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ARTICLES

Ubiratan D'Ambrosio and ICME-5: scenes of the international constitution of a new search of studies and research

Ubiratan D'Ambrosio e o ICME-5: cenas de constituição internacional de uma nova seara de estudos e pesquisas

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Abstract

This text analyzes the Fifth International Congress on Mathematical Education (ICME-5) as an international stage for the dissemination of ideas that shaped a new field of research: Ethnomathematics. It is based on documents contained in the Ubiratan D'Ambrosio Personal Archive (APUA). The guiding question of the study is: What characteristics shaped the context in which it became possible to internationally articulate the emergence of a new field of research related to mathematics education? The study begins with an introduction to ICME. It then summarizes D'Ambrosio's trajectory, addresses the formation of the APUA, and examines the context in which ICME-5 took place. Furthermore, it discusses aspects of the lecture delivered by D'Ambrosio, which established him as an international reference for studies on Ethnomathematics.

Keywords: personal archive, Ethnomathematics, ICME

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Resumo

O texto analisa o Fifth International Congress on Mathematical Education (ICME-5) como palco internacional para a circulação de ideias de constituição de um novo campo de pesquisas: a Etnomatemática. Apoia-se nos documentos contidos no Arquivo Pessoal Ubiratan D'Ambrosio (APUA). Como questão norteadora do estudo, interroga-se: Que características moldavam o contexto no qual foi possível enunciar internacionalmente o surgimento de um novo campo de pesquisas ligado ao ensino de matemática? Na organização do estudo, inicialmente apresenta-se o ICME. Em seguida, resume-se a trajetória de D'Ambrosio. Aborda-se, na sequência, a constituição do APUA e o contexto de realização do ICME-5. Discutem-se, também, aspectos da conferência proferida por D'Ambrosio, que o colocou como referência internacional para estudos sobre Etnomatemática.

Palavras-chave: *arquivo pessoal, Etnomatemática, ICME*

Opening Remarks

The professional trajectory of Professor Ubiratan D'Ambrosio, who passed away in 2021, is marked by moments that turned this intellectual into an international reference in topics related to mathematics education. With a highly eclectic profile, D'Ambrosio became especially renowned for initiating Ethnomathematics. This text historically addresses the key moment for the global dissemination of D'Ambrosio's ideas regarding this new field of study and research: the Fifth International Congress on Mathematical Education (ICME-5).

The structure of this paper begins by introducing ICME. Next, a summary of D'Ambrosio's career is presented, as it is already well-known nationally and, to a reasonable extent, in international circles. Following that, the constitution of the Ubiratan D'Ambrosio Personal Archive (APUA) is discussed, a collection of documents that facilitated the preparation of this text. The context of ICME-5, held forty years ago in Adelaide, Australia, is then examined. In this regard, the analysis of this context aligns with the international movement of investigating the production of knowledge, considering behind-the-scenes elements that help elucidate aspects not visible through official and public documents. These behind-the-scenes elements are crucial for understanding how the systematization and dissemination of knowledge occur within a given field of study. Finally, aspects of the lecture delivered by D'Ambrosio,

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which established him as an international reference for studies on Ethnomathematics, are discussed. These sections of the text are articulated to answer the question: What characteristics shaped the context in which it became possible to internationally articulate the emergence of a new field of research related to mathematics education?

About the ICME

The organization of the International Congresses on Mathematical Education (ICME) is the result of a long trajectory that began in the early 20th century. These congresses stemmed from the interest shown by mathematicians in investigating the teaching of mathematics during the IV International Congress of Mathematicians, held in Rome in 1908. At that time, a commission led by mathematician Felix Klein was established, which, through ruptures and continuities, has persisted to the present under the name of the International Commission on Mathematical Instruction (ICMI). This Commission became responsible for the "legitimization process of a specific congress on Mathematical Education, the ICME" (Morais, 2015, p. 82).

To date, fifteen ICME congresses have been held in different countries, with the first taking place in Lyon, France, in 1969, during ICME-1. In July 2024, also in Australia, four decades after ICME-5, ICME-15 will take place.

Each congress, undoubtedly, has its own history. The timeline of a congress is not limited to the period when it actually takes place. In the case of the ICME, which are held every four years, the period preceding each event involves an extensive amount of dialogue among ICMI researchers, researchers from the host country, future congress participants, and many other stakeholders. A vast network of contacts is established to enable the event's realization. Several topics fuel these conversations, with the primary one being the definition of the event's program. During the time of ICME-5, physical letters were still the usual means of communication, circulating worldwide to discuss the organization of this leading global event for Mathematical Education. Personal letters between researchers, formal and public letters to participants, bulletins, event posters, draft programs, invitations, promotional folders, advertisements from airlines and tourism companies, and many other materials documented the movement and dynamics surrounding ICME-5, held in Adelaide, Australia, in 1984. A

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significant portion of this material was preserved by Professor Ubiratan D'Ambrosio and is now part of the APUA. ICME-15, in Sydney, celebrated the 40th anniversary of this congress. Beyond commemorating the four-decade milestone, this event highlighted the international debut of ideas on Ethnomathematics.

Thus, this text analyzes ICME-5 from a historical perspective, using APUA as a research source. Considering that this congress became a pivotal space for disseminating new and revolutionary ideas in Mathematical Education, systematized by Professor Ubiratan D'Ambrosio, we ask: What characteristics shaped the context in which it became possible to internationally articulate the emergence of a new field of research related to mathematics education?

Ubiratan D'Ambrosio (1932–2021) and the APUA

Some Elements of a Biography

Currently, numerous publications evoke, in one way or another, the role of Professor Ubiratan D'Ambrosio in various fields of knowledge. History of Science, History of Mathematics, Ethnomathematics, Mathematics Education, Education for Peace, Transdisciplinarity, among other areas, have greatly benefited from his contributions. In many of these works, biographical notes about D'Ambrosio are frequently included. Nevertheless, it is worthwhile to briefly address some aspects of this figure's professional life, especially for younger researchers who did not have the opportunity to follow his trajectory.

Ubiratan D'Ambrosio completed his PhD in Pure Mathematics in 1963 with a dissertation titled *"Superfícies Generalizadas e Conjuntos de Perímetros Finitos"* (Generalized Surfaces and Sets of Finite Perimeters) at the School of Engineering of São Carlos, University of São Paulo.

After completing his doctoral thesis, as was common for Brazilian mathematicians at the time, D'Ambrosio traveled to the United States in 1964. There, he worked at The State University of New York, Buffalo, and other American universities.

During his stay in the United States, he participated in a project for the United Nations Educational, Scientific, and Cultural Organization (UNESCO), implementing a research

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program in the Republic of Mali, Africa. Through this work experience, guiding studies in the field of Mathematical Analysis and Applied Mathematics with the support of the *Centre Pédagogique Supérieur de Bamako*, he established a fertile empirical foundation for what would later gain him worldwide recognition: "It was precisely in 1975, while discussing, in the context of Differential Calculus, the role played by the notion of time in the origins of Newton's ideas, that the educator referred to the term Ethnomathematics for the first time" (Knijnik et al., 2021, p. 19).

In 1972, D'Ambrosio returned to Brazil. Upon his return, he assumed the directorship of the Institute of Mathematics, Statistics, and Scientific Computing (IMECC) at the University of Campinas (UNICAMP), holding the position until 1980. During this period, more precisely from 1975 to 1984, he coordinated what is considered the first research program in Science and Mathematics Education in Brazil, creating a master's degree course (Rocha, Valente, & Domingues, 2024).

In 1979, D'Ambrosio was elected President of the Inter-American Committee on Mathematics Education (CIAEM).

D'Ambrosio was honored by the International Committee for the History of Mathematics (ICHM) with the Kenneth O. May Prize in 2001 for his contributions to the development of the History of Mathematics. Four years later, in 2005, the ICMI awarded him the Felix Klein Medal in recognition of his impact on Mathematics Education.

The APUA – Ubiratan D'Ambrosio Personal Archive

Since the year 2000, encouraged by D'Ambrosio himself, a Documentation Center was established to gather personal documents from mathematicians and former Brazilian mathematics professors. Modestly, in two small adjoining rooms at the Pontifical Catholic University of São Paulo (PUC-SP), personal documents of various professors and mathematicians who played a fundamental role in shaping Brazilian Mathematics Education began to be collected.

At the inception of the Center, Ubiratan D'Ambrosio donated part of his documents stored in two of his apartments, where hundreds of books and thousands of texts and materials

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related to his professional and research trajectory were accumulated. With this donation made during his lifetime, the APUA was formed in two stages: Phase I and Phase II. These initial phases of inventorying the donated documentation revealed that the APUA comprises a rich and diverse collection, encompassing topics such as Medicine, Arts, Education, Technology, History, and Mathematics. This entire collection is accompanied by correspondence sent and received by Ubiratan D'Ambrosio from the 1950s to almost the present day. The material is cataloged and organized into approximately 500 folders, including numerous documents from his participation in conferences, colloquia, symposia, and scientific congresses; articles authored by him, Brazilian and foreign mathematicians and mathematics educators, as well as professionals from other fields. The archive also includes drafts of books that were later published; various teaching projects and programs, theses, and dissertations; transparencies from courses D'Ambrosio taught in Brazil and abroad, as well as handwritten or typed speeches by him and others; newspapers and magazines containing articles by D'Ambrosio and other authors; photographs and negatives from various events involving personalities with whom he interacted during congresses; and reviews of articles submitted to journals, covering various themes and by numerous authors.

Over time, the Documentation Center received more and more collections, requiring an expansion of its physical space. The enlargement of the storage area, now outside PUC-SP, enabled D'Ambrosio to continue donating materials, documents, and books, transforming the APUA into the largest collection within the Documentation Center. Thus, a new stage of cataloging the APUA began: Phase III.

Following Ubiratan D'Ambrosio's passing in 2021, his wife, Maria José D'Ambrosio, contacted the Center and made additional, substantial donations of his documentation, tripling the volume of existing material and initiating a new, extensive phase of cleaning, cataloging, and inventorying thousands of documents (Phase IV).

In 2022, the Center's space expanded further, with commercial rooms acquired in the city of Santos, São Paulo's coastal region, through the Associated Group of Studies and Research in the History of Mathematics Education (GHEMAT-Brasil), a nonprofit association with representatives across all Brazilian states.

The new Documentation Center, now called the Scientific and Pedagogical Memory Documentation Center for Mathematics Education (CEMAT), was officially inaugurated in May

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2023 and is undergoing reorganization. Financial support from institutions such as the São Paulo Research Foundation (FAPESP) and the National Council for Scientific and Technological Development (CNPq) has proven crucial for acquiring special preservation papers, custom storage boxes, and other essential materials for cleaning and preserving the collections. Additionally, the Center is improving its digitization and computerization processes, made possible through technical assistance grants from CNPq. These ongoing activities position CEMAT as a resource not only for projects directly linked to GHEMAT-Brasil but also as an increasingly open space for researchers and those interested in topics related to Mathematics, Mathematics Education, Ethnomathematics, and related fields.

In December 2023, CEMAT inaugurated the Ubiratan D'Ambrosio Room, bringing together all the professor's documents in a dedicated space, separate from other collections. This arrangement accommodates national and international researchers interested in analyzing APUA documentation.

All this information about the newly named CEMAT was gathered by the author of this text during work visits to the APUA, facilitated by researchers conducting studies with other collections housed at the Center.

ICME-5

Before analyzing the documentation related to ICME-5, it is worth mentioning that, in the personal organization D'Ambrosio applied to his lifelong collection of documents, one often finds not isolated letters but rather entire dossiers of correspondence that can be grouped by themes. It is unfeasible to enumerate all the dossiers contained in the APUA within this text, particularly as many are still in the process of being organized. However, the research conducted for this article uncovered a collection of documents related to ICME-5, providing insight into the behind-the-scenes aspects of this congress. In this sense, the study aligns with the international trend of investigating the "laboratories" of knowledge production. Other personal archives of intellectuals, academics, and scientists can also be considered laboratories for exploring the backstage of knowledge elaboration and systematization. It is important to note that the way knowledge is produced has garnered increasing attention from researchers over the

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past few decades. The goal is to access laboratories, offices, conference preparation spaces, and any other settings where traces of scientific activities might be found, enabling the identification of processes and dynamics involved in the production of knowledge. Some of the many works dedicated to this subject are enlightening, even from their titles: *Laboratory Life – The Construction of Scientific Facts* (1st ed. 1979, Latour & Woolgar, 1979); *Science: Opening the Black Box* (1st ed. 1988, Woolgar, 1991); *Science in Action – How to Follow Scientists and Engineers Through Society* (1st ed. 1987, Latour, 1987); *Science as it Happens* (Gil, 1999); *The Material Dimension of Knowledge, 16th–21st Centuries* (Waquet, 2015); and *Behind the Scenes of Science – Technicians, Assistants, and Other Invisible Workers* (Waquet, 2022).

Latour and Woolgar (1987, p. 22) explain that their studies on knowledge production and its elaboration through laboratory research build upon what became known as the "strong program," formulated by David Bloor in the 1970s: "Bloor's original idea was to encourage historians and sociologists who were still hesitating to move from a history and sociology of scientists to a history and sociology of the sciences."

Woolgar (1991, p. 128) continues these discussions, emphasizing an approach designed to challenge the erroneous and idealized portrayals of science and the scientific method by revealing the 'more delicate' aspects of science: science as practiced in the laboratory.

Using the metaphor of the black box, Latour (2000, p. 15) draws on controversies to analyze how certain scientific facts were established in a stable manner over time. The author contrasts this with the lack of interest often shown by researchers in studying the construction of knowledge: "(...) Unfortunately, almost no one is interested in science in the making. They shy away from the disorderly mixture revealed by science in action and prefer the orderly pattern of scientific method and rationality."

As Fernando Gil (1999, p. 9) remarks in the "Presentation" of his book on the subject of scientific production: "(...) the intention here was to present the act of doing science, not its facts and theories. Even if it is not always possible to reveal the 'what,' nothing prevents us from understanding the 'how' of scientific knowledge."

The analysis of processes and dynamics involved in the production of new knowledge through strategies such as ethnographic studies in scientific laboratories, analysis of controversies preceding the dissemination of scientific production, and other approaches require historical-sociological work. These efforts aim to understand how the systematization

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of certain knowledge was achieved in a specific era, even if in the present day. From established knowledge, one can question how its elaboration took place. How was the transition made from a set of scattered information to the systematization of knowledge? This is a fundamental question raised by Peter Burke (2016) in his work *What is the History of Knowledge?*

Modes of knowledge production, changes in these modes, and the history of knowledge inform the focus of this text. How, at a given time, does the transition from dispersed information to systematized knowledge occur? This question guides the specific analysis of documentation contained in personal archives. Such archives are considered privileged sites for studying the processes and dynamics of knowledge production—laboratories of knowledge production, as previously mentioned. Specifically, this article seeks to explore the possibilities of research into the production of new knowledge based on the documents that make up the APUA. More precisely, it aims to understand the international context in which a new field of research emerged: Ethnomathematics. What characteristics shaped the context in which it became possible to internationally articulate the emergence of a new field of research related to mathematics education?

Preparations for ICME-5

Preparations for ICME-5, held in Adelaide in 1984, began as early as 1980. The structure of the event demonstrated that the selection of those who would deliver plenary lectures would play a fundamental role in defining the congress. Thus, the committees began consultations on potential invitees. Mike Newman (1983), chair of the committee responsible for organizing the ICME-5 program, clarified that:

> The selection of plenary speakers for the Congress is one of the major responsibilities of the IPC. It was a difficult task. It is the practice at ICMEs to have a small number of plenary lectures covering as many facets as possible of mathematics education from as international a point of view as possible. The IPC aims to have a balance of subject matter and a balance of speakers.

Until 1982, Ubiratan D'Ambrosio was one of the vice presidents of the ICMI. In this role, he actively participated in organizing the event. In the APUA, there is a letter from H. Whitney, president of the ICMI, dated October 1981, thanking D'Ambrosio for agreeing to join

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the ICME-5 International Program Committee. The following year, in a letter from September 1982, Marjorie Carss, responsible for the congress's local program, expressed her gratitude for D'Ambrosio's acceptance to deliver a plenary lecture at the event.

In his extensive letter of acceptance to deliver the ICME-5 opening lecture, dated August 21, 1982, D'Ambrosio suggested professors whose work justified their inclusion as plenary speakers at the event. The first name he proposed was Professor Bent Christiansen, a researcher attentive to the development of mathematics didactics and its establishment as an autonomous field of research. The second was Professor Phil J. Davis, known for his studies in History, Learning Psychology, Education, and Philosophy. Alternatively, in place of Davis, D'Ambrosio suggested inviting Professor R. B. Potts, an Australian scholar. D'Ambrosio emphasized the importance of including someone from the host country as a plenary speaker, praising Potts's writings.

Continuing his recommendations for structuring ICME-5 plenary lectures, D'Ambrosio noted the necessity of inviting a researcher from outside the field, someone who could provide a broader view of society at the time. One of the names he mentioned was the philosopher Jürgen Habermas from the University of Frankfurt.

Finally, and no less emphatically, D'Ambrosio recommended inviting the Soviet professor A. P. Yushkevich to deliver a plenary lecture on the History of Mathematics. He reinforced this suggestion by noting that the professor from the then Soviet Union (USSR) was one of the foremost specialists in Asian and Arabic Mathematics and its impact on European Mathematics.

In response to D'Ambrosio's letter and the recommendations he made for the ICME-5 structure and plenary lectures, Marjorie Carss, president of the event's national program committee, wrote to D'Ambrosio on September 3, 1982, thanking him for accepting the invitation to deliver the opening lecture at the congress. She also praised his recommendations and agreed on the importance of including intellectuals not directly linked to Mathematics

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Education to deliver one of the lectures, highlighting the need for broader studies that considered many aspects beyond those inherent to the field.

Still serving as one of the ICMI vice presidents, D'Ambrosio expressed concern in a letter dated December 15, 1982, about the difficulty of ensuring the presence of Latin American researchers and teachers at ICME-5 in Australia. The significant expenses and long distances posed barriers to greater participation from representatives of these countries. As a suggestion, D'Ambrosio raised the possibility of broadcasting the congress remotely—something so common today in the post-pandemic era.

On January 1, 1983, Jean-Pierre Kahane assumed the presidency of the ICMI. D'Ambrosio, no longer a vice president, was invited to join the ICME-5 organizing committee. In this capacity, he sent dozens of recommendation letters for professors and researchers to be invited to participate in the congress program in Adelaide.

Beyond suggesting plenary speakers for the congress, D'Ambrosio, at the request of session coordinators, recommended names for each ICME-5 working group. In this regard, he largely focused on Latin American scholars, many of whom were unknown to the event organizers. These recommendations were significant in bringing international visibility to studies developed in Brazil and other Latin American countries, which had previously lacked global recognition. D'Ambrosio's suggestions were always accompanied by explanations of each researcher's work, their contributions to the field, and the relevance they could bring to a specific ICME-5 working group. In this way, D'Ambrosio was able to include numerous Latin American scholars closely connected to his studies.

Behind the Scenes of ICME-5 Organization

As mentioned earlier, the preparation of scientific events involves intense activity by organizers and researchers in defining the event's program, selecting participants, and identifying those distinguished to deliver plenary lectures. ICME-5 was no exception. The APUA houses hundreds of preparatory documents exchanged during the organization of the

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event, some of which have already been cited. These documents highlight several unique elements that formed part of what we refer to as the "behind the scenes of ICME-5."

Confirming what the president of the ICME-5 program committee stated, the lectures would address broad themes that could resonate across all countries. Additionally, there should be a sufficient number of lectures to cover major contemporary topics of interest. In Newman's (1983) words: "We believe that the team we have chosen: D'Ambrosio, Kilpatrick, Potts and Yushkevich is an excellent and well-balanced one. It will provide the participants with a good mixture of stimuli".

Thus, the organizers announced, in the congress pamphlet, the names of the invited plenary speakers and noted their acceptance:

> The following people have accepted invitations to give plenary addresses: Professor Ubiratan D'Ambrosio of the Universidade Estadual de Campinas (Brazil) will talk on the socio-cultural basis of mathematics education. Professor Jeremy Kilpatrick of the University of Georgia (USA) will examine thinking about thinking as a theme in mathematics education. Professor A. P. Yushkevich of the Institute for the History of Science and Technology of the Academy of Sciences of the USSR will talk on the role of the history of mathematics in mathematics education. Professor Renfrey B. Potts of the University of Adelaide (Australia) will talk on discrete mathematics and its significance in mathematics education.

The documents in the APUA that allow access to the behind-the-scenes aspects of ICME-5 reveal that there were issues with representatives from the Soviet Union at the time. The official stance of the USSR did not agree with the invitation extended by the ICME-5 organizers to the mathematician A. P. Yushkevich. This is evident in a brief letter sent to Newman, reproduced below:

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Image 1

Letter from L. S. Pontryagin to the ICME-5 organization

July, 20, 1983

Dr.M.F.Newman,
Chair, IPC,
Dept. math. Australian
National University,G.P.O. Box 4,
Canberra, A.C.T., 2601,
Australia

We got to know from the official information which was received from yuo that professor A.P.Yushkevich is planned as plenary lecturer of the 5th International Congress on Mathematical education. The National Commitee of Soviet mathematicians and the Comission on School Mathematical Instruction of the Mathematical section of the Academy of Science of the USSR desidedly raise an objection against nomination of A.P.Yushkevich as plenary lecturer. We consider that the subject of his lecture on the role of the history of mathematics in mathematics education is not actual nowadays.

In Soviet Union the major problem just now is the very substanc of the school mathematical education. Academician A.V.Pogorelov is who can state in the best way the point of view of the Soviet mathematicians about mentioned problem. We nominate academician A.V.Pogorelov as plenary lecturer with lecture on the teaching of mathemat[illegible] in school of the USSR.

Deputy president of National Commetee
of Soviet mathematicians,
Chairman of Comission on School Mathematical instruction of the Mathematical
section of the Academy of Science
of the USSR,
academician

L.S.Pontrjagin

Source: APUA

In response to the Soviet letter, Newman (1983), in a highly diplomatic manner, among other remarks, replied in a letter dated September 23, 1983, that:

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> In your letter you report that the National Committee of Soviet Mathematicians and the Commission on School Mathematical Instruction of the Mathematical Section of the Academy of Science of the U.S.S.R. feel the Professor Yushkevich is not the most suitable representative for the central parts of mathematics education in the Soviet Union at the present time. It is not the intention of the IPC that Professor Yushkevich represent the Soviet Union. Your advice that Academician Pogorelov would be the most suitable person to present a report is helpful and will be very important in our discussions.

At the end, as plenary speakers at ICME-5, only the following remained, according to the Congress Proceedings: Ubiratan D'Ambrosio – social bases for Mathematical Education; Jeremy Kilpatrick – Reflection and Recursion; Renfrey Potts – Discrete Mathematics.

Thus, ICME-5 announced its opening lecture as a discussion on Mathematics Education and society, led by Ubiratan D'Ambrosio.

Given the behind-the-scenes activities of ICME-5, D'Ambrosio's important role in organizing this event becomes evident. To a large extent, his recommendations were incorporated into the event's program. In a certain way, a highly favorable atmosphere was created for embracing debates on extra-mathematical aspects present in mathematics education.

The Sociocultural Aspects of Mathematics Education: Foundations of Ethnomathematics

Since ICME-3 in Karlsruhe, the mathematics included in education began to be questioned in curricular terms. Previously, efforts had been made to establish a universal mathematics curriculum. From the earliest international dialogues initiated with the creation of the International Commission on Mathematical Instruction (IMUK/CIEM) in 1908, during the IV International Congress of Mathematicians in Rome, as previously mentioned, studies were conducted aimed at promoting curriculum reform in mathematics. The primary goal was to establish a universal curriculum through a comparative analysis of what was happening in different countries. Felix Klein, president of the Commission, worked extensively on developing a curriculum reform that, at the time, highlighted the importance of introducing Differential and Integral Calculus into secondary education (Valente, 2003).

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At ICME-3, the idea of a universal mathematics curriculum that could serve everyone in the same way began to be questioned. D'Ambrosio, as a rapporteur for one of the event's sessions titled "Objectives and Trends in Mathematics Education," presented criticisms of the curriculum. Writing later about this ICME, he noted:

> Unfortunately, and erroneously, it has been observed that great emphasis in the teaching of this science has been placed on fulfilling a certain pre-set curriculum, primarily based on tradition, and on the construction of a logical and formal structure that often does not correspond to the motivation and objectives of teaching. A global perception of what teaching Mathematics entails, especially considering aspects such as: to whom this teaching is directed and why it is done, should take precedence and have greater importance than discussions of curricular details" (D'Ambrosio, 1976, p. 29).

Thus, internationally, foundations were laid for considering the mathematics curriculum not solely as determined by the field of mathematics but also as something dependent on the student: to whom is the teaching directed? This questioning later moved from the individual level of the student to the culture of the society in which the learner is immersed. This shift occurred at ICME-5, where D'Ambrosio delivered the plenary lecture titled "Socio-Cultural Bases for Mathematical Education."

In this lecture, D'Ambrosio began by questioning the world of forty years prior, the 1980s, mentioning the efforts to consolidate the electronic age and mass society, indicating how this phenomenon disrupted the cultural dynamics of societies. He explained that his lecture was primarily informed by experiences in various cultural environments and, from the outset, asked for the participants' patience, as he would address mathematics specifically only at the end of his presentation.

His intention was to critique the mathematics curriculum in terms of the cultural diversity of different societies. According to him, this complex diversity was evident in classrooms through the varied ways students' parents were integrated into the labor world, and it became even more pronounced when different ethnic groups were involved in schooling—a reality in both developed and developing countries.

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D'Ambrosio (1986, p. 5) observed:

> Cultural diversity is so complex, it is a mesh of attitudes and behaviors which have not been sufficiently understood in education, and especially in mathematics education. I would dare to say they have practically never been recognized as important factors in mathematics education. Attitudes such as modes of thought, jargon, codes, interests, motivation, myths, build up to generate very definitive cultural roots, modes of production, modes of poverty, class conflicts, sense of social security, human rights and so on. These are the factors which comprise society, but are usually ignored in mathematics education.

Broadly speaking, for D'Ambrosio, the task was to discuss the relationship between mathematics and society—a mass society with a vast range of cultural differences. D'Ambrosio (1986, p. 5) initially framed the issue in terms of the relationship between ethnomathematics and society, clarifying: "(…) 'ethnos' comes into the Picture as the modern and very global concept of ethno both as race and/or culture, which implies language, codes, symbols, values attitudes and so on, and which naturally implies science and mathematical practices".

D'Ambrosio (1986, p. 6) acknowledged the usual process of distancing mathematics from society. This science often presents itself as a closed body of knowledge. Transformations within this scientific field, which could be critical drivers of innovation in education, took a long time to be incorporated into the mathematics students learned. On the other hand, a different dynamic emerged when considering the relationship between society and ethnomathematics::

> (…) ethno-mathematics has an almost nonexistent barrier with respect to society. This is like a porous system with permanent interaction. Evaluation of what is the result of an ethno-mathematics practice results from immediately changing it into societal practice, which in turn feeds the body of knowledge, in this case ethno-mathematics, with innovation. In other words, the relationship between ethno-mathematics and society is characterized by a fast reaction, through a self-regulating system. This self-regulating system manifests itself in the building-up of motivation, an essential component in education.

From his plenary lecture at ICME-5, D'Ambrosio's ideas on ethnomathematics gained international resonance. The following year, the article *"Ethnomathematics and its Place in the History and Pedagogy of Mathematics"* was published in the journal *For the Learning of Mathematics*. According to Rosa (2021), this article represented the first comprehensive and theoretical work in English on Ethnomathematics as a program. Furthermore, Rosa and Orey (2014) noted that with the international expansion of the Ethnomathematics movement, the International Study Group

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on Ethnomathematics (ISGEm) was established in 1985, officially launching the Ethnomathematics Program at an international level.

Closing Remarks

On the fortieth anniversary of ICME-5, it is worth highlighting, as Carss (1986) writes in the Congress Proceedings, that the social context of the early 1980s allowed the emergence of new and urgent issues for Mathematics Education. These issues were primarily linked to the mathematics curriculum. For a long time, as discussed, debates on mathematics teaching had been dominated by didactics and discussions about the methods and alternatives for integrating the scientific field of mathematics into elementary schools. With this focus, the aim was to find an ideal curriculum that could serve everyone equally. ICME-5 marked a break with this perspective by questioning the mathematical knowledge considered essential for all students. Amidst a context where, in reality, the entire educational field was turning its attention to cultural aspects, Ubiratan D'Ambrosio posed such challenges to mathematics teaching. New questions arose, as Carss (1986) mentions: What type of mathematics curriculum is appropriate for the needs of the majority? What curriculum modifications or alternative curricula are necessary for special groups of learners? How should this curriculum be structured? How can it be implemented?

By questioning curricular aspects in light of sociocultural challenges, D'Ambrosio had the opportunity to introduce new ideas that would form a new professional and research field: Ethnomathematics.

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