INITIAL STUDY OF "THE STATE OF THE TOPIC AREA ABOUT MULTICULTURALITY AND MATHEMATICS EDUCATION"

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1.-INTRODUCTION. OBJECTIVES. STUDY PHASES. "MULTICULTURALITY AND MATHEMATICS EDUCATION".

In this document, we hereby present a study which has been carried out in order to structure the work which this group is analysing and to organize the sessions of STG 33 of ICME 11 to be held in July 2008 in Monterrey.

The aim of our study is to collaborate in elaborating a "STATE OF THE QUESTION" ABOUT "MULTICULTURALITY AND MATHEMATICS EDUCATION". To do this we have carried out a Model to analyse and classify the material collected, which allows both the authors of the model and other interested groups to apply it in the study of the compiled material.

The genesis of the model and the study have the same origin, both start from an initial exploration of the different types of documents which the readers considered dealt with topics related to the nucleus of our study: Multiculturality related to mathematics education. This constituted Phase I of the study and was carried out between October and December 2007, in the University of Granada (Spain).

This initial work has enabled us to make several observations and reflections from which some of the instruments for analysis have emerged. Until this point it has been an academic study, of initiating research which has been carried out by a group of Master students together with their course leader of "Ethnomathematics" (M.L.Oliveras)

Following on from this, the work has been continued by analysing the findings from new points of view, structuring, preparing the foundations and organization and creating a model MOMUME, made up of an icon-model, various instrumental components and some working guidelines or syntax of the model, which is presented in another paper. This period constituted Phase 2 of the study.

Having elaborated the model, we endeavoured to use it in the classification of two types of products:

a) Some previous publications to the ICME11 and
b) All the papers presented to the "TSG33" of the ICME11.

Its use in a) and b) gives rise to an incipient "State of the question" which we show as Phase 3, and in which other researchers, members of the STG 33 team, have taken part.

The use of the model in b) in more detail, which makes up Phase 4 of this study, will be carried out at a later date, and therefore the products to be analysed will be available at a date later than that required for the end of this report.

2.- Model of analysis. Categories

The MOMUME Model (Oliveras 2008) has several categories of analysis which are of interest here.

The set of *"Categories", "Subcategories 1 and 2"* (both are "Thematic subcategories" or with specific anthropological, mathematical or educational contents which are studied: e.g. the difficulty of translating the mathematical terminology from the native language to Portuguese), *"Protocol", "System of codification"* (each article must be characterised initially using a bi one to one code that allows it to be later treated using the Instruments of "Categorisation, Sub categorisation and Protocol") make up the components of the "Model of Analysis" that we have elaborated.

This model is an instrument with which Didactic Mathematics research can be carried out on the papers which are published by our community of Teachers, researchers, young researchers, study organisers, assessors and those interested in interculturality in mathematics. These papers deal with the social and economic phenomena that are produced in Multicultural environments and that concern Mathematics.

We have so far elaborated the following categories and sub categories:

INSTRUMENTAL CATEGORIES RELATIVE TO ACTIONS
"Actions carried out and their objectives"

A.- RESEARCH
A.I. Field Research:
- A.I.1-Projects or actions of formal teaching in multicultural groups
- A.I.2-Specific teacher training projects or actions
- A.I.3-Specific projects or actions of non formal education
- A.I.4-Development and analysis of resources that permit and favour intercultural education

AII. Basic Research:
- A.II.1-Bibliographical compilations
- A.II.2-Text analysis and productions on the topic
- A.II.3-Projects and Proposals of intercultural teaching to be developed

A.II.4-Projects and Proposal of teacher training to be developed
A.II.5-Analysis of theories and existing models

B.- EXPERIENCES
B.I. Descriptions of teaching experiences relative to multicultural groups-classes
B.II. Descriptions of political-educational systems related to multiculturality
B.III Descriptions of teacher training programs
B.IV Descriptions of didactic resources that favour intercultural education

C.- THEORETICAL STUDIES
C.I. Elaboration or analysis and explanation of Theories and Models of "MULTICULTURALITY AND MATHEMATICS EDUCATION"
C.II. Elaboration and explanation of Theories that form part of the system of Foundations of Intercultural Education

With respect to the variable"Subjects or objects of research or actions", considering "subjects" to be the elements about which the research has been carried out even if it does not concern people. They are the object of the research, teaching or other action studied; we have the following subcategories that we call ORDER 1:

INSTRUMENTAL SUBCATEGORIES OF ORDER 1
RELATIVE TO THE SUBJECT:
"The elements (subjects or objects) about which the actions have been developed":

A-THE PEOPLE AND THE GROUPS
A.1. TRAINERS/MATHEMATICS TEACHER TRAINING, THE CULTURE OF THE TRAINERS AND THEIR VISION OF THOSE TRAINED AND THEIR CULTURES
A.2. EMIGRANTS**.** SECOND GENERATION OR NATIVES WITH DIFFERENT FAMILY ORIGIN, (CHICANOS ETC.)
A.3. EMIGRANTS**.** FIRST GENERATION, OR BORN IN OTHER CULTURES WITH DIFFERENT ORIGINS
A.4. NEIGHBOURING COMMUNITIES WITH DIFFERENT CULTURES THAT EXCHANGE OR CLASH

B-ACTIONS THAT ARE CARRIED OUT AND DESCRIBED
B.1. REGULATED PRIMARY OR SECONDARY MATHEMATICS TEACHING
B.2. REGULATED HIGHER EDUCATION IN MATHEMATICS
B.3. TEACHER TRAINING
B.4. ADULT EDUCATION
B.5. NON REGULATED TEACHING

C-THE OBJECTS OR PRODUCTS AS THE CENTRE OF THE ANALYSIS
C.1. TEACHING RESOURCES: DIFFERENT TYPES OF RESOURCES
C.2. TEXT BOOKS (THEY ARE SPECIFIC RESOURCES)
C.3. TRAINING PROGRAMMES OR SCHOOL CURRICULAR DESIGNS
C.4. TESTS OR EXAMS

INSTRUMENTAL SUBCATEGORIES OF ORDER 2 RELATIVE TO CONTENTS
"Specific contents (mathematical or educational, linguistic, anthropological) studied in mathematical contexts".

A.- THE MATHEMATICS CURRICULUM

B.- ASSESSMENT
B.1. SCHOOL PROGRESS IN MATHEMATICS: SUCCESS, FAILURE
B.2. TESTS ADAPTED TO DIFFERENT CULTURES
B.3. DIFFERENTIATED OBJECTIVES AND STANDARDS

C- SPECIFIC MATHEMATICS DIFFICULTIES
C.1. RELATED TO THE DIFFERENT CULTURE, EXPRESSION AND SYMBOLIZATION
C.2. CONCEPTUAL, OPERATIONAL DIFFICULTIES, ETC

D- PROBLEM OF THE DIFFERENT LANGUAGE
D.1. IN THE TEACHERS, THEIR ABILITY
D.2. IN THE TEACHERS, IN THE ACTIONS IN CLASS
D.3. IN THE BOOKS AND OTHER RESOURCEES

E- THE CUSTOMS AND FORMS OF CULTURAL EXPRESSION
E.1. ORAL CULTURE AND ORAL MATHEMATICAL LEARNING
E.2. VISUAL CULTURE AND MATHEMATICS LEARNING
E.3. COMPUTER CULTURE AND MATHEMATICS LEARNING
E.4. RESOURCES ADAPTED TO THE DIFFERENT CUSTOMS RELATIVE TO THE LEARNING AND THE CULTURAL RELATIONS

These subcategories can be called "Thematic Subcategories" or Subcategories of ORDER 2, and in mathematical didactic research they are of great interest to study school failure, learning errors, assessment and others by focusing the studies on specific topics of the curriculum.

The papers found in our bibliographical search respond to some of these types. We have added others which conceptually complete the existing possibilities, from our perspective.

3.- Instruments for the model of analysis. Protocols

In relation to some of the classifying Categories elaborated and presented in the previous section, we have adopted some instruments to analyse the work (in the three most general Categories and which bear most relation to the scientific product shown in the paper being analysed) which enables us to characterise each paper in a more detailed way and so continue its analysis and classification.
These instruments will be called:
"Protocols to Analyze Documents about Multiculturality, Interculturality and Mathematics Education".

At present we have prepared four of these "Protocols", which can be found in the MOMUME model.

PROTOCOL I. Applicable to documents relative to Field Research
PROTOCOL II. For documents relative to Basic Research;
PROTOCOL III. Applicable to various Documents that describe work which is not research such as: classroom experiences, projects, creating resources, bibliographical review, tests.
PROTOCOL IV. To characterise documents conceptually by situating them in the Fundamental Categories.

We present them applied to several cases, in section 5:

4.- Emergent categories from the information sent to ICME 11.

After analyzing the 19 papers sent, we have come to the conclusion that among the previous possible types of papers, the following appear in this group

EMERGENT KINDS OF THE COMMUNICATIONS SENT:

WITH REFERENCE TO THE ACTIONS AND THEIR OBJECTIVES

- RESEARCH
- EXPERIENCES RELATED TO TEACHING WORK
- DEVELOPMENT OF THEORETICAL FOUNDATIONS
- ELABORATION OF EXPLANATORY MODELS

WITH REFERENCE TO THE CONTENTS DEALT WITH

- TRAINERS/MATHEMATICS TEACHER TRAINING, THE CULTURE OF THE TRAINERS AND THEIR VISION OF THOSE TRAINED AND THEIR CULTURES
- EMIGRANTS**.** SECOND GENERATION OR NATIVES WITH DIFFERENT FAMILY ORIGIN, (CHICANOS ETC.)

- PRIMARY OR SECONDARY MATHEMATICS TEACHING
- HIGHER EDUCATION IN MATHEMATICS
- TEACHER TRAINING
- TEACHING RESOURCES: DIFFERENT TYPES OF RESOURCES
- TEXT BOOKS (SPECIFIC RESOURCES)
- TRAINING PROGRAMMES OR SCHOOL CURRICULUM DESIGNS
- TESTS OR EXAMS

WITH REFERENCE TO WRITTEN PRESENTATIONS

STRUCTURED REPORT
STRUCTURED NARRATIVE

SEQUENTIAL STORY
SEMI-STRUCTURED QUALITATIVE NARRATIVE

The communications sent, respond to some of these types. In a table, we will show the specific types of communications that have been accepted.

5. - State of the question. Preliminary study.

"System of Codification" consists of characterising each article using a bi one to one code which will enable its later treatment using the Instruments of "Categorisation, Subcategorization and Protocol", with no need to express its complete name. The codification system is simple, using ordered pairs, giving a natural number to each document in the same order as the alphabetical order, which is established by the surname of each author, matching the number and the letter, for example: (1,A) (1st DÁmbrosio, U), (2,A) (2nd Ascher, M),.., (13, O) (13th, Oliveras, ML.,). This application can be shown in a table, for example:

Table 1- Table of Codification of the Papers studied

Num. paper	1	2	3	4						15	
Author	D´AmbrosioU.	AscherM.								OreyD.	
Code	(1 A)	(2 A)								(15 O)	

A list of alphabetically ordered authors is included along with this table. Here it is easy to find who corresponds to the code (n, y) since the second component of the ordered pair makes reference to the surname which are strictly put in order.

List of the Papers for the study (n=50):

1-Alberti M., Gorgorio N. 2006. Etnomatemáticas y cognición situada: cuestión de ingenios. *Matemáticas e Interculturalida. Biblioteca de Uno*. Capítulo 2, p. 25 – 46. ISBN 84-7827-464-2.

2-Atweh, B. 2004.International and Global Contexts in Mathematics Education: Friends or Foes?. Queensland University of Technology, Australia. ICME X..TA Theme B.

3-Bishop, A. J. 2004. Immigrant students in transition: dilemmas and decisions. Faculty of Education, Monash University. Melbourne, Australia. ICME X. TA Theme B.

4-Burgos S., Domínguez M., Rojas F., Planas N., Vilella X. 2006. La participación en el aula de matemáticas. *Matemáticas e Interculturalidad. Biblioteca de Uno*. Capítulo 3, p.49 - 62. ISBN 84-7827-464-2.

5-Castello Branco Fantinato, M.C. Quantitative and spatial representations among working class adults from Rio de Janeiro. Río de Janeiro,Brasil. ICME 10.

6-Civil, M. 2004.Lessons Learned from Research on the Intersection of Culture, Social Class, and Mathematics Education: Implications for Equity. The University of Arizona. ICME X. TA Theme B.

7-Clanche, P y Sarrazy, B. 2004. Occurrence of typical cultural behaviours in an arithmetic lesson: how to cope? Burdeos. Francia. ICME 10.

8-Clarkson, Ph. 2004. Multicultural Classrooms: contexts for much mathematic teaching and learning. Melbourne-Australia. ICME 10.

9-Cook, W. 2006. Florida´s dramatic shift in students demographics: Implications for mathematics teacher education. *Journal of Instructional Psychology,* Tomo 33, Nº 2, pp. 124 -135, ISSN 00941956. Obtenido el 23 de noviembre de 2007 de la base de datos ProQuest Psychology Journals.

10-Cotton, T. 2004. Learning and Teaching Mathematics: Not a matter of life or death … Faculty of Education, Nottingham Trent University. ICME X.. TA Theme B.

11-D´Ambrosio, U., 2006. The Program Ethnomathematics: A Theoretical Basis of the Dynamics of Intra – Cultural Encounters. *Journal of Mathematics and Culture*. Volume 1, Number 1, May. p. 1 - 7. ISSN - 1558-5336

12-D´Amore, B. 2003. Matemática en algunas culturas suramericanas: Una contribución a la etnomatemática. *Revista Latinoamericana de Investigación en Matemática Educativa*, Vol. 6, pp. 279 – 291, ISSN1665-2436. Comité Latinoamericano de Matemática Educativa. México.

13-Davis F. E. 2004. The Algebra Project – Social Movement & Educational Intervention Lesley University, Cambridge, MA USA. ICME X.

14-Díaz R. Inclusión de la aritmética maya en la propuesta de currículo nacional básico de Honduras. *Matemáticas e Interculturalidad. Biblioteca de Uno*. Capítulo 4, p. 63 – 77. ISBN 84-7827-464-2.

15-Diez-Palomar, J., Simic, K., & Varley, M. 2007. "Math is Everywhere": Connecting Mathematics to Students' Lives**.** *Journal of Mathematics and Culture*. Volume 1, Number 2 . March. P. 20 – 36. ISSN - 1558-5336

16-Favilli, F.; Tintori, St. 2004. Intercultural mathematatics education: comments about a didactics proposal. Universita di Pisa. Pisa, Italia. ICME 10.

17-Fiorentino, G. 2005. La Yupana elettronica : uno strumento per la didattica interculturale della matematica. *XXII Seminario Nazionale di Ricerca in Didattica Della Matemática.* Dipartamento di Matemática Universita di Pisa. Pisa.

18-Fossa, J. 2006. Ethnomathematics and Cooperativism. *Journal of Mathematics and Culture* . Volume 1, Number 1, May. ISSN - 1558-5336

19-Giménez, J.; Díez-Palomar, J.; Civil, M.; D'Ambrosio, U.; FitzSimons, G.E.; García, P.; Knijnik, G.; López, P.; Planas, N.; Rosich, N.; Skovsmose, O.; Valero, P. 2007. *Educación matemática y exclusión.* ISBN 978-84-7827-513-7. Editorial Graó. Barcelona.

20-Gómez-Chacón I.M., Figueira L. 2007. Identidad y factores afectivos en el aprendizaje de la matemática. *IREM de STRASBOURG*. Volumen 12. P. 117-146. ISSN 0987 – 7576.

21-Goñi, J.M.; Albertí, M.: Burgos, S.; Díaz, R.; Domínguez, M.; Fioriti, G.; Gorgorió, N.; Nunes, Ch.; Oliveras, M.L.; Planas, N.; Prat, M.; Rojas, F.J.; Santesteban, M.; Vilella, X. 2006. *Matemáticas e interculturalidad.* ISBN 978-84-7827-464-2. Editorial Graó. Barcelona.

22-Gorgorio N., Prat M., Santesteban M. 2006. El aula de matemáticas multicultural: distancia cultural, normas y negociación. *Matemáticas e Interculturalidad. Biblioteca de Uno*. Capítulo 1, p.7 - 23. ISBN 84-7827-464-2.

23-Harding-Dekam, J. L., 2007. Foundations in Ethnomathematics for Prospective Elementary Teachers. *Journal of Mathematics and Culture*. Volume 1, Number 2 .March. P. 1-19. ISSN 1558-5336

24-Hsui-fei S.L.2004. Ethnomathematics in Taiwan-A Review. Taiwan. ICME 10.

25-Issic K.C.; Ling, S. L.; Wong, R.M.F.2004. Student´s Mathematics performance in authentic problems. Hong Kong. China. ICME 10.

26-Israel, M. 2007. Atención a la diversidad desde el área de matemáticas : El Proyecto Yeti. *UNO: Revista de Didáctica de las Matemáticas.* Núm 046, JUL-SEP pp. 115-125, ISSN 1133-9853.Editorial Graó. Barcelona.

27-Knijnic, G. y Wanderer, F. 2004. The art of tiles in Portugal and Brazsil: Ethnomathematics and traveling culturs. Portobello, Brasil. ICME 10

28-Lipka, J.; Sharp, N.; Adams, B.; Sharp, F.; 2004. Connecting out of school learning to school mathematics: Qualitative and Quantitative Data from Alaska. University of Alaska Fairbanks. ICME X.. TA Theme B.

29-Lipka, J. y Adamas, B.L.2004. Some evidence for ethnomath: Quantita.and Qualitative data from Alaska. Alaska.USA. ICME 10.

30-Maffei, L.; Favilli, F.2004. Piloting the software Sona Polygonals_1.0: a didactic proposal for the GCD. Italia. ICME 10.

31-Matang, R. and Owens, K. 2004. Rich Transitions from indigenous counting systems to English arithmetic strategies: Implication for mathematics education in Papua New Guinea. Nueva Guinea. Australia. ICME 10.

32-Mosimege, M.; Ismael, A.; 2004. Ethnomathematical studies in indigenous games: exemples from Southerm Africa. Southerm Africa. ICME 10.

33-Muis, K. 2004. Personal epistemology and mathematics: A critical review and synthesis of research. *Review of Education Research,*Tomo 74, Nº3, pp. 317 – 377, ISSN 00346543. Obtenido el 23 de noviembre de 2007 de la base de datos ProQuest Psychology Journals.

34-Nunes, Ch. 2006. El conocimiento matemático y el conjunto de conocimientos culturales en la perspectiva sociológica. *Matemáticas e Interculturalidad.*
Biblioteca de Uno. Capítulo 4, p. 63 – 77. ISBN 84-7827-464-2.

35-Nunes, T. 2006. La multiculturalidad de las matemáticas. Ponencia 1° Congreso Internacional Lógico-Matemática. Madrid.

36-Oliveras M.L. 2006. Etnomatemáticas. De la multiculturalidad al mestizaje. *Matemáticas e Interculturalidad .Biblioteca de Uno*. Capítulo 7, p. 117 – 147. ISBN 84-7827-464-2.

37-Orey D.C. and Rosa, M.2004. Ethnomathematics and the teaching and learning mathematics from a multicultural perspective. USA. Califor-nia. ICME 10.

38-Orey, D.; Rosa, M. 2005. Las raíces históricas del Programa de estudios Etnomatemáticas. *Revista Latinoamericana de Investigación en Matemática Educativa*, Vol. 8 (3), pp. 363-377, ISSN1665-2436. Comité Latinoamericano de Matemática Educativa. México.

39-Orey, D., Rosa, M. 2006. Ethnomathematics: Cultural Assertions and Challenges Towards Pedagogical Action. *Journal of Mathematics and Culture*. Volume 1, Number 1, May. ISSN - 1558-5336

40-Ortiz-Franco L. 2004. Testimonios sobre la cultura matemática en países latinoamericanos: Prolegómenos a las etnomatemáticas en Mesoamérica. *Revista Latinoamericana de investigación en matemática educativa.* Volumen 7, No. 2, p. 171-186. ISSN 1665-2436. Comité Latinoamericano de Matemática Educativa. México.

41-Rogers, L. 2004. Multilingual and multicultural classrooms in Europe: Increasing diversity. Leo Roehampton University of Surrey. ICME X.

42-Santos-Domite, M.C. 2004. Notes on teacher education: an ethnomathematical perspective. Sao Pablo. Brasil. ICME 10.

43-Staats.S 2006. The Case for Rich Contexts in Ethnomathemátics**.** *Journal of Mathematics and Culture*. Volume 1, Number 1 . May. P. 39 – 59. ISSN - 1558-5336

44-Stathopoulou, Ch. 2004. Mathematics Education As An Acculturation Process: The Case Of a Romany Student Group in Greece. University of Aegean. ICME X

45-Stathopou-lou, Ch. 2004. Mathematical Cognition in and out of school for Romany Students. ICME 10. (stath@rhodes.aegean.gr)

46-Stinson, D. 2006. African American Male Adolescents, Schooling (and Mathematics):Deficiency, Rejection, and Achievement. *Review of Education Research,* Tomo 76, Nº4, pp. 477 – 506, ISSN 00346543. Obtenido el 23 de noviembre de 2007 de la base de datos ProQuest Psychology Journals.

47-Tintori, S. 2005. Proposte per una didattica interculturale della matemática: Il micro-progetto "La Zampoña". *XXII Seminario Nazionale di Ricerca in Didattica Della Matemática.* Dipartamento di Matemática Universita di Pisa. Pisa.

48-Vegas, M.L. 2005. Matemáticas y educación en valores. *SUMA*. Núm 50, pp. 37-45, ISSN 1130-488X. Federación Española de Sociedades de Profesores de Matemáticas. Madrid.

49-Vilella, X. 2006. Matemáticas y cultura : Una relación pendiente de profundizar. *SUMA*. Núm 52, pp. 51-61, ISSN 1130-488X. Federación Española de Sociedades de Profesores de Matemáticas. Madrid.

50-Zinger, V. 2004. Key issues of teaching mathematics to Alaska Native students. University of Alaska Southeast at Ketchikan (UAS-K)**.** ICME X.

Table 1- Table of Codification of the Papers

Num.paper	1	2	3	4	5	6	7	8	9	10
Author	Alberti	Atweh	Bishop	Burgos	Castello	Civil	Clanche	Clarkson	Cook	Cotton
Code	(1,Al)	(2, At)	(3, Bi)	(4, Bu)	(5,Ca)	(6,Ci)	(7,Cl)	(8,Clk)	(9, Coo)	(10, Cot)
Num.paper	11 DA	12	13	14	15	16	17	18	19	20
Author	D´Ambrosio	D´Amore	Davis	Díaz	Diez-Palomar	Favilli, Tintori	Fiorentino	Fossa	Giménez	Gómez Chacón
Code	(11,DA)	(12,Dm)	(13,Dv)	(14,Di)	(15, DP)	(16, FaT)	(17,Fi)	(18,Fo)	(19,Gi)	(20,Gch)
Num.paper	21	22	23	24	25	26	27	28	29	30
Author	Goñi	Gorgorió	Harding-Dekam	Hsui-fei; Lee	Issic; Ling	Israel	Knijnic; Wanderer	Lipka et al.	Lipka; Adamas	Maffei; Favilli
Code	(21,Go)	(22,Gor)	(23,HD)	(24, HfL)	(25, Iss)	(26, Isr)	(27,K)	(28,L)	(29,LA)	(30,MF)
Num.paper	31	32	33	34	35	36	37	38	39	40
Author	Matang; Owens	Mosimege; Ismael	Muis	Nunes, Ch.	Nunes, T	Oliveras	Orey; Rosa	Orey; Rosa	Orey ; Rosa	Ortiz-Franco
Code	(31,MO)	(32,MI)	(33,M)	(34,Nch)	(35,Nt)	(36,O)	(37,OR)	(38,OR)	(39,OR)	(40,Of)
Num.paper	41	42	43	44	45	46	47	48	49	50
Author	Rogers	Santos-Domite	Staats	Statho-poulou	Statho-poulou	Stinson	Tintori	Vegas	Vilella	Zinger
Code	(41, R)	(42,Sd)	(43,St)	(44,Sta)	(45, Sta)	(46,Sti)	(47,T)	(48,V)	(49,Vi)	(50,Z)

PROTOCOL I. Field Research

Title of the research paper	Code and Authors	Langu age (s)	Place of Public a-tion	Year Publi-shed	Journal or book where it is published	ISSN ó ISBN	Length of text in nº of words or of pages	Subject of research	Cultural group to which the subjects belong	Research Methodo -logy	Subcategories	Categories (Key words: categories)
Quantitative and spatial representations among working class adults from Rio de Janeiro	**(5,Ca)** María Cecilia de Castello Branco	Inglés	Brasil	2004	ICME 10			Class adults from Rio de Janeiro	Brazil Rio de Janeiro		Quantitative and spatial representa-tions. Adult basic education	Ethnomathe matics;. Aplicación directa al aula.
The art of tiles in Portugal and Brazsil: Ethnomathema -tics and traveling culturs	**(27,K)** Gelsa Knijnic y Fernanda Wanderer.	Inglés	Brasil	2004	ICME 10			Primaria	Brazil y Portugal		Investigación Propuesta curricular Mathematics educacions	Culture and art. Ethnomate matics. Aplicación directa al aula
Some evidence for ethnomath: Quantita. and Qualitative data from Alaska	**(29,LA)** Jerry Lipka y Barbara L. Adamas.	Inglés		2004	ICME 10		29795	Estudiant es de Primaria	Estados Unidos Alaska	Quantita. and Qualitativ e data	Investiga-ción. Creencias	Ethnomathe matics. No para aplicación directa al aula
Piloting the software Sona Polygonals_1. 0: a didactic proposal for the GCD	**(30,MF)** Laura Maffei y Franco Favilli	Inglés		2004	ICME 10			Secundari a	Italia		Investiga-ción. Resources for learning	Ethnomathe matics. Aplicación directa al aula

PROTOCOL II. Basic Research

Title of the research paper	Code and Authors	Language (s)	Place of publication	Year Published	Journal or book where it is published	ISSN ó ISBN	Length of text in nº of words or of pages	Metodología de la investiga-ción	Subcategories	Categories (Key words: categories)
Occurrence of typical cultural behaviours in an arithmetic lesson: how to cope?	**(7,ClS)** Pierre Clanche ; Bernard Sarrazy	Inglés	Burdeos. Francia	2004	ICME 10			Ensayo	General	No aplicable directamente al aula
Multicultural Classrooms: contexts for much mathematic teaching and learning	**(8,Cph)** Philip Clarkson.	Ingles	Melbourne-Australia	2004	ICME 10			Ensayo	Contexts for learning mathematic. Educación General	Multicultural Classrooms. Aplicable directamente al aula
Ethnomathematics in Taiwan- A Review	**(24,HfL)** Hsui-fei; Sophie Lee	Ingles	Taiwan	2004	ICME 10			Ensayo	Educativo General	No aplicable directamente al aula
Ethnomathematics and the teaching and learning mathe-matic from a multi-cultural perspective	**(37,OR)** Daniel Clark Orey; Milton Rosa	Inglés	California USA.	2004	ICME 10			Ensayo	Educativo General	Aplicable directamente al aula
Matemáticas y educación en valores.	**(48,V)** María Isabel Vegas Miguel.	Español, Caste-llano	Madrid	2005	Revista SUMA	1130 -488 X	8 páginas (37-45)	Ensayo	Matemáticas y valores.	Conflicto, mu-ndo pluricul-tural, valores fundamentales No al aula
Matemáticas y culturas: una relación pendiente de profundizar	**(49,Vi)** Xavier Vilella Miró.	Español, Caste-llano	Madrid	2006	Revista SUMA	1130 -488 X	10 páginas (51-61)	Ensayo	Matemáticas y culturas. Contextuali-zación	Diversidad cultural. No al aula.

PROTOCOL III. Documents that are not research (classroom experiences, projects, resources, bibliographical reviews, tests)(1)

Title of the research paper	Code and Authors	Language (s)	Place of publication	ear Publis-hed	Journal or book where it is published	ISSN ó ISBN	Length of text in nº of words	Kind of Work	Subcatego-ries: Subjects or objects	Categories
Intercultural mathematatics education: comments about a didactics proposal	**(16,FaT)** F.Favilli y Stefania Tintori.	Inglés	Italia	2004	ICME 10			Difusión de Experiencias	Propuesta desarrollo del currículum. Educación Primaria.	Ethnomatema ticas. Aplicable directamente al aula
Educación matemática y exclusión.	**(19,Gi)** Joaquín Giménez (coord.)	Español Castella-no	Barcelona	2007	Libro. Editorial GRAÓ	978-84-782 7-513-7	189 páginas	Artículos de reflexión y para el aula	Prácticas pedagógi-Cas. Mates. críticas	Exclusión, atención a la diversidad, inmigración.
Matemáticas e interculturalidad.	**(21,Go)** Jesús M. Goñi (coord..)	Español Castella-no	Barcelona	2006	Libro. Editorial GRAÓ	978-84-782 7-464-2	149 páginas	Artículos de reflexión y para el aula	Fundamentos de Inter-culturalidad	Sociedad multicultural, enseñanza de las matemáticas.
Student´s Mathematics performance in authentic problems	**(25,Iss)** Leung, Issic; Ling, Siu-hing; Wong, Regina M.F.	Inglés	Hong Kong. China	2004	ICME 10			Difusión de Experiencias	Educación General Problemas Auténticos. PISA.	Ethnomatema ticas. Aplicable directamente al aula
Atención a la diversidad desde el área de matemáticas: el proyecto Yeti.	**(26,Isr)** Antonio Israel Mercado	Español Castella-no	Barcelona	2007	UNO: nº46 Revista de didáctica de las matemáticas	1133-9853	10 páginas (115-125)	Propuesta curricular para el aula	Unidades didácticas integradas	Diversidad, necesidades educativas especiales. Aplicable directamente al aula

PROTOCOL III. Documents that are not research (classroom experiences, projects, resources, bibliographical reviews, tests)(2)

Title of the research paper	Code and Authors	Language (s)	Place of publication	ear Publis-hed	Journal or book where it is published	ISSN ó ISBN	Length of text in nº of words	Kind of Work	Subcatego-ries: Subjects or objects	Categories
Rich Transitions from indigenous counting systems to English arithmetic strategies:Implication for mathematics education in Papua New Guinea	**(31,MO)** Rex Matang and Kay Owens	Inglés	Papua , Nueva Guinea. Australia	2004	ICME 10			Difusión de Experiencias	Elemental Primaria	Ethnomatemat icas. Aplicable directamente al aula.
Ethnomathematical studies in indigenous games: exemples from Southerm Africa	**(32,MI)** Mogege Mosimege y Abdulcarimo Ismael	Inglés	South Africa. Mozam-bique	2004	ICME 10			Difusión de Experiencias .	Primaria. Recursos para el aula	Ethnomatemat icas. No aplicable directamente al aula
Personal epistemology and mathematics: A critical review and synthesis of research.	**(33,M)** Krista R. Muis	Inglés	Estados Unidos Washin-gton	2004	Review of Edu-cation Research Tomo 74, Nº3	00346-543	29795	Revisión de otros trabajos	Acciones B1 Contenidos B1. Cambios en: estilo de enseñanza y currículum	Matemáticas. Epistemología Creencias. No aplicable directamente al aula
Notes on teacher education: an ethnomathematical perspective	**(42,Sd)** María Do CarmoSantos Domite.	Inglés	Sao Pablo. Brasil	2004	ICME 10			Difusión de Experiencias	Formación de profesores	No aplicable directamente al aula
Mathematical Cognition in and out of school for Romany Students	**(44,Sta)** Charoula Stathopou-lou.	Inglés	Grecia	2004	ICME 10			Difusión de Experiencias	Secundaria y Universidad	No aplicable directamente al aula

In order to characterize documents with respect to the Fundamental Categories we have the following

PROTOCOL IV. FUNDAMENTAL CATEGORIES

CODIFIED PAPERS	CULTURE	MATHEMATICS		EDUCATION		SOCIETY
		EPISTE-MOLOGY, BELIEFS,	MATHEMA-TICAL TOPICS	EDUCATI O-NAL MODEL	TYPE OF CURRICULUM MATHEMA-TICAL RESOURCES	
(5,Ca)	X	X	X	X		
(7,ClS)	X	X	X			
(8,Cph)			X	X	X	X
(16,FaT)	X	X	X		X	
(19,Gi)	X	X		X	X	X
(21,Go)	X	X		X	X	X
(24,HfL)	X	X				
(25,Iss)			X	X	X	
(26,Isr)			X	X	X	X
(27,K)	X	X	X		X	
(29,LA)	X	X	X			X
(30,MF)		X	X		X	
(31,MO)	X	X	X		X	X
(32,MI)	X	X	X			X
(33,M)		X	X	X	X	
(37,OR)	X	X		X	X	
(42,Sd)	X	X		X		
(44,Sta).		X	X	X		X
(48,V)	X	X				X
(49,Vi)	X	X				

In order to detect the fundamental categories which correspond to each paper studied, it is necessary to understand and summarize them. Following on from this, the summary is analysed conceptually and the fundamental topics emerge. These topics are found within the fundamental categories of the MOMUME model.

6.- Conclusions

From the previous analysis we can conclude:

1- The number of articles written about this line of Mathematics Education is increasing

2- Studies are being carried out in the five continents

3- From the total number of papers analysed the central study theme is:

A- Themes directly related to classroom teaching in 70%? of cases

B- Themes related to theories or foundations, not directly applicable to the classroom in 70%? of cases

4-It is worth making a greater effort to study this Line of education owing to the social and cultural repercussions it has.

We hope that by studying intercultural education, we can contribute to peace and understanding between the people of the world.