

Science and Mathematics Education Conference – Dublin, Ireland City University

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Agenda

- Present recommendations for science and mathematics education by the National Commission on Mathematics and Science Teaching for the 21st Century - Glenn Commission.
- Provide a brief overview of the First in the World Consortium.
- Discuss how our new Learning Point Associates provides professional services to improve education.



*The National Commission on
Mathematics and Science Teaching
for the 21st Century*

Commission Members

Senator John Glenn, Commission Chair

Conda Rosen, Executive Director

Deborah Ball, University of Michigan

Dwight Barrett, INTEL Corporation

Janet Briars, Pittsburgh Public Schools

Rep. Cynthia Chestnut, Florida State Legis.

Governor James Geringer, Wyoming

Debra Feldman, AFT

David Gonzalez, Pioneer High School

Berilyn Grignon, Menominee Indian High
School

Jeff Himmelstein, (Retired) Livingston
Public Schools

Rep. Rush Holt, New Jersey

Governor James Hunt, North Carolina

Senator James Jeffords, Vermont

Anne Jolly, Cransford Burns Middle School

Nancy Keenan, Montana Office of Public
Instruction

Senator Edward Kennedy, Massachusetts

Paul Kimmelman, (Retired) W. Northfield
School District No. 31

William Kirwan, The Ohio State Univ.

Maria Lopez-Freeman, Calif. Science Proj.

Walter Massey, Morehouse College

Iris Metts, Prince George's County

Rep. Connie Morella, Maryland

Edward Rust, State Farm Insurance

Chang-Lin Tien, UC Berkeley

Dennis Van Roekel, NEA



***The National Commission on
Mathematics and Science Teaching
for the 21st Century***

The technology-driven economy of the 21st century will add about 20 million jobs to the American economy by 2008 - if we can only educate our young people to fill them.



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- Singapore reputedly has the most technologically intensive workforce in the world.
- Israel now produces more technology-based startups than anywhere outside Silicon Valley, and with 135 engineers per 10,000 citizens, has twice the U.S. ratio.
- Ireland now produces 60% of all PC business-application software sold in Europe.

An urgent need for competency in mathematics and science

- Rapid pace of change in both the global economy and in the American workplace.
- Increasing need for mathematics and science for everyday decision-making.
- Inextricably linked to the nation's security interests.
- The intrinsic value of mathematical and scientific knowledge shape and define our common life, history, and culture.



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The Commission is convinced that the future well-being of our nation and people depends not just on how well we educate our children generally, but on how well we educate them in mathematics and science specifically.



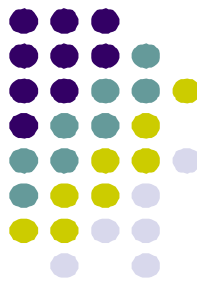
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It is abundantly clear from the evidence already at hand that we are not doing the job that we should do - or can do - in teaching our children to understand and use ideas from math and science.



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The Commission concluded that the most powerful instrument for change, and therefore the place to begin, lies at the very core of education - *with teaching itself.*



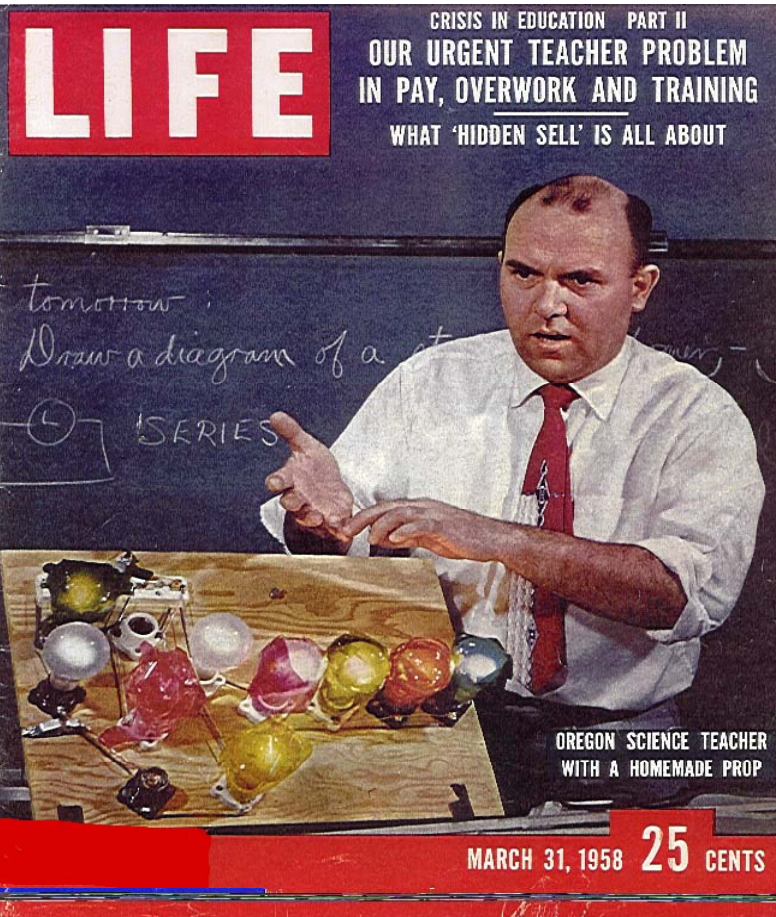
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...e-part series that identified
...cal issues in American
...cation.

...ey are wretchedly overworked,
...erpaid and disregarded."

...discouraging number of them are
...ompetent".

...enough time to plan lessons.



The Magnitude

- 11% of the 2.7 million public school teachers are middle and high school math and science teachers.
- 61% of public school teachers have some math and science teaching responsibilities.

How comfortable do teachers feel about their professional knowledge?

- Only 36% of full-time K-12 teachers feel very well prepared to implement state or district curriculum and performance standards.
- Only 41% of full-time K-12 teachers feel very well prepared to implement new methods of teaching.
- Only 20% of full-time K-12 teachers feel very well prepared to integrate educational technology.



Teachers with a sufficient content knowledge base?

- 28% of teachers do not have even a minor in mathematics in schools where there are fewer than 20% free-lunch recipients.
- 40% of teachers do not have even a minor in mathematics in schools where there are more than 49% free-lunch recipients.
- 14% of teachers do not have even a minor in science in schools where there are fewer than 20% free-lunch recipients.
- 20% of teachers do not have even a minor in science in schools where there are more than 49% free-lunch recipients.

From the student's perspective

- 56% of high school students taking physical science are taught by out-of-field teachers; and
- 27% of high school students taking mathematics are taught by out-of-field teachers.
- In schools with the highest minority enrollments, students have less than a 50% chance of getting a science or math teacher who holds a license and a degree in the field.

Why are they leaving?

- 40% of math and science teachers depart because of job dissatisfaction and
- 29% of all teachers depart because of job dissatisfaction.

What makes them dissatisfied?

- 54.3% of all teachers leave their jobs because of dissatisfaction with the salary, whereas 56.7% of math and science teachers leave their jobs because of salary.
- 22.9% of all teachers leave their jobs because of student discipline problems, whereas 29% of math and science teachers leave their jobs because of discipline.
- 14.6% all teachers leave their jobs because of poor student motivation, whereas 21.4% of math and science teachers leave their jobs for poor motivation.

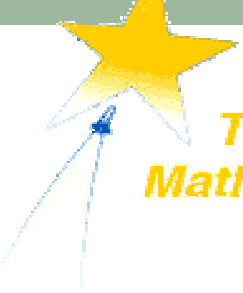


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What is the impact on new teachers?

In Cumulative Percent

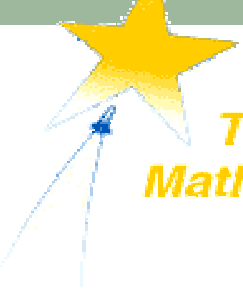
- 11% leave teaching after 1 year.
- 21% leave teaching after 2 years.
- 29% leave teaching after 3 years.
- 33% leave teaching after 4 years.
- 39% leave teaching after 5 years.



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GOAL ONE

Establish an ongoing system to improve the quality of mathematics and science teaching in grades K-12.



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Action strategies to realize Goal One

- Needs Assessment.
- Summer Institutes.
- Inquiry Groups.
- Leadership Training.
- Internet Portal.
- Reward and Incentive Programs.



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GOAL TWO

Increase significantly the number of mathematics and science teachers and improve the quality of their preparation.

Action strategies to realize Goal Two

- Exemplary models of teacher preparation.
- Attract additional qualified candidates into teaching.
- Mathematics and science teaching academies.



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GOAL THREE

Improve the working environment and make the teaching profession more attractive for K-12 mathematics and science teachers.



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Action strategies to realize Goal Three

- Induction programs.
- Business/District partnerships.
- Incentives.

Coordinating Council for Mathematics and Science Teaching

- Bringing together stakeholder groups to collaborate.
- Monitoring state and local progress on the goals.
- Disseminating, models, research, and ideas for technical assistance.

First in the World Consortium

First in the World Consortium

- Group of 17 suburban Illinois school districts.
- Committed to national goal to be first in the world in mathematics and science.
- First non-country to take the Third International Mathematics and Science Study (TIMSS).

FITW

- 49 elementary and middle schools.
- 6 high schools.
- One special education district.
- 36, 000 students.
- 78% white, 14% Asian, 7% Hispanic, 2% black.

Goals

- Benchmark consortium performance against international measures of student achievement.
- Create a forum to clarify world-class standards.
- Establish networks of learning communities.

Some activities of the FITW

- Collaborative content-based, teaching strategy professional development.
- Collaborative summer institutes for teachers, administrators, parents and students.
- A research-based, data-driven process guided by a committee.
- Advocacy for improved mathematics and science teaching and learning.

Results

- In 4th grade only Singapore had scores significantly above FITW in math and no nations outperformed it in science.
- In 8th grade only Singapore had scores significantly above FITW in math and no nations outperformed it in science.
- In 12th grade two assessments.

12th Grade

- U.S. data difficult to analyze because of population selection criteria.
- In general math and science knowledge FITW scores not significantly different than the seven highest performing countries.
- FITW AP calculus and physics students were first in the world.
- When general ed students were factored in for advanced courses the FITW dropped below the international average.

Learning Point Associates

PSG Strategies

- **Strategy #1** is to help our clients integrate professional development with their school/district improvement planning through co-planning.
- **Strategy #2** is to help our clients address barriers to change and sustainability using collaborative processes for developing strategies to overcome those barriers.
- **Strategy #3** is to position ourselves to better sense and serve the needs of our clients by building and maintaining strong relationships with clients.

Professional Services

Areas of Products and Services

- Using data to improve teaching and learning.
- **Curriculum, instruction, assessment (math, science, literacy).**
- After school programs.
- Technology.
- On-line Learning.

Customization

- Specialized work with a variety of clients to meet their specific needs in the areas of our products and services.

Curriculum, Instruction, Assessment Services: Mathematics and Science

- **Technical Assistance:** On-site consultation around school reform efforts.
- **Professional Development:** Research-based support fostering capacity building and long-term commitments to teacher professional growth.
- **Collaboration:** Co create processes to support systemic efforts focused on providing meaningful, purposeful, and engaging learning experiences in mathematics and science for all students.



LEARNING POINT
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