

**NO TEACHER LEFT BEHIND:
NCLB-Compliant Math Programs
That Support Teacher Learning and Student Achievement
NCSM Conference Presentation
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<i>An electronic copy of this presentation and handout are available at http://www.math.ucla.edu/mcpt/resources.htm</i>

PROGRAMS AT UCLA

An Overview of UCLA Programs in Mathematics Education

The Mathematics Department houses several programs and offers various courses connected with math education. Additionally, several of its faculty members participate in programs housed elsewhere.

<http://www.math.ucla.edu/mathed/>

UCLA Math Content Program for Teachers

MCPT offers mathematics courses at in the Los Angeles area for teachers who wish to study topics in school mathematics from an advanced standpoint and a problem solving perspective. When this 12-course program (48 quarter units), is completed, we expect it will be equivalent to a major for middle school math.

<http://www.math.ucla.edu/mcpt/>

LUCIMATH Program

LUCIMATH Institutes (**L**ocal School Districts, **U**CLA, **CA** County Offices of Education Institutes in **MAT**hematics) are designed to increase teacher competence and confidence in the mathematics they teach, familiarize teachers with the components of their textbooks, improve instructional skills, and address issues of English Language Learners. The program has been designed to provide teachers with a cohesive, coherent, and mature look at mathematics taught in elementary and middle school, with emphasis placed on building mathematical ideas based on children's prior knowledge.

<http://www.lucimath.org/>

RESEARCH AND RECOMMENDATIONS

CTP Research Report: Teacher Preparation Research: Current Knowledge, Gaps, and Recommendations, Suzanne Wilson, Robert Floden, Joan Ferrini-Mundy. Michigan State University, February 2001.

Working from over 300 research studies published over the past two decades, a team synthesized a report detailing major findings, research gaps, and recommendations for further research on teacher preparation programs and policies that support them.

- Seven studies show some positive correlation between a mathematics teacher's degree in mathematics and student results. (p. 7)
- One study shows some positive correlation between some mathematics coursework and student results, but no effect of having a full mathematics degree. (p. 7)
- Two studies show some positive correlation between about 5 mathematics courses and student results, but no effect of having more coursework. (p. 7)
- Five studies show math education or education coursework contributes to student gains. (p. 8)

<http://depts.washington.edu/ctpmail/Study14.html>

Mathematical Proficiency for All Students: Toward a Strategic Research and Development Program in Mathematics Education, RAND Mathematics Study Panel, Deborah Loewenberg Ball, Chair, 2003

The RAND Mathematics Study Panel synthesized some existing research, and proposes a comprehensive R&D program supporting the improvement of mathematics proficiency among U.S. school students.

- The importance of content knowledge: "A teacher whose mathematical knowledge is thin is less likely to recognize the mathematical sense in a student's representation or solution, leading to an inappropriate assessment of the student's capabilities." (p. 22)
- But what content knowledge is needed? "Research over the past several decades has clearly indicated that the knowledge of mathematics needed to be an effective teacher is different than the knowledge needed to be a competent mathematician or the knowledge that is needed to use mathematics in some other fields such as engineering or science." (p. 19)
- Liping Ma's work introduces an important idea "she calls 'profound understanding of fundamental mathematics'...a refined sense of the organization and development of a set of related ideas in a particular [mathematical] domain." (p. 19)
- "In 1985, Lee Shulman and colleagues introduced the term 'pedagogical content knowledge'...This term called attention to a special kind of teacher knowledge that links content, students, and pedagogy."
- A call for further research..."We do not know much about how teachers need to be able to get inside mathematical ideas to make them accessible to students. And we do not know what they need to know of the mathematics that lies ahead of them in the curriculum. We need studies that would help us learn about the mathematical resources needed to teach mathematics effectively." (p. 20)

<http://www.rand.org/publications/MR/MR1643/>

A Research Companion to Principles and Standards for School Mathematics, Edited by Jeremy Kilpatrick, W. Gary Martin, and Deborah Schifter, NCTM, 2003

This companion to NCTM's Principles and Standards for School Mathematics explores the underpinnings of that document in the scholarly literature.

- Fernandez, 1997 - Strong mathematics knowledge enables teachers to “provide a counter example to uncover an error in student’s thinking, follow through on a student’s comment to lead to a contradiction or a viable solution, apply a student’s method to a simpler or related problem, understand a student’s alternative method, and incorporate a student’s alternative method into instruction.” (p. 48)
- “Teachers need to revisit the mathematics they are teaching to gain insights into the conceptual underpinnings of topics and the interconnections among them.” (p. 49)

<http://my.nctm.org/store/ECat/product.asp?ID=12341>

What Do Teachers of Middle Grades Mathematics Need? NCTM News Bulletin. Sept. 2003.

This open letter from Johnny Lott, President of NCTM, summarizes content recommendations needed to teach middle school.

- “Discontinue K–8 teaching certificates that have minimal requirements. If states want to continue this type of certification, then they should increase the demands for content and pedagogy for the certificate. A person receiving this type of certificate should expect five years of preparation for the certificate (including a bachelor’s degree).”
- “Revise the requirements for a 7–12 teaching certificate. In most states this certificate has allowed a mathematics major to receive a secondary school certification. Unless coursework is changed significantly, this major will still allow minimally qualified mathematics teachers in middle school.”
- Develop coursework that is appropriate for middle school teachers. All universities and teacher preparation institutions should acknowledge that most traditional mathematics majors do not meet the special needs of middle school mathematics teachers.

http://faculty.washington.edu/warfield/WaToToM/Johnny_Lott_letter

The Mathematical Education of Teachers, Parts 1 & 2. Providence, R.I: Conference Board of the Mathematical Sciences, American Mathematical Society, 2001.

This report gives recommendations for preservice teacher education programs. Its primary audience is mathematics faculty at colleges and universities that prepare teachers.

- “Prospective elementary grade teachers should be required to take at least 9 semester hours on fundamental ideas of elementary school mathematics.” (p. 8)
- “Prospective middle grades teachers of mathematics should be required to take at least 21 semester-hours of mathematics, that includes at least 12 semester-hours on fundamental ideas of school mathematics appropriate for middle grade teachers.” (p. 8)
- “Prospective high school teachers of mathematics should be required to complete the equivalent of an undergraduate major in mathematics, that includes a 6 hour capstone course connecting their college mathematics course with high school mathematics.” (p. 8)

http://www.cbmsweb.org/MET_Document/index.htm/

FEDERAL AND STATE (CA) REGULATIONS

Improving Teacher Quality: (NCLB) Non Regulatory Guidance Report. Office of Elementary and Secondary Education. U.S. Department of Education. September, 2003

This document provides guidance for Title II programs, which focus on preparing, training, and recruiting high-quality teachers and principals. States must develop plans that will ensure that all teachers teaching in core academic subjects are highly qualified by the end of the 2005-2006 school year.

<http://www.ed.gov/programs/teacherqual/guidance.pdf>

Helping State Leaders Shape Educational Policy. A feature on the Education Commission of the States website.

This website allows the user to easily gather information and compare how each of the 50 states is implementing its evaluation policy for HOUSSSE certification under NCLB.

http://www.ecs.org/ecsmain.asp?page=/html/educationissues/teachingquality/housse/housedb_intro.asp

California's NO CHILD LEFT BEHIND Teacher Requirements – Final Regulations Filed with Secretary of State's Office – February 27, 2004

We believe this is the most recent official document driving California's policies surrounding the certification of NCLB compliant (highly qualified) teachers.

<http://www.cde.ca.gov/regulations/nclbhqtrff022604.pdf>

California's NCLB Teacher Requirements Resource Guide

This document was prepared by the California Department of Education. It provides information to teachers, administrators, and district personnel to help them determine which California teachers currently meet NCLB federal requirements, and what needs to be done to demonstrate subject area knowledge in core subject areas.

<http://www.cde.ca.gov/pr/nclb/teachqual/nclbresourceguide.pdf>

California NCLB Compliance Forms.

Three documents are available at the California Department of Education website: Form 1 - NCLB Teacher Requirements: Certificate of Compliance; Form 2 - California High Objective Uniform Standard of Evaluation, CALIFORNIA HOUSSSE, Part 1; Form 3 - California High Objective Uniform State Standard of Evaluation, CALIFORNIA HOUSSSE, Part 2

<http://www.cde.ca.gov/regulations/nclbhoussef12ro.pdf>

<http://www.cde.ca.gov/regulations/nclbhoussef3ro.pdf>