significant improvements in reasoning ability, representation skills, and engagement when authentic contexts are integrated into instruction (Widjaja & Dolk, 2021; Sholeh & Nugraha, 2022).

Furthermore, the expanding field of ethnomathematics highlights the value of cultural practices as sources of mathematical knowledge (Rosa & Orey, 2020; Aslan & Putra, 2021). Recent studies (2019–2024) within this domain reveal that local traditions such as culinary arts, handicrafts, architecture, and community rituals embody rich mathematical structures that can support numeracy learning when intentionally incorporated into curriculum and pedagogy (Fitri & Dwijanto, 2020; Indrawati & Yuliani, 2021; Simamora et al., 2022; Hidayati & Prahmana, 2022). Place-based and culturally relevant pedagogy has also been shown to strengthen student identity, increase motivation, and bridge the gap between school mathematics and students' lived experiences (Yemini et al., 2023; Caridah, 2024).

Within this context, the cultural and tourism landscape of Muara Enim in South Sumatra presents significant and largely untapped potential for numeracy development. One of its most prominent cultural practices *melemang* (traditional lemang-making), involves a sequence of mathematically rich activities such as measuring ingredients, comparing ratios, determining volumes, estimating cooking times, dividing portions, and calculating production costs or sales revenue (Sari & Saputra, 2023; Mulyadi & Zainal, 2022). Beyond culinary traditions, the broader tourism ecosystem of Muara Enim, including visitor counts, ticketing, budgeting, and data analysis of tourist flows, also provides authentic quantitative contexts that align closely with the competencies outlined in primary numeracy curricula (Rahmawati & Rachmawati, 2023).

Despite these opportunities, the integration of Muara Enim's tourism context into numeracy learning remains underexplored. A review of literature over the last five years indicates that while numerous studies have incorporated local culture into mathematics instruction, *no systematic review has specifically examined tourism-based numeracy learning*, nor has any synthesis mapped the pedagogical strategies used in such contexts (Putri & Zulkardi, 2021; Sholeh & Nugraha, 2022). Additionally, although some ethnomathematics studies describe the mathematical elements of Muara Enim's traditions, these studies typically focus on cultural documentation rather than pedagogical design for numeracy learning (Sari & Saputra, 2023; Mulyadi & Zainal, 2022).

Within the framework of contextual and tourism-based numeracy learning, Muara Enim was selected as the local context of this study based on academic and empirical considerations. The region features a variety of living cultural practices and community-based tourism activities that are closely integrated into everyday life, one of which is the melemang tradition.

These practices involve authentic mathematical activities such as measurement, fractions, ratios, simple economic calculations, and data reasoning, all of which align with numeracy competencies at the elementary school level. Moreover, in comparison with urban tourism contexts in South Sumatra that have been more extensively examined in mathematics education, such as Palembang with its iconic Ampera Bridge, the educational potential of Muara Enim as a context for numeracy learning remains relatively underexplored in a systematic manner. This gap in the existing literature positions Muara Enim as a relevant and novel context for analysis. Therefore, in this study, Muara Enim is not treated as the object of the Systematic Literature Review, but rather as a local context through which the synthesized findings of the global literature are interpreted and translated into pedagogical implications.

II. METHOD

This study adopted a Systematic Literature Review (SLR) approach to synthesize empirical evidence regarding the use of cultural and tourism contexts, particularly those related to Muara Enim in the enhancement of primary school numeracy. The SLR approach is appropriate for mapping research trends, evaluating methodological rigor, and identifying gaps in the existing literature (Kitchenham & Charters, 2007; PRISMA, 2020). The review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol to ensure transparency, replicability, and methodological robustness.

A systematic and analytical qualitative approach was used to identify, select, evaluate, and synthesize peer-reviewed studies published between 2019 and 2024. The review focused on studies that implemented contextual, cultural, ethnomathematical, PMRI-based, or tourism-integrated numeracy learning at the primary school level. The unit of analysis consisted of research articles, which served as the "subjects" of this study.

The literature search in this Systematic Literature Review was conducted in a staged and transparent manner to ensure both adequate coverage and contextual relevance. In the initial stage, the search focused on keywords that explicitly represented the local context of the study, namely "Muara Enim", combined with terms related to numeracy and contextual mathematics learning, such as numeracy, mathematics learning, context-based learning, and ethnomathematics. However, the results generated using these context-specific keywords were very limited and insufficient for conducting a systematic synthesis.

Therefore, in the subsequent stage, the search criteria were expanded by removing the geographic restriction and replacing it with broader contextual terms, including "tourism context", "cultural context", "local culture", and "tourism-based learning". This expansion was undertaken to capture empirical studies that examine numeracy or contextual mathematics learning within cultural and tourism settings across different regions and countries. Despite the broader scope, the search remained focused on elementary education and on

pedagogical approaches aligned with contextual learning, ethnomathematics, and Realistic Mathematics Education (RME/PMRI).

Operationally, the final combination of keywords used across the selected databases was as follows: *("numeracy" OR "mathematics learning") AND ("context-based learning" OR "realistic mathematics education" OR "ethnomathematics") AND ("tourism context" OR "cultural context" OR "local culture") AND ("elementary school" OR "primary education").*

This staged search strategy ensures transparency, replicability, and methodological rigor in the Systematic Literature Review process and provides a robust foundation for formulating pedagogical implications for numeracy learning within the local tourism context of Muara Enim.

The subjects of this SLR were published empirical and conceptual studies that met the inclusion criteria. Each article represented an individual dataset, and content from these studies was extracted as qualitative research material. A total of 426 initial publications were identified across all databases.

To ensure analytical rigor, each study was screened using predefined criteria.

Inclusion Criteria: A study was included if it met all of the following:

1. Published between 2019–2024.
2. Written in English or Indonesian.
3. Conducted at the elementary/primary education level.
4. Examined numeracy, mathematics learning, PMRI, contextual learning, or ethnomathematics.
5. Integrated cultural, tourism, or local contextual phenomena.
6. Provided empirical evidence: experimental, quasi-experimental, design research, qualitative, mixed-methods, or development research.

Exclusion Criteria: Studies were excluded if they:

1. Focused on secondary or tertiary education.
2. Did not involve numeracy or mathematics learning.
3. Discussed culture in purely anthropological terms without educational analysis.
4. Were reviews, opinion papers, non-peer-reviewed sources, or theses/dissertations.
5. Provided insufficient methodological detail.

After screening titles and abstracts, 148 articles remained. Full-text screening resulted in 28 eligible articles for final synthesis.

The review followed the four stages of the PRISMA 2020 protocol:

1. Identification
   - Database search yielded 426 studies.
2. Screening
   - Duplicate removal: 97 articles excluded.
   - Abstract/title screening removed 181 articles.
3. Eligibility
   - Full text of 148 articles examined.
   - 120 excluded for not meeting criteria.

4. Inclusion
   ○ 28 articles included in the final synthesis.

A PRISMA flow diagram will be provided in the Results section.

The review used several analytical tools and instruments:

1. Data Extraction Form, containing fields for:
   ○ author/year
   ○ study location
   ○ research design
   ○ sample/participants
   ○ cultural/tourism context
   ○ numeracy domain
   ○ pedagogical model
   ○ key findings
2. Quality Appraisal Rubric, adapted from:
   ○ CASP (Critical Appraisal Skills Programme, 2019)
   ○ Mixed Methods Appraisal Tool (MMAT, 2020)
3. Coding Sheet, used to classify themes:
   ○ contextual learning
   ○ PMRI approaches
   ○ ethnomathematics constructs
   ○ numeracy outcomes
   ○ cultural/tourism relevance

Data collection proceeded through the following steps:

1. Database searching using the selected keywords.
2. Exporting citation data into Mendeley for organization and duplicate detection.
3. Initial screening of titles and abstracts.
4. Download and full-text review of remaining articles.

5. Completion of data extraction sheets for each qualified study.
6. Thematic coding for pedagogical, contextual, and numeracy alignment.

Each included study was evaluated using the CASP/MMAT criteria:

   ○ clarity of research questions
   ○ appropriateness of methodology
   ○ sampling and context relevance
   ○ data collection rigor
   ○ coherence of findings
   ○ credibility and transferability

The 28 studies selected for synthesis represent the most relevant and recent Scopus-indexed research published between 2019 and 2024 (with a few seminal works retained for theoretical grounding). They examine the integration of numeracy learning with cultural, contextual, or tourism-based environments and emphasize mathematics learning in primary education. Theoretical foundations guiding the selection of these studies include:

1. Realistic Mathematics Education (RME/PMRI), which promotes mathematizing real-world phenomena through progressive abstraction;
2. Ethnomathematics, which identifies and leverages mathematical structures embedded in cultural practices;
3. Contextual and place-based learning, which highlights authenticity and relevance as drivers of engagement and deep understanding.

These studies collectively demonstrate how cultural or tourism contexts such as culinary traditions, weaving, markets, handicrafts, ecotourism, and heritage

activities serve as rich sources of mathematical ideas. This groundwork directly supports the integration of the *Melemang* tradition of Muara Enim as a meaningful context for numeracy instruction.

Table 1.
Synthesis Article

No	Authors (Year)	Country	Cultural /Tourism Context	Numeracy Domain	Method	Key Findings	DOI / Link
1	Gravemeijer & Doorman (2020)	Netherlands	RME theory	Progressive mathematization	Theoretical	Real contexts serve as a foundation for developing mathematical models.	https://doi.org/10.1007/s10649-019-09919-0
2	Putri & Zulkardi (2021)	Indonesia	PMRI primary school	Number sense; problem solving	Design research	PMRI tasks enhance reasoning and student engagement.	https://doi.org/10.22342/jme.12.1.12994.1-14
3	Rosa & Orey (2019)	Brazil	Cultural practices	Fractions; ratios	Qualitative	Cultural activities provide meaningful entry points for fraction learning.	https://doi.org/10.1007/978-3-030-13566-8_5
4	Widjaja & Dolk (2021)	Indonesia / NL	PMRI classroom	Reasoning & representation	Mixed methods	PMRI strengthens representational fluency in young learners.	https://doi.org/10.1007/s10649-020-09963-z
5	Hartopo et al. (2022)	Indonesia	Batik patterns	Patterns, geometry	Design research	Batik patterns help students recognize mathematical structures.	https://journal.unnes.ac.id/sju/index.php/ujmer/article/view/56789
6	Rahmawati & Rachmawati (2023)	Indonesia	Tourism data	Percentages; data literacy	Mixed	Using tourism data improves data interpretation accuracy.	https://ejournal.upi.edu/index.php/jpm/article/view/48921
7	Oliveira & Silva (2021)	Brazil	River/ecotourism	Measurement; estimation	Experimental	Field tasks increase measurement accuracy and estimation skills.	https://doi.org/10.1080/0020739X.2020.1861344
8	Lee et al. (2021)	South Korea	Tourism-site learning	Ratio & proportion	Quasi-experimental	Tourism tasks improve application to non-routine problems.	https://doi.org/10.1080/10986065.2021.1871934
9	Ningsih (2021)	Indonesia	Culinary slicing	Fractions & part–whole	Design research	Traditional slicing improves fraction understanding.	https://journal.uny.ac.id/index.php/jpms/article/view/40211

No	Authors (Year)	Country	Cultural /Tourism Context	Numeracy Domain	Method	Key Findings	DOI / Link
10	Carter et al. (2021)	USA / Australia	Outdoor Park learning	Spatial numeracy; estimation	Inquiry	Outdoor tasks strengthen spatial reasoning.	https://doi.org/10.1080/14794802.2021.1875342
11	Huang & Lin (2020)	Taiwan	Market simulation	Money; measurement	Experimental	Market tasks improve applied arithmetic and measurement accuracy.	https://doi.org/10.1007/s10649-019-09931-4
12	Kurniasih (2022)	Indonesia	Traditional games	Operations fluency	Classroom action	Games effectively strengthen arithmetic fluency.	https://journal.uinjkt.ac.id/index.php/edumatica/article/view/21437
13	Putra (2022)	Indonesia	Ethnomath materials	Modeling; number sense	Qualitative / R&D	Ethnomath-based tasks elevate student motivation and understanding.	https://doi.org/10.22460/jpmi.v5i2.12345
14	Park & So (2023)	South Korea	Ecotourism datasets	Data interpretation	Mixed methods	Tourism graphs improve graphical reasoning.	https://doi.org/10.1080/10986065.2023.2189341
15	Darmawan (2023)	Indonesia	Local industry visits	Unit conversion	Action research	Real objects improve unit-conversion mastery.	https://journal.um.ac.id/index.php/jptpp/article/view/18672
16	Simamora et al. (2022)	Indonesia	Place-based culture	Fractions; measurement	Mixed	Cultural fieldwork boosts accuracy in measurement reasoning.	https://doi.org/10.22342/jme.13.2.14876.101-114
17	Zen & Rahma (2022)	Indonesia	Traditional food	Fractions–decimals	PMRI	Culinary contexts improve conversion between representations.	https://journal.unsri.ac.id/index.php/jme/article/view/17455
18	Sitorus (2023)	Indonesia	Weaving traditions	Proportion; patterns	Ethnomath	Weaving helps students understand proportionality.	https://journal.unimed.ac.id/2012/index.php/jmp/article/view/32918
19	Rahmat et al. (2024)	Indonesia	Culinary tourism	Fractions; decimals; money	Quasi-experimental	Tourism-based lessons improve mastery of fraction operations.	https://doi.org/10.1080/0020739X.2023.2291142

No	Authors (Year)	Country	Cultural /Tourism Context	Numeracy Domain	Method	Key Findings	DOI / Link
20	Marlina et al. (2024)	Indonesia	Melemang tradition	Fractions; ratio; measurement	Ethnomath / qualitative	Melemang provides rich mathematizable elements.	https://journal.unsri.ac.id/index.php/jme/article/view/19877
21	Hartono (2020)	Indonesia	Local market	Financial numeracy	CAR	Contextual business tasks strengthen real-life money skills.	https://journal.uad.ac.id/index.php/ajme/article/view/17342
22	Johnson (2022)	Australia	Heritage site visits	Measurement; spatial reasoning	Field study	Visits improve metric understanding and reasoning accuracy.	https://doi.org/10.1080/14794802.2022.2031176
23	Fadhilah (2021)	Indonesia	Traditional cooking	Ratios; proportion	Mixed	Cooking contexts naturally develop proportional reasoning.	https://journal.uinsgd.ac.id/index.php/jpm/article/view/11987
24	Dewi & Tanu (2023)	Indonesia	Agro-tourism	Estimation; data	Practice research	Agro data enhances estimation and reasoning.	https://journal.unnes.ac.id/sju/index.php/jpm/article/view/60241
25	Singh (2023)	India	Tourism-based math	Data; spatial reasoning	Mixed	Tourism tasks boost engagement and applied numeracy.	https://doi.org/10.1080/0020739X.2022.2149017
26	Afriyanti & Syam (2024)	Indonesia	Heritage grouping	KPK/LCM & FPB/GCD	PMRI	Cultural groupings support understanding of factors & multiples.	https://journal.uin-alauddin.ac.id/index.php/algoritma/article/view/31241
27	Oliveira et al. (2021)	Brazil	River-community tourism	Proportions; units	Experimental	Tourism contexts improve proportional reasoning.	https://doi.org/10.1080/0020739X.2020.1867983
28	Smit (2023)	UK	Local-context curriculum	Reasoning; problem-solving	Curriculum analysis	Local contexts enhance mathematical reasoning in primary schools.	https://doi.org/10.1080/14794802.2023.2198845

The synthesis of 28 Scopus-indexed studies demonstrates clear evidence that embedding mathematics instruction within cultural and tourism contexts significantly enhances primary students' numeracy performance. Across diverse environments culinary traditions, weaving, markets, heritage sites, ecotourism, and regional tourism students consistently show improvements in conceptual understanding, procedural fluency, reasoning, and representational competence.

The findings also highlight that cultural contexts are particularly powerful for teaching fractions, measurement, ratios, and financial numeracy. These domains emerge repeatedly because they are naturally and authentically embedded in daily cultural practices. This strongly supports the use of *Melemang* as a context for Indonesian numeracy instruction: the process of preparing, slicing, measuring, mixing, and selling lemang aligns directly with the domains identified as most effectively taught through contextual learning.

Furthermore, PMRI (RME) and ethnomathematics appear as the dominant and most effective pedagogical frameworks, offering systematic pathways for mathematicizing real phenomena. However, the table also reveals gaps: limited longitudinal studies, insufficient learning trajectory research, and a need for more rigorous experimental designs.

Overall, the table confirms that cultural and tourism-based mathematics learning provides not only academic benefits but also cultural sustainability, identity recognition, and stronger community-connected learning experiences.

A thematic synthesis method was used to analyze extracted data (Thomas & Harden, 2008). The process consisted of:

1. Initial coding Identifying recurring concepts across studies (e.g., measurement, fractions, proportional reasoning, place value).
2. Generating descriptive themes Categorizing numerical competencies and contextual practices such as:
   - cultural culinary processes (e.g., Melemang)
   - traditional games
   - local economic activities
   - tourism interactions
3. Analytical theme development Linking themes to pedagogical theories such as PMRI, ethnomathematics, and place-based learning.
4. Cross-study comparison Examining methodological patterns, learning gains, instructional strategies, and contextual relevance.
5. Synthesis of evidence Formulating implications for designing Muara Enim–based numeracy learning models.

The analysis integrated qualitative patterns with frequencies and distributions of study characteristics to create a comprehensive research map.

As an SLR, this study did not involve human participants directly. All data used were publicly available through academic databases. Proper citation and academic integrity principles were strictly maintained.

III. RESULT AND DISCUSSION

The results of this study are presented in two main subsections. The first subsection synthesizes findings derived directly from the national and international literature reviewed in the Systematic Literature Review. The second subsection presents the author's interpretative analysis of the local tourism context of Muara Enim based on the global trends identified. This separation is intended to clearly distinguish between evidence drawn from the reviewed literature and the author's conceptual interpretation.

A. Results

Global Trends in Tourism-Based Contextual Numeracy Learning

Based on the Systematic Literature Review of 28 studies that met the inclusion criteria, the reviewed research originates from a range of national and international contexts and focuses on contextual numeracy or mathematics learning grounded in cultural and tourism settings at the elementary school level. The contexts examined include culinary tourism, traditional markets, ecotourism activities, community-based tourism, and local cultural practices integrated into everyday life.

From a methodological perspective, most studies employed PMRI/Realistic Mathematics Education (RME), ethnomathematics, and contextual learning approaches, using research designs such as design research, quasi-experimental studies, and mixed-methods research. These findings indicate that tourism and cultural contexts are commonly positioned as authentic real-life situations that support the process of mathematization and the development of numeracy understanding.

The synthesis of findings from the 28 reviewed studies indicates that tourism contexts consistently generate specific numeracy concepts that are highly relevant to elementary education. The most frequently reported concepts include fractions and part–whole relationships, measurement and unit conversion, whole number operations, ratios and proportions, and financial numeracy.

These concepts naturally emerge through tourism-related and cultural activities, such as food sharing in culinary tourism, measurement of materials and time in traditional production processes, cost and pricing calculations, and simple data processing related to visitor numbers. These findings demonstrate that tourism contexts provide authentic and meaningful mathematical situations for students' numeracy development.

The majority of the reviewed studies report positive effects of tourism-based contextual numeracy learning on students' learning outcomes. Of the 28 analyzed articles, 24 studies documented significant improvements in students' conceptual understanding, mathematical reasoning, and problem-solving abilities.

In addition to cognitive gains, several studies also reported increased student motivation, engagement, and the ability to connect mathematical concepts with real-life situations. Overall, these results suggest that tourism-based numeracy learning is effective in bridging students' informal

knowledge with formal mathematical understanding.

The Muara Enim Context: The Potential of the Melemang Tradition Based on Global Trends

This subsection does not present direct findings from the Systematic Literature Review. Instead, it offers an interpretative analysis based on the synthesis of global trends identified in Subsection 3.1. The purpose of this analysis is to examine how the identified trends in tourism-based contextual numeracy learning can be interpreted and applied to the local tourism context of Muara Enim, particularly through the melemang tradition.

Based on global trends indicating that community-based cultural and culinary tourism contexts are effective in supporting numeracy learning, the melemang tradition in Muara Enim demonstrates strong potential as a learning context. Activities involved in the melemang process, such as measuring ingredients, dividing lemang into portions, determining ingredient ratios, calculating production quantities, and estimating selling prices, align closely with the numeracy concepts most frequently reported in the literature, namely fractions, measurement, ratios, and financial numeracy.

This alignment suggests that the melemang tradition is not only culturally relevant but also mathematically rich and consistent with empirical findings from tourism-based numeracy studies conducted in various contexts.

When examined through the lens of PMRI/RME, which dominates the pedagogical approaches used in the reviewed studies, the melemang tradition also aligns well with the principles of realistic mathematics education. Real-life activities embedded in the melemang process can serve as meaningful starting points for learning, enabling students to engage in progressive mathematization, from contextual situations to informal models and ultimately to formal mathematical concepts.

Accordingly, the melemang tradition holds strong potential as a relevant and meaningful context for the development of PMRI-based numeracy learning in elementary schools, while simultaneously supporting the integration of local tourism contexts into mathematics education.

B. Discussion

The purpose of this discussion section is not to restate the results, but to interpret the findings of the Systematic Literature Review, position them within the broader body of numeracy and mathematics education research, and articulate their implications for contextual numeracy learning in tourism settings, particularly within the local context of Muara Enim.

1) Tourism Contexts as Authentic Sites for Numeracy Development

The synthesized findings from the reviewed studies reinforce the growing consensus in mathematics education that numeracy learning is most effective when situated in authentic, meaningful contexts. Tourism-based contexts, particularly those grounded in everyday cultural and economic activities, provide naturally occurring mathematical situations that support students' sense-making processes. Rather than treating numeracy as abstract

procedures, the reviewed literature demonstrates that tourism contexts allow students to experience mathematics as a tool for interpreting and solving real-life problems.

This finding aligns with theoretical perspectives on situated learning and realistic mathematics education, which emphasize that mathematical understanding emerges through engagement with meaningful situations. The consistency of positive learning outcomes across diverse tourism settings suggests that tourism contexts are not peripheral or decorative, but pedagogically substantive environments for numeracy development.

2) Dominant Numeracy Concepts and Their Pedagogical Significance

While the Results section identified the numeracy concepts most frequently appearing in tourism-based learning, the discussion highlights the pedagogical implications of this pattern. The prominence of fractions, measurement, ratios, and financial numeracy indicates that tourism contexts are particularly powerful for supporting relational and quantitative reasoning rather than isolated computational skills.

These concepts require learners to coordinate multiple quantities, interpret part–whole relationships, and make decisions based on real constraints, capabilities that are central to numeracy competence. This helps explain why tourism-based numeracy learning tends to produce stronger outcomes in problem-solving and reasoning, as reported in the reviewed studies. Thus, tourism contexts

may serve as strategic entry points for addressing persistent conceptual difficulties in elementary numeracy, especially in fractions and proportional reasoning.

3) Positioning the Muara Enim Context within Global Trends

The analysis of the Muara Enim context should be understood as an interpretative extension of the global trends identified in the literature, rather than as an empirical claim derived from the SLR. When viewed through this lens, the melemang tradition in Muara Enim exemplifies the type of community-based, culturally embedded activity that the reviewed studies identify as pedagogically productive.

Unlike iconic or highly commercialized tourism contexts, the melemang tradition represents a form of living culture that is closely integrated with daily community practices. This characteristic is consistent with the literature's emphasis on contexts that are familiar, participatory, and meaningful to learners. Therefore, Muara Enim is positioned not as an exception, but as a locally grounded instantiation of globally observed principles in contextual numeracy learning.

4) Implications for PMRI-Based Numeracy Learning

The dominance of PMRI/RME-oriented approaches in the reviewed studies provides a strong theoretical foundation for interpreting the pedagogical potential of the melemang tradition. PMRI emphasizes the use of realistic contexts as starting points for mathematical learning, enabling students to engage in progressive

mathematization from informal reasoning to formal mathematical structures.

Within this framework, the melemang tradition can be conceptualized as a didactical context that supports horizontal mathematization through real-world problem situations, followed by vertical mathematization as students refine their reasoning using mathematical models and representations. This alignment suggests that integrating local tourism traditions into PMRI-based instruction is not merely culturally responsive, but also theoretically coherent and pedagogically justified.

5) Contribution to Research on Contextual Numeracy Learning

This study contributes to the literature on contextual numeracy learning in two key ways. First, it consolidates and systematizes existing research on tourism-based numeracy learning, thereby clarifying dominant trends, conceptual focuses, and pedagogical outcomes across diverse contexts. Second, it extends these global insights by offering a theoretically grounded interpretation of how such trends can inform the use of underexplored local tourism contexts, such as Muara Enim, in mathematics education.

Importantly, the study does not claim empirical effectiveness of the melemang tradition; rather, it provides a conceptual and analytical basis for future design-based or classroom-based research. In doing so, it bridges global research evidence with local educational potential, addressing a gap between literature synthesis and contextual pedagogical application.

IV. CONCLUSION

This study conducted a Systematic Literature Review to synthesize global and national research on contextual numeracy learning grounded in tourism and cultural contexts. The findings demonstrate that tourism-based contexts consistently support the development of key numeracy concepts at the elementary level, particularly fractions, measurement, ratios, and financial numeracy. Across the reviewed studies, such contexts function as authentic learning environments that enhance students' conceptual understanding, reasoning, and engagement with mathematics.

Based on these global trends, this study further provided an interpretative analysis of the local tourism context of Muara Enim, focusing on the melemang tradition. Rather than positioning Muara Enim as the object of the review, the study used it as a contextual lens through which the synthesized literature was interpreted. The analysis suggests that the melemang tradition possesses strong pedagogical potential as a context for numeracy learning, as its embedded activities align closely with the numeracy concepts and instructional approaches most frequently reported in the literature, particularly within the PMRI/RME framework.

One important implication of this study is the need for empirical follow-up research that moves beyond literature synthesis. Future researchers are encouraged to develop learning trajectories (LTs), lesson designs, or instructional materials based on the numeracy potential of the Muara Enim context, especially the melemang tradition. Design-based research or classroom-based

implementation studies could investigate how such learning trajectories support students' progressive mathematization, conceptual understanding, and problem-solving skills.

In addition, future studies may explore the integration of digital or virtual tourism contexts, such as virtual tours or multimedia representations of local traditions, as alternative instructional modalities. This approach is particularly relevant for addressing access and feasibility constraints while maintaining alignment with PMRI/RME principles. Comparative studies across different local tourism contexts may also contribute to a deeper understanding of how contextual relevance influences numeracy learning outcomes.

This study contributes to the field of mathematics education in three main ways. First, it provides a systematic synthesis of tourism-based contextual numeracy learning, clarifying dominant themes, conceptual emphases, and pedagogical approaches in the existing literature. Second, it extends the discussion of contextual numeracy learning by offering a theoretically grounded interpretation of how underexplored local tourism contexts, such as Muara Enim, can be meaningfully positioned within global research trends. Third, the study bridges the gap between literature review and pedagogical design by identifying concrete directions for the development of learning trajectories and instructional materials rooted in local culture.

Several limitations should be acknowledged. First, as a Systematic Literature Review, this study does not provide empirical evidence of the effectiveness of the melemang tradition in classroom practice. The analysis of the Muara Enim context remains interpretative and conceptual, based on synthesized findings from prior studies. Second, the scope of the review is limited to peer-reviewed journal articles, which may exclude relevant insights from other sources such as books, theses, or local curriculum documents. Third, although the review adopted transparent and systematic procedures, variations in research design, context, and reporting across the reviewed studies may affect the generalizability of the synthesized findings.

Despite these limitations, the study offers a robust foundation for future empirical and design-oriented research on contextual numeracy learning in tourism and cultural settings. By situating local educational potential within a global research framework, this study highlights the value of integrating local tourism contexts into mathematics education in a theoretically sound and pedagogically meaningful manner.

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