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The Philosophy and Ethics of Ethnomathematics: Rejecting the High versus Low Valuations

La Filosofia e l'Etica dell'Etnomatematica: Oltre la Distinzione tra Cultura Alta e Cultura Bassa

La Filosofía y la Ética de la Etnomatemática: Más allá de la Distinción entre Alta y Baja Cultura

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Abstract. *This paper examines the ethical dimensions of ethnomathematics—the mathematical practices embedded in cultures, often informal, oral, and non-institutionalised. It argues that the marginalisation of ethnomathematics relative to formal, academic mathematics is not merely an epistemological issue but an ethical one, involving questions of social justice, class distinction, and cultural hierarchy. Drawing on Alan Bishop's framework of six universal activities, the paper shows how mathematics emerges from culturally situated practices. It explores the relationship between critical mathematics education and ethnomathematics, engaging with the work of Ole Skovsmose, Paola Valero, and Gelsa Knijnik to articulate the ethical-political nature of the field. The paper then examines the diverse philosophical and ontological frameworks embedded in Indigenous mathematical traditions, demonstrating that ethnomathematics embodies distinct worldviews. Drawing parallels with other domains of cultural production—history, art, music, language—it shows how the distinction between "high" and "low" culture serves to maintain social hierarchies. It argues that recognising the value of ethnomathematical practices is an ethical imperative connected to broader struggles for cultural recognition and social justice.*

Keywords: ethnomathematics, critical mathematics education, social justice, indigenous knowledge, epistemic justice, cultural hierarchy, philosophy of mathematics, Ubuntu, decoloniality.

Sunto. *Questo articolo esamina le dimensioni etiche dell'etnomatematica, intesa come l'insieme delle pratiche matematiche radicate nelle culture, spesso informali, orali e non istituzionalizzate. Si sostiene che la marginalizzazione dell'etnomatematica rispetto alla matematica formale e accademica non costituisca soltanto una questione epistemologica, ma anche una questione etica, che coinvolge temi di giustizia sociale, distinzione di classe e gerarchie culturali. Facendo riferimento al modello delle sei attività universali di Alan Bishop, l'articolo mostra come la matematica emerga da pratiche culturalmente situate. Viene inoltre esplorata la relazione tra educazione*

matematica critica ed etnomatematica attraverso il confronto con i contributi di Ole Skovsmose, Paola Valero e Gelsa Knijnik, al fine di evidenziare la natura etico-politica del campo. Successivamente, il lavoro analizza i diversi quadri filosofici e ontologici presenti nelle tradizioni matematiche indigene, mostrando come l'etnomatematica incorpori visioni del mondo differenti. Attraverso un confronto con altri ambiti della produzione culturale – storia, arte, musica e linguaggio – si evidenzia come la distinzione tra cultura "alta" e cultura "bassa" contribuisca al mantenimento delle gerarchie sociali. Si sostiene infine che il riconoscimento del valore delle pratiche etnomatematiche costituisca un imperativo etico connesso a più ampie rivendicazioni di riconoscimento culturale e giustizia sociale.

Parole chiave: etnomatematica, educazione matematica critica, giustizia sociale, saperi indigeni, giustizia epistemica, gerarchia culturale, filosofia della matematica, Ubuntu, decolonialità.

Resumen. *El presente estudio explora los procesos mediante los cuales los docentes de educación primaria identifican e interpretan los errores de los estudiantes de Grado 5 en relación con el ítem INVALSI del pez espada. En las respuestas a dicha tarea, administrada de forma abierta a una muestra de 100 estudiantes, aparece como recurrente la idea errónea (misconcepción) vinculada a la confusión entre magnitudes unidimensionales y bidimensionales (longitud y área). Los protocolos más representativos de este tipo de error se utilizaron posteriormente como estímulo durante entrevistas semiestructuradas realizadas individualmente a dos docentes de educación primaria; las transcripciones se analizaron a través de la nueva lente teórica de la competencia hermenéutica. Los resultados evidencian diferentes modalidades de expresión de dicha competencia y muestran cómo la trayectoria profesional de los docentes puede influir en los procesos de identificación e interpretación del error. Al mismo tiempo, el estudio señala cómo el análisis guiado de los protocolos y de los datos a gran escala constituye una prometedora herramienta formativa para promover el desarrollo de la competencia hermenéutica de los docentes.*

Palabras clave: etnomatematica, educación matemática crítica, justicia social, conocimientos indígenas, justicia epistémica, jerarquía cultural, filosofía de las matemáticas, Ubuntu, decolonialidad.

1. Introduction: Mathematics High and Low

Mathematics is typically understood as the formal, institutionalised discipline taught in universities and schools, published in journals, and practiced by professional mathematicians. However, mathematics in a broader sense encompasses far more. Almost every human society has developed ways of counting, measuring, locating, designing, playing, and explaining that involve mathematical thinking. These practices—embedded in culture, often oral and informal, passed down through generations—constitute what has come to be called ethnomathematics.

The term "ethnomathematics" was in use from at least the early 1970s; Wilbur Mellema claimed to have coined it in a 1971 speech, defining it as «the study of pre-Western and non-Western Mathematics and Logic.» The Brazilian mathematician and educator Ubiratan D'Ambrosio encountered the term in the late 1960s or early 1970s while seeking a way to describe mathematical practices embedded within cultural contexts. Rather than coining the term, D'Ambrosio's foundational contribution was to formalise the field, broadening its definition to encompass the mathematics of *any* culturally identified group—not solely non-literate or non-Western societies. As D'Ambrosio defined it:

> Ethnomathematics is the mathematics practiced by cultural groups, such as urban and rural communities, groups of workers, professional classes, children in a given age group, indigenous societies, and so many other groups that are identified by the objectives and traditions common to these groups. (D'Ambrosio, 1985, p. 45)

A more recent formulation, drawing on the work of the World Intellectual Property Organization, defines traditional knowledge as "knowledge, know-how, skills and practices that are developed, sustained and passed on from generation to generation within a community, often forming part of its cultural or spiritual identity" (WIPO, n.d., para. 1). This understanding recognises that what makes knowledge "traditional" is not its antiquity but its living, dynamic character: "much Traditional Knowledge is not ancient or inert, but is a vital, dynamic part of the contemporary lives of many communities today" (Indigenising University Mathematics project, n.d., "What is Traditional Knowledge?" section).

Ethnomathematics recognises that mathematical thinking is a universal human activity, but that its forms and expressions vary enormously across cultures and contexts. The mathematical practices of street vendors in Brazil, of Indigenous peoples in the Amazon, of craftspeople in India, of farmers in Africa, of workers in urban communities—all these are mathematics, even if they do not look like the mathematics taught in schools. As Marcelo Borba has argued:

> When the solution of this problem involves a mathematical treatment, the solution contributes to the development of ethnomathematics in this culture. Over time, this ethnomathematics is probably going to be more efficient than the models stored in textbooks and written in codes not always accessible to a given cultural group, because it is connected to the culture where the problem was generated. (Borba, n.d., cited in Indigenising University Mathematics project, "Ethnomathematics and Education" section)

The relationship between formal mathematics and ethnomathematics is not merely one of difference but of hierarchy. Formal mathematics occupies a position of prestige and power; ethnomathematics is marginalised, devalued, often invisible. This hierarchy is not epistemologically justified—it does not rest on the superior truth or utility of formal mathematics—but is socially

constructed. It reflects and reinforces class distinctions, cultural hierarchies, and relations of power.

This paper examines the ethical dimensions of this hierarchy. It argues that the marginalisation of ethnomathematics is not just a scholarly oversight but an injustice—one connected to broader patterns of cultural domination and class distinction.

The specific contribution of this paper is to reframe that marginalisation as an ethical rather than a merely epistemological problem, and to argue the case through a sustained parallel with other cultural hierarchies. Its central thesis is that the hierarchy dividing formal from ethnomathematical practice is a socially constructed "high"-versus-"low" distinction of the same kind that separates fine art from craft, standard languages from dialects, or elite from popular history, and that, once this is recognised, the devaluing of ethnomathematics stands exposed as an injustice demanding redress. The paper advances this claim in three steps: it establishes the philosophical priority of everyday over formal mathematics; it shows, through African, First Nations, and Amazonian examples, that ethnomathematical traditions embody whole worldviews rather than mere techniques; and it draws the cross-cultural parallels that reveal the high–low distinction as a mechanism of social power. Recognising the value of ethnomathematics thus emerges not as an act of scholarly courtesy but as an ethical imperative bound up with wider struggles for cultural recognition and social justice.

2. The Philosophical Priority of Everyday Mathematics

Before examining the specific claims of ethnomathematics, it is necessary to address a fundamental philosophical issue: the claim that formal, academic mathematics is the sole legitimate form of mathematical knowledge. This claim inverts the actual relationship between formal and informal mathematics. Historically and ontologically, everyday mathematical practices come first. Long before there were professional mathematicians, there were merchants counting goods, builders measuring materials, farmers tracking seasons, and craftspeople designing patterns. The regularity and reliability of these practices—the fact that two goats plus two goats always makes four goats—is what sustains the sense of certainty and truth that we associate with mathematics. As the philosopher of mathematics Reuben Hersh argued: "The real foundation of mathematics is not in formal systems or Platonic heavens but in human practice. Mathematics is a human activity, a social phenomenon, part of human culture" (Hersh, 1997, p. 22).

The claim that formal proof is what legitimates mathematics is a professional ideology, not a description of how mathematics actually functions in human life. Most mathematical knowledge that people use every day has never been formally proved. As the mathematician and philosopher Imre Lakatos observed:

"The informal, quasi-empirical, mathematics has not been superseded by formal, axiomatic mathematics. On the contrary, formal mathematics is an abstraction from informal mathematics, and its validity depends on its relationship to the informal practices from which it is derived" (Lakatos, 1976, p. 3).

This philosophical point has profound ethical implications. If formal mathematics is derivative from, and dependent on, everyday mathematical practices, then the hierarchy that privileges formal over informal mathematics is not epistemologically justified. It is a social hierarchy, not a logical one. The marginalisation of ethnomathematics is therefore not just a scholarly oversight but an act of epistemic injustice—a failure to recognise the knowledge of ordinary people as genuine knowledge.

3. Alternative Epistemic Practices: Intuitionism and Dialectical Materialism

The claim that formal, academic mathematics is not the only valid form of mathematical knowledge is reinforced by the existence of alternative epistemic practices within mathematics itself and beyond.

3.1. Intuitionism and Mathematical Constructivism

Intuitionism, developed by L.E.J. Brouwer and his followers, rejects the classical law of excluded middle (that every statement is either true or false) and insists that mathematical objects must be constructed by the mind. As Brouwer wrote: "There are no non-experienced truths. The only possible foundation of mathematics must be sought in the construction of mental mathematical objects, which are based on the intuition of time" (Brouwer, 1912, p. 128).

For intuitionists, a mathematical statement is true only if there is a constructive proof of it. This leads to a rejection of many classical results that rely on non-constructive arguments. Intuitionism survives as a minority tradition within academic mathematics, but its existence demonstrates that even within the academy, there is not universal agreement on the nature of mathematical truth. This has parallels with ethnomathematics: different cultural traditions may have different conceptions of what counts as mathematical knowledge.

3.2. Dialectical Materialism and the Logic of Contradiction

An even more striking alternative epistemic practice is found in the tradition of dialectical materialism, developed by Marx, Engels, and their successors. Dialectical materialism rejects the classical law of non-contradiction (that a statement cannot be both true and false) in favour of a logic that embraces contradiction as a motor of development. As Friedrich Engels wrote in

Dialectics of Nature: "Dialectics, so-called objective dialectics, prevails throughout nature, and so-called subjective dialectics, dialectical thought, is only the reflection of the motion through opposites which asserts itself everywhere in nature" (Engels, 1940, p. 206).

This tradition holds that contradiction is not a sign of error but a feature of reality. The Soviet philosopher Evald Ilyenkov explained: "Contradiction is the principle of motion, of change, of development. To think dialectically is to think in contradictions, to grasp things in their development, in their transition from one state to another" (Ilyenkov, 1977, p. 240).

This logic of contradiction has been enormously influential outside the Western academic mainstream. Yet from the perspective of classical logic, dialectical materialism is incoherent. The significance for ethnomathematics is profound: if a major intellectual tradition operates with a logic incompatible with classical mathematics, then the claim that classical mathematics is the universal foundation of all rational thought becomes untenable. Different cultures have developed different standards of evidence and conceptions of truth. Recognising this is not cultural relativism but intellectual honesty.

4. Bishop's Universal Activities: The Cultural Foundations of Mathematics

Alan Bishop's foundational work in *Mathematical Enculturation* (Bishop, 1988) provides a crucial framework for understanding the cultural origins of mathematics. Bishop argued that mathematics, as cultural knowledge, derives from humans engaging in six universal activities in a sustained and conscious manner. These six activities—counting, locating, measuring, designing, playing, and explaining—represent the fundamental ways in which human societies develop mathematical understanding.

Counting is the activity of quantifying and enumerating. *Locating* involves finding one's way in space, navigating, and representing spatial relationships. *Measuring* is the activity of quantifying qualities—length, area, volume, weight, time. *Designing* involves creating shapes, patterns, and structures. *Playing* includes games, puzzles, and other activities that involve rule-based behaviour and strategic thinking. *Explaining* is the activity of making sense of the world, finding patterns, and developing theories.

Bishop's framework is significant because it shows that mathematics is not a European invention but a universal human activity. As Bishop himself wrote: "Mathematics is a form of cultural knowledge which all cultures generate but which need not necessarily look the same from one cultural group to another" (Bishop, 1988, p. 180).

Crucially, Bishop's framework also shows how formal, academic mathematics has appropriated these activities. As D'Ambrosio argued, these universal human activities have been "expropriated by the scholarly

establishment, formalized, codified and incorporated into academic mathematics" (D'Ambrosio, 2001, p. 31). But they also "remain alive in culturally identified groups and constitute routine in their practices" (D'Ambrosio, 2001, p. 31). The relationship between formal mathematics and ethnomathematics is one of expropriation and marginalisation—the "high" form has taken what was once common and claimed it as its own.

5. Critical Mathematics Education and Ethnomathematics

Ole Skovsmose, whose critical philosophy of mathematics (Skovsmose, 2024a) has been central to this field, has written extensively on the relationship between critical mathematics education (Skovsmose, 2024b) and ethnomathematics. Skovsmose characterises critical mathematics education by its many concerns, identifying four interconnected themes:

> Critical mathematics education can be characterized by its many concerns. I refer here to four of them connected to social justice and politics, power and mathematics, students' future possibilities, and the socio-political structuring of education, all of which are interrelated and integrated. (Skovsmose, 2022, p. 2)

Skovsmose argues that much work in ethnomathematics shares these concerns, but adds a crucial qualification: the relationship between ethnomathematics and critical concerns is not automatic but must be examined in each case.

> However, to what extent an ethnomathematical study turns critical must be discussed in every case. I see the concerns of critical mathematics education as an important challenge to ethnomathematics. (Skovsmose, 2022, p. 4)

This formulation is significant. Skovsmose is not dismissing ethnomathematics but insisting that it must be evaluated critically. Ethnomathematical studies can be descriptive, simply documenting practices without engaging with questions of power or justice. The challenge from critical mathematics education is to move beyond description to critique—to ask how ethnomathematical practices relate to structures of power, how they might contribute to social justice, and how they might open new possibilities for students.

In his recent *Critical Philosophy of Mathematics* (2024a), Skovsmose develops these themes further, interpreting mathematics as being "indefinite"—always part of ongoing human constructions—and outlining "a performative interpretation of mathematics, portraying mathematics as intrinsically connected to actions" (Skovsmose, 2024a, p. 87). As he argues: "Any kind of action, including mathematics-based actions, calls for ethical considerations and this leads to any mathematical practice, either in research, application, or education, to face ethical challenges" (Skovsmose, 2024a, p. 93).

Ethnomathematical practices, like all mathematical practices, are actions in the world, embedded in particular social, cultural, and political contexts.

Recognising ethnomathematics therefore requires attending to these ethical dimensions.

6. The Ethical-Political Dimensions of Ethnomathematics

The work of Paola Valero and Gelsa Knijnik has been central to articulating the ethical-political dimensions of ethnomathematics and mathematics education. Valero's research examines how mathematics education participates in the fabrication of subjects and the structuring of societies. As she writes: "Mathematics education is not merely about the transmission of mathematical knowledge; it is about the formation of human subjects and the constitution of social order" (Adrade Molina & Valero, 2019, p. 8).

Gelsa Knijnik has been a leading voice in ethnomathematics for over three decades. Her work, grounded in the social realities of rural Brazil, has consistently emphasised the connections between ethnomathematics and struggles for social justice. In a 1993 article, Knijnik:

> Presents two practices used by rural Brazilians to estimate area of land and volumes of tree trunks. Using an ethnomathematical approach, develops educational ideas involving the interrelations between academic and popular mathematical knowledge in the context of the struggle for land. (Knijnik, 1993, p. 3)

The reference to "the struggle for land" is significant. Knijnik's work is rooted in concrete struggles for justice. The mathematical practices of rural Brazilians are not just interesting cultural artifacts but resources in their struggle for land, dignity, and recognition.

The 2024 edited volume *Ethnomathematics and Mathematics Education*, co-edited by Knijnik and Cynthia Nicol, brings together international perspectives on ethnomathematics. The editors emphasise how ethnomathematics supports "transformation of educational systems toward regaining cultural reclamation and self-confidence, challenges colonial logics for decolonizing and Indigenizing mathematics education, and engages with actions for critical and social justice issues" (Nicol et al., 2024, p. 3).

7. The Program of Ethnomathematics: Social Justice and the Six Dimensions

The 2016 ICME-13 Topical Survey *Current and Future Perspectives of Ethnomathematics as a Program*, authored by Milton Rosa, Ubiratan D'Ambrosio, and colleagues, provides a comprehensive overview of the field. The survey emphasises that ethnomathematics is not merely a descriptive enterprise but a program with normative commitments:

> The theoretical basis of ethnomathematics offers a valid alternative to traditional studies of history, philosophy, cognition, and pedagogical aspects of mathematics. The current agenda for ethnomathematics is to continue an ongoing, progressive

> trajectory that contributes to the achievement of social justice, peace, and dignity for all. (Rosa et al., 2016, p. v)

The survey identifies six dimensions of ethnomathematics that structure the field: the conceptual, historical, cognitive, pedagogical, epistemological, and political dimensions (Rosa et al., 2016, p. 3). These six dimensions demonstrate the breadth of ethnomathematics as a program. It is not simply about studying other cultures' mathematics but about rethinking the very foundations of mathematics education, challenging dominant epistemologies, and engaging with questions of power and justice.

8. Indigenous Philosophies of Mathematics: Community, Relationality, and Ontology

The philosophical foundations of ethnomathematics are evident in Indigenous traditions of thought, which offer profound alternatives to Western individualistic and objectivist conceptions of mathematics. These traditions emphasise community, interconnectedness, and the social embeddedness of all knowledge.

8.1. African Philosophies: Ubuntu, Ayatutu, and Community

The philosophy of *Ubuntu*, with its foundational principle that "a person is a person through persons" (umuntu ngumuntu ngabantu), has been increasingly recognised as a framework for mathematics education. As Terungwa James Age argues, African approaches to education must move beyond the wholesale adoption of external methods, proposing an alternative pedagogy rooted in communal responsibility and mutual assistance. Age develops this through the concept of "Ayatutu," a communal philosophy from Nigeria's Tiv people (an agrarian people of the Benue valley in central Nigeria, among the country's larger ethnic groups) that embodies "collective responsibility and mutual assistance" (Age, 2025). This framework demonstrates that mathematical learning is not an individual achievement but a communal endeavour.

The work of Paulus Gerdes has been foundational in documenting and recovering African mathematical heritage. Gerdes (1994) argues that "in African thought, mathematics is considered a social activity. It is regarded as an activity that involves the whole community" (Gerdes, 1994, p. 2). Similarly, Ron Eglash's groundbreaking work on fractals in African architecture and design demonstrates that sophisticated mathematical concepts can be embedded in cultural practices without being formalised in the Western sense. As Eglash argues, "African mathematics is not simply a tool for problem-solving, it is a way of thinking and reasoning about the world" (Eglash, 1999, p. 159).

8.2. First Nations Perspectives: Relationality and Ontology

The Dakota/Lakota Math Connections project represents a pioneering effort to develop an epistemological framework that honours Indigenous ways of knowing. (The Dakota and Lakota are closely related peoples of the Oceti Šakowiŋ, the Seven Council Fires, known in English as the Great Sioux Nation, whose homelands lie in the Northern Plains of what is now the north-central United States; the project is based at Sitting Bull College on the Standing Rock Reservation in North and South Dakota.) The framework explicitly challenges the Western assumption of mathematics as universal and objective:

> This assumption describes that D/Lakota math existed before colonization. It passed down from one generation to the next and needed no justification from colonial powers or reinforcement with colonial knowledge. Just like the D/Lakota language does not need the English language to justify its credibility, use, or power, D/Lakota math does not need Western math to justify its credibility, use, or power. Each circle can stand on its own. (Frontiers in Education, 2023, p. 7)

The work of Rik Pinxten, particularly his studies of Navajo and Hopi geometry, demonstrates that Indigenous mathematical thinking operates with fundamentally different ontological assumptions. Pinxten's research reveals that Navajo conceptions of space reflect a different understanding of what space is—not an empty container but a field of relationships and processes.

Lisa Lunney Borden's work with Mi'kmaw communities has developed what she calls "verbing mathematics"—an approach that shifts from noun-based Western conceptions to verb-based Indigenous conceptions. This shift reflects a worldview in which mathematics is not a set of objects to be manipulated but a way of acting in and with the world.

8.3. Amazonian Mathematics: Kinship as Algebra

One of the most remarkable developments is the recognition that kinship systems in Amazonian societies embody sophisticated mathematical structures. As Vandendriessche and Pinxten's volume includes a chapter on "Indigenous mathematics in the Amazon: kinship as algebra and geometry among the Cashinahua" (Vandenriessche & Pinxten, 2022) (the Cashinahua, or Huni Kuin, an Indigenous people of the western Amazon along the Peru–Brazil border). This research demonstrates that what Westerners might classify as "social organisation" is simultaneously mathematical—a system of relations that can be mapped and manipulated according to rules. For the Cashinahua, mathematical thinking is not separate from kinship; it is kinship.

Mariana Kawall Leal Ferreira's work on Indigenous peoples in Brazil (Ferreira, 2015) provides rich documentation of mathematical thinking embedded in different ontological frameworks. Her book *Mapping Time, Space and the Body* brings together studies of the Xavante, Suyá, and other peoples (Indigenous nations of Brazil—the Xavante of the central Cerrado savanna and

the Suyá, or Kĩsêdjê, of the Xingu river basin), showing how they use mathematical thinking to understand and protect their territories. Particularly striking is Ferreira's chapter title "WHEN 1 + 1 ≠ 2," which signals that even basic arithmetic operations may not hold in Indigenous mathematical frameworks, reflecting different ontological assumptions about identity, relation, and time.

9. Beyond Contemplative Admiration: A Performative and Relational Ethnomathematics

Aldo Parra (2024) offers a powerful reconceptualisation of ethnomathematics that addresses the limitations of what he calls "contemplative admiration." He argues that much ethnomathematical research has been content to document and admire Indigenous mathematical practices without engaging with them as living, dynamic knowledge systems. Parra identifies two types of studies that have dominated the field: archaeological studies that reveal knowledge of the past, and non-participant observation studies that report on current practices. Both share the assumption that "the knowledge and practices investigated pre-exist the specific research" (Parra, 2024, p. 6).

This contemplative stance, Parra argues, positions the ethnomathematician as a spectator rather than a participant. Parra proposes instead a performative and relational ethnomathematics that recognises knowledge as something created through interaction, not merely discovered:

> I contend that rather than look for a modernist answer, Ethnomathematics can forge a decolonial answer. Decolonial studies meet Ethnomathematics in their concern for the assemblages of knowledge and power. Within this chapter, I formulate a particular understanding of the Ethnomathematics program as a decolonising program, that vindicates performativity, interaction, and non-essentialism as values to be promoted in the quest for new insights on mathematics as a manifold of culture-based practices that change over time. (Parra, 2024, p. 5)

This reconceptualisation means that ethnomathematicians are not simply observers but participants in the ongoing creation of mathematical knowledge. The goal is not to extract and preserve Indigenous mathematics but to engage with it as a living practice, in genuine reciprocity with communities.

10. High Culture and Low Culture: Parallels Across Domains

The distinction between formal mathematics and ethnomathematics is one instance of a broader pattern: the distinction between "high" and "low" culture that pervades modern societies. This pattern appears across multiple domains, each illuminating the dynamics at work in mathematics.

10.1. History

As E. P. Thompson showed in *The Making of the English Working Class* (Thompson, 1963), traditional history focused on the doings of elites. Social history, by contrast, recovered the experience of ordinary people. Thompson wrote of: "rescuing the poor stockinger, the Luddite cropper, the 'obsolete' hand-loom weaver, the 'utopian' artisan, and even the deluded follower of Joanna Southcott, from the enormous condescension of posterity" (Thompson, 1963, p. 12).

This was not merely a shift in subject matter but a political and ethical project about whose stories are told and whose agency is recognised.

10.2. Art, Craft, and the Outsider

The Western art canon has traditionally privileged certain forms—oil painting, sculpture, architecture—while marginalising folk art, craft, and the work of anonymous artisans. The distinction between "fine art" and "craft" tracks social hierarchies: art made by and for elites is "high"; art made by and for ordinary people is "low."

A rich spectrum of artistic production exists outside the official art world, each category illuminating different aspects of how "low" culture is positioned. *Art Brut* (Raw Art), a term coined by Jean Dubuffet in the 1940s, describes works created outside official culture—by psychiatric patients, prisoners, isolated individuals—that Dubuffet saw as pure because they were "uncooked" by culture. *Outsider Art*, introduced by Roger Cardinal in 1972 as an English equivalent, has come to encompass a broader range of creators, including "any artist who is untrained or with disabilities or suffering social exclusion" (Maizels, 2009, p. 7). *Naïve Art* refers to untrained artists who depict realistic scenes, often aspiring to artistic status. *Folk Art* encompasses practical objects embodying traditional forms and community values. *Visionary Art* and *Intuitive Art* are umbrella terms preferred by *Raw Vision* magazine to encompass "art produced by those who do not know its name" (Maizels, 2009, p. 7).

What unites these diverse categories is that all exist outside the official art world's institutions of training, validation, and recognition. Their creators work without credentials, without academic training, without the sanction of galleries or museums—yet they produce work of power and sophistication. As John Maizels, founder of *Raw Vision*, describes:

> When I came across Outsider art I was just so amazed by it, it was so powerful and it had such strong personal meaning... people are revealing themselves, their demons, their own aspirations, their own inner feelings... They don't go to exhibitions or private views, they just work. They've got an inner compulsion. (Maizels, cited in Raw Vision, n.d.)

The contemporary British artist Grayson Perry has made a career of challenging these hierarchies. His work explicitly celebrates craft traditions marginalised by

the fine art establishment—pottery, tapestry, embroidery—and elevates them through virtuoso skill and conceptual sophistication. In his 2011 exhibition "The Tomb of the Unknown Craftsman," Perry created a monumental work honouring anonymous artisans "whose names are lost to history" (Perry, 2011). Perry also celebrates ordinary people through his fictional alter ego Julie, a working-class woman from Essex, challenging the assumption that such perspectives are unworthy of artistic attention. In his Reith Lectures, he argued that the art world's values and hierarchies are not natural but constructed—maintained by networks of power, money, and social capital (Perry, 2013).

10.3. Music, Fashion, Food, and Language

Classical music occupies a position of cultural prestige; folk music, popular music, and jazz are often devalued. Haute couture is distinguished from everyday clothing; haute cuisine from everyday cooking. Standard languages, associated with education and prestige, are distinguished from dialects, vernaculars, and creoles—yet linguists recognise that all varieties are equally rule-governed and valid. In each domain, the distinction between "high" and "low" serves to maintain social hierarchies, marking who belongs to the elite and who does not.

The relevance to ethnomathematics is clear. Just as the art world has historically dismissed Art Brut and Folk Art as not really art, so the mathematical establishment has dismissed ethnomathematics as not really mathematics. In both cases, the judgment reflects institutional power rather than intrinsic merit. The recovery and recognition of these marginalised practices is not just scholarly work but ethical work—an act of reparation, a challenge to hierarchies that exclude and devalue.

11. The Hierarchy of Mathematical Knowledges

The parallels across domains reveal that the marginalisation of ethnomathematics is part of a broader pattern of cultural hierarchy. Formal, academic mathematics is "high;" ethnomathematics is "low." The former is associated with elites—professors, researchers, institutions; the latter with ordinary people—workers, traders, craftspeople, farmers. The former is presented as universal and timeless; the latter as particular and local. This hierarchy is maintained through several mechanisms:

- *Institutional exclusion:* Ethnomathematical practices are excluded from schools and universities, reinforcing the message that only formal mathematics counts as "real" mathematics.
- *Epistemic marginalisation:* Ethnomathematical knowledge is dismissed as "folk knowledge" or "practical know-how," terms that carry the implication of inferiority.

- *Historical erasure:* The history of mathematics, as conventionally told, erases the contributions of non-European and non-elite peoples.
- *Ideological legitimation:* The ideology of purism values mathematics for its detachment from worldly concerns, devaluing ethnomathematics as deeply embedded in practical activity.

As with other domains, the boundaries are porous. Formal mathematics has repeatedly drawn on folk practices. The "high" is built on the "low"—but this debt is forgotten in the telling. The recognition of ethnomathematics challenges this forgetting.

12. The Ethical Imperative: Recognising Ethnomathematics

The recognition of ethnomathematics is not merely a scholarly matter but an ethical imperative. It involves several interconnected dimensions:

- *Epistemic justice:* Recognising that multiple forms of mathematical knowledge exist, and that Western academic mathematics is not the only valid mathematics, is a matter of epistemic justice. As one study puts it, the recovery of Indigenous ways of knowing leads to "epistemic freedom and cognitive justice—an essential component of social justice—that redresses the loss of Indigenous knowledges" (Osibodu, 2020, p. 5).
- *Cultural recognition:* Valuing the mathematical practices of diverse cultures as part of their cultural heritage is a matter of cultural recognition. </w:t><w:lastRenderedPageBreak/><w:t>The Dakota/Lakota Math Connections framework insists that Indigenous mathematics can stand on its own, needing no justification from Western mathematics (Luecke & Sanders, 2023, p. 7).
- *Educational equity:* Making mathematics education more inclusive by connecting it to students' own cultural practices is a matter of educational equity. As Borba argues, ethnomathematics developed within a culture is more efficient than textbook models "because it is connected to the culture where the problem was generated" (Borba, n.d.).
- *Social justice:* Recognising that the marginalisation of ethnomathematics is connected to broader patterns of social inequality, and that working for its recognition is part of working for a more just world, is a matter of social justice. As the ICME-13 survey states, the agenda of ethnomathematics is "to contribute to the achievement of social justice, peace, and dignity for all" (Rosa et al., 2016, p. v).

As D'Ambrosio wrote:

> The recognition of ethnomathematics is part of a broader movement toward a more just and peaceful world. It is about recognising the dignity and creativity of all peoples, and about building a world in which all forms of knowledge are valued and respected. (D'Ambrosio, 2001, p. 8)

This ethical imperative connects the study of ethnomathematics to central themes in the philosophy of mathematics. If mathematics is never neutral, then the choice of which mathematics to teach, which to study, which to value, is always an ethical choice. The marginalisation of ethnomathematics is not an accident but a product of social hierarchies and power relations. Recognising and valuing it is an act of ethical and political responsibility.

13. Conclusion

The distinction between formal mathematics and ethnomathematics mirrors distinctions in other domains—history, art, music, fashion, food, language—between "high" and "low" culture. In each case, the distinction serves to mark and maintain social hierarchies, to legitimise the cultural preferences of elites, and to delegitimise those of ordinary people.

The philosophical priority of everyday mathematics challenges the claim that formal proof is what legitimates mathematical knowledge. Historically and ontologically, everyday mathematical practices come first, and formal systems are derivative. The existence of alternative epistemic practices—intuitionism within the academy, dialectical materialism outside it—further demonstrates that mathematical knowledge is not monolithic.

Bishop's framework of six universal activities shows that mathematics is a universal human activity, not a European invention. The diverse philosophical frameworks of African, First Nations, and Amazonian mathematics demonstrate that ethnomathematics embodies entire worldviews with distinct ethical and ontological commitments. The Ubuntu philosophy of mutual responsibility, the Dakota/Lakota assertion that mathematics existed before colonisation, the Cashinahua understanding of kinship as algebra—all challenge the Western assumption that mathematics is a universal, value-neutral domain.

The rich tradition of art outside the academy—Art Brut, Outsider Art, Folk Art, Naïve Art—provides powerful parallels to ethnomathematics. These categories demonstrate that creative expression of the highest order can exist entirely outside institutional frameworks. The recovery and recognition of these art forms is an ongoing ethical project, one that ethnomathematics shares.

Skovsmose's critical mathematics education provides a framework for evaluating ethnomathematics, challenging it to move beyond description to critique. Valero and Knijnik have articulated the ethical-political dimensions of the field, showing that it is about understanding how mathematical practices are situated within structures of power and inequality.

Recognising ethnomathematics is an ethical imperative. It means acknowledging the creativity and agency of ordinary people, challenging cultural hierarchies, and working for social justice. It means understanding that mathematics, like history, art, music, and language, belongs to everyone—not just to elites.

The contribution of this paper has been to draw these strands together into a single ethical argument. Where much of the literature treats ethnomathematics as an epistemological corrective, a reminder that other mathematics exist, this paper has argued that the deeper issue is ethical: the hierarchy of "high" and "low" mathematics is an instance of the same socially constructed distinction that operates across history, art, music, and language, and it functions, as those distinctions do, to preserve the standing of elites and to diminish the knowledge of ordinary people. To see the marginalisation of ethnomathematics in this light is to see that it cannot be remedied by inclusion alone; it calls for recognition, and recognition is a matter of justice. That is the thesis this paper has sought to establish, and it is why the recovery of ethnomathematical practice belongs not only to the philosophy of mathematics but to the ethics of mathematics as well.

As Thompson rescued the poor stockinger from the condescension of posterity, and as Grayson Perry honours the unknown craftsman, and as the champions of Art Brut celebrate those who create without knowing they are artists, so ethnomathematics rescues the mathematical practices of ordinary people from the condescension of academic mathematics. This is not just scholarship; it is reparation. It is part of the larger project of building a world in which all forms of knowledge, all ways of knowing, are valued and respected.

References

Age, T. J. (2025). Ayatutu as a framework for mathematics education: Integrating Indigenous philosophy with cooperative learning approaches. *Knowledge, 5*(2), 11. https://doi.org/10.3390/knowledge5020011

Bishop, A. J. (1988). *Mathematical enculturation: A cultural perspective on mathematics education*. Kluwer Academic Publishers.

Brouwer, L. E. J. (1912). Intuitionism and formalism. *Bulletin of the American Mathematical Society, 20*(2), 81–96.

D'Ambrosio, U. (1985). Ethnomathematics and its place in the history and pedagogy of mathematics. *For the Learning of Mathematics, 5*(1), 44–48.

D'Ambrosio, U. (2001). *Ethnomathematics: Link between traditions and modernity*. Brill | Sense.

Eglash, R. (1999). African influences in cybernetics. *Kybernetes, 28*(7), 808–823.

Engels, F. (1940). *Dialectics of nature*. International Publishers.

Ferreira, M. K. L. (2015). *Mapping time, space and the body: Indigenous knowledge and mathematical thinking in Brazil*. Brill | Sense.

Gerdes, P. (1994). Reflections on the teaching and learning of mathematics in Africa. *For the Learning of Mathematics*, *14*(1), 32–34.

Hersh, R. (1997). *What is mathematics, really?* Oxford University Press.

Ilyenkov, E. V. (1977). *Dialectical logic: Essays in its history and theory*. Progress Publishers.

Indigenising University Mathematics project. (n.d.). *Traditional knowledge*. Retrieved from https://carmamaths.org/meetings/ium/themes/traditional-knowledge.html

Knijnik, G. (1993). Two practices used by rural Brazilians to estimate area of land and volumes of tree trunks. *For the Learning of Mathematics, 13*(3), 3–8.

Lakatos, I. (1976). *Proofs and refutations: The logic of mathematical discovery*. Cambridge University Press.

Luecke, D., & Sanders, D. (2023). Dakota/Lakota math connections: An epistemological framework for teaching and learning mathematics with Indigenous communities and students. *Frontiers in Education, 8*, 1151376. https://doi.org/10.3389/feduc.2023.1151376

Maizels, J. (Ed.). (2009). *Outsider art sourcebook: Art brut, folk art, outsider art* (2nd ed.). Raw Vision.

Nicol, C., Knijnik, G., Peng, A., Cherinda, M., & Bose, A. (Eds.). (2024). *Ethnomathematics and mathematics education: International perspectives in times of local and global change*. Springer.

Osibodu, O. O. (2020). *Embodying Ubuntu, invoking Sankofa, and disrupting with Fela: A co-exploration of social issues and critical mathematics education with Sub-Saharan African youth* (Publication No. 27962619) [Doctoral dissertation, Michigan State University]. ProQuest Dissertations Publishing.

Parra, A. (2024). A performative and relational ethnomathematics. In B. Greer, D. Kollosche, & O. Skovsmose (Eds.), *Breaking images: Iconoclastic analyses of mathematics and its education*. Open Book Publishers.

Perry, G. (2011). *The Tomb of the Unknown Craftsman*. British Museum exhibition catalogue.

Perry, G. (2013). *Playing to the gallery*. Penguin Books.

Rosa, M., D'Ambrosio, U., Orey, D. C., Shirley, L., Alangui, W. V., Palhares, P., & Gavarrete, M. E. (2016). *Current and future perspectives of ethnomathematics as a program*. ICME-13 Topical Surveys. Springer Open.

Skovsmose, O. (2022). Concerns of critical mathematics education – and of ethnomathematics. *For the Learning of Mathematics, 42*(2), 2–6.

Skovsmose, O. (2024a). *Critical philosophy of mathematics*. Springer.

Skovsmose, O. (2024b). *Critical mathematics education*. Springer.

Thompson, E. P. (1963). *The making of the English working class*. Victor Gollancz.

Andrade Molina, M., & Valero, P. (2019). Lo ético-político en la educación matemática: Conceptos y retos para la práctica. *Uno: Revista de Didáctica de las Matemáticas*, 84, 7–14.

Vandendriessche, E., & Pinxten, R. (Eds.). (2022). *Indigenous knowledge and ethnomathematics*. Springer.

World Intellectual Property Organization. (n.d.). Intellectual property and traditional knowledge. Retrieved from https://www.wipo.int/tk/en/