

Determinants of Learning in PISA 2000 & 2003

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The World Bank



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DIRECTIONS IN DEVELOPMENT

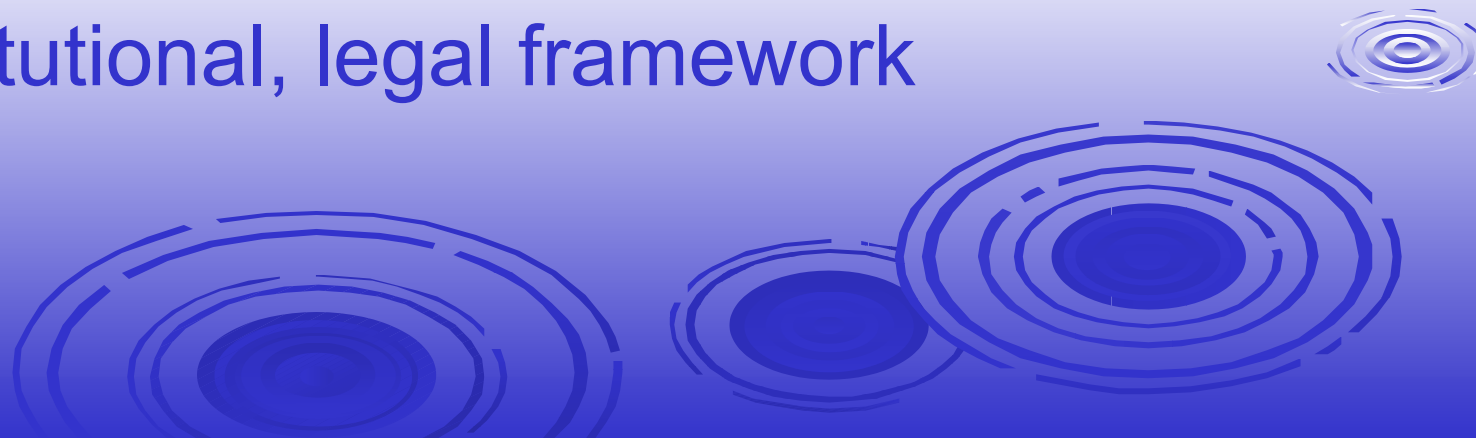
Lifelong Learning in the Global Knowledge Economy

Challenges for Developing Countries



Lifelong Learning in the Global Knowledge Economy

- Knowledge economy puts premium on learning
- Requires multi-sector strategy
- Focus on equity
- Expand access to learning
- Raise quality by changing content, pedagogy
- Variety of financing mechanisms needed
- Policy, institutional, legal framework



Learning in Knowledge Economy

Then

Information based

Rote learning

Teacher directed

Just in case

Formal education only

Directive based

Learn at a given age

Terminal education

Now

Knowledge creation/application

Analysis and synthesis

Collaborative learning

Just in time

Variety of learning modes

Initiative based

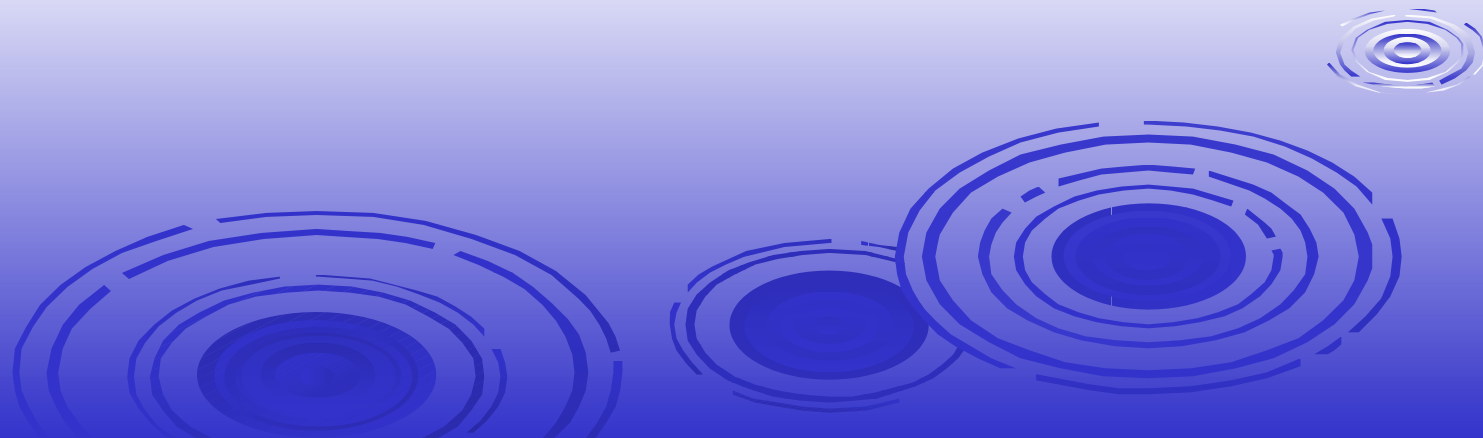
Incentives, motivation to learn

Lifelong learning



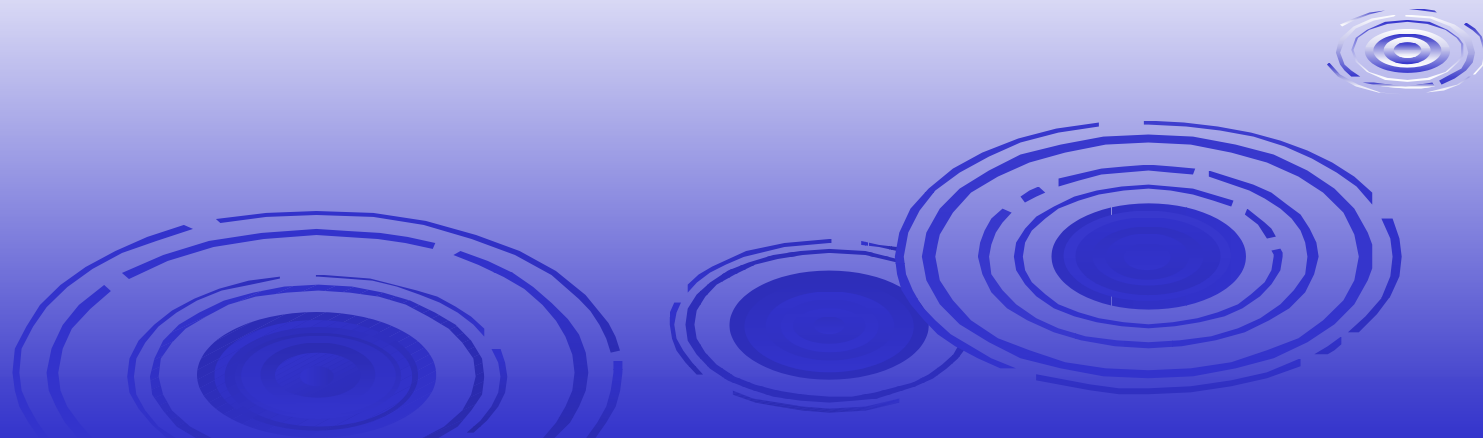
Learner-centered

- Learner: motivation, adaptability, analytical thinking, communication, problem solving
- Teacher: from director to facilitator



Learning by Doing

- Teacher: from director to facilitator
- Classroom: learn by doing, team work, individual learning plans
- Institution: professional community centered on achievement



Traditional Learning Differs From Lifelong Learning

Traditional learning

Teacher is source of knowledge
Learners receive knowledge
Learners work by themselves
Tests given to prevent progress
All learners do same thing
Teachers receive initial training
Good learners identified

Lifelong learning

Educators are guides to knowledge
People learn by doing
People learn in groups
Assessments guide learning
Individual learning plans
Educators are lifelong learners
Access to lifetime learning



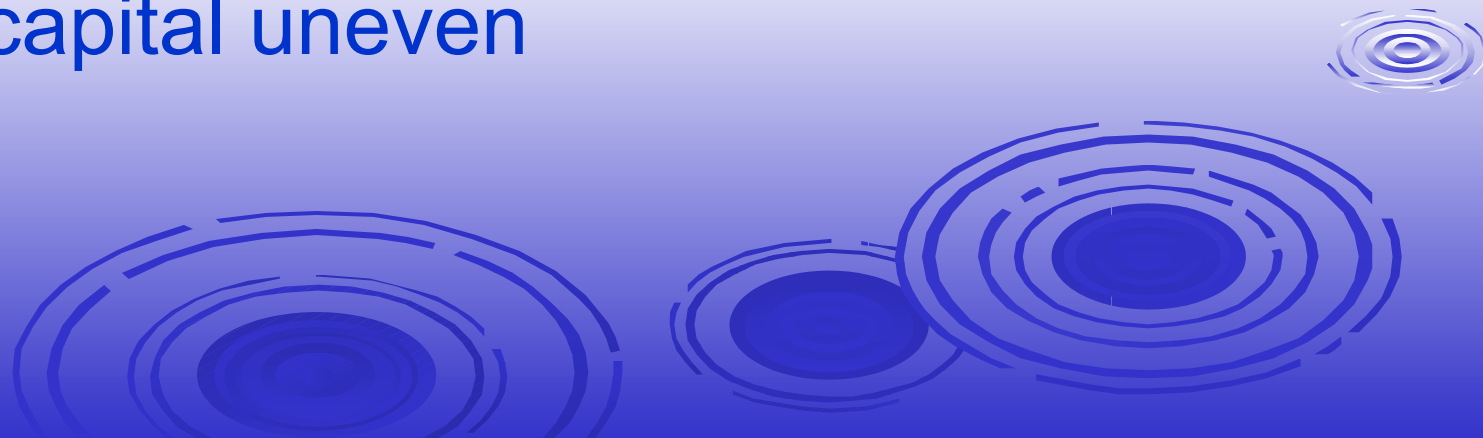
Alternative Delivery Mechanisms

- Increase access to learning opportunities
 - Increase variety of ways learners can learn
 - Give access to knowledge resources
- Enhance quality through technology
 - Learning by doing
 - Self-directed learning
 - Continuously updated curriculum
 - Networks of good practice



Financing Lifelong Learning

- Expenditures increase, public resources limited
- Priority for public: basic education
- Balance between subsidies and market mechanisms given that
 - Benefits both private and public
 - Access to capital uneven



Variety of Finance Mechanisms

Cost-recovery

Traditional loan

Human capital contracts

Graduate tax

Income contingent loans

Subsidies

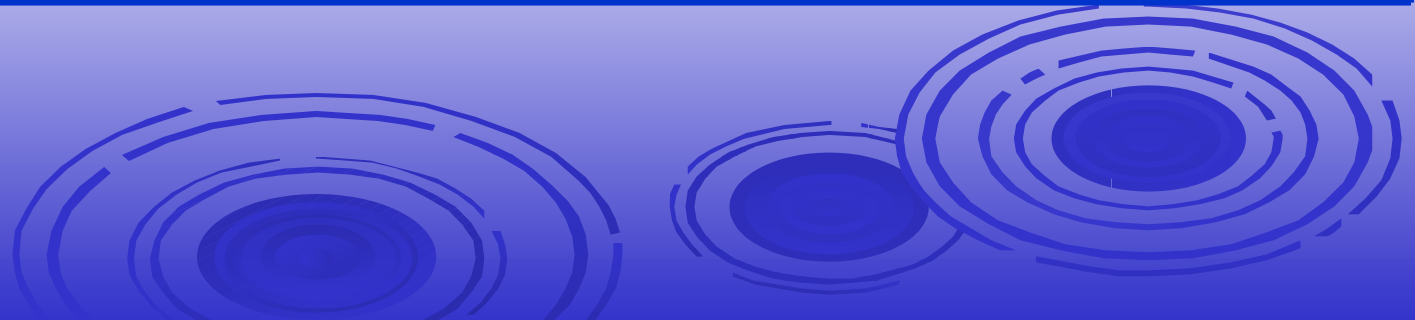
Voucher

Learning accounts

Savings accounts

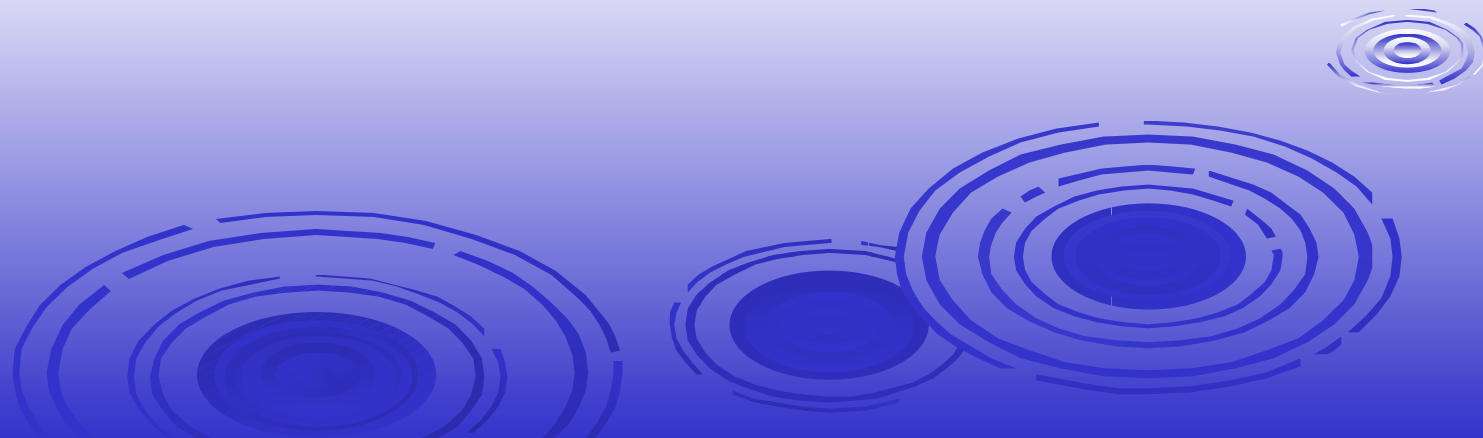
Tax credits

Entitlements: combination loan/voucher



Governance for Lifelong Learning

- Requires multi-sectoral
- Enabling environment for pluralistic approaches
- Focus on equity
- Demand-driven policy



Rate of Return to Schooling by Country Income Group

Private Rate of Return (%)

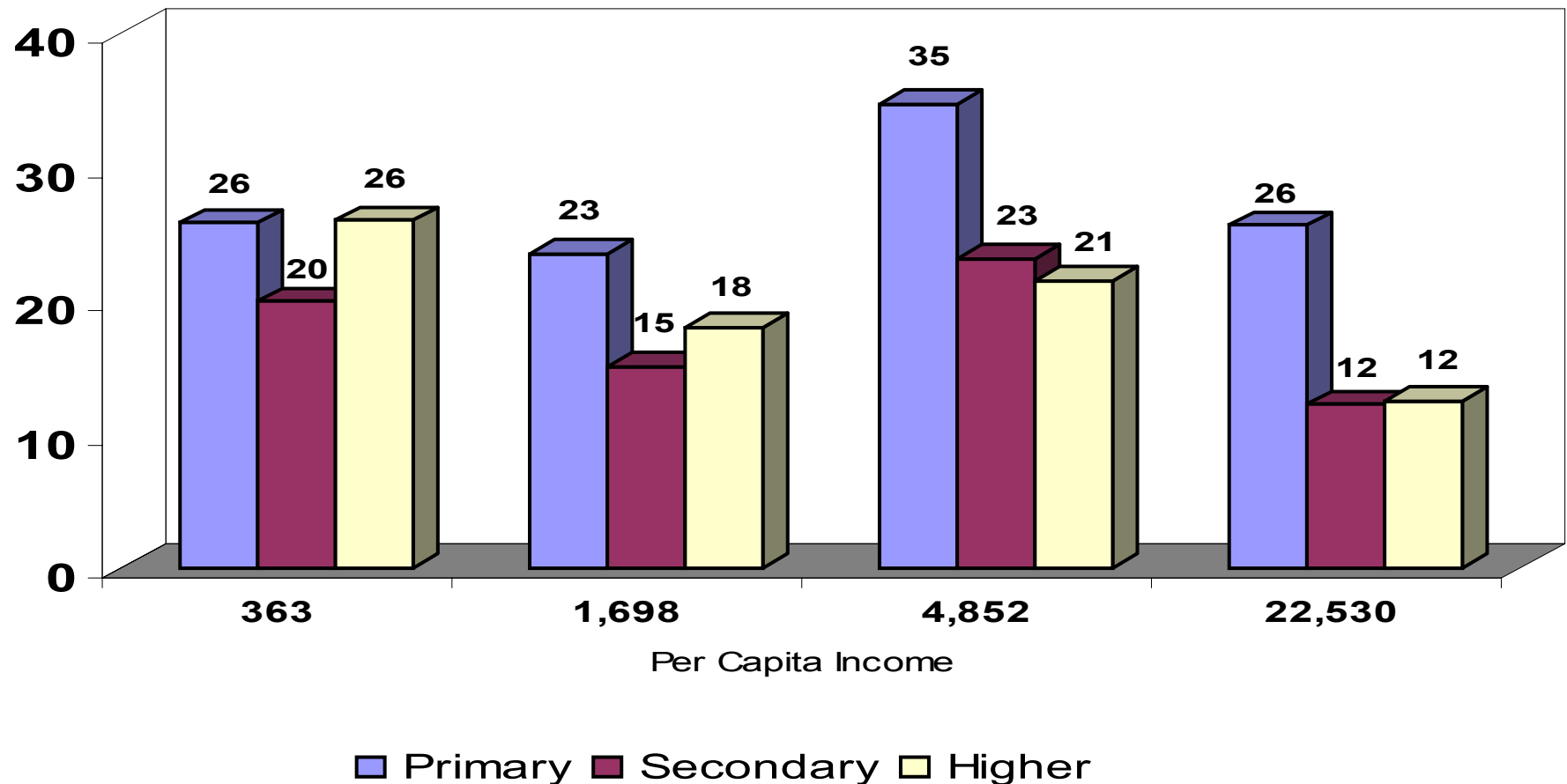
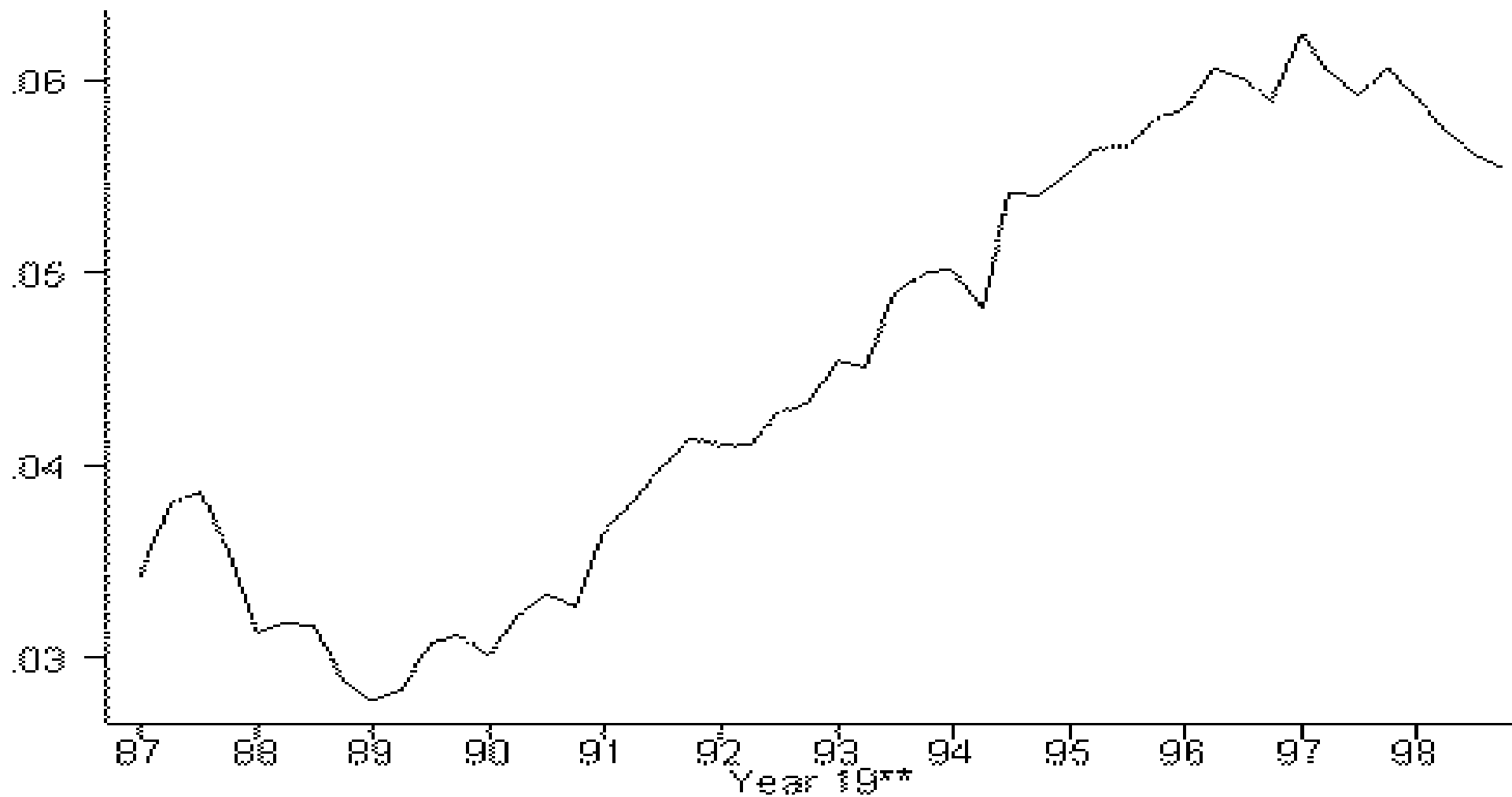
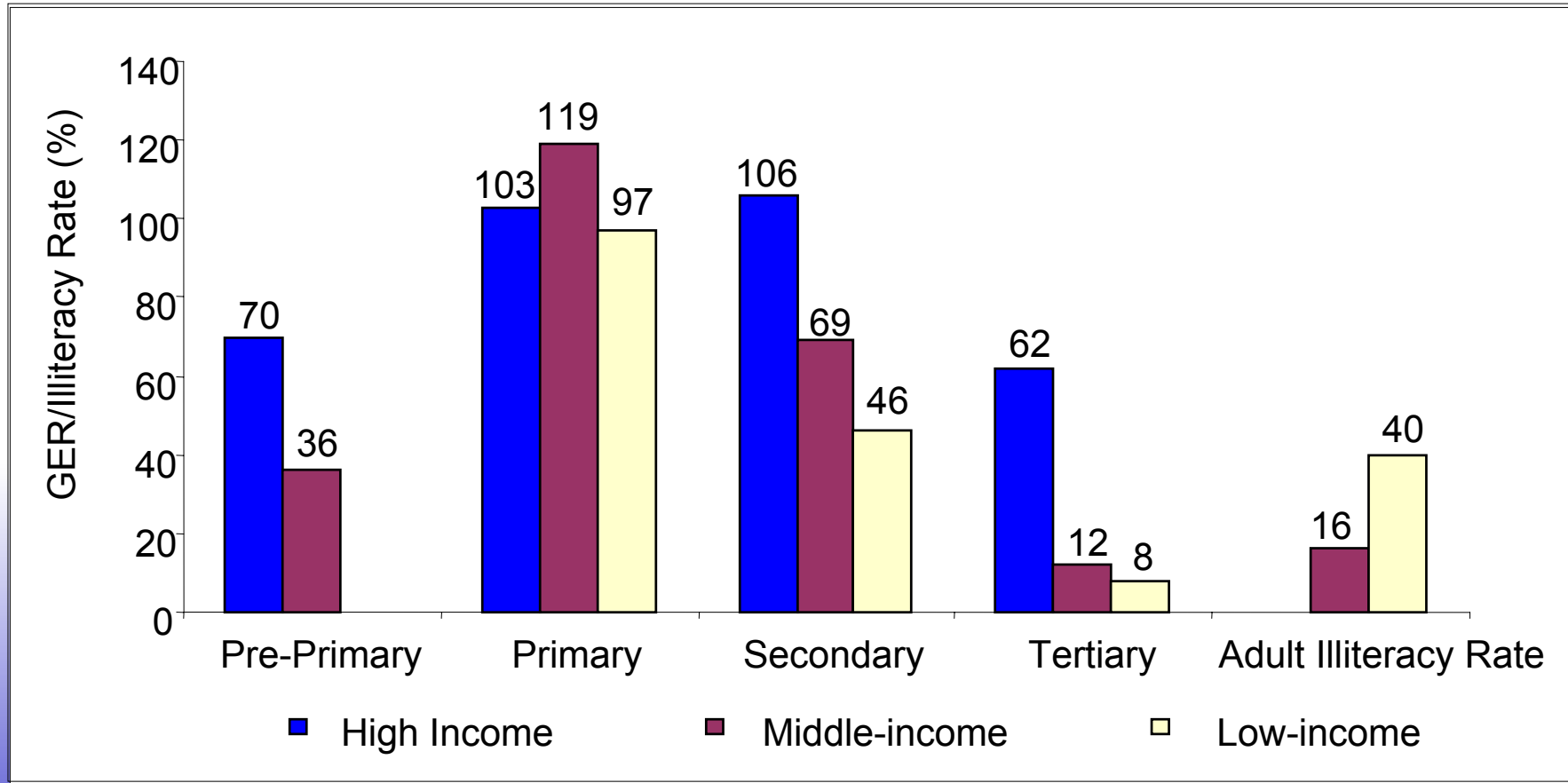


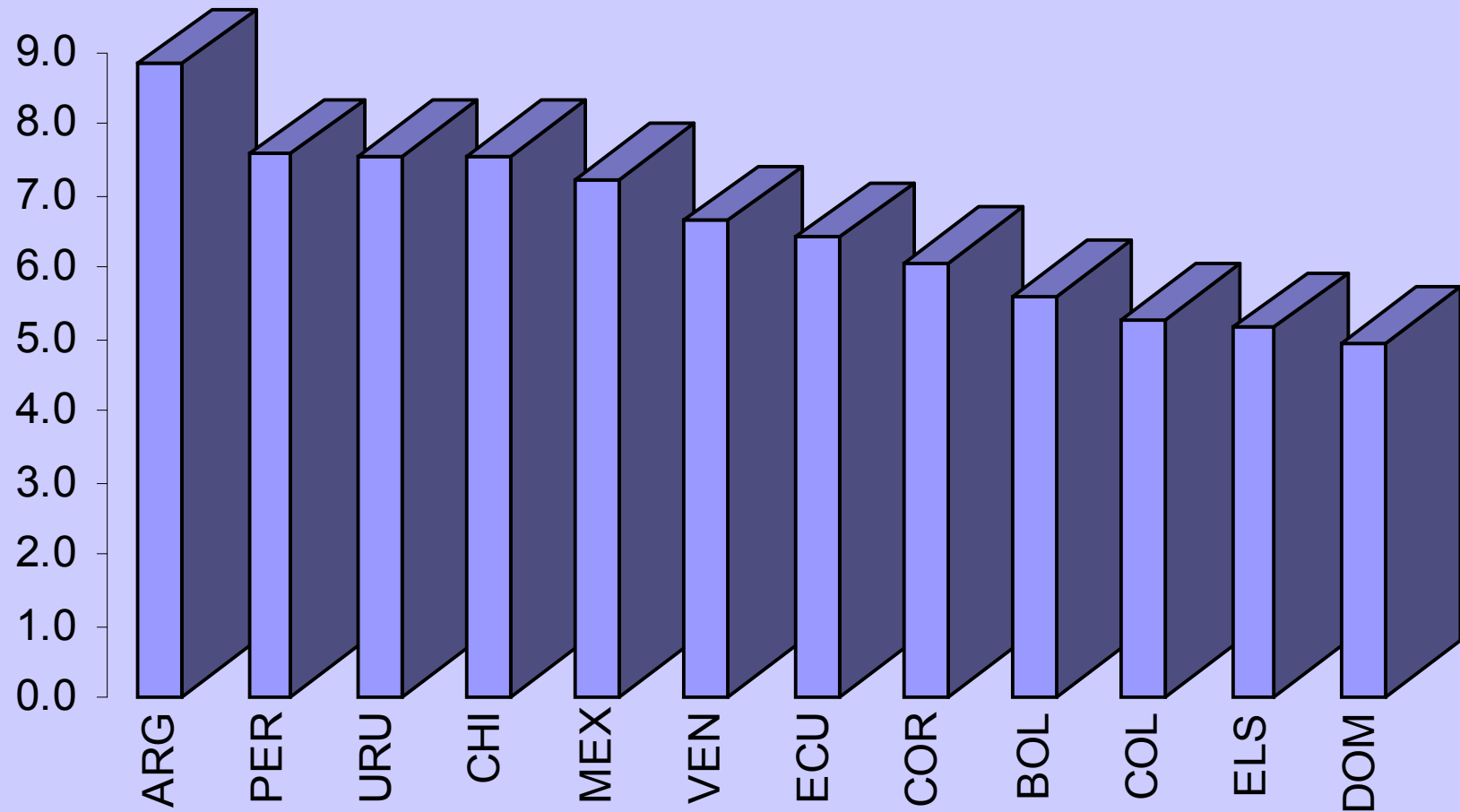
Figure 1b: Returns to Education in Mexico: 1987-1999



Education Indicators

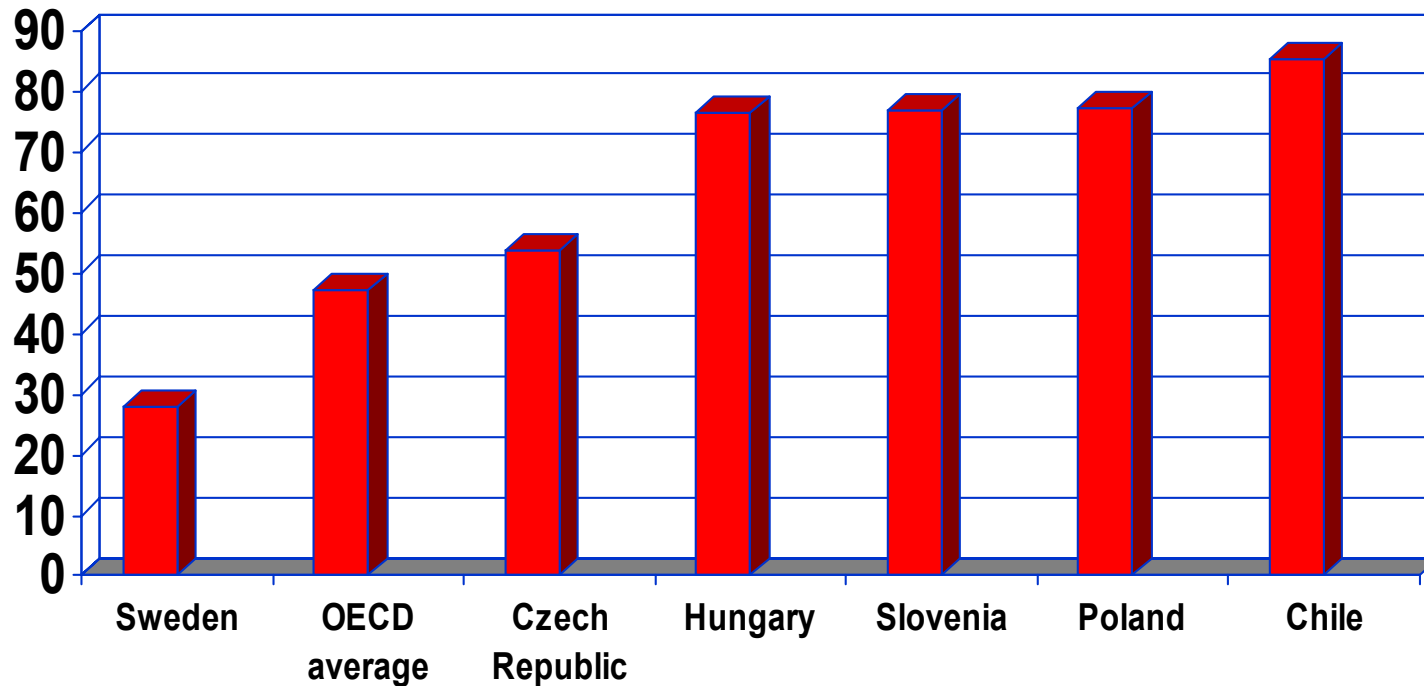


Average Years of Schooling, Latin America (15 Years and Older)



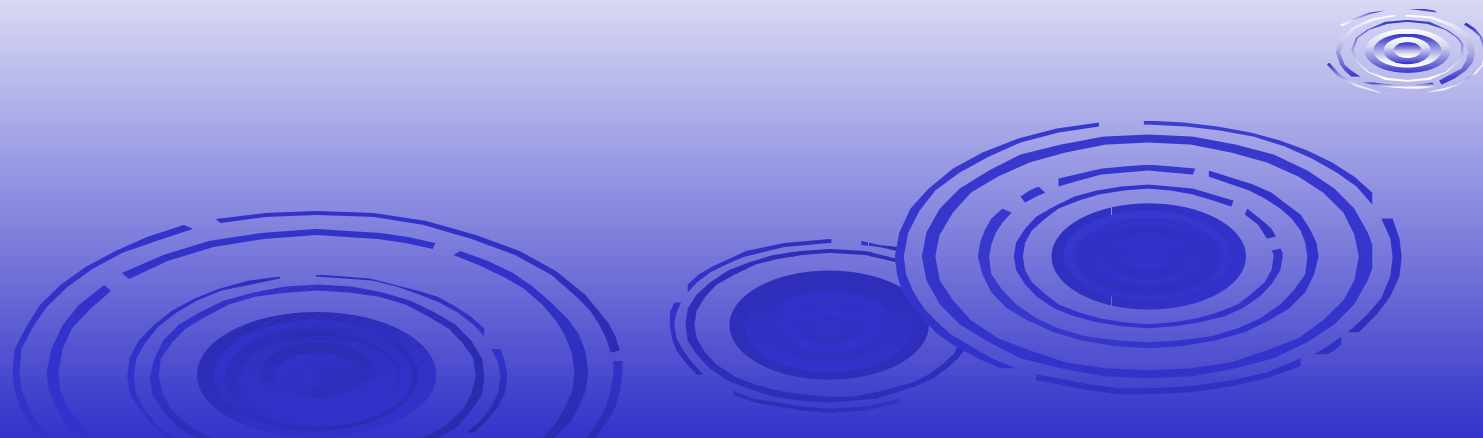
Not Prepared for Knowledge Jobs

Percent of 16-65 Year Olds Who Test at Low Information Processing Levels (1994-98)



Summary: Learning in the Knowledge Economy

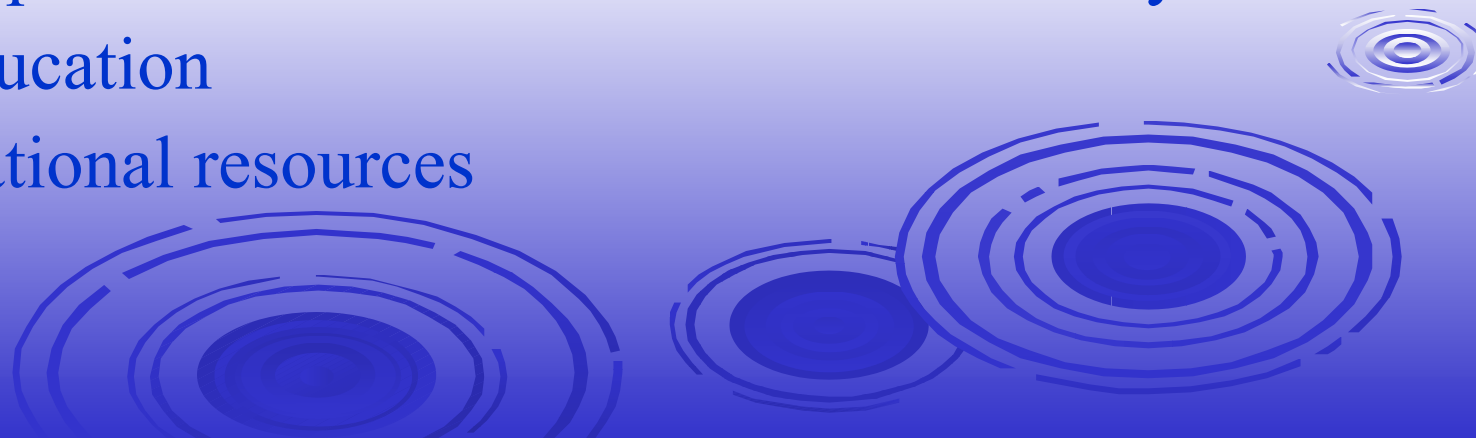
- Premium on learning
- Expand access to learning through alternative mechanisms and financing
- Raise quality by changing content, pedagogy, incentives



PISA 2000 & 2003 Results

Key Findings: Positive Factors (1)

- Student and learning related factors associated with higher scores
 - Time on homework
 - Interest in subject
 - Student perception of relationship with teacher
 - Understanding that science and math are associated with better job opportunities and future financial security
 - Mother's education
 - Home educational resources



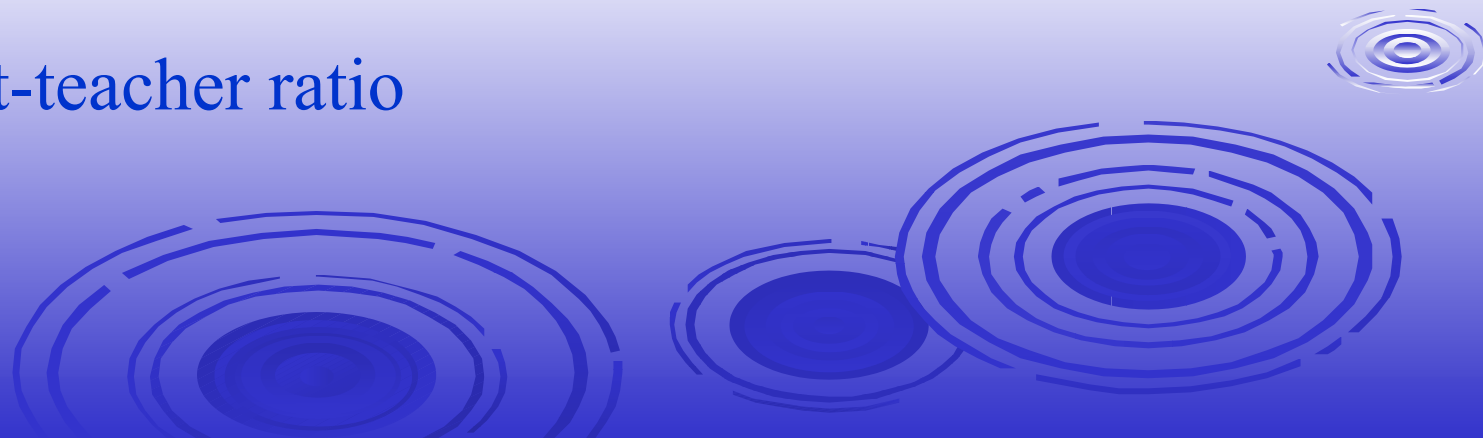
Key Findings: Positive Factors (2)

- School and teacher related factors associated with higher scores
 - Private schools
 - More girls in school
 - Location of school (urban/rural)
 - Good teacher-student relations
 - High teacher morale
 - Teacher behavior and school climate



Key Findings: Negative Factors

- Student and learning related factors associated with lower scores
 - Memorization as a way of learning is not effective
 - Mother's employment
 - Number of siblings
- School and teacher related factors associated with lower scores
 - High student-teacher ratio



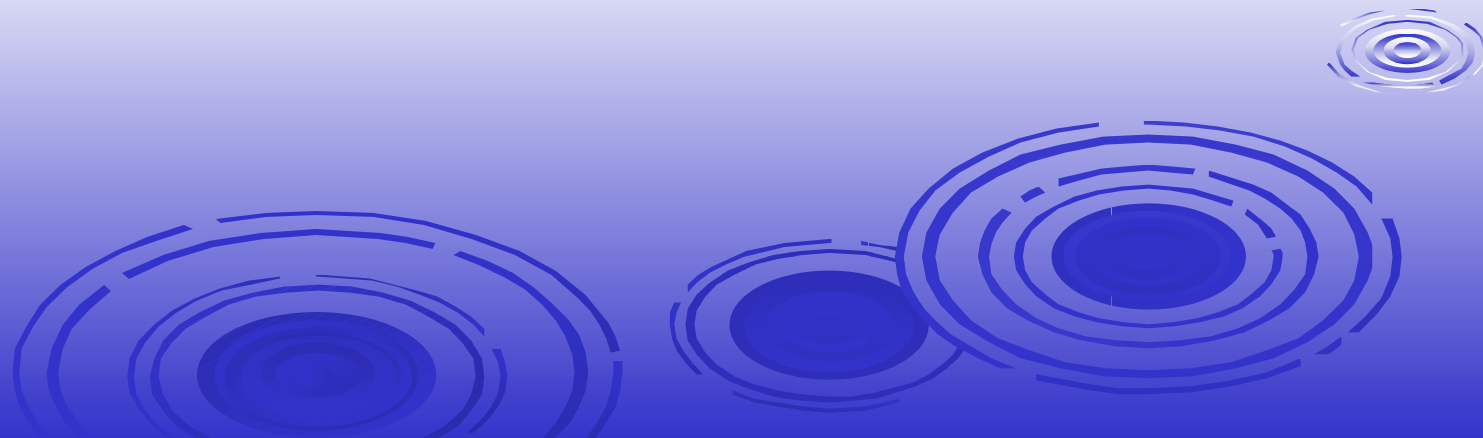
Key Findings: Mixed Effects of Technology

- Total number of computers available to teachers does not have a significant positive impact
- Computer-student ratio does not have a clear impact
- Availability of science equipment and laboratories associated with higher science scores
- Students who used computers effectively at school achieved higher scores in all subjects

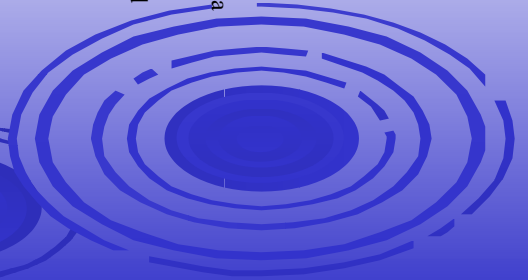
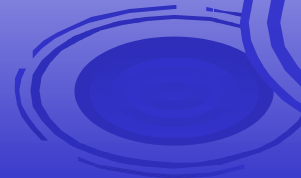
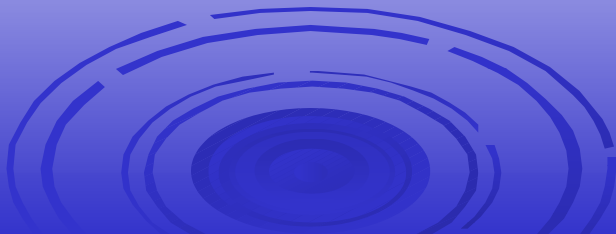
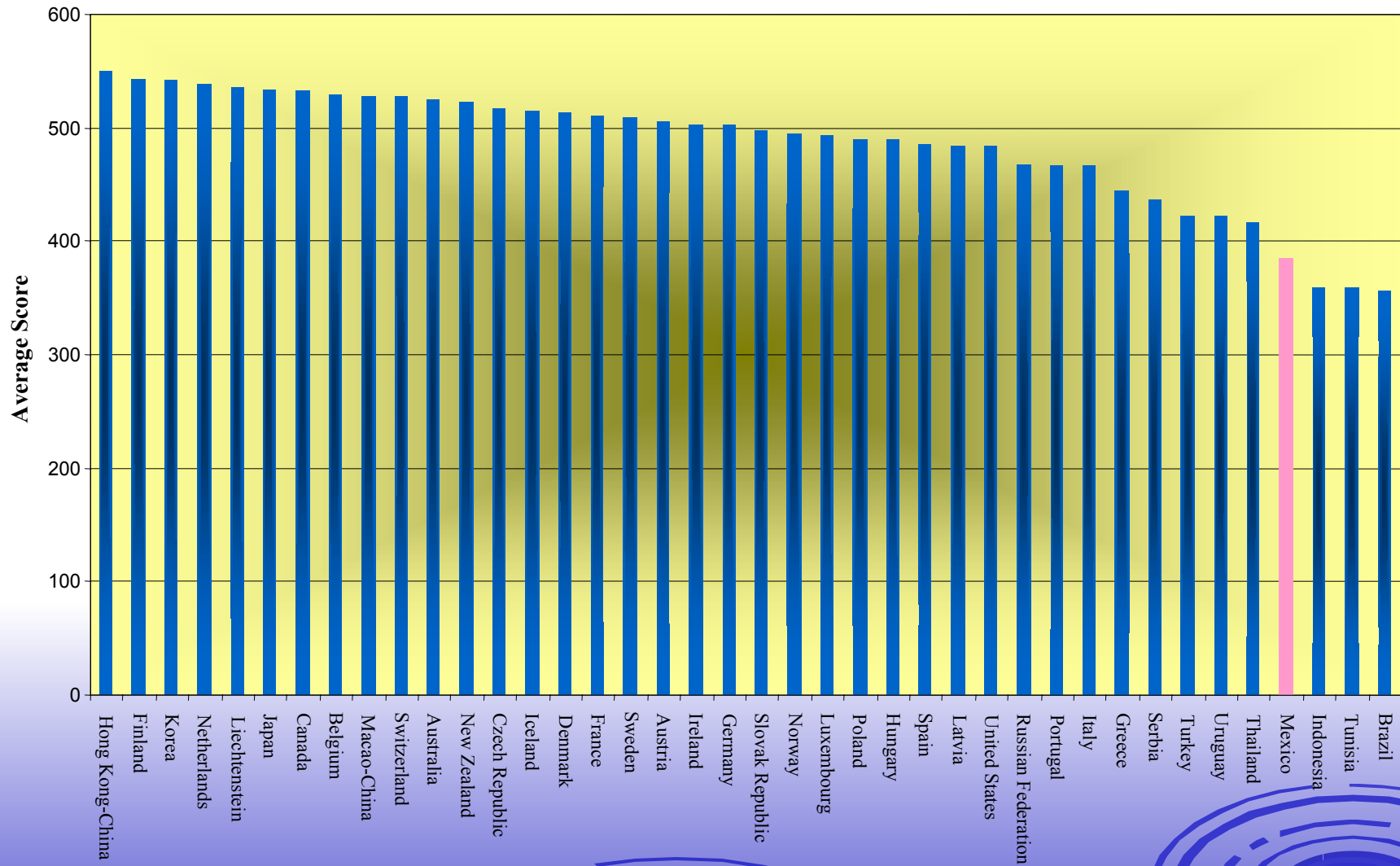


Mexico: Performance Highlights

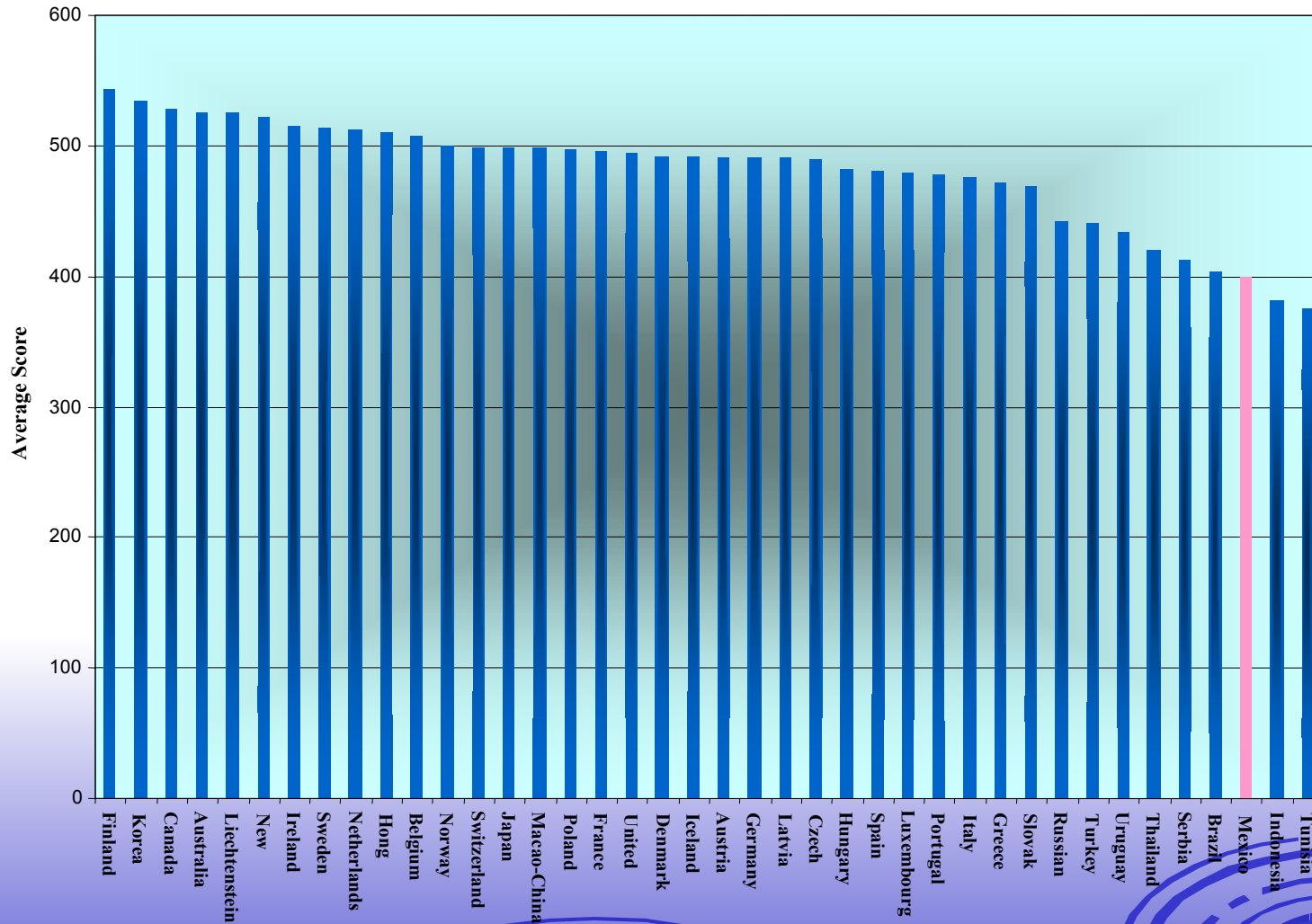
- Low overall performance and low dispersion in scores
- School type, location, climate and material; student's interest, motivation and socioeconomic factors are significantly associated with achievement
- Although overall there is a need for improvement; some states benchmarked themselves in a good place internationally and nationally



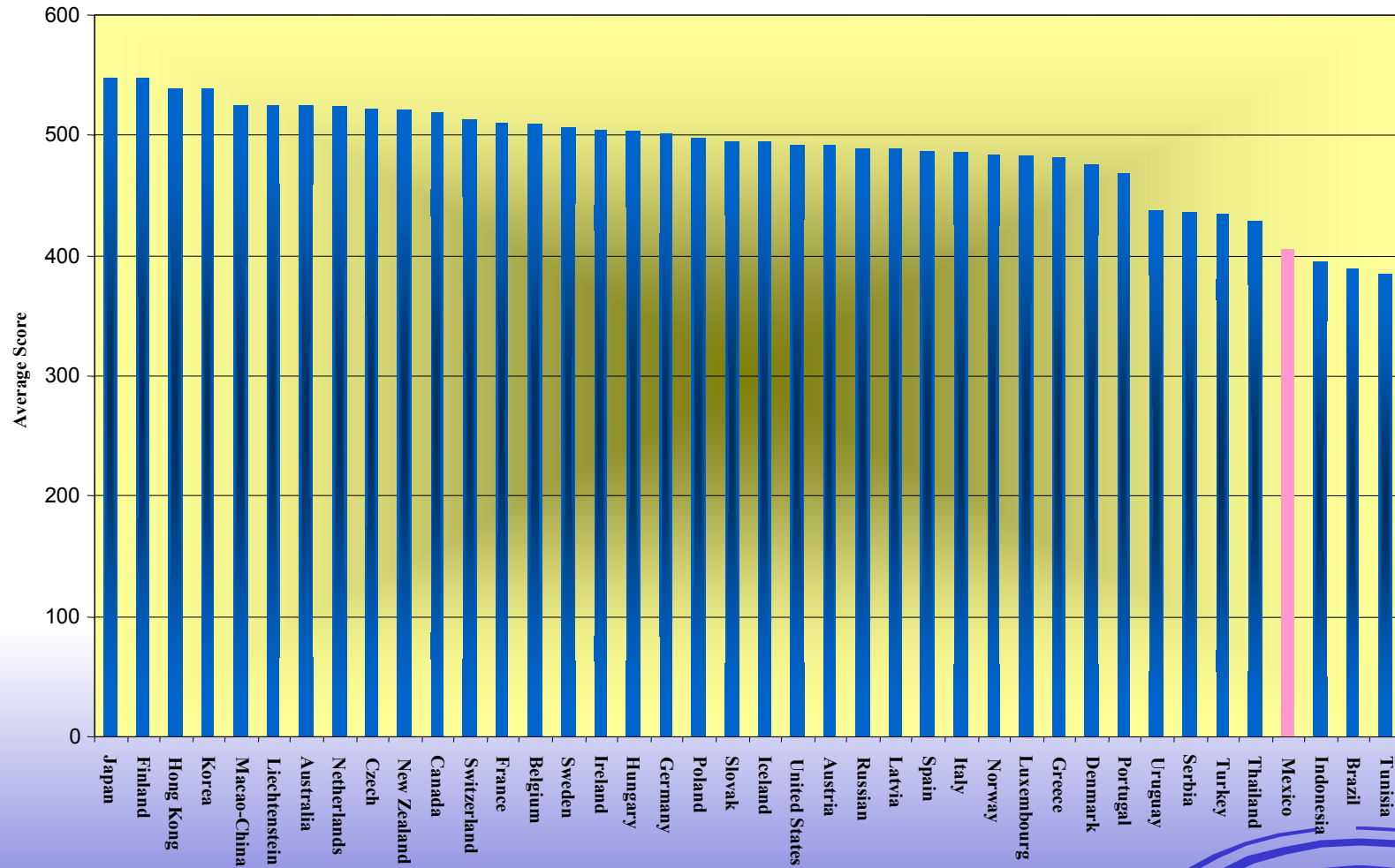
Performance in Mathematics by country, PISA 2003



Performance in Reading by country, PISA 2003



Performance in Science by country, PISA 2003



Reading and Math Performance of Mexico by Level, PISA (Reading- 2000; Math- 2003)

Reading

Math

Reading Literacy Level 5

Evaluating information and building hypotheses; drawing on specialized knowledge; accommodating concepts contrary to expectations

Math Level 5

Students can develop and work with models for complex situations; can select, compare, and evaluate appropriate problem-solving strategies for dealing with complex problems related to these models; can work strategically using broad, well-developed thinking and reasoning skills, appropriately linked representations, symbolic and formal characterizations, and insight pertaining to these situations; can reflect on their actions and can formulate and communicate their interpretations and reasoning

Reading Literacy Level 1

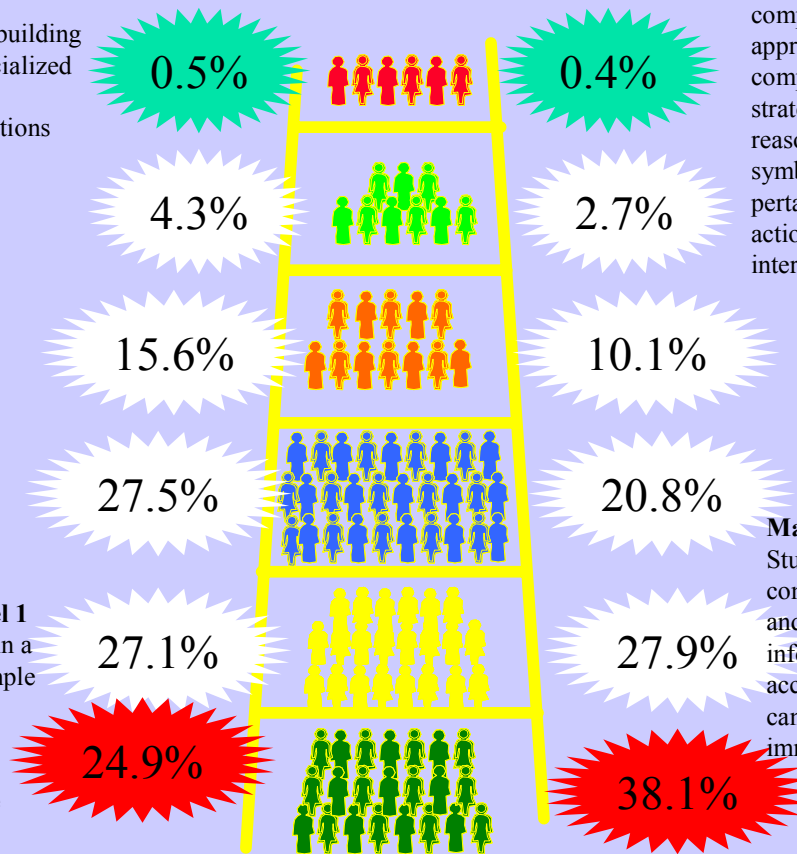
Recognize main theme in a familiar topic; make simple connections

Math Level 1

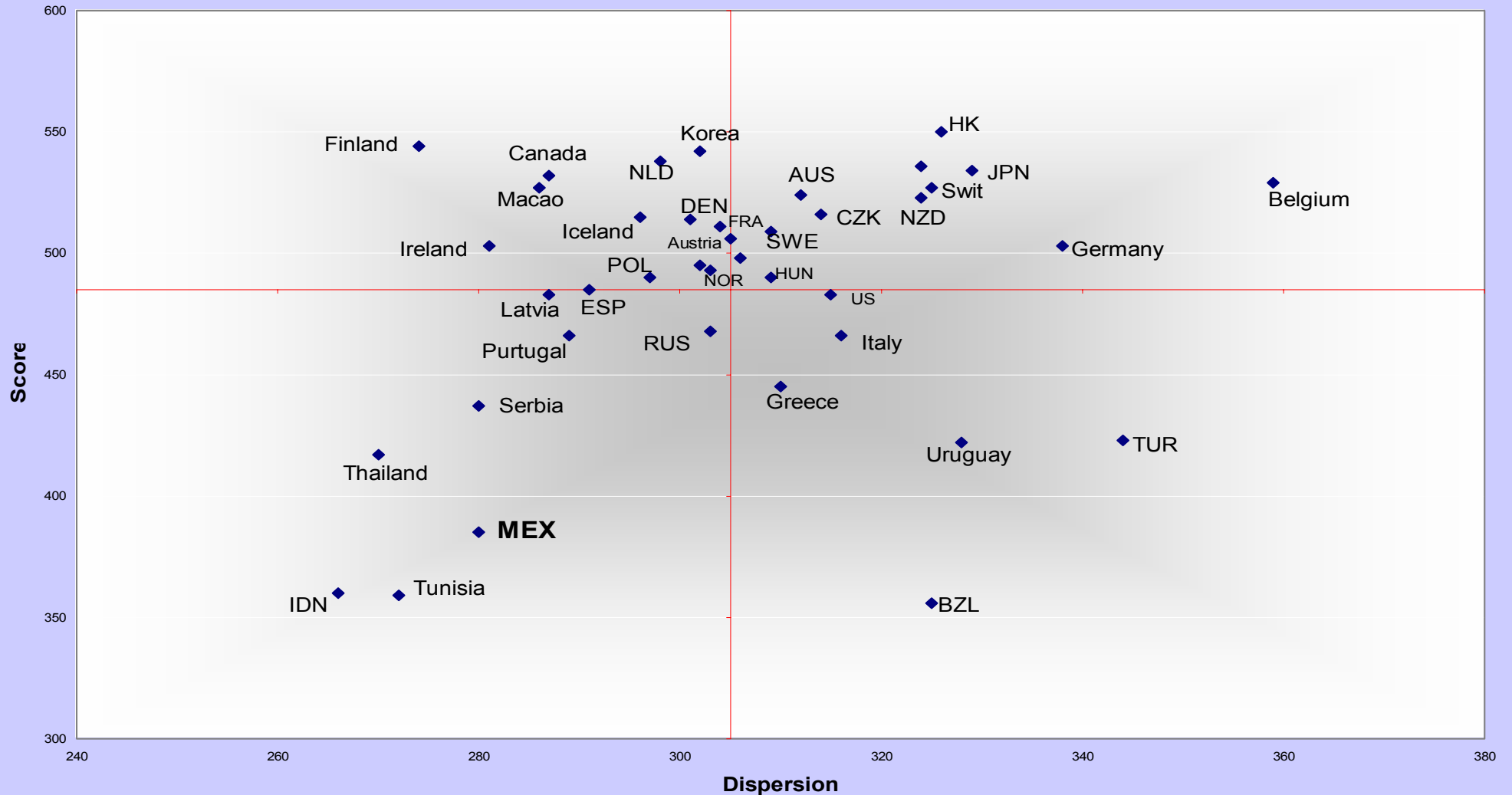
Students can answer questions involving familiar contexts where all relevant information is present and the questions are clearly defined; able to identify information and to carry out routine procedures according to direct instructions in explicit situations; can perform actions that are obvious and follow immediately from the given stimuli

Below Level 1

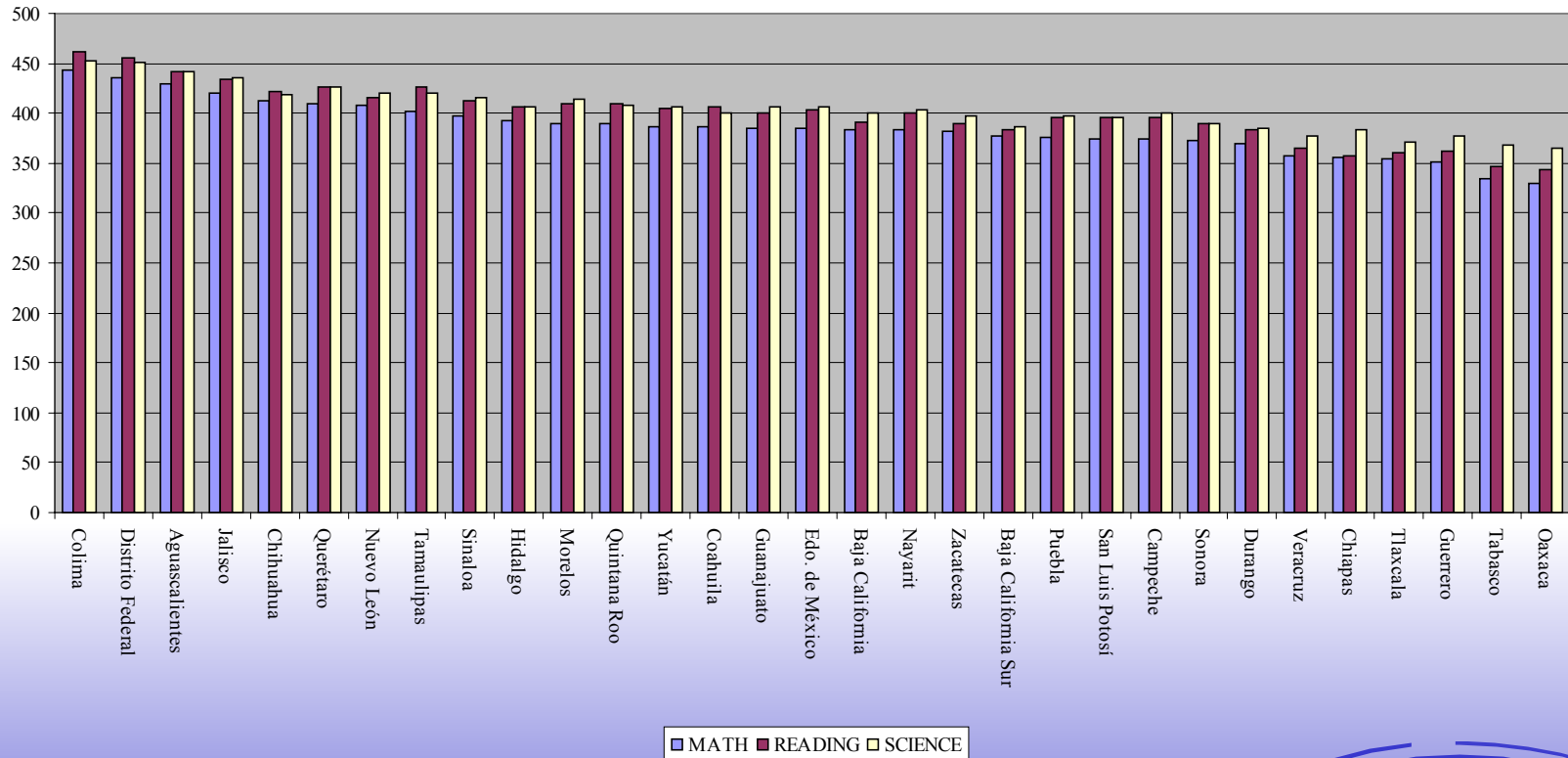
These students may be able to read, but have not acquired the skills to use reading for learning



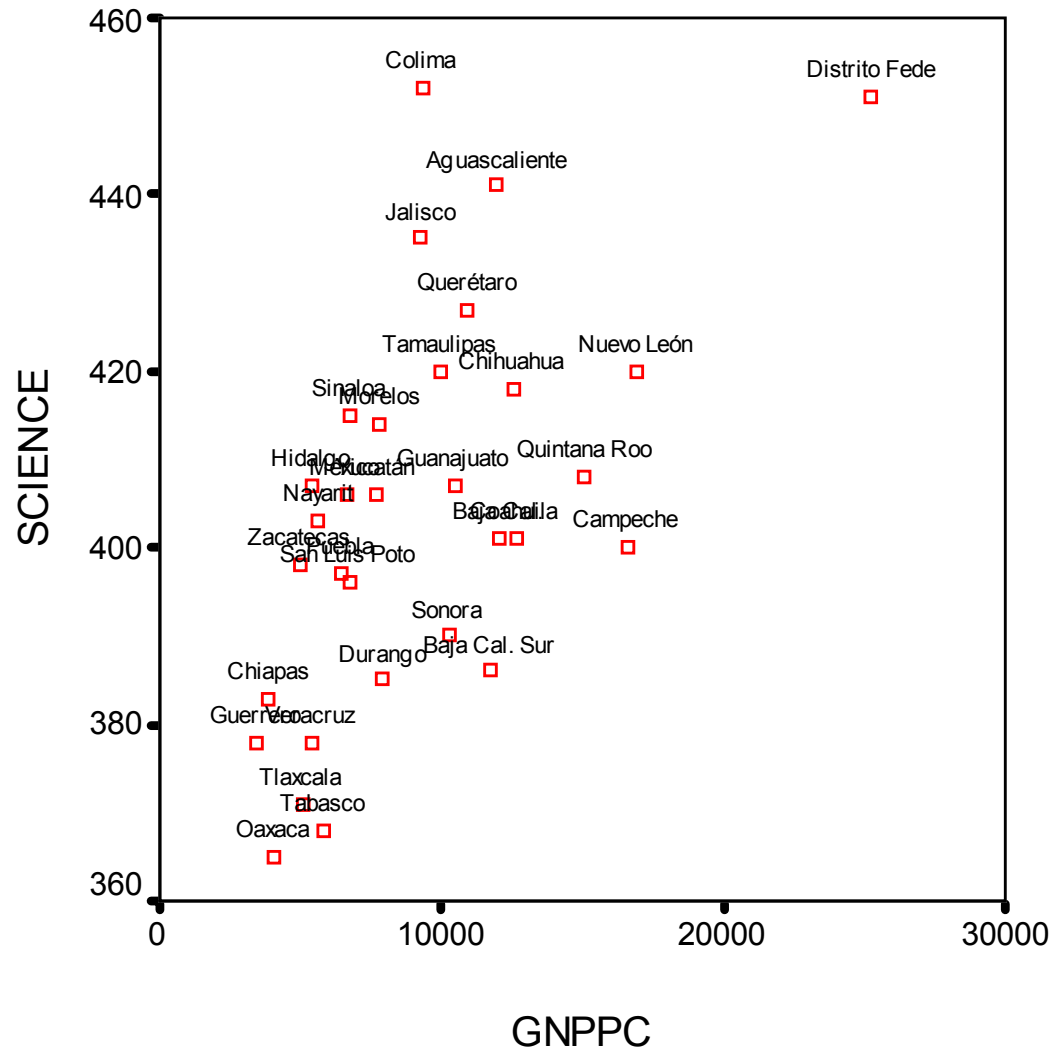
Math Scores and Dispersion Across Countries, PISA 2003



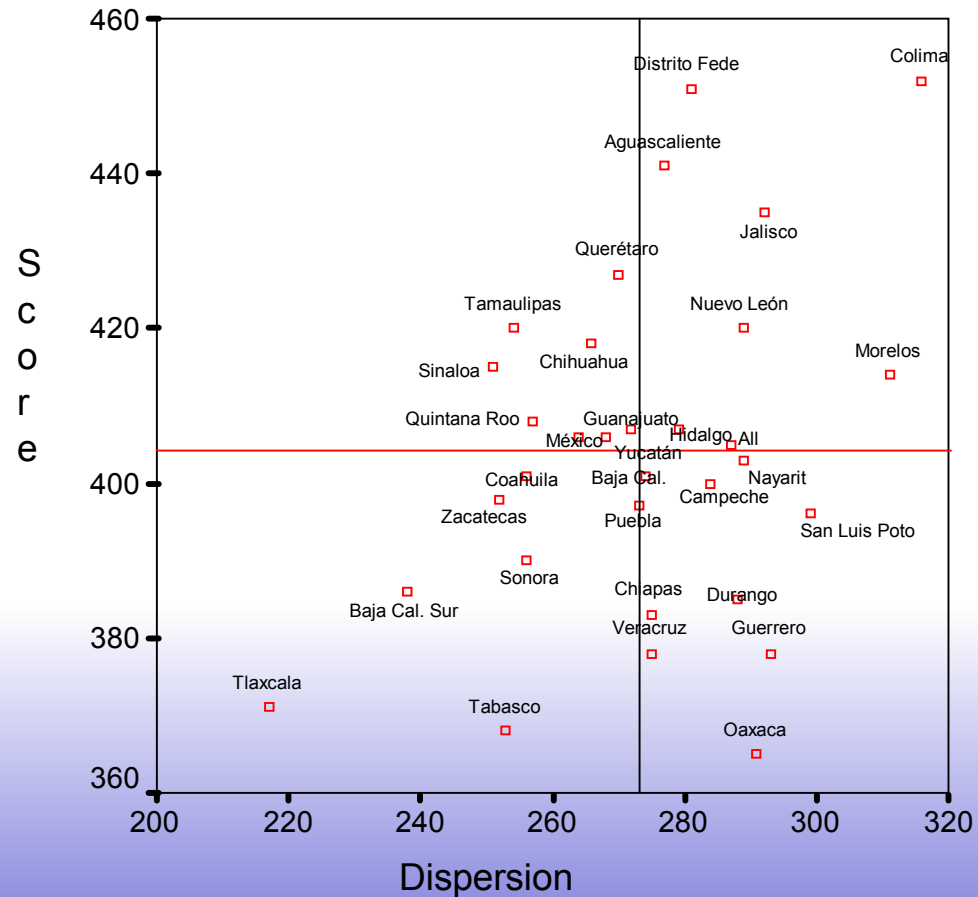
PISA 2003: Performance by subject and state



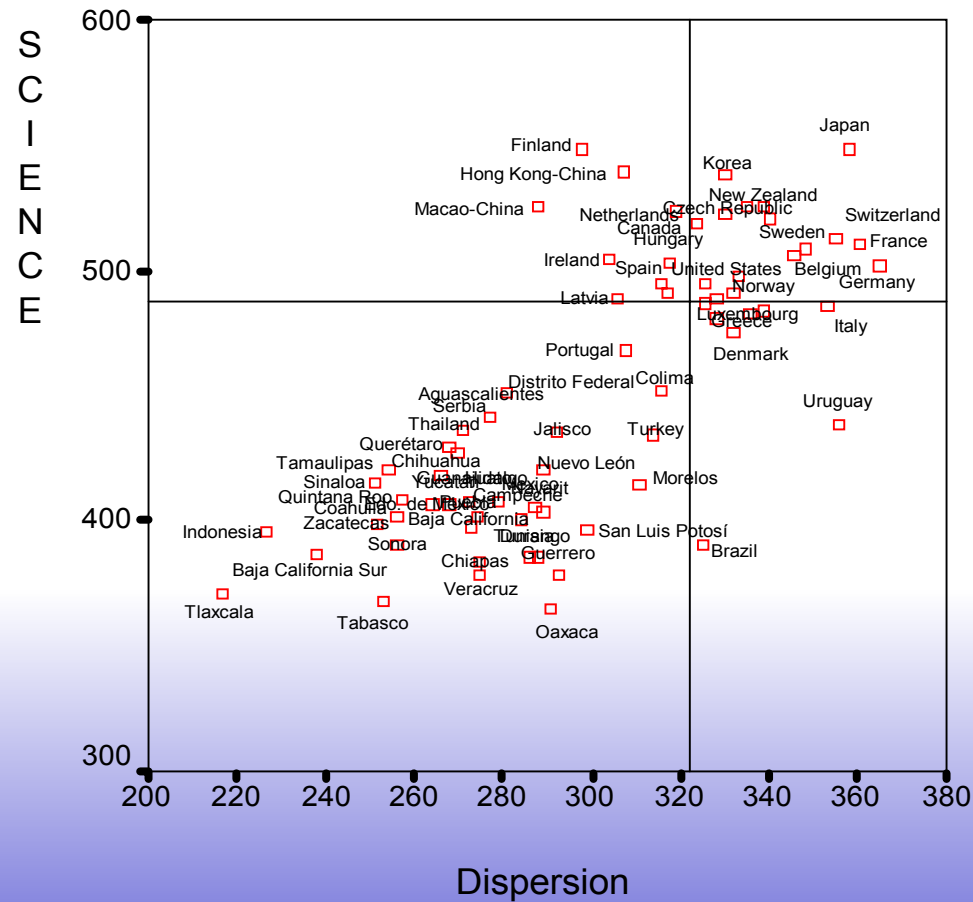
Performance by state in science by GNP per capita, PISA 2003



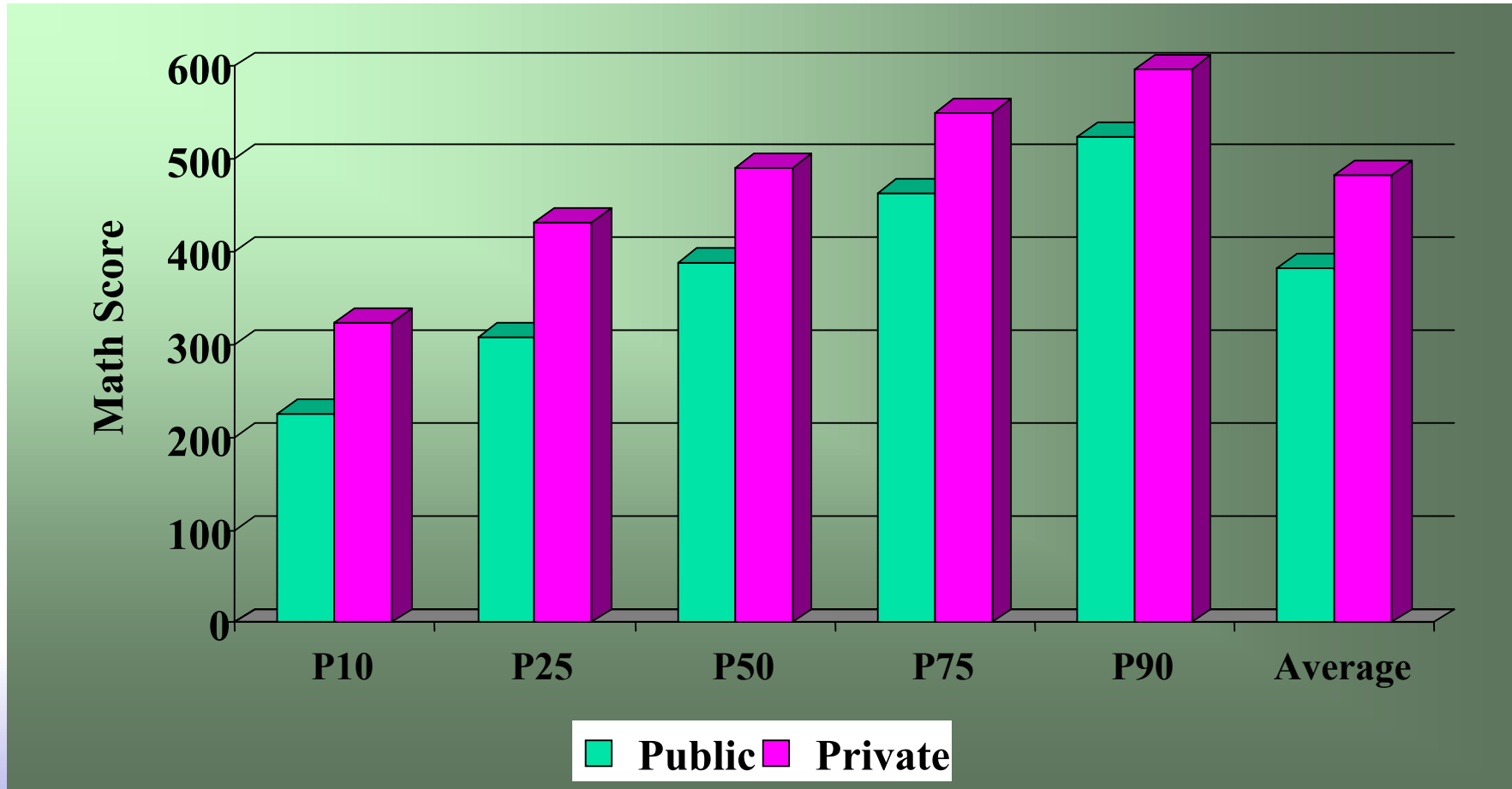
Benchmarking for states: performance in science and test score dispersion, PISA 2003



Benchmarking by states with other countries in science (scores and dispersions), PISA 2003



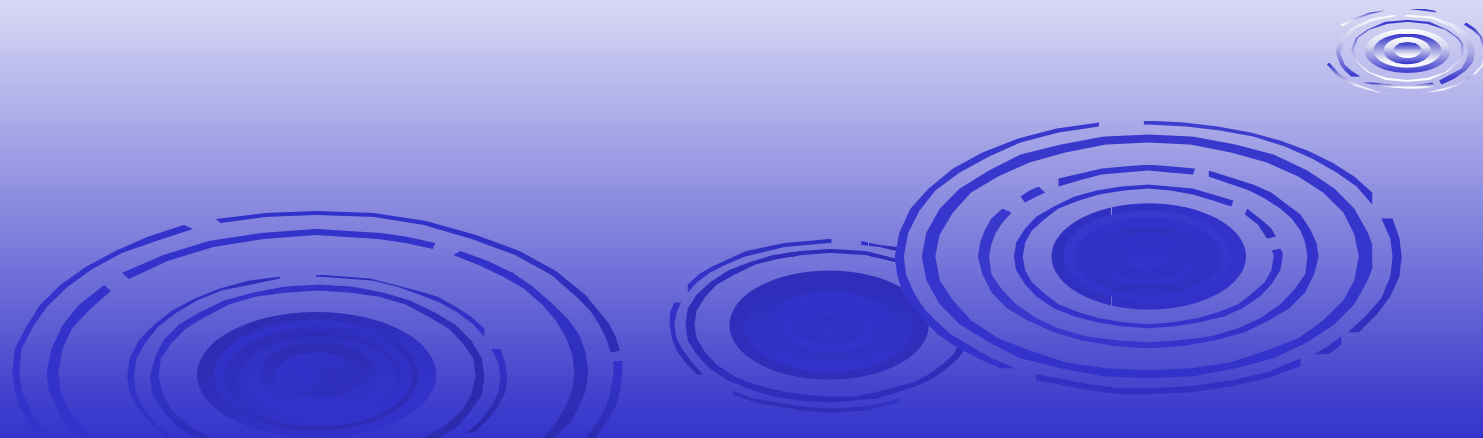
Differences in results in science by school type (private and public), PISA 2003



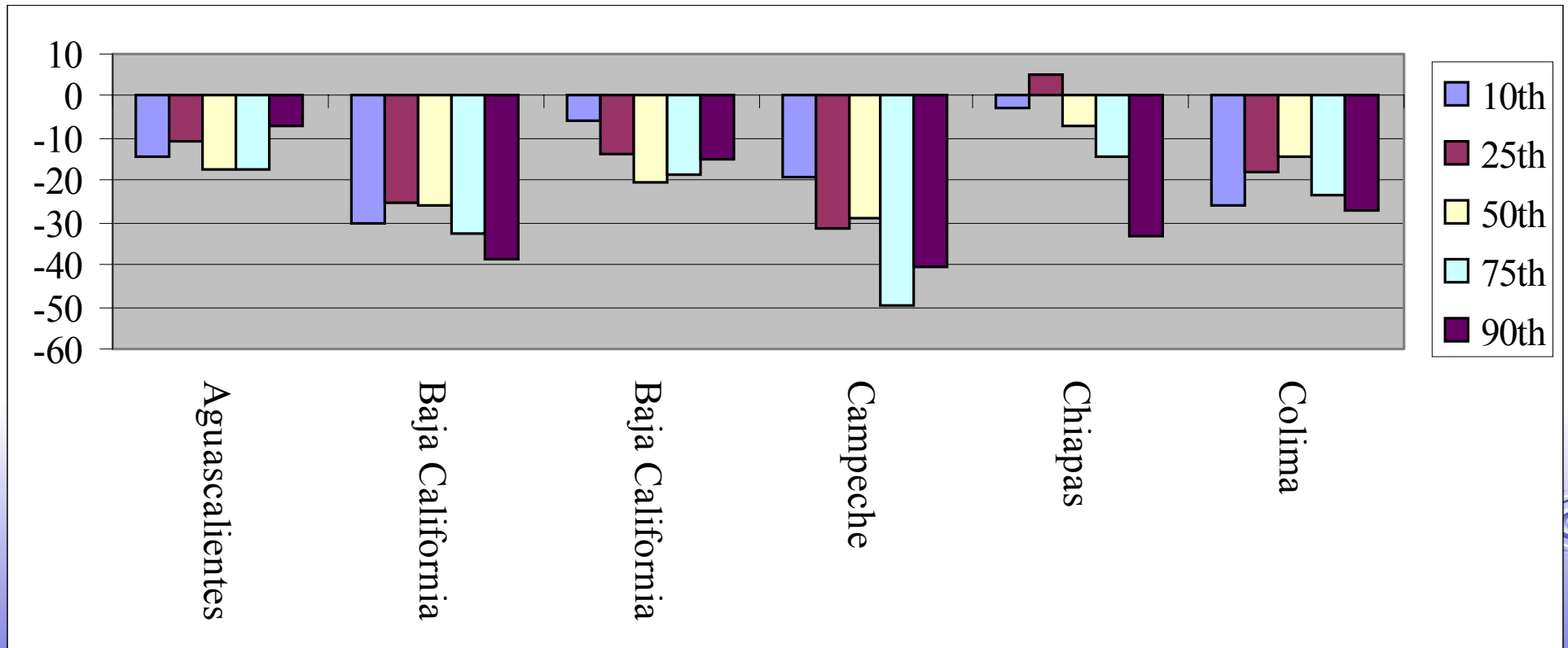
Note: P10 is the lowest 10th percentile in achievement
P90 is the highest 10th percentile in achievement

Key determinants of learning

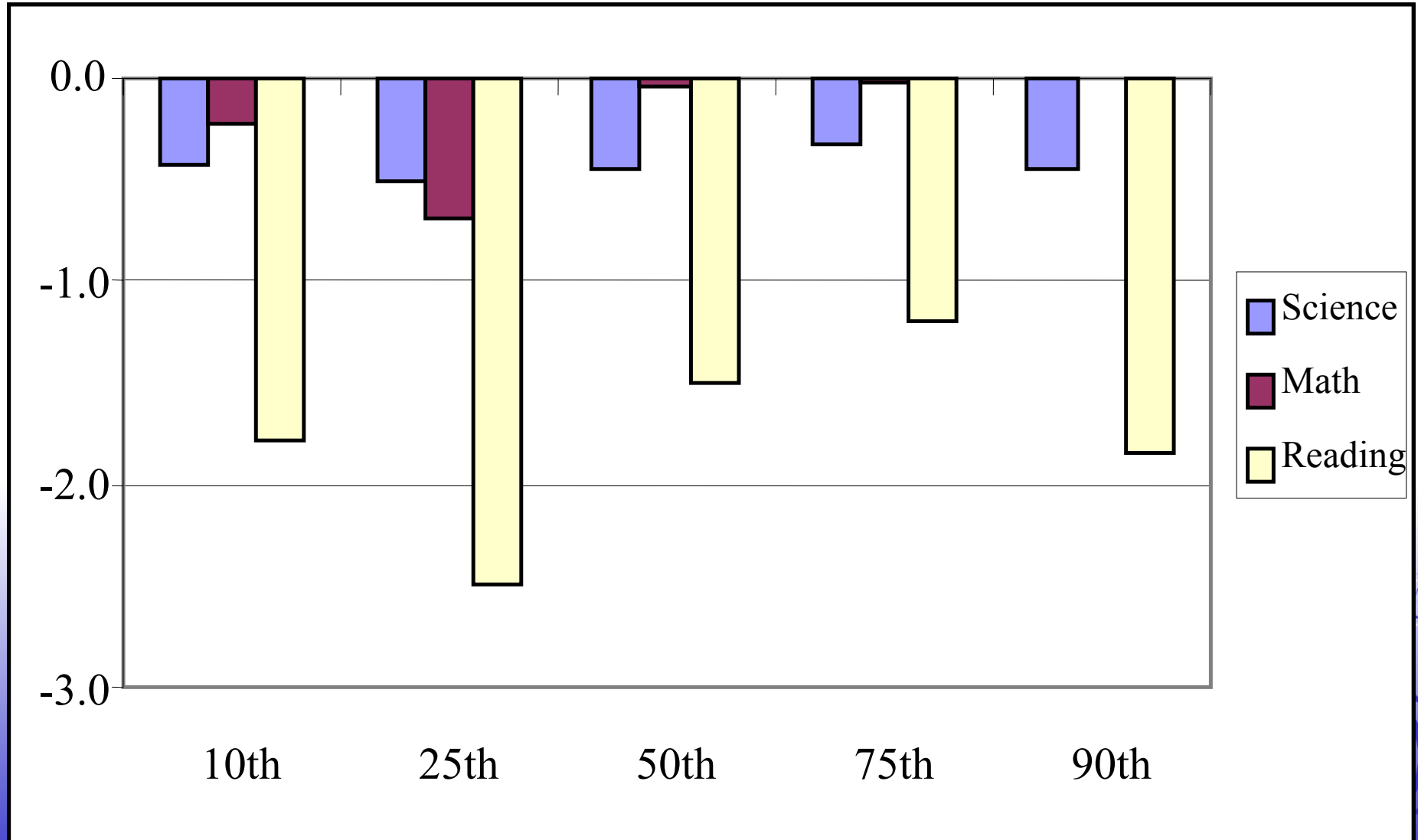
- Gender
- Student factors
- School resources and materials



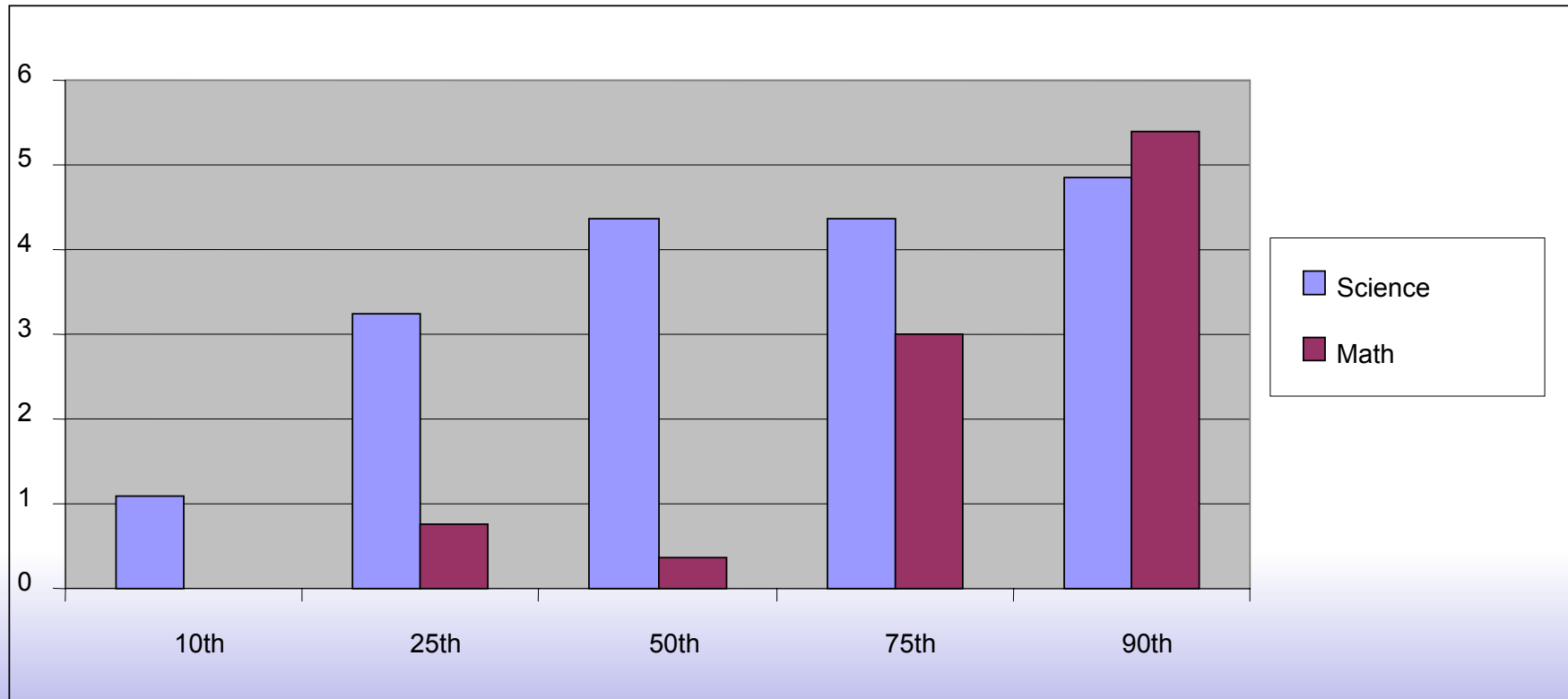
Gender inequality in science (effects of being female on science scores), PISA 2003



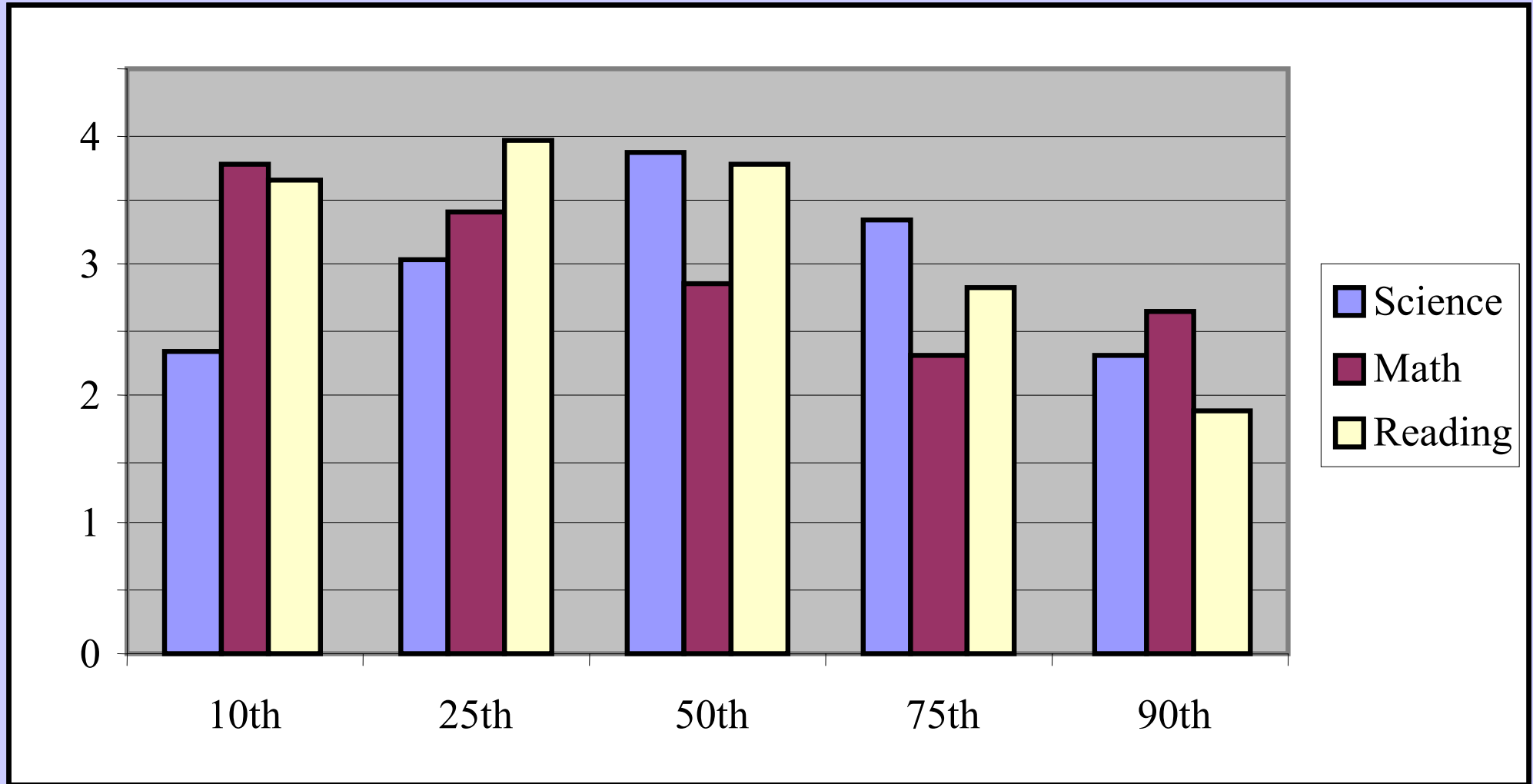
Effect of Memorization on Performance by Achievement Level, PISA 2003



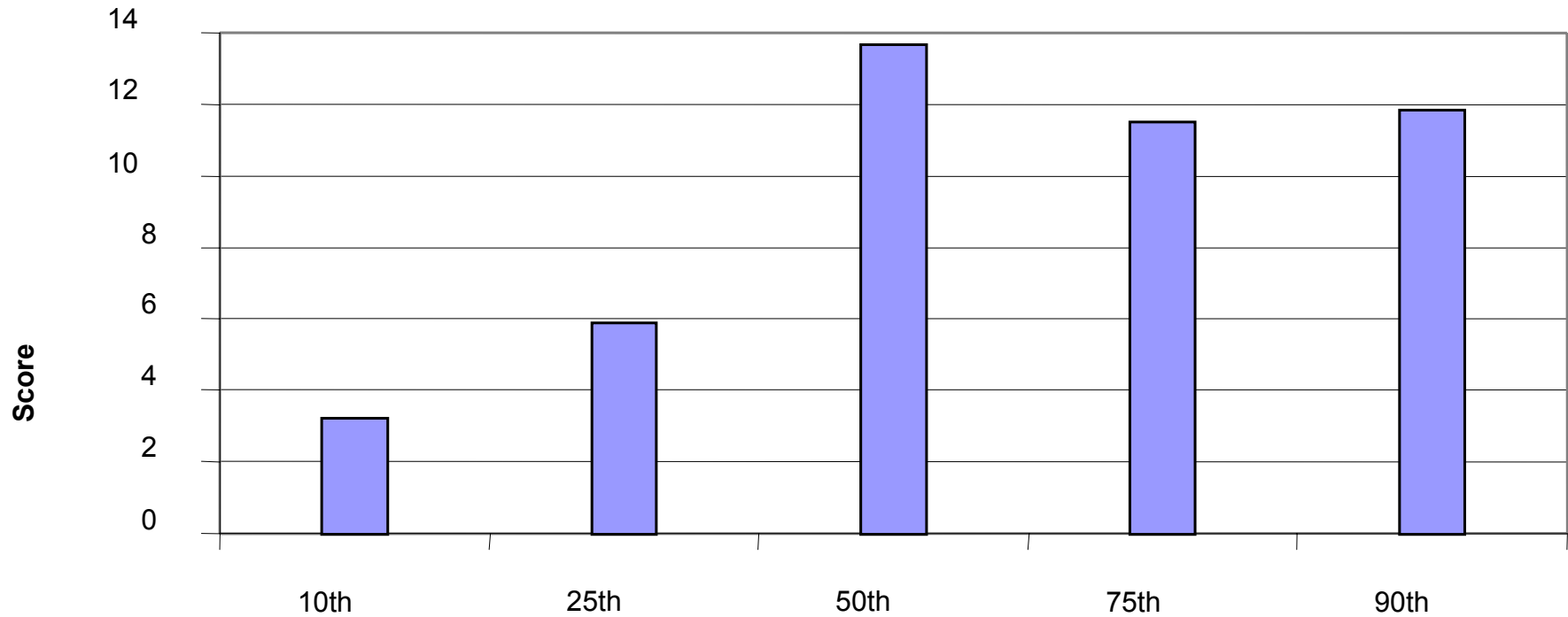
Effect of Motivating Students on Value of Subject in Labor Market by Achievement Level, PISA 2003



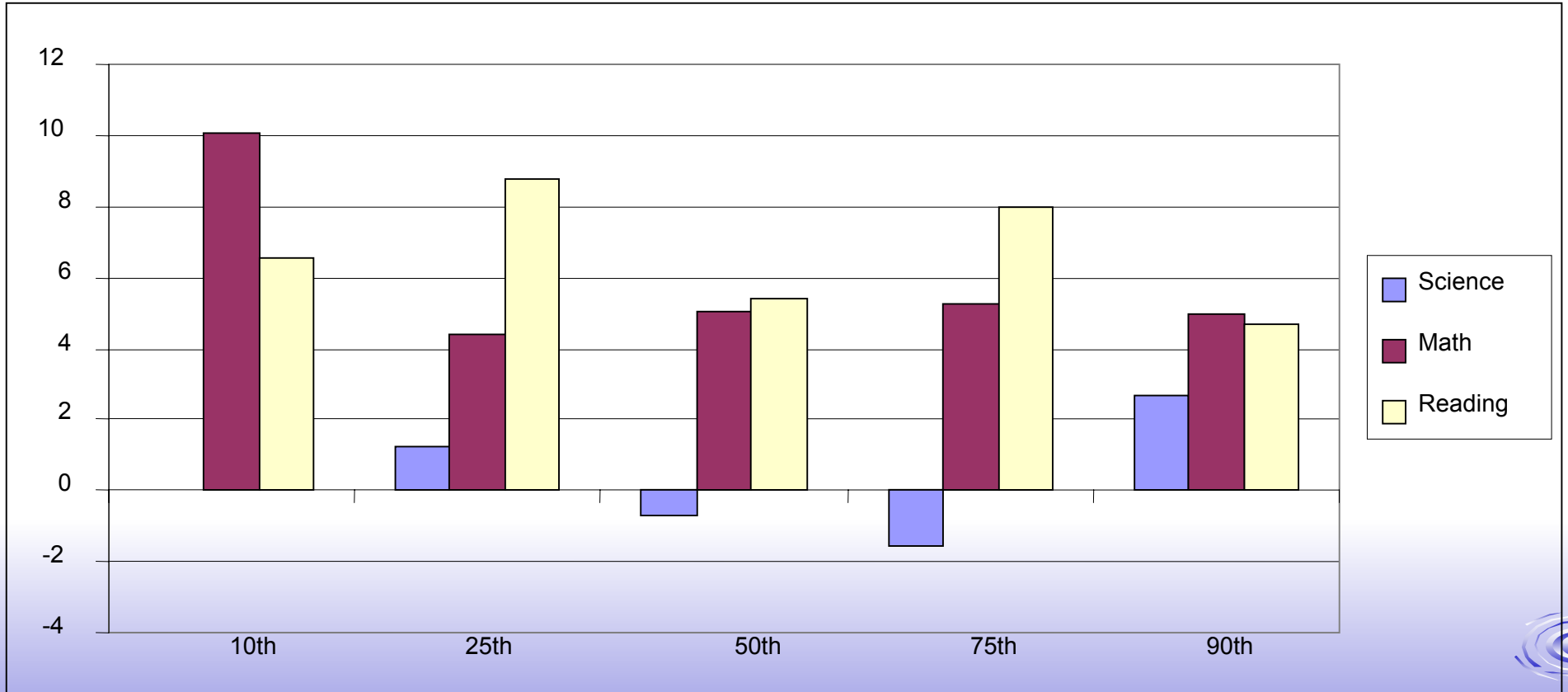
Effect of Teacher Morale on Performance by Achievement Level, PISA 2003



Effect of Availability of Science Equipment and Labs on Science Scores, PISA 2003, across performance distribution

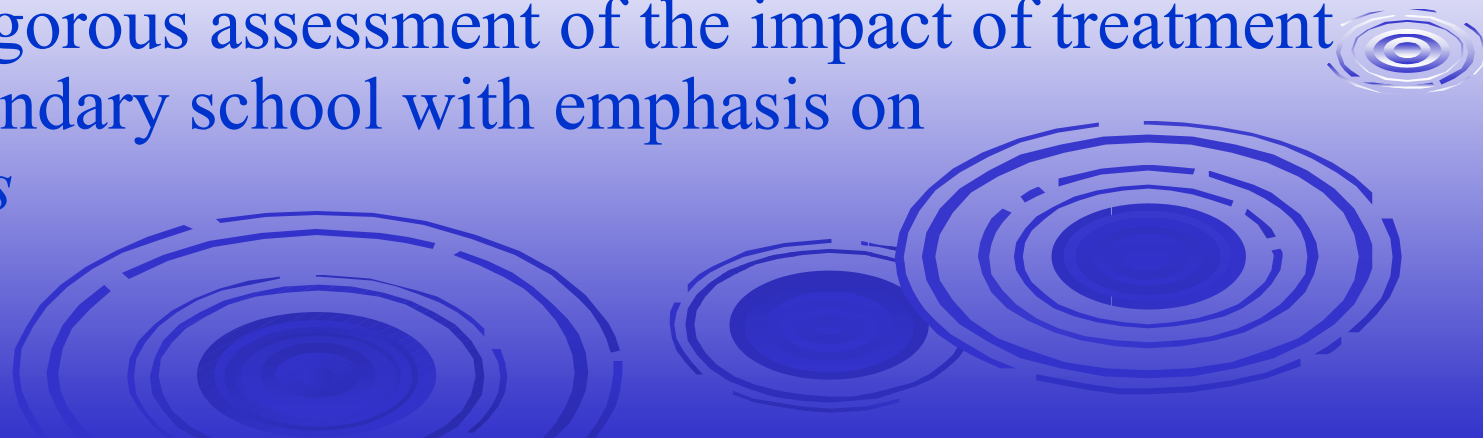


Effect of Student Use of Computers at School by Achievement Level, PISA 2003

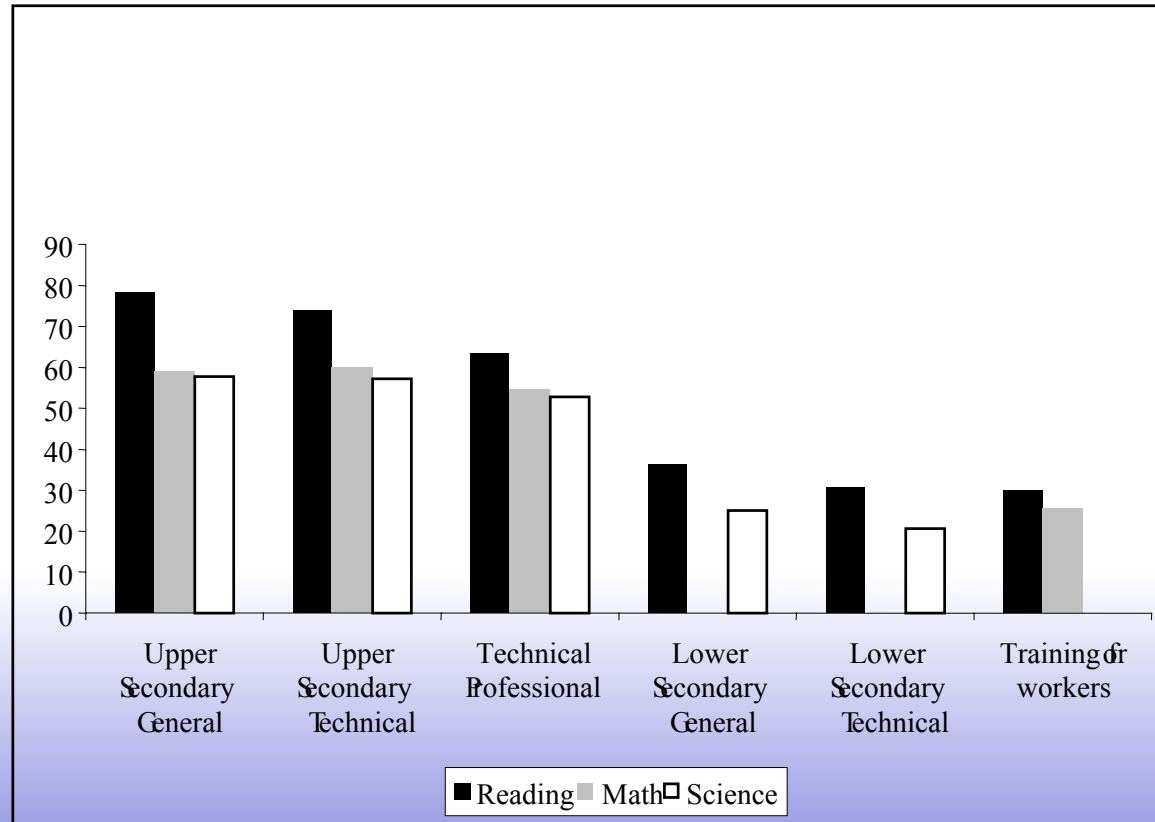


Telesecundarias in Mexico

- Effective at expanding educational coverage to difficult-to-reach populations
- Covers 1.2 million students
- Fastest growing type of secondary school; 1/5 of total secondary school enrollment
- However, *telesecundarias* score lower than most other types of secondary schools, controlling for other factors
- Recommend rigorous assessment of the impact of treatment by type of secondary school with emphasis on *telesecundarias*



Performance advantage of different school type over *telesecundaria* when controlling for other factors (significant effects only)



The Three A's

- **Autonomy**

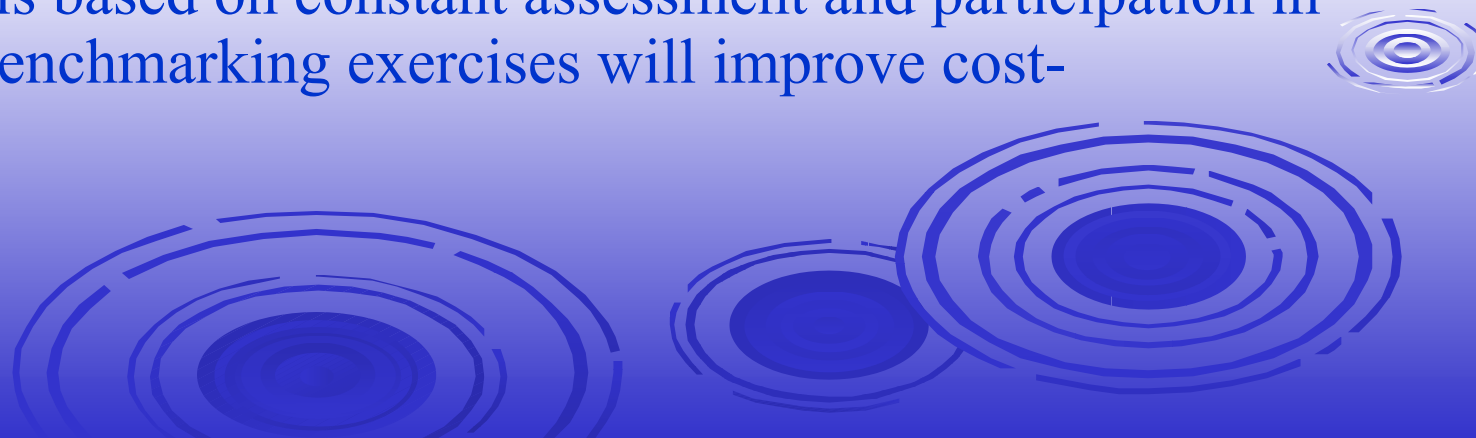
- More autonomous schools can implement appropriate education policies.

- **Accountability**

- A more accountable system will encourage more active participation by parents and others, which is key to improving learning outcomes.

- **Assessment**

- A system that is based on constant assessment and participation in international benchmarking exercises will improve cost-effectiveness.



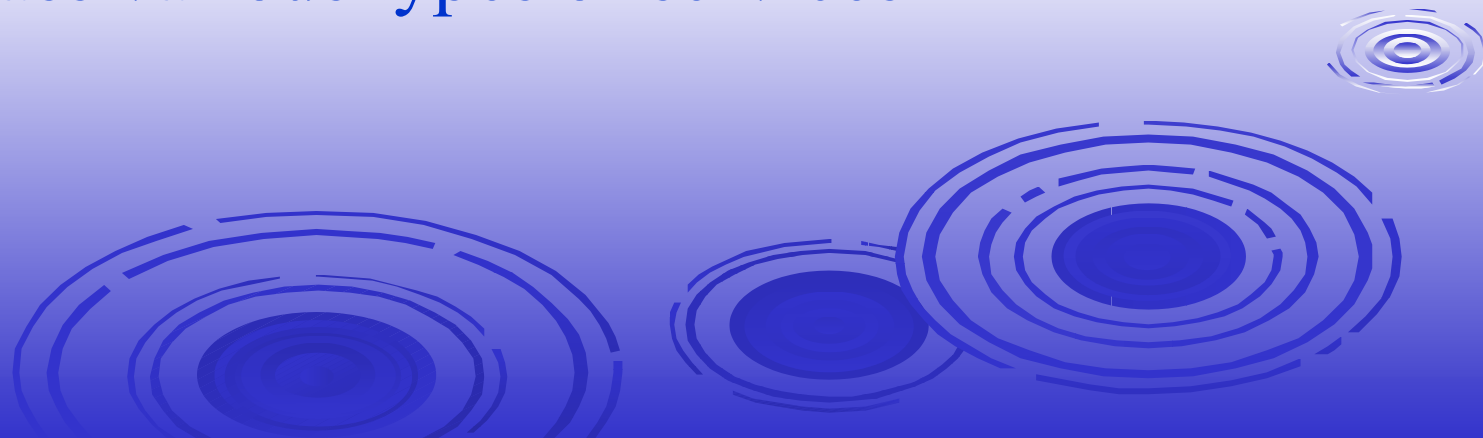
Increase School *Autonomy* at Public Schools

- To improve quality, efforts are needed to move decision-making to the school level, thus increasing school autonomy
- Increasing school autonomy can compensate disadvantaged schools
- Autonomy can help raise the schooling outcomes of indigenous peoples
- School autonomy reinforces the role of homework, learning styles and future value of education
- With more autonomy, schools could determine the appropriate mix of technology for their students



Improve *Accountability*

- Accountability mechanisms can improve school quality
- Accountability mechanisms that put people at the center of service provision can go a long way in making services work and improving outcomes
- Flexible and wide-ranging accountability mechanisms could encompass various types of services



Continue Learning from *Assessments*

- Assessment testing can be used to inform policy decisions.
- Analysis of assessments can foster public and civil society involvement in education reform.
- However, governments must be proactive in encouraging public debate using assessment results.
- Expand coverage of the national assessments.
- National and international assessments could be used to inform school reform process



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