

Technology, School Reform, and the Computer Industry's Role

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Priorities for School Reform

- Hirsch -- More Factual Knowledge
- Public -- Higher Test Scores
- Policy-Makers -- Standards
- Governance Reformers --
 - Contracting, Vouchers, Charters
- Teacher Educators --
 - Project-Based Teaching
- Cognitive Psychologists --
 - Deep Understanding

Model of Instructional Reform I

Make Meaningfulness The Primary Attribute of Tasks

- Contextually rich learning tasks
 - Projects
 - Real world applications
 - Authenticity
 - Depth
 - Skill learning embedded
- Take students' thinking and feeling into account
 - Students' prior beliefs
 - Student interest -> tasks
 - Student choice in tasks and methods
- Reorganize classroom structures and roles
 - Cooperative work groups
 - Students given leadership roles
 - Student initiative facilitated

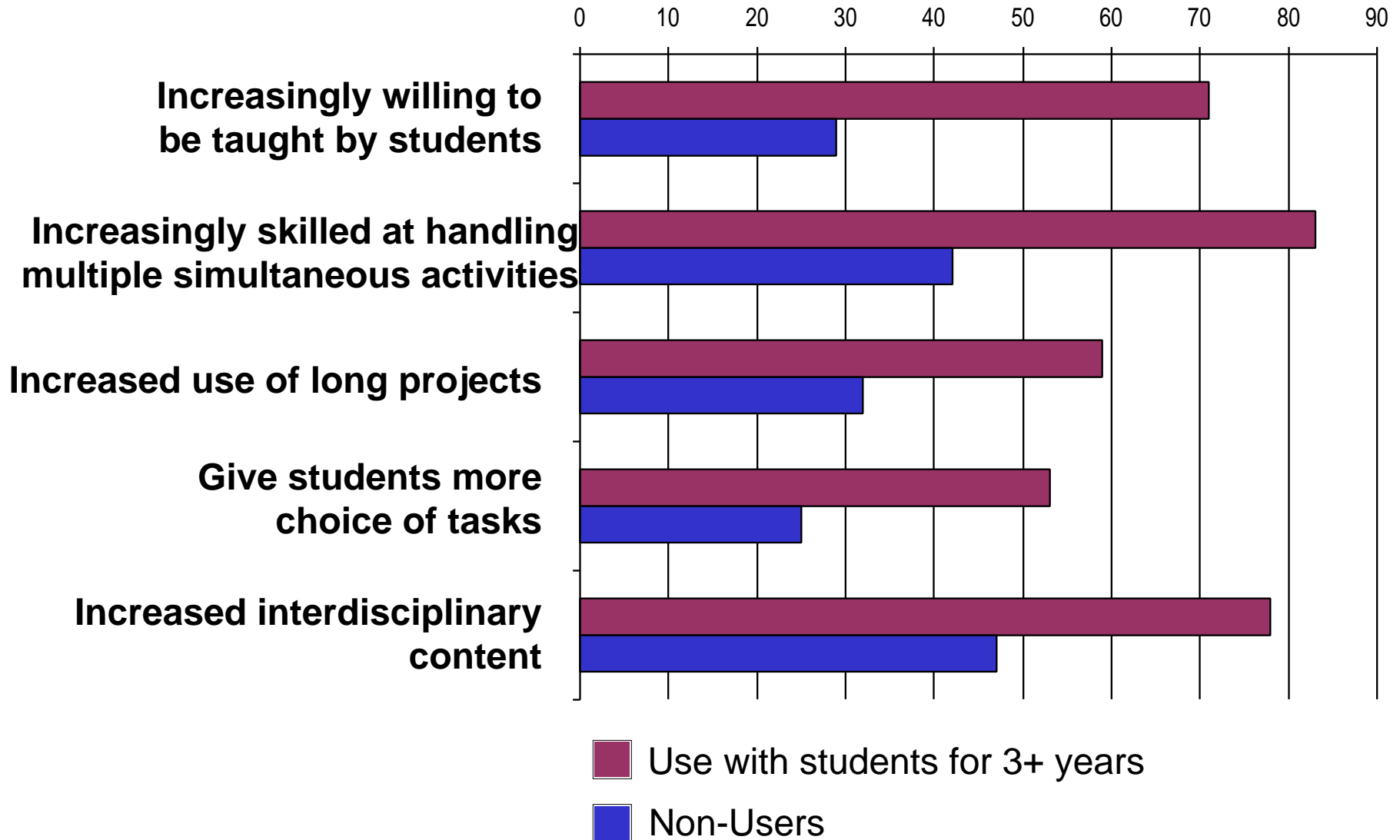
Model of Instructional Reform II: Emphasize Teaching for Understanding

- Focus on challenging objectives...
- And equally challenging tasks...
 - Students articulate reasoning (e.g., writing)
 - Revise their work
 - Peer discourse and group decision-making
 - Meta-cognition
- Made feasible by...
 - Resources: information, “thinking tools,” communication
 - Reorganizing classroom structures and roles
 - Model the learning process
 - Student responsibility and freedom
 - Meaningful tasks
- Assessment consistent with learning goals

What is the role of computers
in constructivist reform?

Computer-using teachers reported more changes in their teaching practice in the past 3 years than non-users

National School Network survey, Spring, 1997



Teaching, Learning, and Computing 1998

The National Survey of Computer Technology and Instructional Reform

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TLC Project: Purpose

To investigate the conditions under which teachers' use of computers is related to teaching practice consistent with constructivist instructional reform theories.

The School Sample in TLC

- A representative sample of all U.S. schools, public and private (Probability Sample: 655 schools participated)
- The “Purposive Sample”
 - 378 schools from more than 50 major reform projects
 - 182 schools with high-end technology
- Three-quarters of sampled schools participated in the study

The Teacher Sample in TLC

- Over 4,100 teachers from grades 4-12 participated, nearly 70% of those sampled
 - Completed 20 page questionnaires
 - Four different versions; heavily overlapping questions
- The sampling process disproportionately selected active computer-users and reform-oriented teachers.
 - BUT data was re-weighted to reflect a “simple random sample” of teachers
- Parts of this presentation use data only from the Probability Sample: 2,251 teachers

Philosophy Index

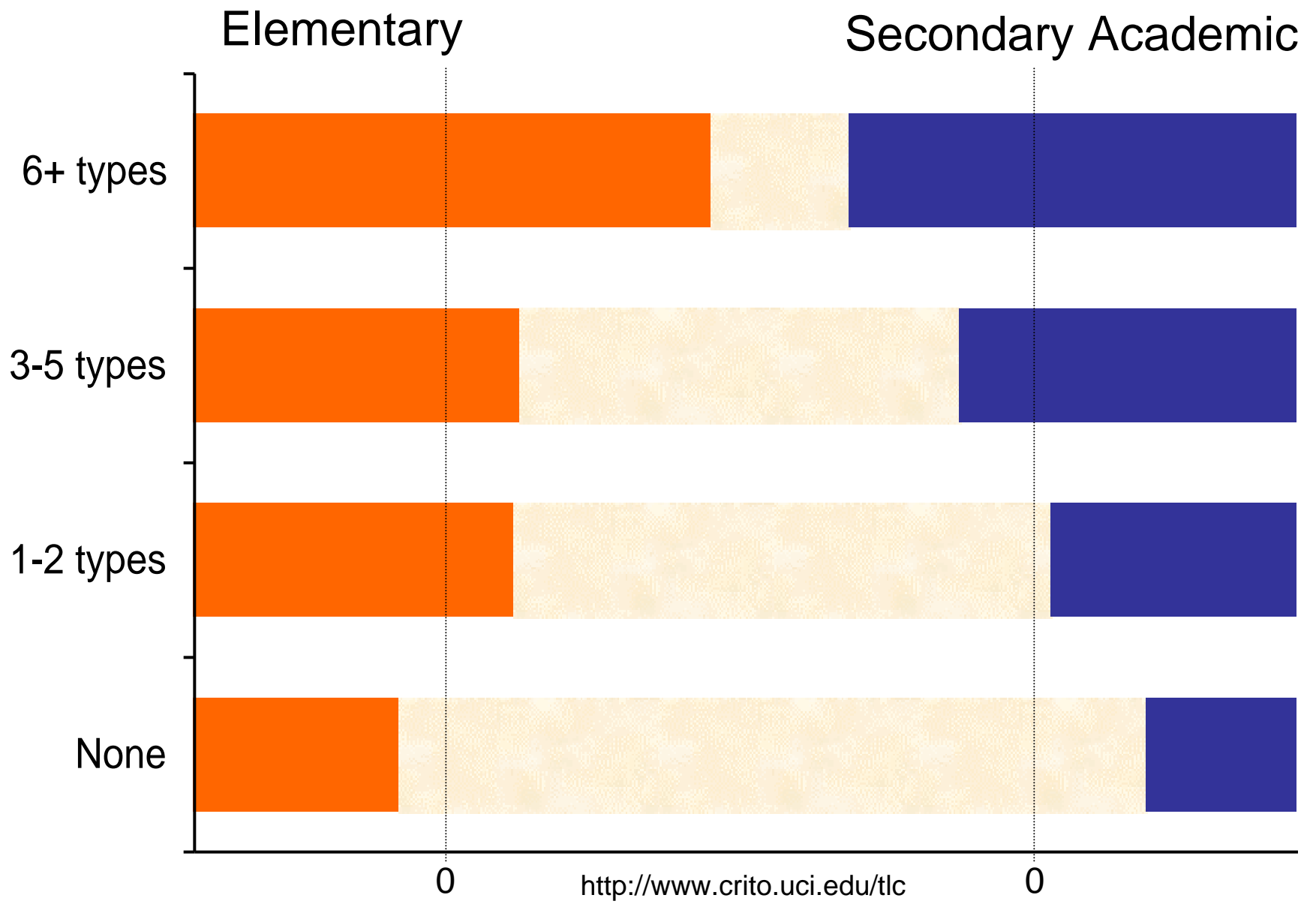
Constructivist Philosophy

- Knowledge is built through class and group discussions
- Students need to find answers to their own questions and problems
- Students construct concepts for themselves
- “Sense-making” and guided inquiry
- Authentic, integrated tasks
- Diverse classroom projects

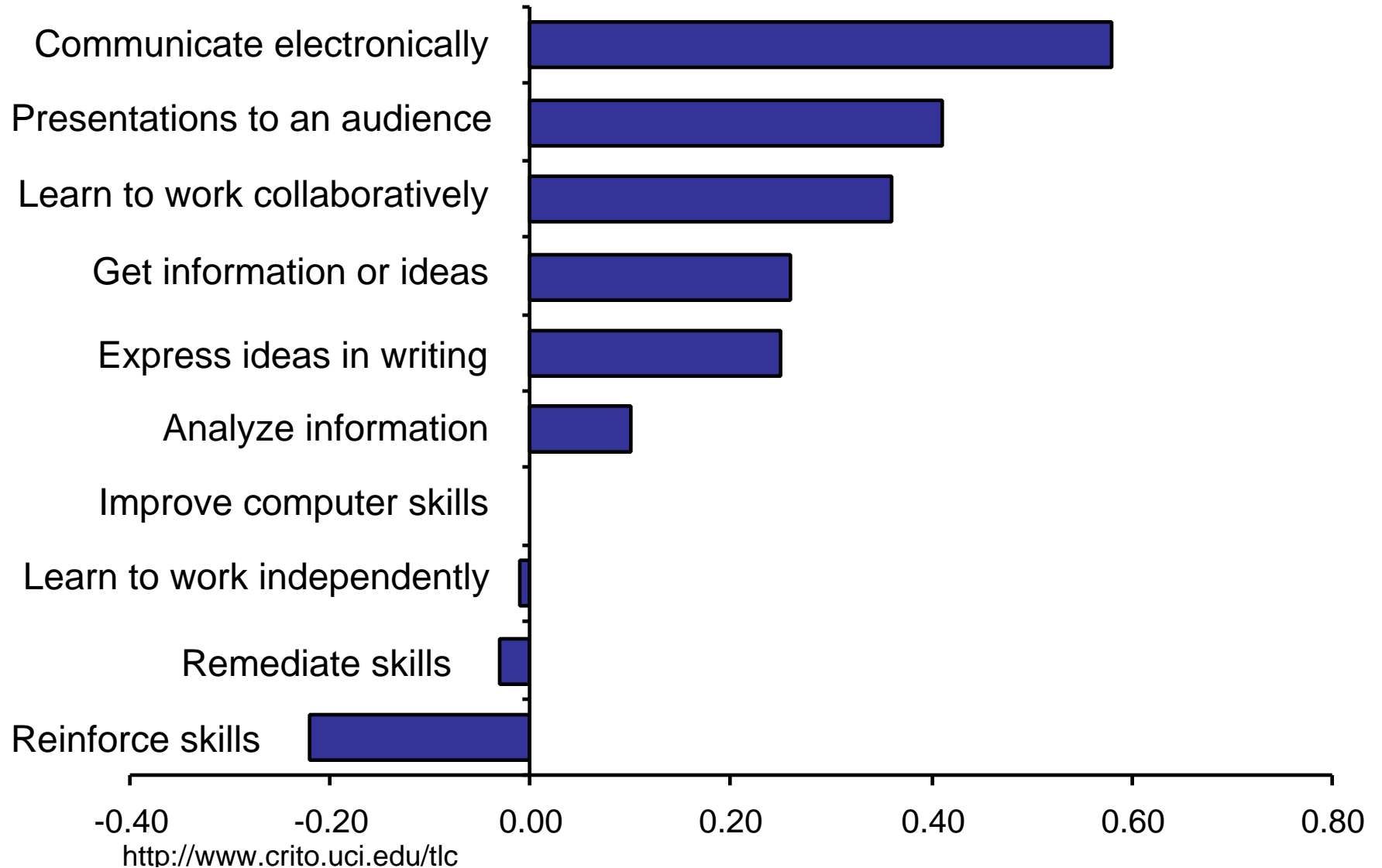
Traditional Philosophy

- Teachers describe and explain concepts, and students learn this content
- A quiet classroom is important for learning
- Acquiring basic content knowledge and skill primary
- Teacher - not students - determine activities
- Instruction is built around problems with clear, easily found, correct answers
- Teaching facts and skills provides the foundation for later learning

Teachers Who Use a Greater VARIETY of Software Have More Constructivist Philosophies



Teachers' Objectives for Computer Use Mirror Their General Philosophy (Average Constructivist Philosophy scores among computer-using teachers)



Major Computer-Related Predictors of Extent of Constructivist Pedagogical Change

- Variety of software used
- Collaboration objectives for computer use
- “Written expression” objectives
- General computer expertise
- Extensive use of World Wide Web

Structural and Personal Predictors of Constructivist Practice and Pedagogical Change

- Lots of technology available
- Schoolwide technology reform programs
- Professional role orientation and personal involvement in reform programs
- Professional school culture

Types of School Settings Examined

- **High-Tech Schools (362)** (no particular reform program but lots of equipment)
- **Schoolwide Technology-Oriented Reform Programs (253)**
 - Co-NECT Schools New American Schools Design
 - National School Network, Schools for Thought,
 - Web66 pioneers with sites indicating substantial reform activities,
 - Bozeman’s “Best Technology Practices”, 5 more sources
- **Schoolwide Reform Programs that are NOT TECHNOLOGY Oriented (605)**
 - Accelerated Schools, National Alliance for Restructuring,
 - Coalition for Essential Schools, Paideia Schools, 17 more
- **National (Probability) Sample of Teachers (2,251)**
- **Tech reforms targeting individual teachers** (Co-VIS, HOTS, “NetLearning”, Learning Circles, 10 more programs/sources)
 - **Participants (51)** separately from **non-participants (232)**

Teacher's Work Role Orientation: Professional Leadership vs. Classroom Focus

1. Teacher Professional Contacts at School:

Discussions of Teaching, Learning, Subject-matter, Technology
Classroom Visits to Observe Teaching

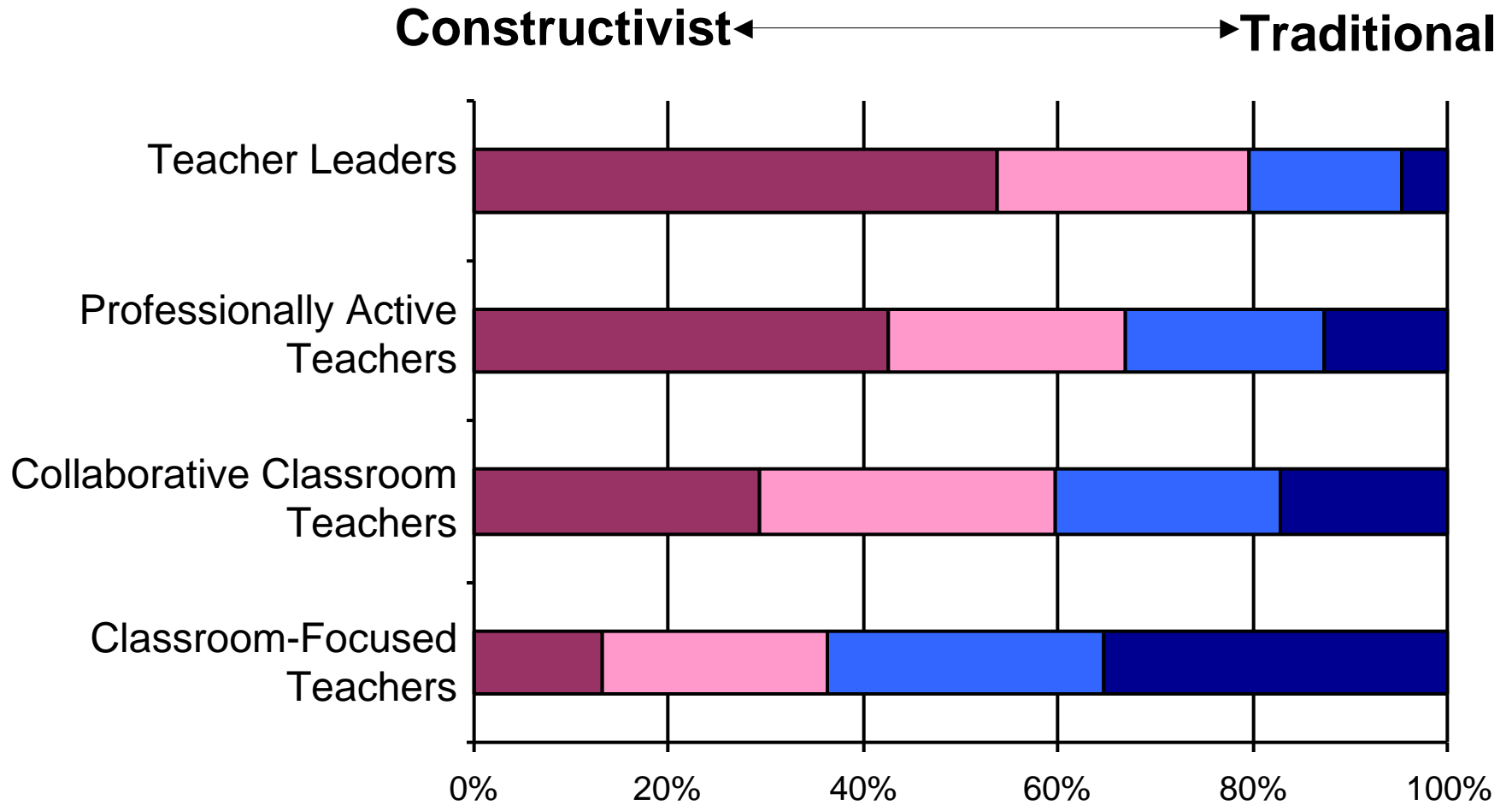
2. Teacher Interactions Beyond the School:

Attends Workshops
Participates on Committees
Professional exchanges through E-mail

3. Leadership Activities over Past 3 Years:

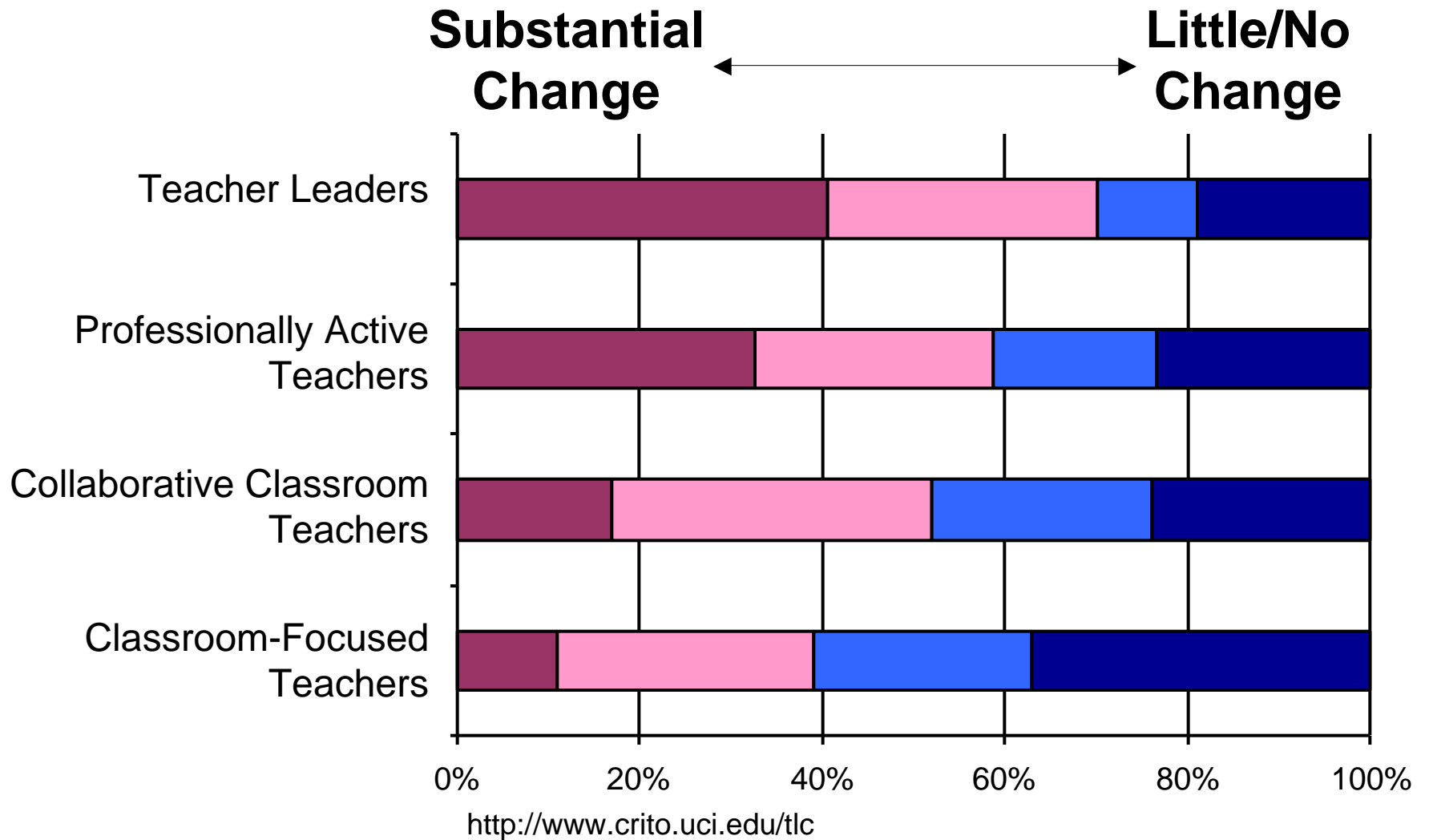
Mentoring
Teaching Peers in Workshops/Conferences
College Teaching
Publishing Articles for Practitioners

Teacher Practice by Work Role Orientation

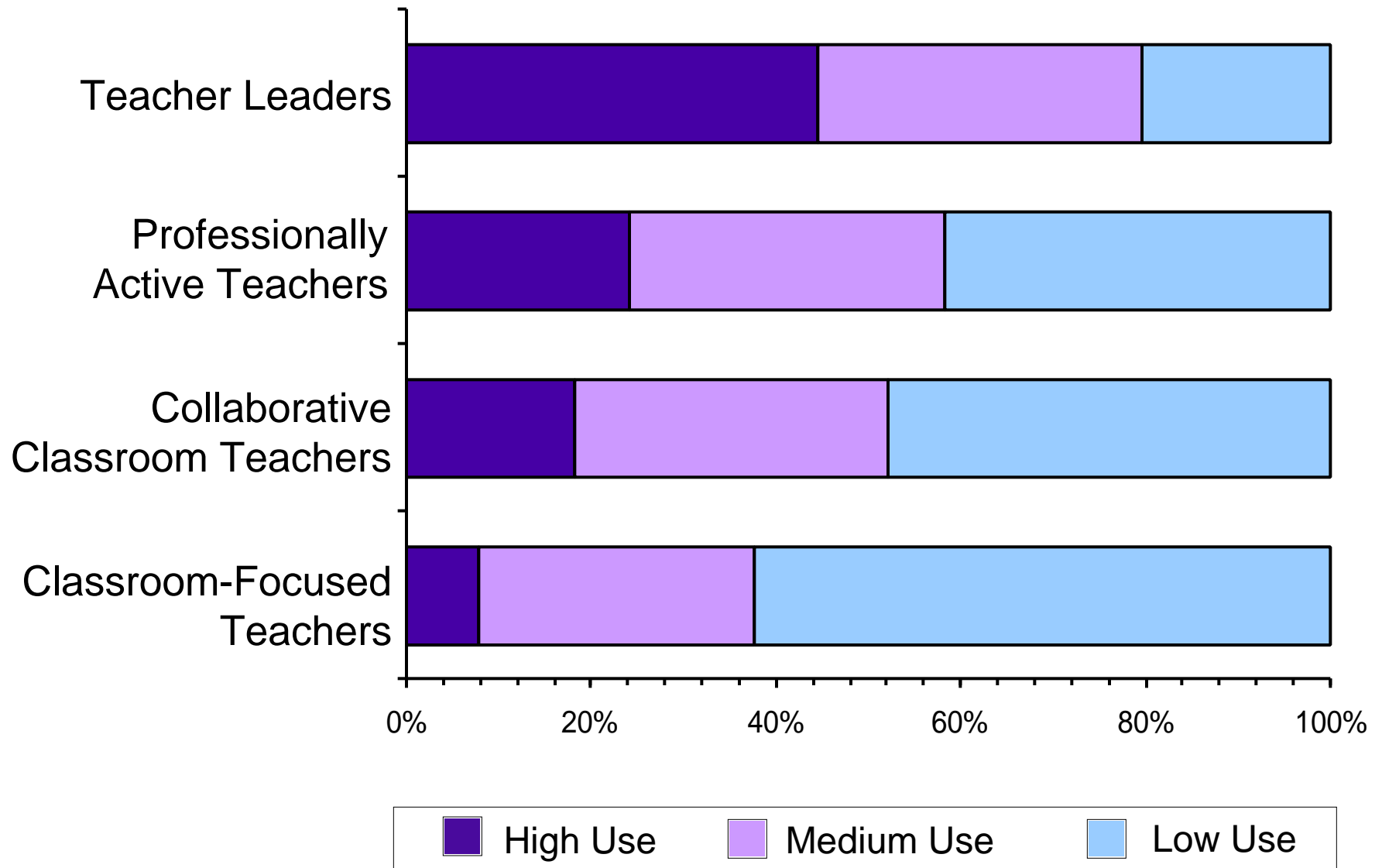


<http://www.crito.uci.edu/tlc>

Change in Pedagogy in a Constructivist Direction



Extent and Variety of Constructivist Computer Use by Teacher Role Orientation



Professional School Culture

Teacher Learning Community

It is common for us to share samples of student work

Other teachers encourage me to try out new ideas

Evaluation: Teacher Recognition and Constructive Peer Criticism

Teachers who successfully innovate are given public recognition

Most teachers will press another if that person is not teaching well

Integrated, Teacher-Respecting Staff Development

Staff development is followed by support to help teachers implement ideas

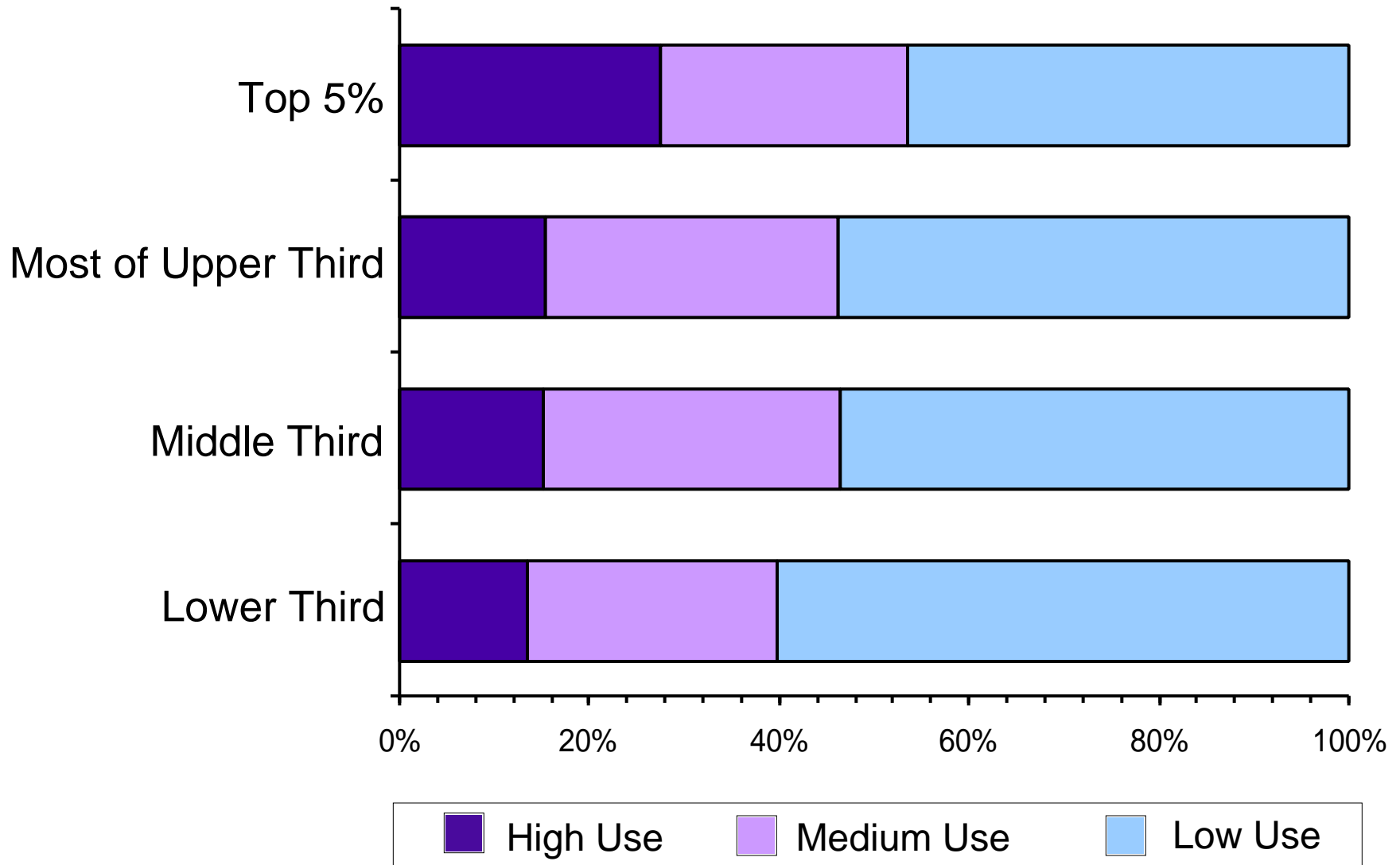
New ideas presented are discussed by teachers afterwards

Goal Consensus

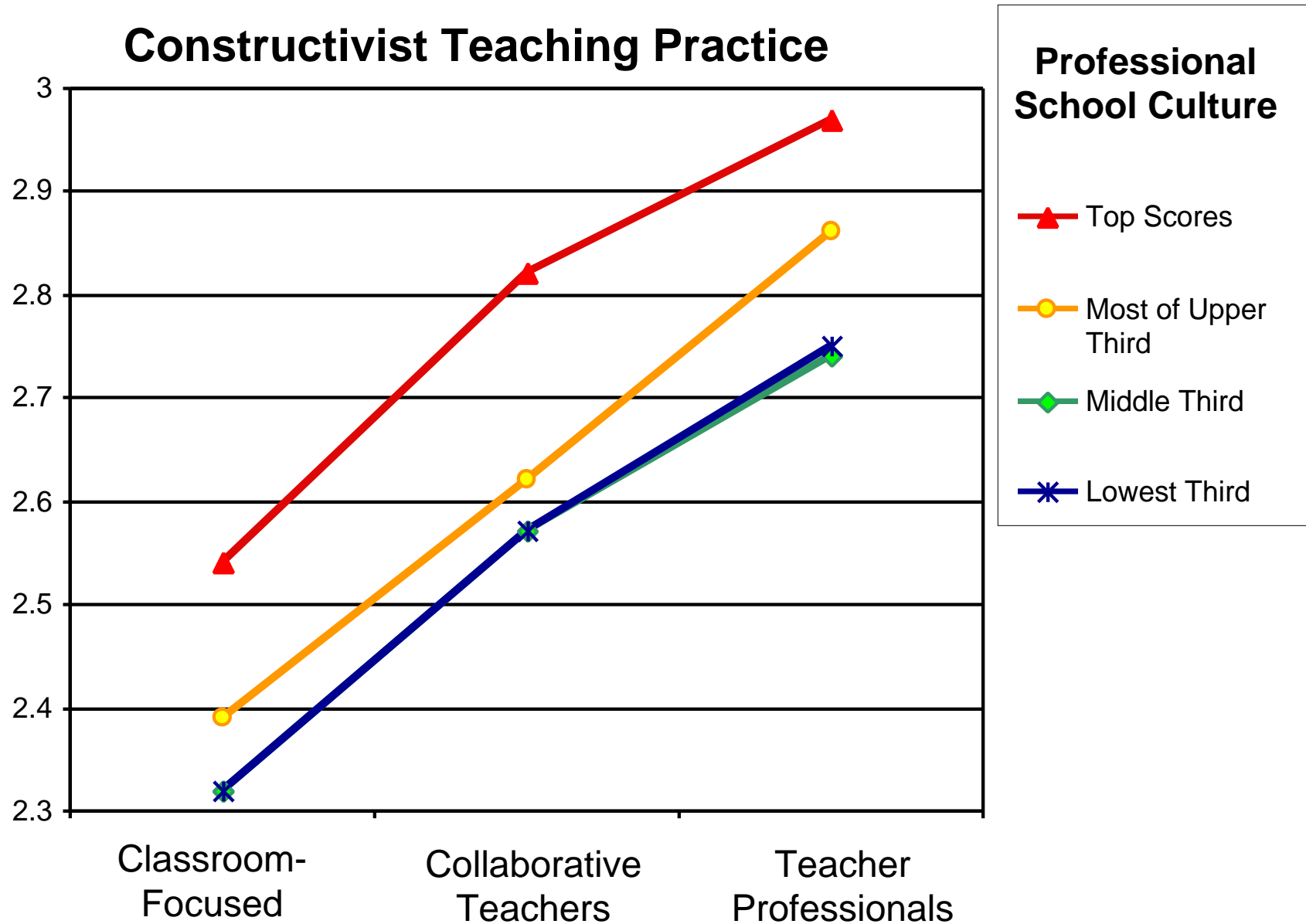
The principal's philosophy of education is similar to my own

Most teachers share my beliefs about the central goals of the school

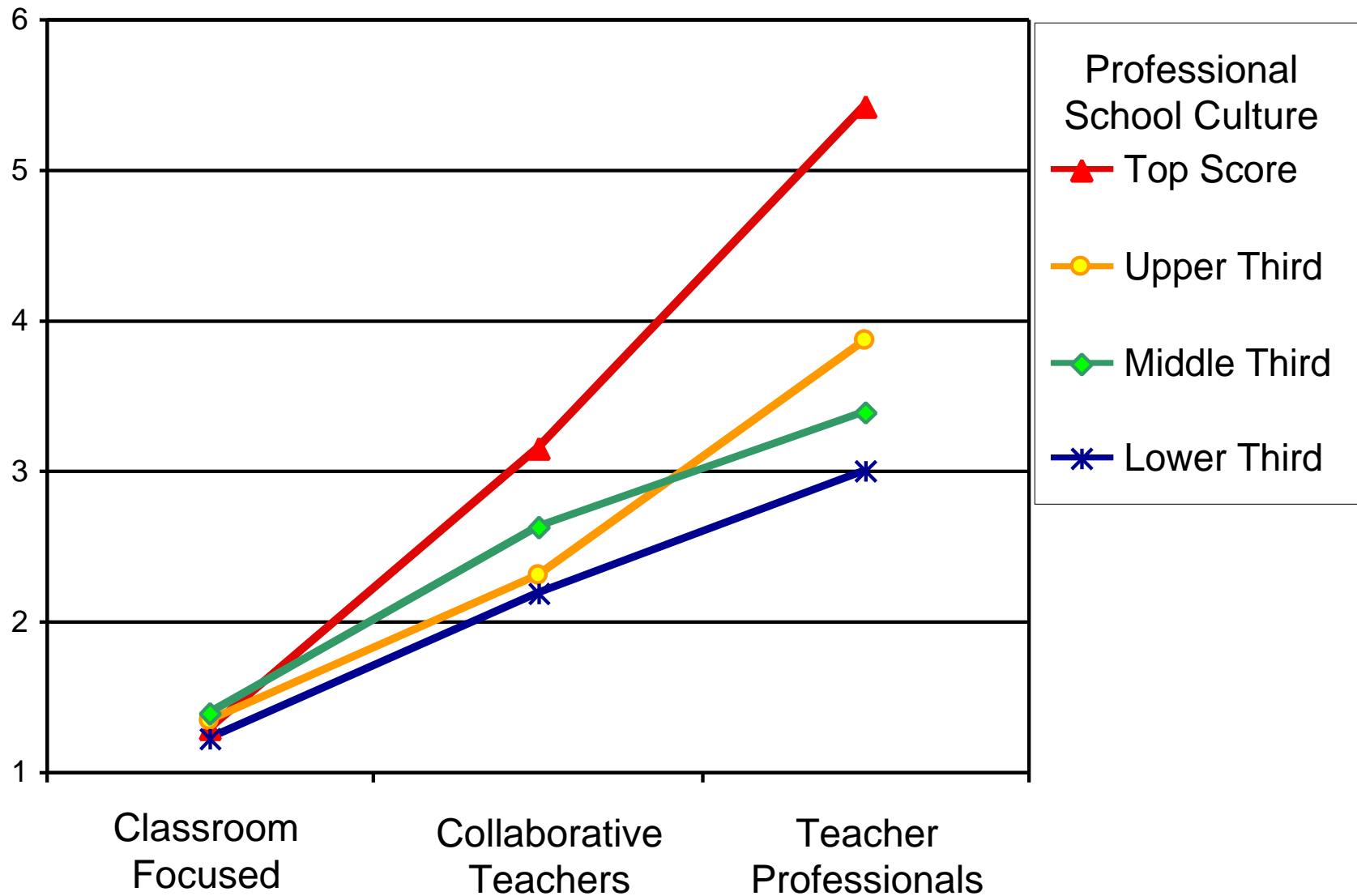
Extent and Variety of Constructivist Computer Use by School Work Culture



Pedagogy by School Culture by Work Role Orientation



Use of World Wide Web Browser, by Role Orientation, by School Culture (Selected Subjects)



What is the Computer Industry's Role?

- Help education professionals address the problem of inadequate public understanding of learning and schooling
- Provide support for the professionalization of teachers
 - Support teacher professionals
 - Support whole school reform that is based on constructivist models and that emphasizes teaching for understanding
- Provide incentives for district investments in staff development
 - Require allocations for support in purchases

Report Series Available on Web & Hard Copy

- *Internet Use by Teachers (available now)*
- *Computer Presence in American Schools (available now)*
- *Computer and Software Use by Teachers (available shortly)*
- *School Decision-Making on Technology*
- *Staff Development & School Support for Teachers' Computer Use*
- *Pedagogical Beliefs and Practices Among American Teachers*
- *School Technology Investment Alternatives*
- *Teacher Pedagogy and their Use of Computers*
- *School Context and Personal Factors in Teachers' Use of Computers*
- *Computer Use in Reform and High-End Technology Settings*
- *Dynamic Relationships Between Pedagogy and Computer Use*
- *A Summary of Teaching, Learning, & Computing-1998*

For More Information visit our Research Project Web Site:

www.crito.uci.edu/TLC

- New findings presented *weekly* as often as we can
- Discussion group
- Reports and newsletters: view or download
- Archive of previous newsletters and findings