

**PROBLEMS AND  
CHALLENGES IN  
IMPLEMENTING THE NEW  
TEACHER EDUCATION  
CURRICULUM (NTEC) IN  
MATH EDUCATION IN THE  
PHILIPPINES**

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# RATIONALE AND CONTEXT

- CHED in its response to the issues and challenges besetting mathematics and science education in the Philippines, promulgated CMO 30 Series 2004.
- This is known as the New Teacher Education Curriculum (NTEC) in Math Education.
- The NTEC recognizes the need to equip future math teachers with a wide range of theoretical and methodological skills affording these teachers with greater flexibility in designing and implementing learning environments that can bring about meaningful learning of mathematics.



# RATIONALE AND CONTEXT

- There are implied knowledge and skills as well as beliefs in the NTEC that practicing teachers in TEIs in the Philippines must possess to fully implement this new curriculum.
- There are without doubt, potential problems, concerns and impediments that math teacher educators and TEIs have to address to fully implement the NTEC.




# RESEARCH PROBLEMS

1. How ready are the TEIs in implementing the NTEC in Math Education in terms of curriculum and instruction?
2. To what extent are math teacher educators ready to implement the NTEC as regards to the cognitive demand, and pedagogical content knowledge and beliefs implied in the NTEC in math education?
3. What potential problems, concerns, and impediments are encountered by math educators in implementing the NTEC in math education?
4. What courses of action may be recommended to address the problems, concerns and impediments in the implementation of the NTEC?



# METHOD: PARTICIPANTS

- 78 math teachers from eight schools (with either a BSE Math or BS Math programs) in the NCR participated.
  - 70% have undergraduate math degrees; 13.8% have Ph.D./EdD in Math; while 28.8% have either MA or MS degree in Math.
  - 78% are experienced college teachers; 64.6% handle major courses and 20% have 1-10 years of teaching at the graduate level.
  - Sampling in NCR fairly represents the TEIs in the country since most centers of excellence are based in the NCR.
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# METHOD: INSTRUMENTS

## *Teaching Beliefs and Practices Questionnaire (TBPQ)*

- Designed to measure four sub areas: (a) Goals of math teaching; (b) effective math teaching; (c) effective math learning activities; and (d) your own teaching practices.
- Each item in the TBPQ was coded as traditional and inquiry allowing the reporting of mean ratings for all traditional and inquiry statements per component of the TBPQ.
- Over-all traditional and inquiry beliefs were operationalized as the sum ratings given to traditional and inquiry statements .



# METHOD: INSTRUMENT

## *Implementation Readiness Questionnaire (IRQ)*

Readiness is defined as

- (1) availability of course syllabi or outlines adhering to the cognitive demands implied in the NTEC
- (2) Extent of involvement in the preparation of these syllabi
- (3) Availability of learning materials
- (4) Degree of confidence of math teachers in teaching or handling math courses



# RESULTS: MEAN RATINGS ON TRADITIONAL AND INQUIRY ITEMS

TRADITIONAL	X	INQUIRY	X
<b>Goals of Math Teaching</b> ■ Master mathematical facts	4.36	<b>Goals of Math Teaching</b> ■ Generate his/her own solutions to problems	4.50
<b>Effective Mathematics Teaching</b> • Present the content of lessons as planned in a teacher-directed manner	4.07	<b>Effective Mathematics Teaching</b> ■ Provide opportunities for students to discover concepts and procedures for themselves	4.53
<b>Math Learning Activities</b> ■ Giving lectures or explanation in teaching students.	4.23	<b>Math Learning Activities</b> ■ Argumentation, proving problem solving and collaboration	4.42
<b>Overall Traditional Beliefs</b>	12.66	<b>Overall Inquiry Beliefs</b>	13.45



# MEAN RATINGS ON TEACHERS' OWN PRACTICE

TRADITIONAL	X	INQUIRY	X
<ul style="list-style-type: none"><li>▪ Follow the syllabus or course outline thoroughly</li><li>▪ Give students many individual exercises, drills, seatwork and quizzes in the classroom</li></ul>	<b>4.02</b>	<ul style="list-style-type: none"><li>▪ Give stronger emphasis on the applications of math in the real world instead of computational skills.</li><li>▪ Serve as facilitator of students' independent inquiry and learning.</li></ul>	<b>4.18</b>



# CORRELATION MATRIX FOR BELIEFS VS TEACHING PRACTICE

	OTB	OIB	TTP	ITP	EB
OTB	1	0.17	0.58**	0.12	0.07
OIB		1	-0.06	0.37**	0.15
TTP			1	0.31**	-0.18
ITP				1	0.34**
EB					1

OTB - Overall Traditional Beliefs, OIB - Overall Inquiry Beliefs  
TTP - Traditional Teaching Practices ITP - Inquiry Teaching Practices  
EB - Educational Background



# MEAN OF TBPQ ITEMS RE-TAGGED AS COGNITIVE DEMANDS

Cognitive Demand	Definition	Mean
<b>Visualizing</b>	Use of imagination to create images and pictures to represent and understand math concepts	<b>4.11</b>
<b>Knowing</b>	Understanding of concepts, memorizing and recalling facts and procedures	<b>3.88</b>
<b>Computing</b>	Ability to estimate, compute, calculate, use of correct algorithms and determine the final results	<b>4.06</b>

# MEAN OF TBPQ ITEMS RE-TAGGED AS COGNITIVE DEMANDS

Cognitive Demand	Definition	Mean
<b>Solving</b>	Understanding the problem to be solved, making a plan and evaluating the results of the solution	<b>4.54</b>
<b>Applying</b>	Ability to recognize situations that call for the use of math concepts and procedures	<b>4.26</b>
<b>Proving</b>	Ability to verify statements, justify steps taken, produce proofs of important theories and generalize	<b>4.28</b>

# AVAILABILITY OF SYLLABI, MATH SUBJECTS TAUGHT AND DEGREE OF CONFIDENCE

Math Subject	No Prepared Syllabi		Not Yet Taught		Most Confident	
	N	%	N	%	N	%
History of Math	45	78	51	88	9	16
Action Research in Math	43	74	54	93	8	14
Seminar in Technology in Math	45	78	55	95	4	7
Instrumentation in Math	47	81	54	93	4	7
Math Modelling and Investigation	47	81	56	97	7	12

# REASONS FOR PERCEIVED CONFIDENCE

Reasons	N	%	Reasons	N	%
Knowledge of Subject Matter	48	83	Availability of Instructional Materials	21	36
Teaching Experiences	43	74	Deep Understanding of the Learning Process	29	50
Continuing Professional Education	37	64	Pedagogical Content Knowledge	25	43
Knowledge of Learners' Level of Cognitive Development	25	43	Wide Range of the Teaching Process Skills	23	40

# AVAILABILITY OF MATERIALS, FREQUENCY OF USE AND DEGREE OF CONFIDENCE

Learning Materials	Availability		Frequency of Use (16 or more in a semester)		Most Confident	
	N	%	N	%	N	%
Scientific Calculator	53	91	43	74	40	69
Graphing Calculator	26	45			6	10
Computer Math Software	27	47	5	9	8	14
Computer Application	47	81	12	21	17	29
Teacher-Made Activity Sheets and Worksheets	46	79	22	38	33	57

## FGD HIGHLIGHTS

- Participating schools are implementing the NTEC in Math Education but in varying degrees.
- The most frequently cited concern was the unavailability of instructional materials and references particularly for the new subjects as well as the unavailability of necessary software for more advanced math subjects.
- The lack of training for teachers to effectively carry out the cognitive demands of the NTEC in math education was another issue raised.
- Apparent in the curriculum is the development of the pedagogical content knowledge of pre service mathematics teachers.





# MATHEMATICAL STRANDS FROM THE MATHEMATICS FRAMEWORK ON TEACHER EDUCATION

N	Number and Number Sense
M	Measurement
G	Geometry
PFA	Patterns, Functions and Algebra
DAP	Data Analysis and Probability
A	Analysis
AM	Abstract Mathematics



# COGNITIVE DEMAND, MATHEMATICAL STRANDS AND LEVELS OF CONFIDENCE ASSOCIATED WITH MATH SUBJECTS

Math Subject	Cognitive Demand	Mathematical Strand	Level of Confidence (%)
History of Mathematics	V, K, C, S, A	N, M, G, PFA	20
Action Research in Math	K,S, A	N, M, DAP	22
Seminar in Technology in Math	V, K C, S, A	N, M, PFA,	16
Instrumentation in Math	V, K, C, S, A	N, M, PFA, G	13
Math modelling and Investigation	V, K, C, S, A	N, M, PFA, G, AM	20

# RECOMMENDED COURSES OF ACTION

- Venues to discuss and share resources to address content, pedagogical and methodological issues in the full implementation of the NTEC.
- Re-tool and train teachers to address implied cognitive demands in the NTEC to include use of Technology.
- There is a need for more seminars, workshops in conceptualizing, planning and executing lessons consistent with the Mathematics Framework for Teacher Education (MFTE).
- TEIs might even need to share resources and expertise to ensure that the curriculum is properly implemented.
- Teachers must experience learning in a constructivist environment; they need to see alternative ways of assessing learning before they can vary their practice from the usual pencil and paper tests. Most of all, they have to experience certain transformations in beliefs before they can embrace the paradigm of mathematics education advocated in the NTEC.



# CONCLUSION

- Participating TEIs are not ready to implement the NTEC in math education. TEIs as well as math teacher educators must be helped to address the implied cognitive demands and competencies in fully implementing the NTEC.
- The study asserts that beyond the acquisition of content knowledge and making available the needed course materials is a concerted effort in a change in paradigm in the teaching and learning mathematics from the traditional to the inquiry mode.
- There is a need to continuously articulate and be involved in investigations on the dynamics and interplay of beliefs and practices consistent with the Mathematics Framework for Teacher Education.



