

Teaching, Learning, & Computing: 1998 National Survey

Funded by National Science Foundation and
U.S. Department of Education

Principal Investigators:

Hank Becker, Univ. of Calif., Irvine

Ron Anderson, Univ. of Minnesota

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

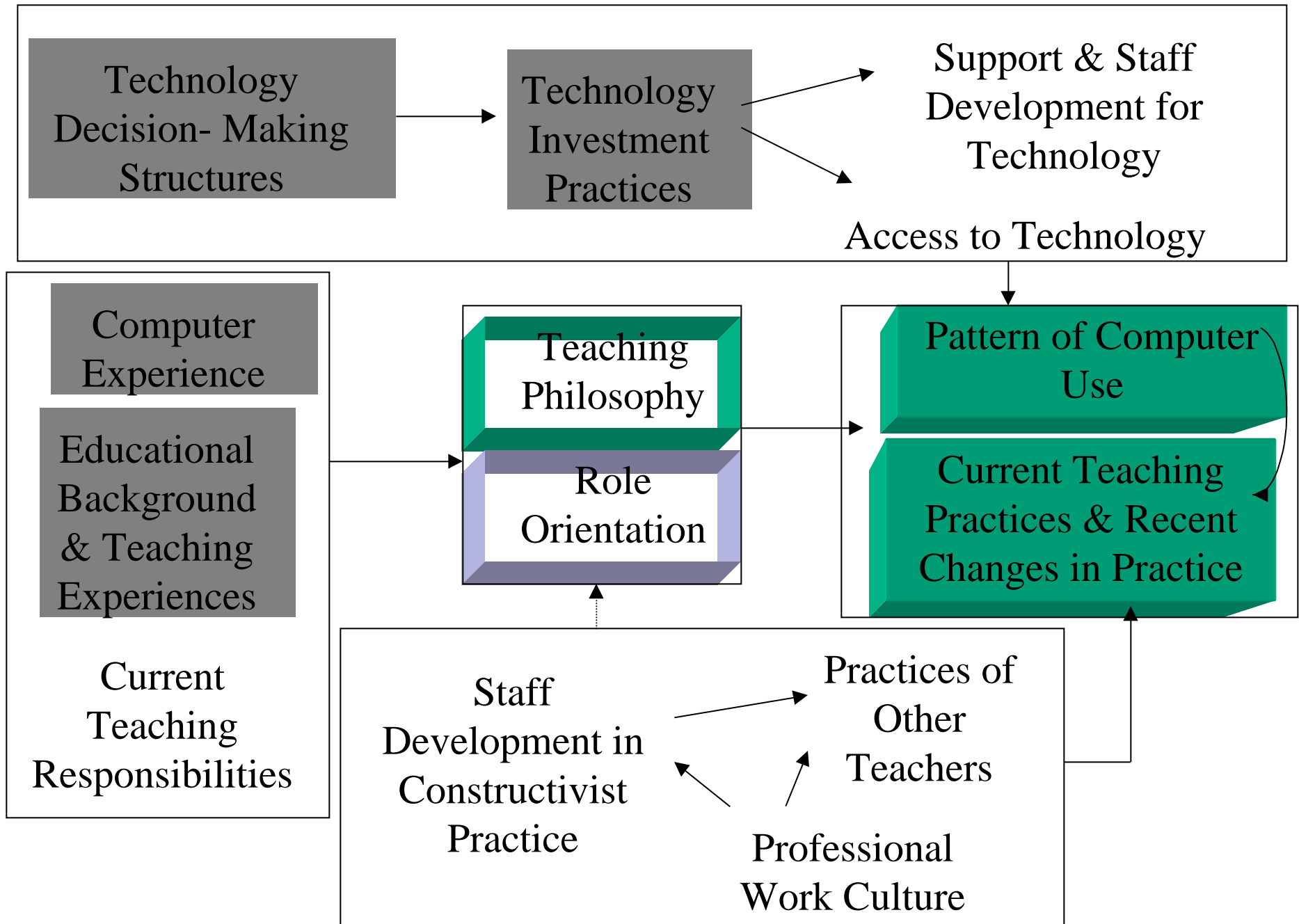
Model of Instructional Reform II: Emphasize Teaching for Understanding

- 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

The TLC Sample

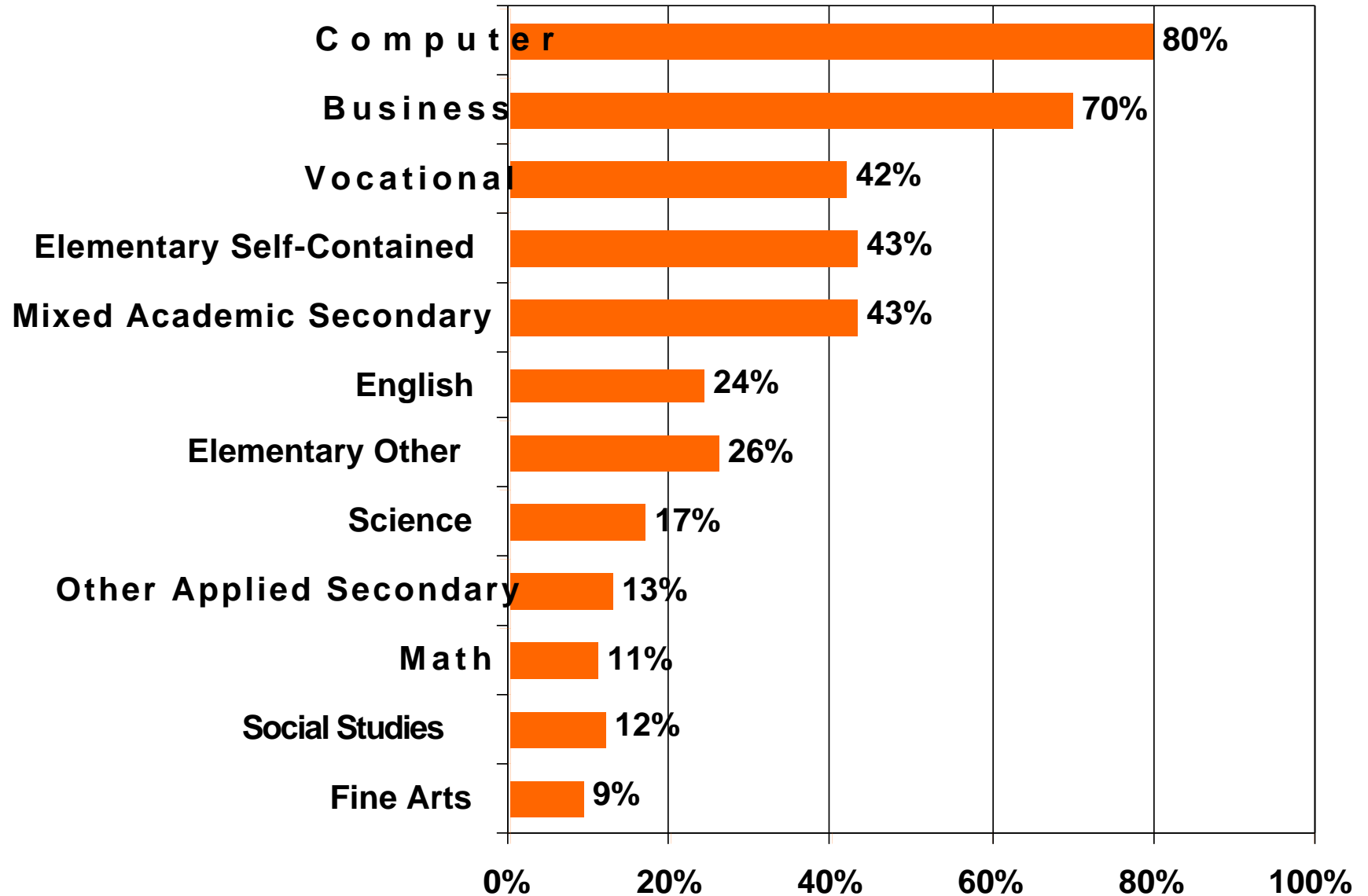
- A representative sample of all U.S. schools, public and private (Probability Sample: 655 schools participated--over 75%)
- Also other schools:
 - **378 schools from more than 50 major reform projects**
 - **182 schools with high-end technology**
- Over 4,100 teachers from grades 4-12 participated, nearly 70% of those sampled
 - Completed 20 page questionnaires

Model of Effects on Computer Use Practices and General Pedagogy

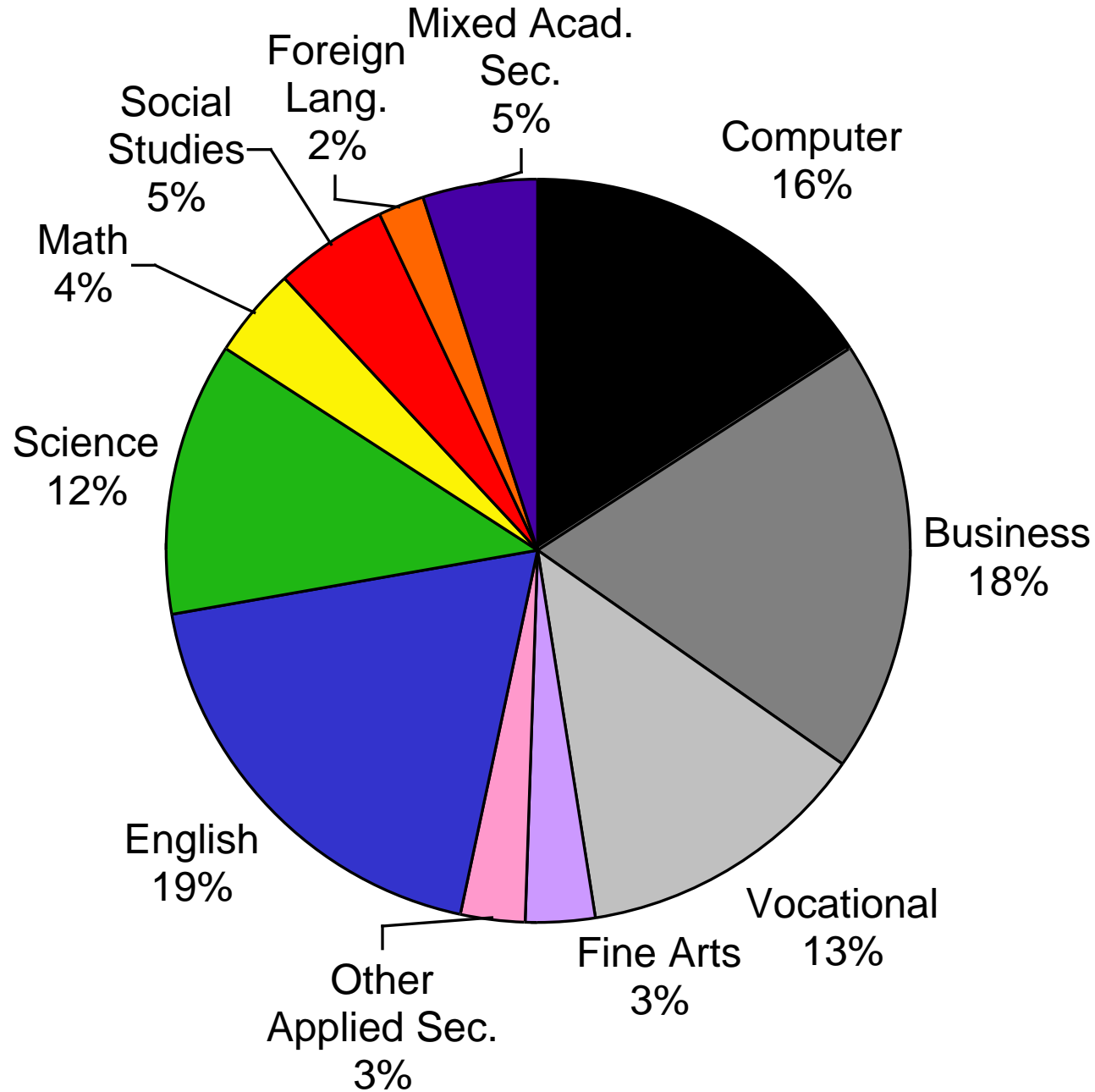


Frequent Computer Use by Subject Taught

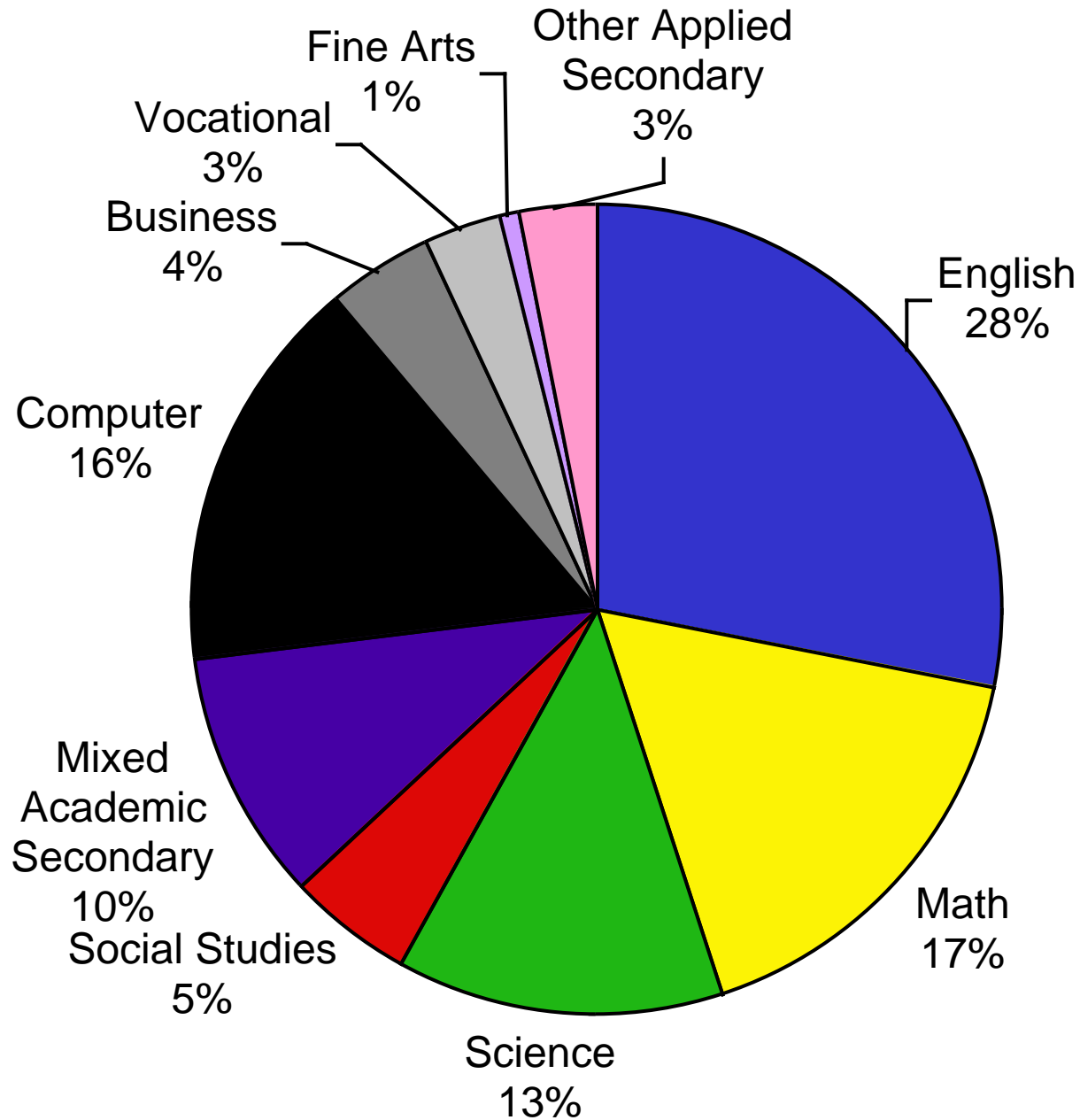
(Percent of teachers reporting 20+ uses by typical student in class during year)



High School Teachers Who Use Computers Frequently



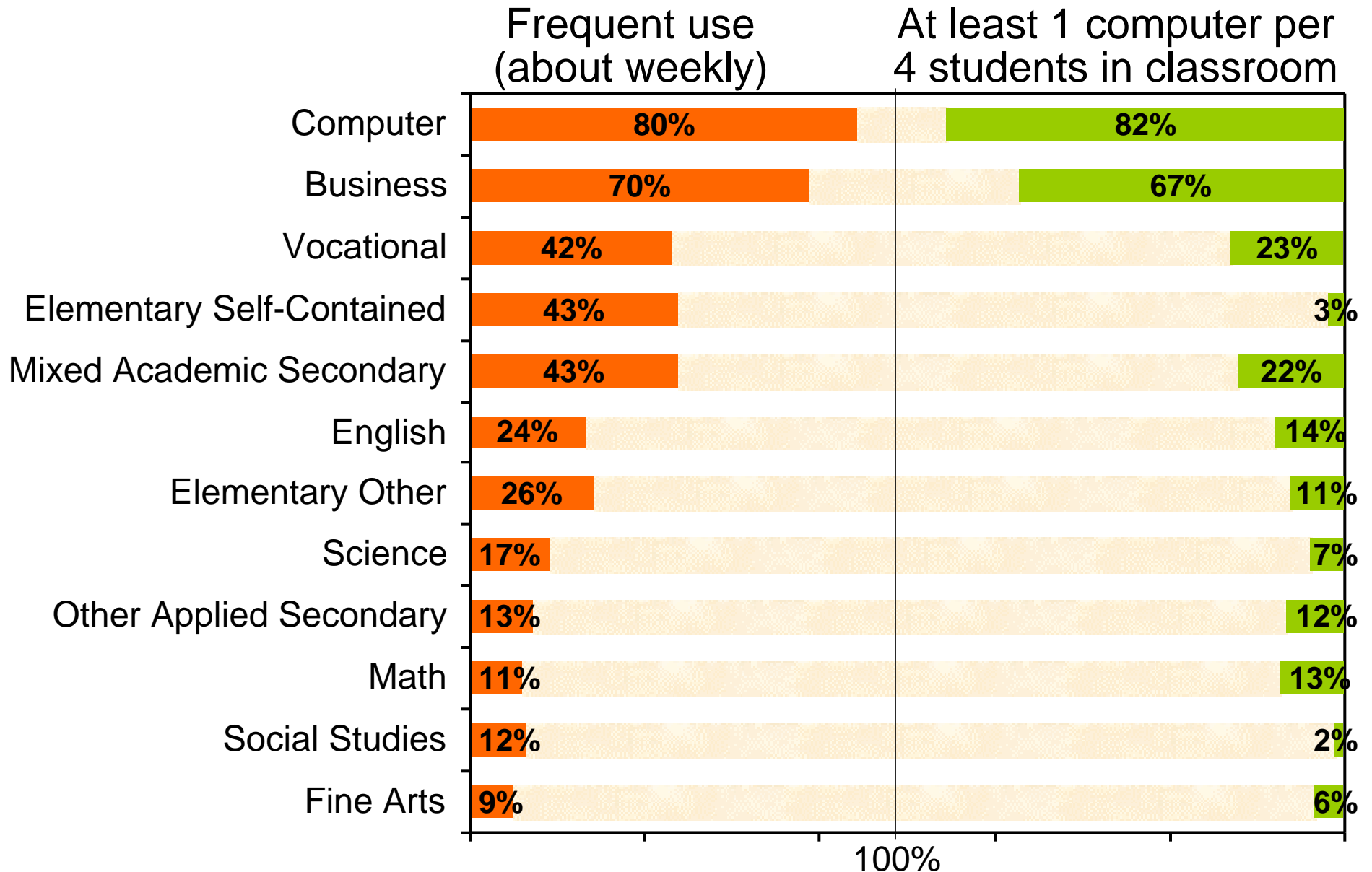
Middle School Teachers Who Use Computers Frequently



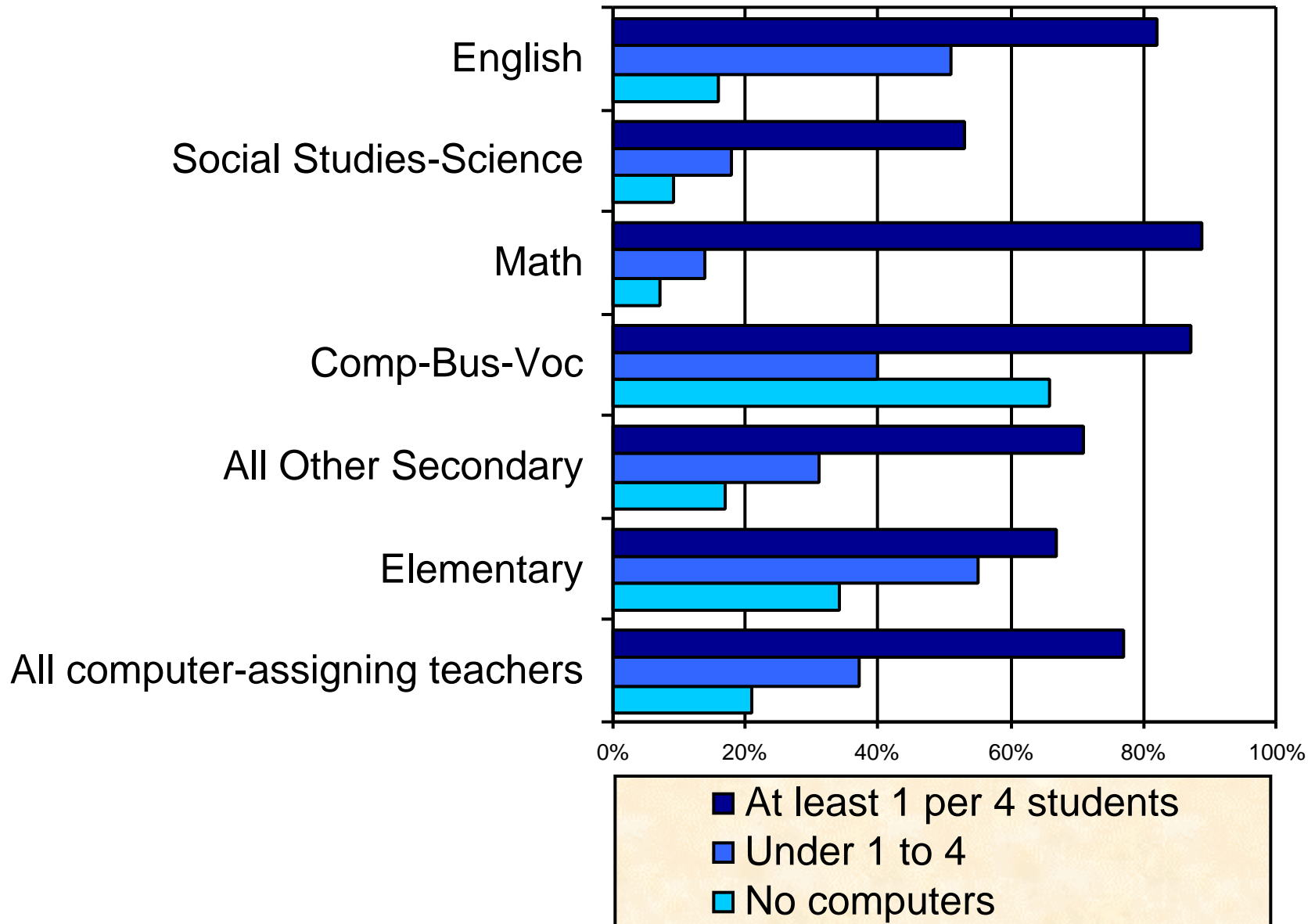
Why?

- Curriculum Pressures
- Scheduling: 50 min. periods
- Access
- Pedagogical Objectives
- Technical Confidence

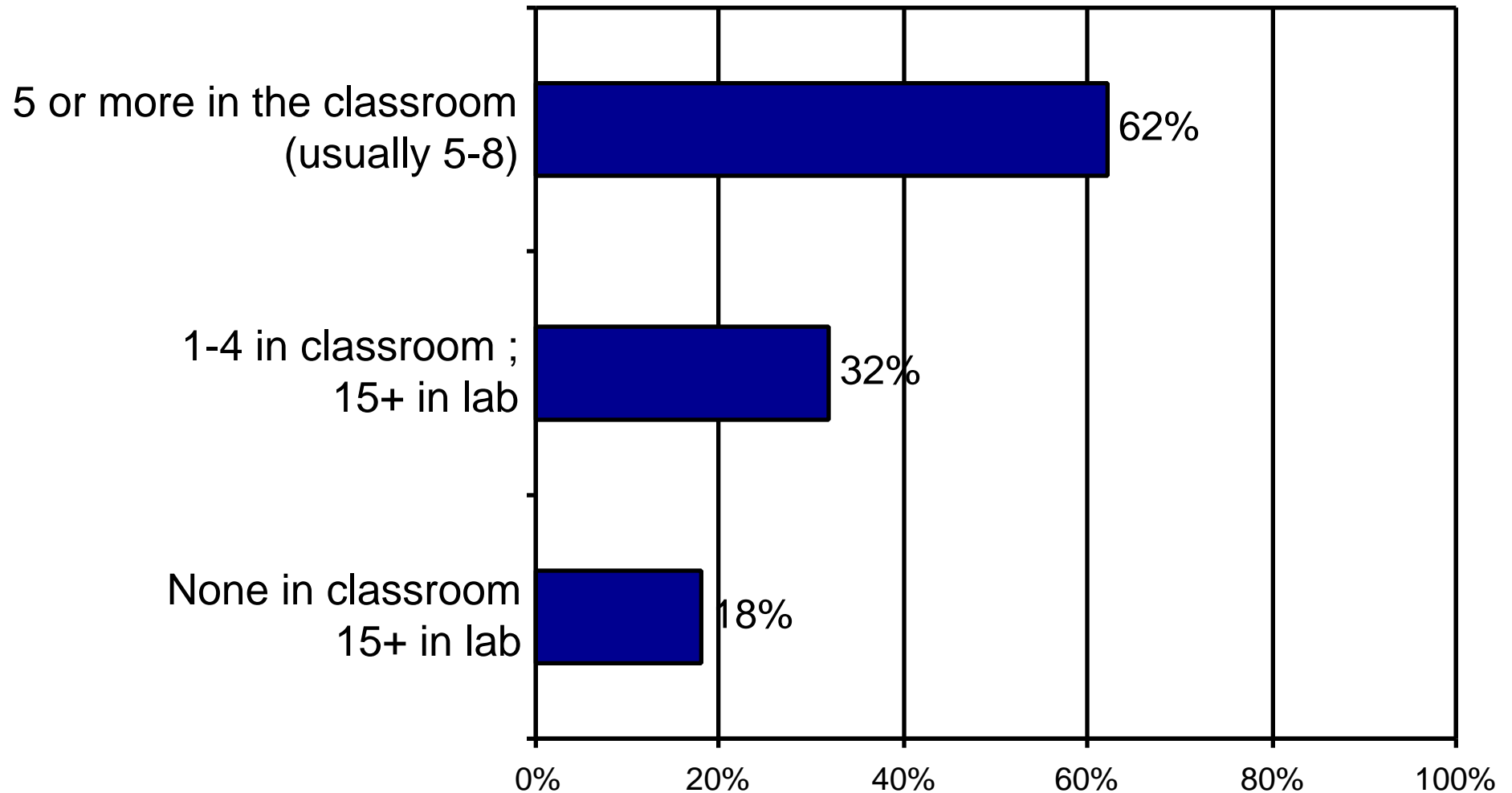
Frequent Use & Classroom Access by Subject



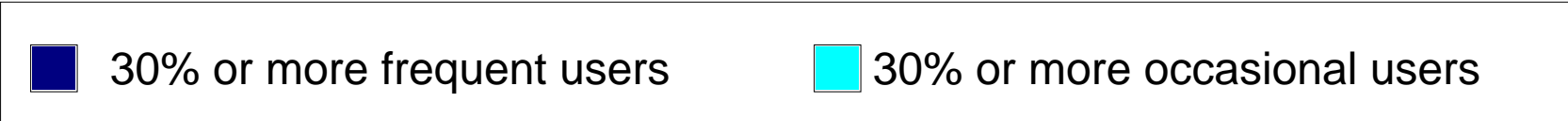
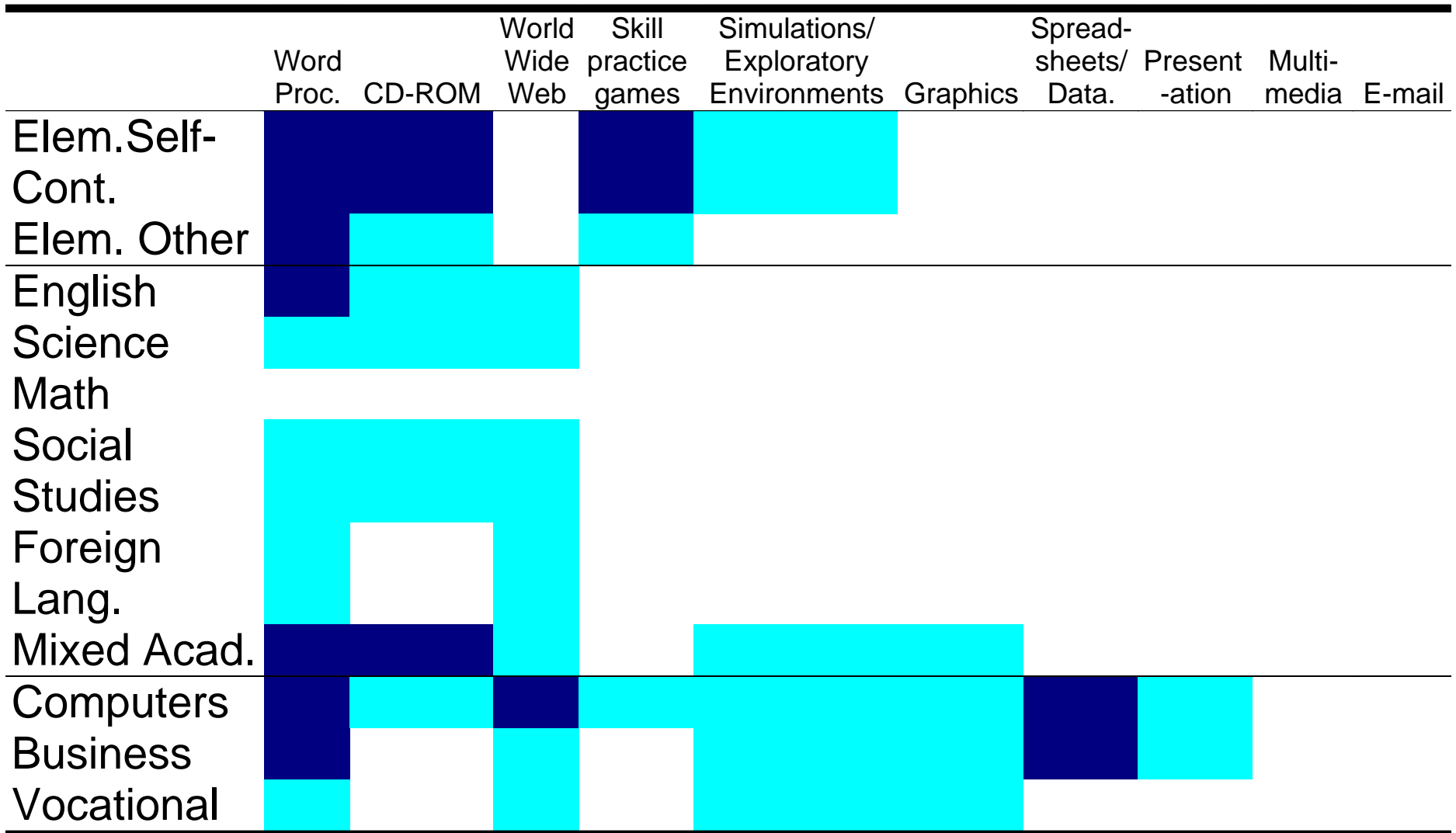
Percent of Teachers Who Use Computer Frequently by Level of Classroom Computer Access



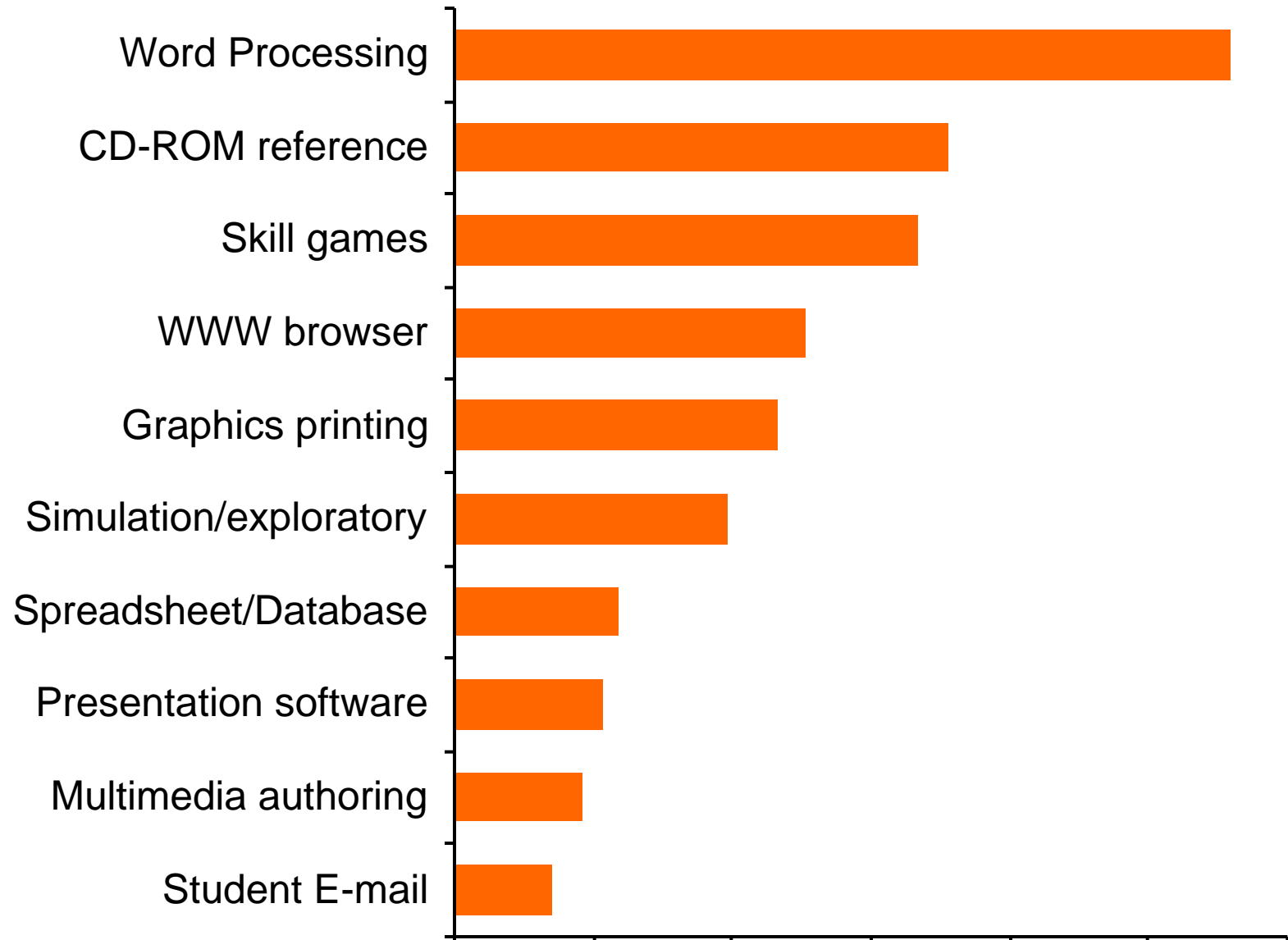
Frequent Computer Use Occurs More Often with 5-8
Computers in a Classroom
than with 15-30 in a Computer Lab
(data for Secondary Academic Teachers)



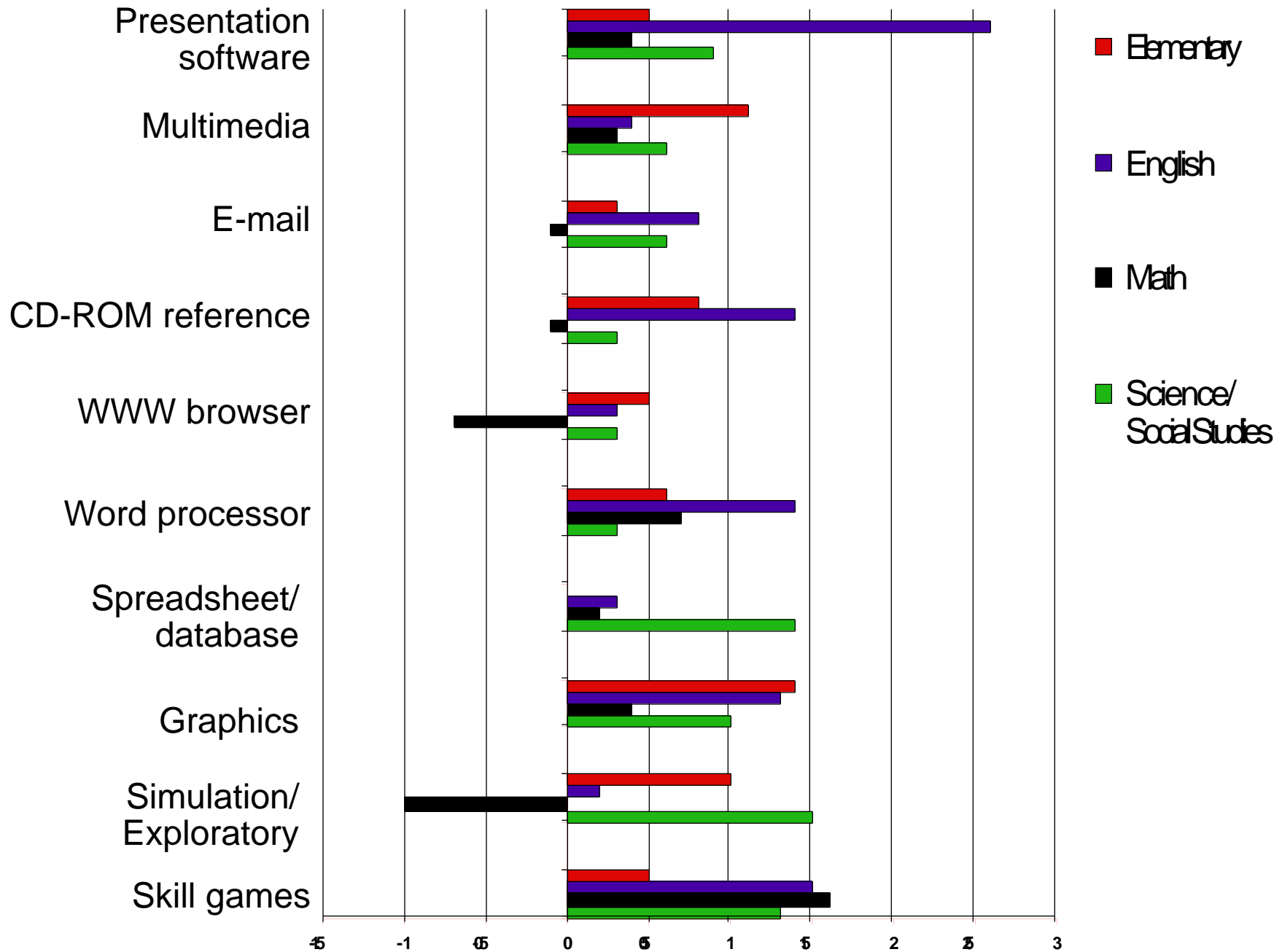
Software Use by Subject and School Level



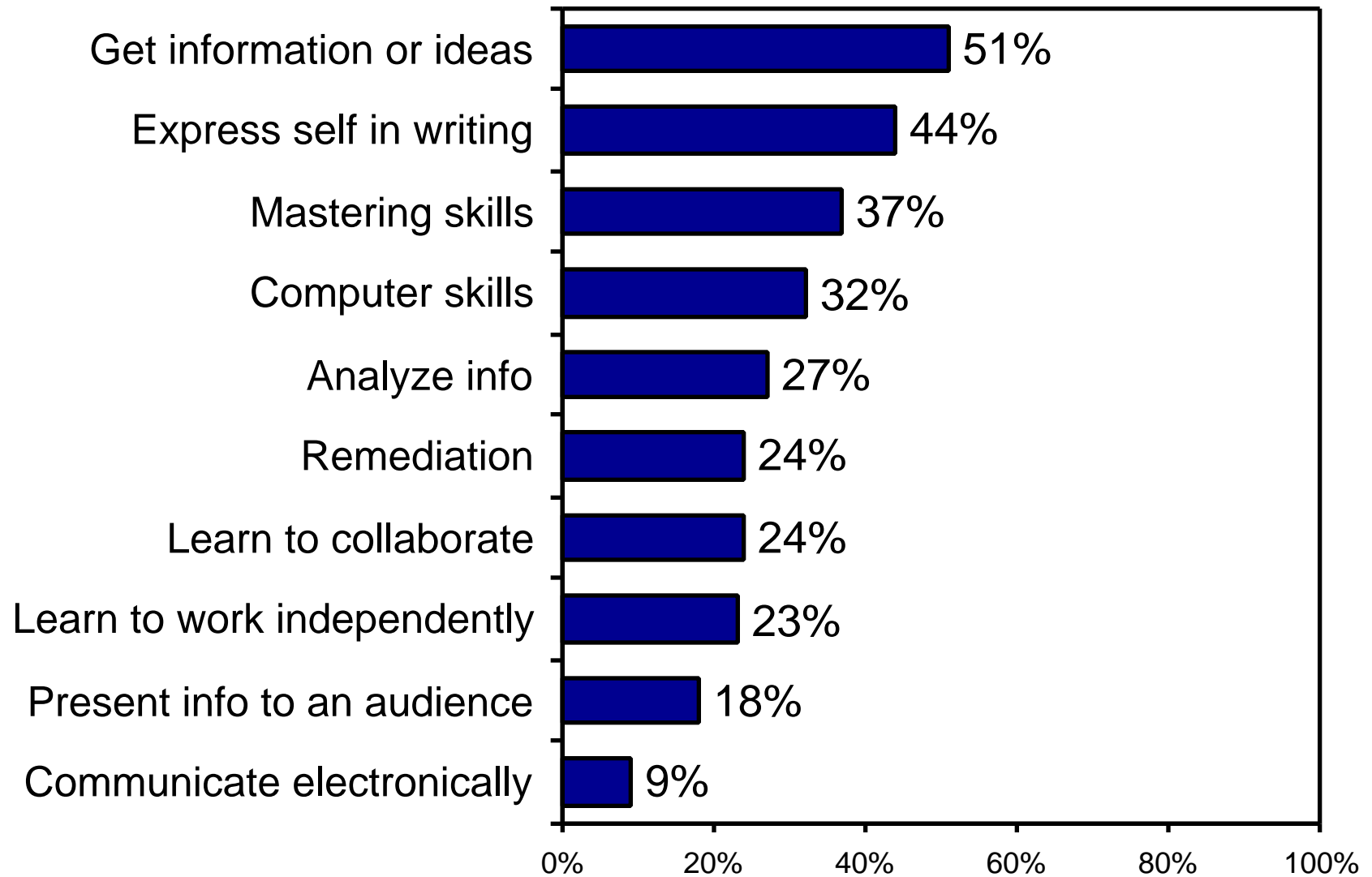
Software Used by Frequent Computer Using Teachers (Elem. & Sec. Academic Subjects)



Teachers With 5+ Classroom Computers Use Certain Software More



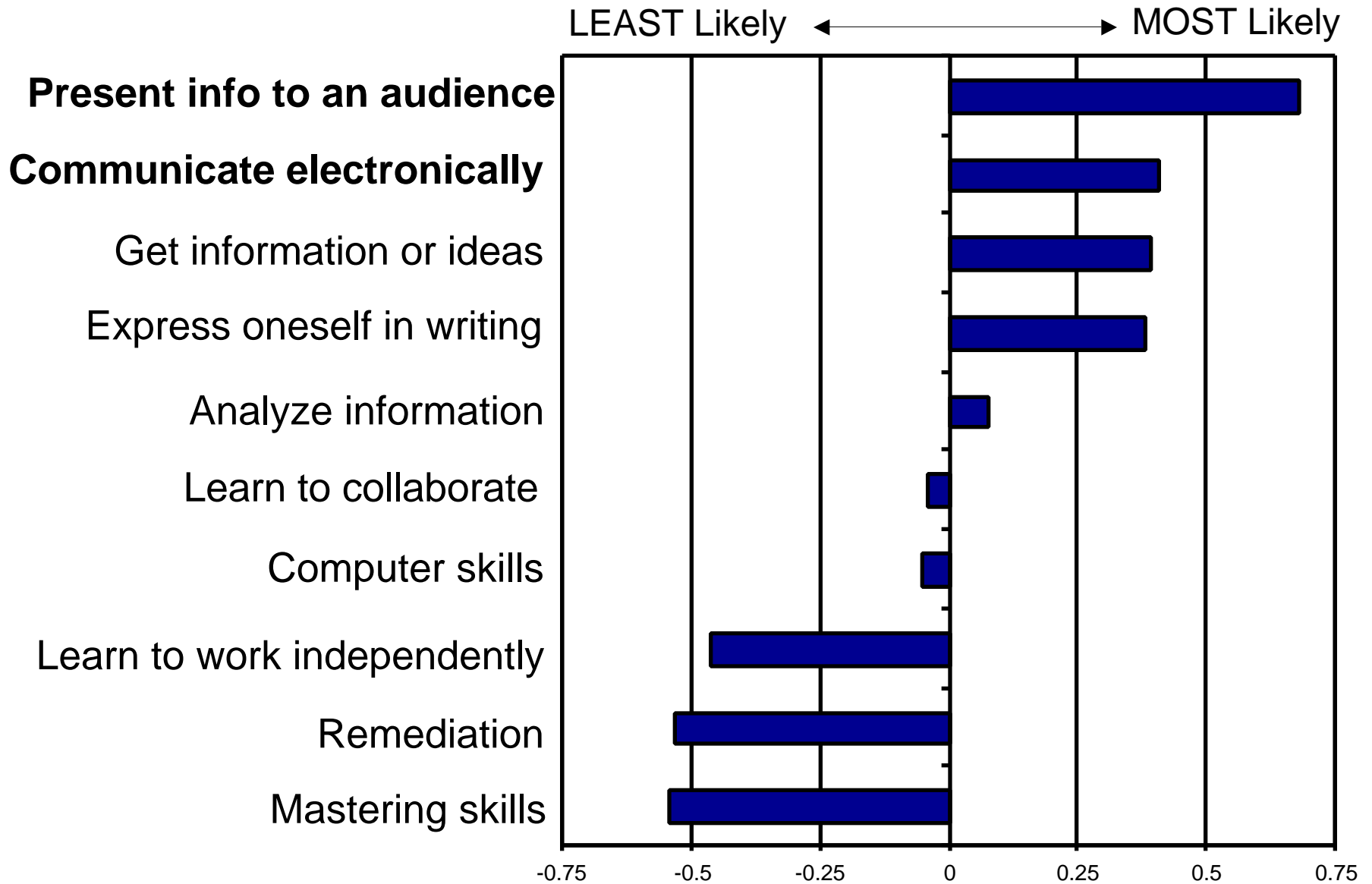
Teachers' 3 Primary Objectives for Computer Use



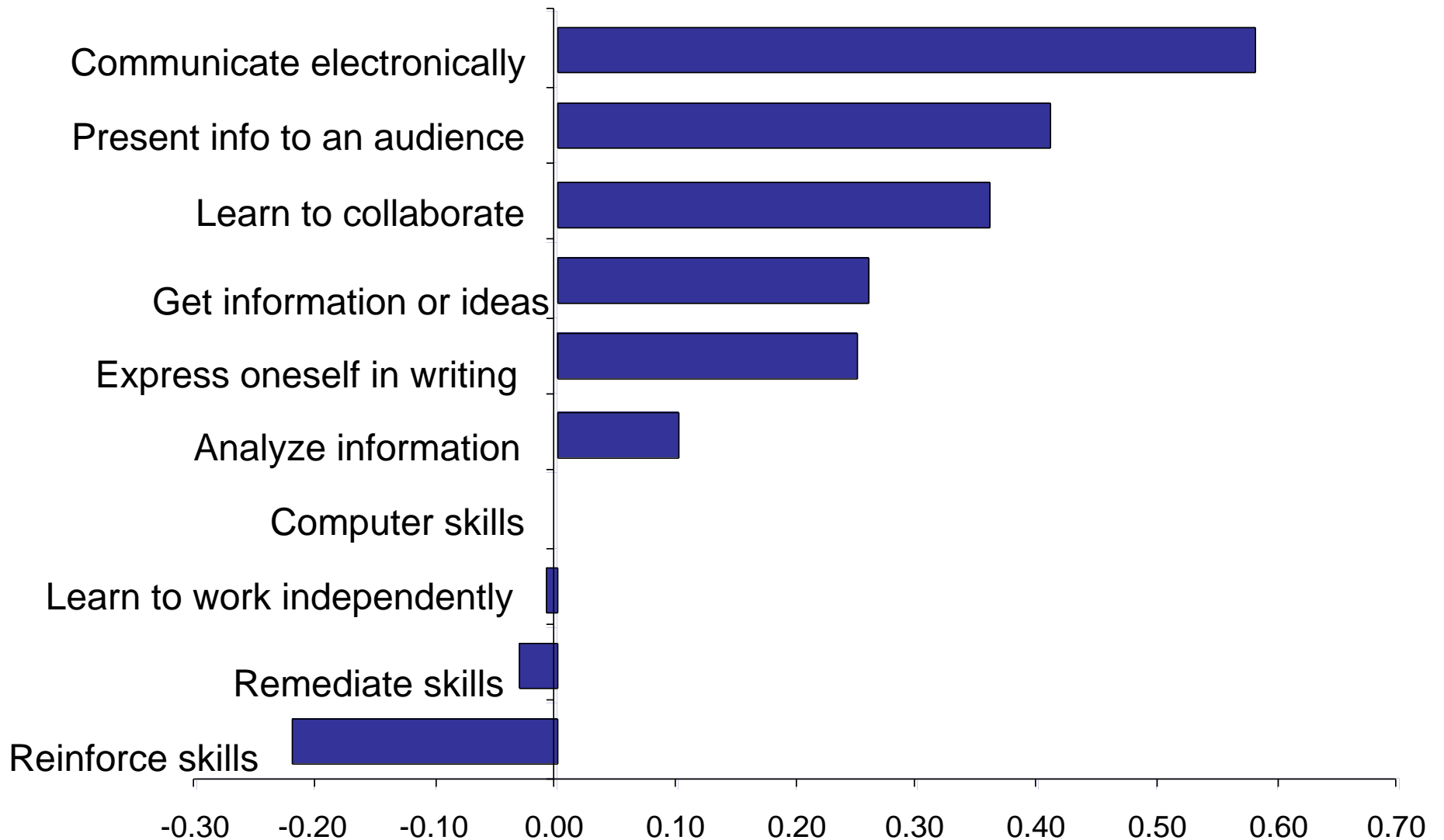
Subject Matter Teachers More Likely and Less Likely Than Average to Name Each Objective Among Their Most Important

	Much More Likely	More Likely	Average	Less Likely	Much Less Likely	
Finding out about ideas & info. (51% of all computer-assigning teachers)	Misc. Academic Social Studies				Foreign Lang.	Business Ed. Computer Ed. Math
Expressing self in writing (44%)	English	Elem. Self-Cont.			Business Ed.	Computer Ed. Math
Reinforcement (“Mastering skills just taught”) (37%)	Business Ed. Math				English Social Studies Misc. Academic	
Computer skills (32%)	Computer Ed.	Business Ed. Elem. Self-Cont.			English Foreign Lang. Fine Arts	
Analyzing information (27%)	Science Computer Ed.	Foreign Lang.				
Remediation of skills (24%)	Math	Elem. Other			Social Studies Misc. Academic Computer Ed. Vocational Ed.	
Collaboration (24%)		Misc. Academic Social Studies			Elem. Other	Foreign Lang.
Independent work (23%)	Foreign Lang. Vocational Ed.	Business Ed. Fine Arts			Science	
Presenting info. to an audience (18%)		Fine Arts English			Elementary	
Communicating electronically (9%)		Misc. Academic Computer Ed.			Math	

Large Differences by Objectives of Teachers Reporting Students Use Computers for Class Work Outside of Class Time (Effect Sizes)



Objectives for Computer Use is Also Linked to Teaching Philosophy (Constructivism vs. Transmission-Oriented)



Competing Teaching Philosophies

Traditional Transmission 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

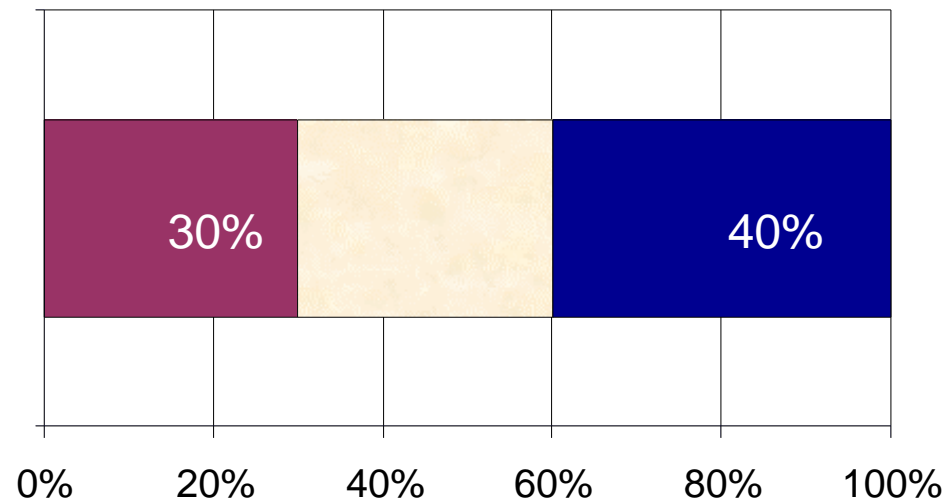
Constructivist Philosophy

- 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

Teaching Philosophy: Teacher as Instructor Or Facilitator?

Instructor

“My students won’t really learn the subject unless you go over the material in a structured way. It’s my job to explain, to show students how to do the work and to assign specific practice.”

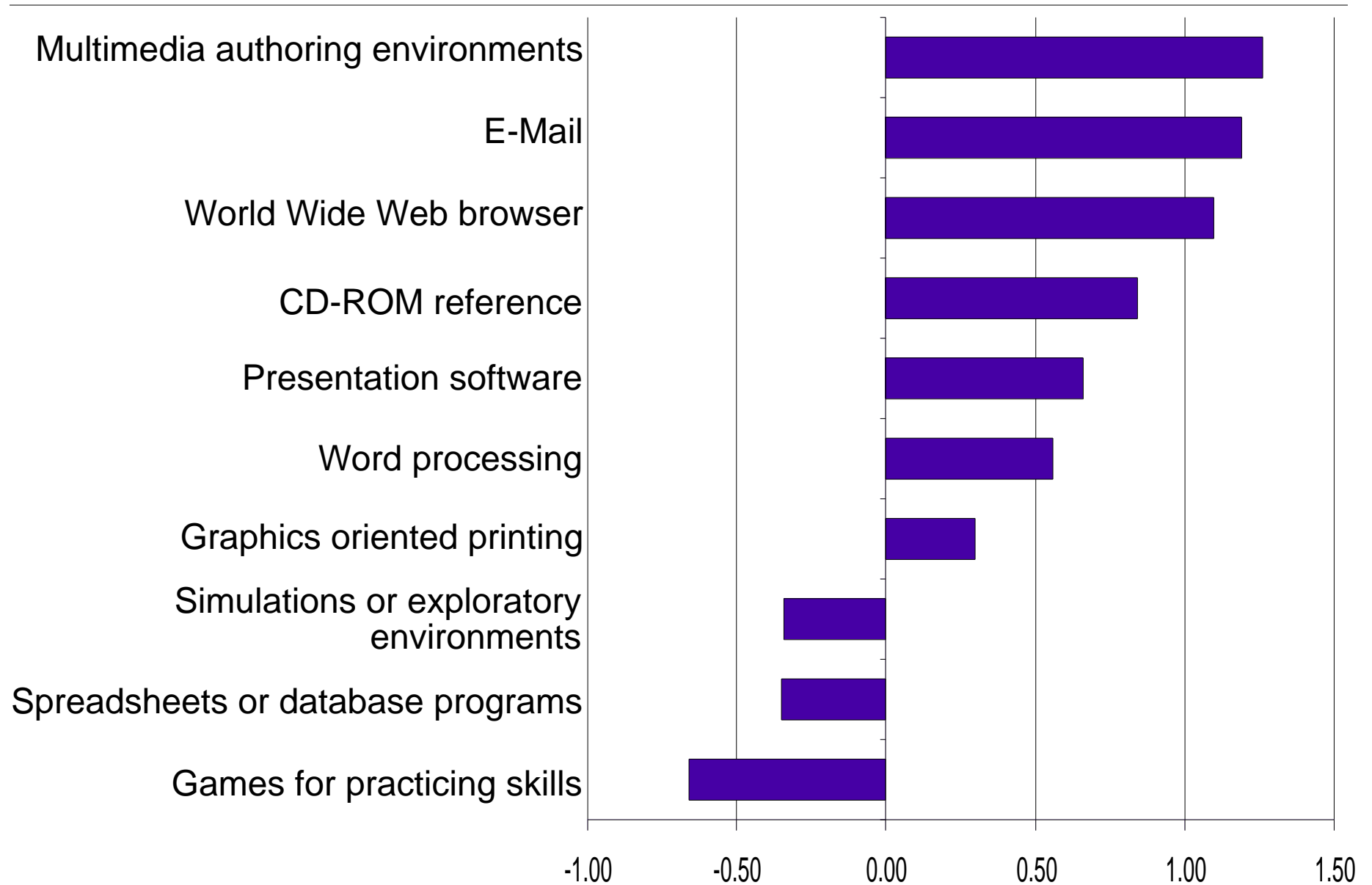


Facilitator

“I try to provide opportunities and resources for my students to discover or construct concepts for themselves.”

Which Software Is Linked with Constructivist Teaching?

(Constructivism of Computer Objectives of Major Users)

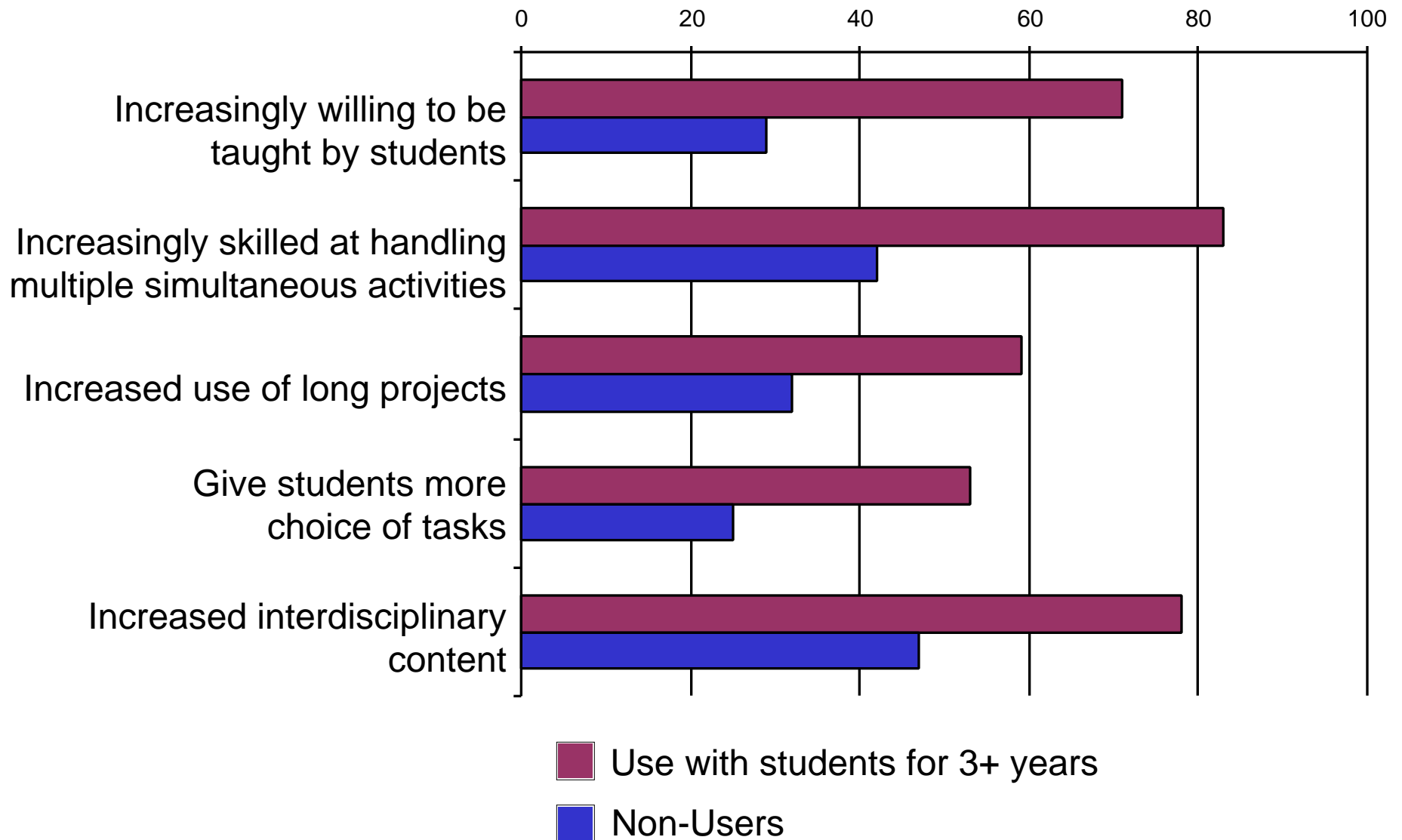


Which Teachers Report the Most Constructivist Pedagogical Change in their Own Practice?

- Users of a large variety of software
- Collaboration objectives for computer use
- “Written expression” objectives
- High computer expertise themselves
- Extensive use of World Wide Web

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

National School Network survey, Spring, 1997



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

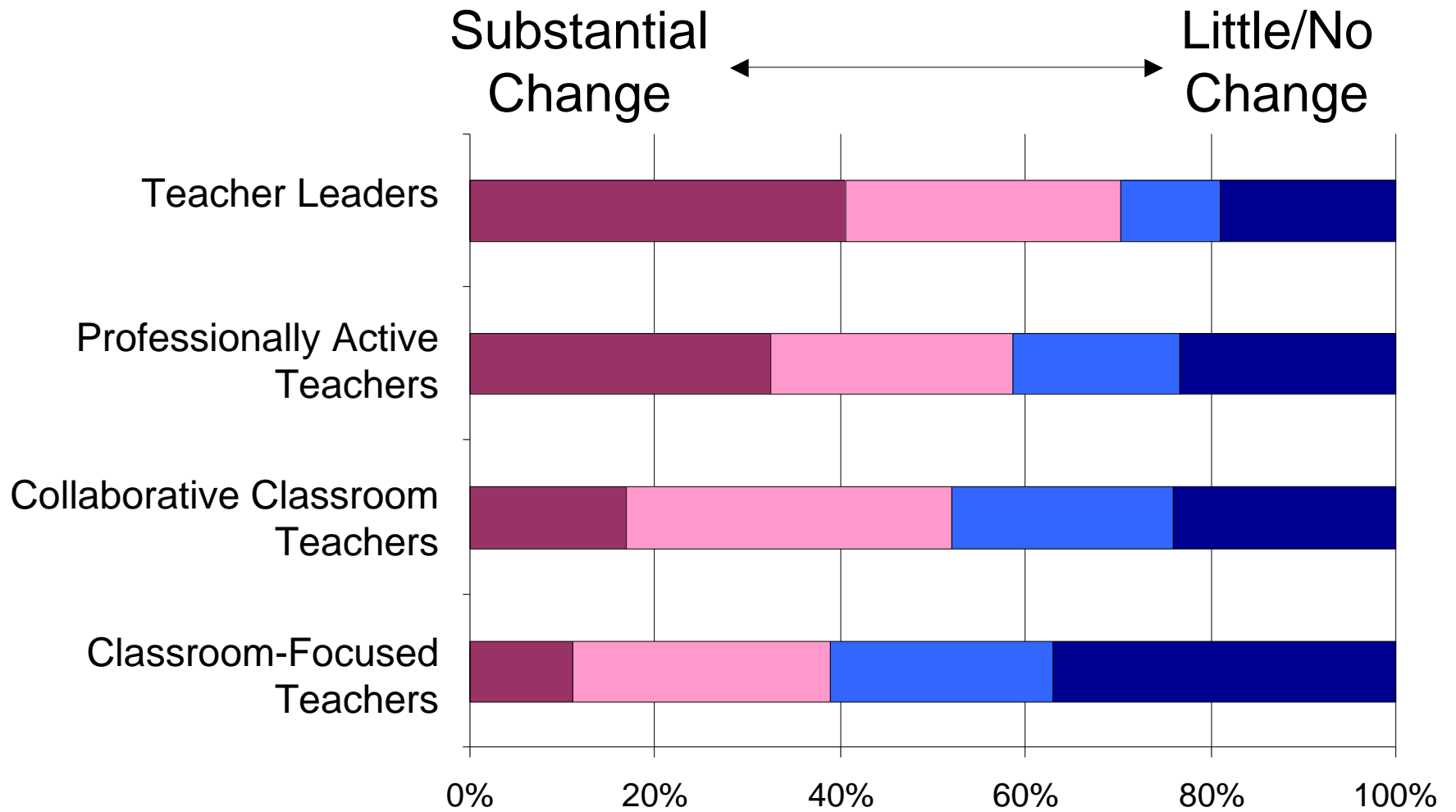
2. Teacher Interactions Beyond the School:

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

Change in Pedagogy in a Constructivist Direction



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

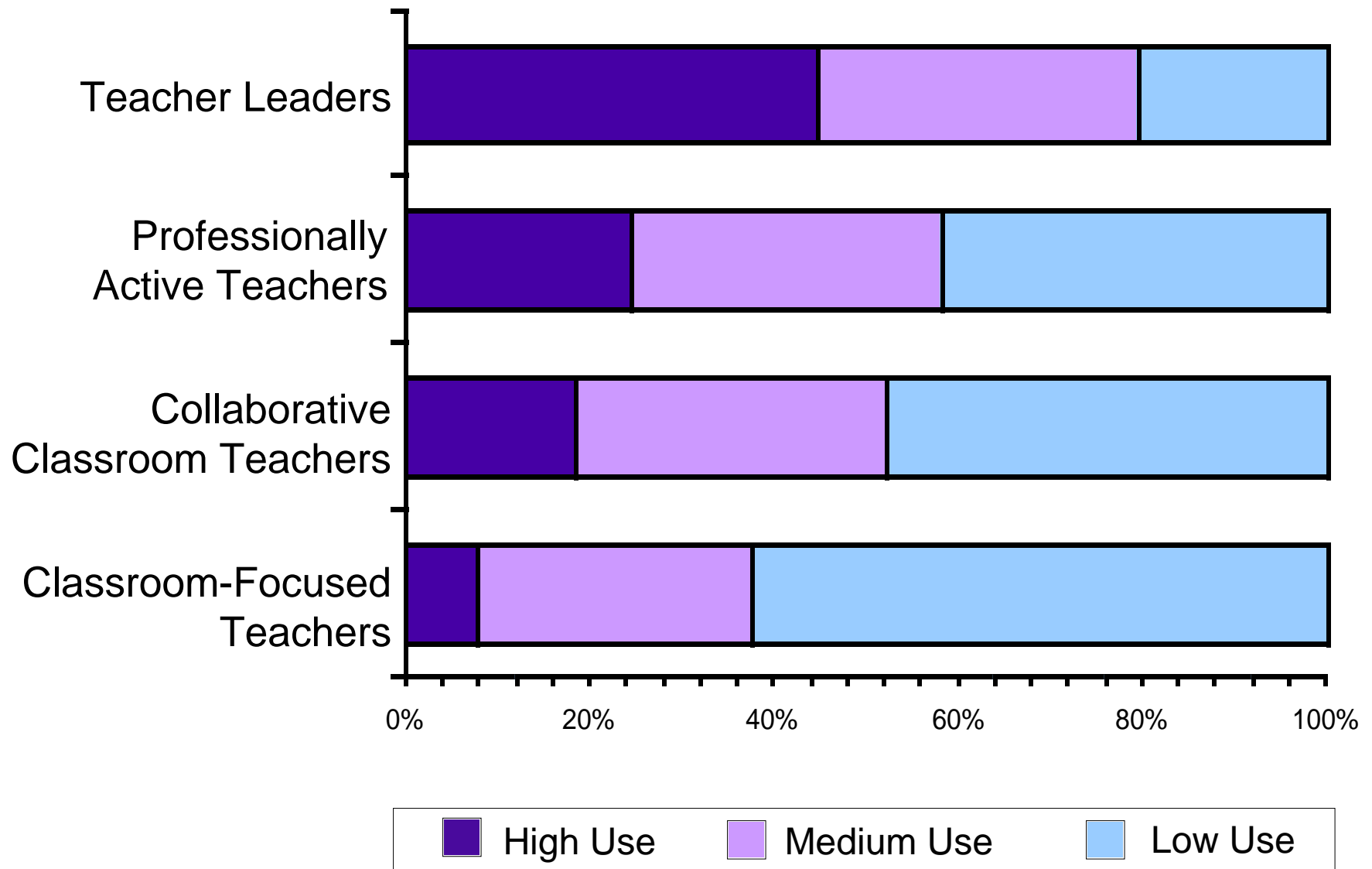
New ideas presented are discussed by teachers afterwards

Goal Consensus

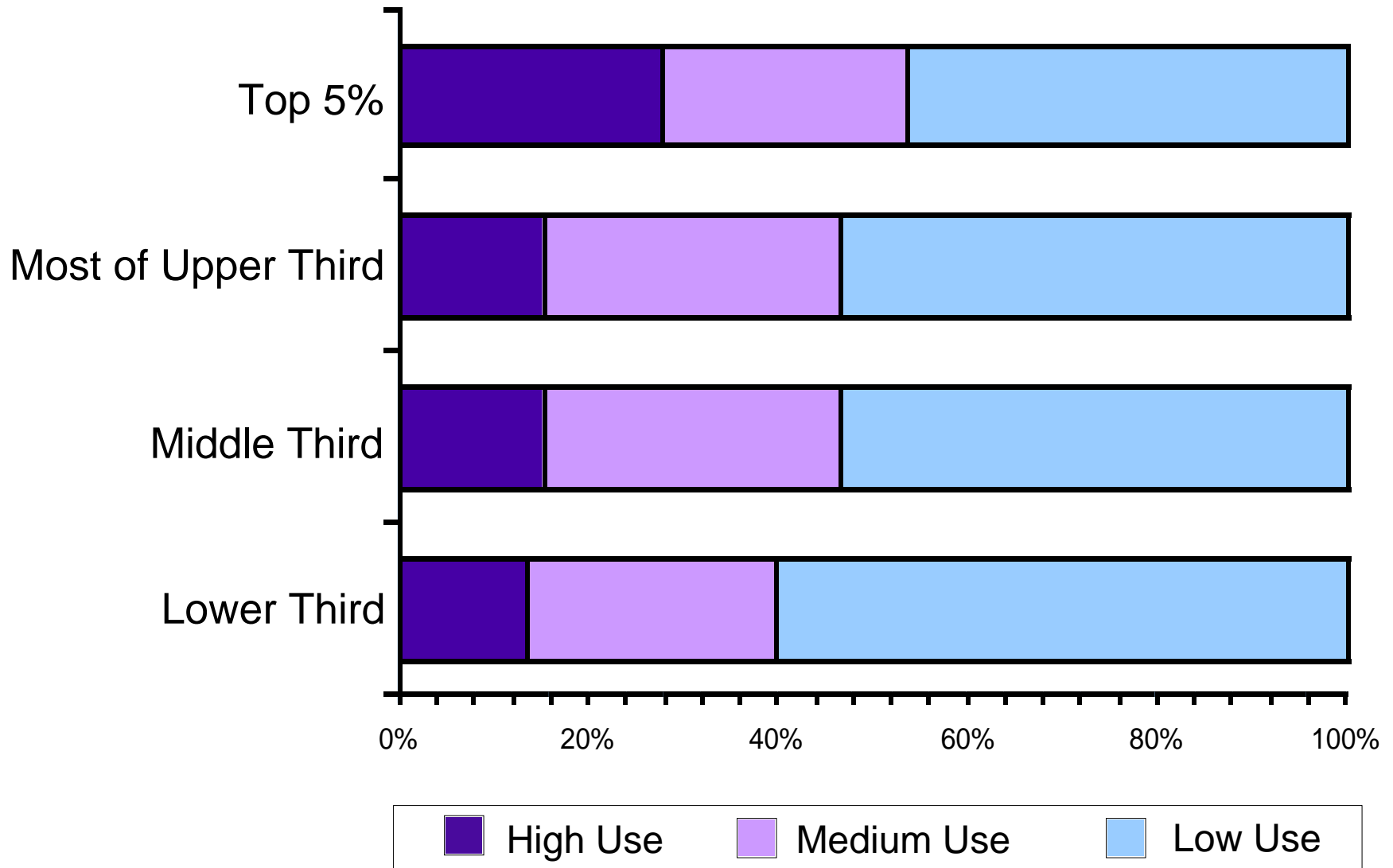
The principal's philosophy of education is similar to my own

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

Extent and Variety of Constructivist Computer Use by Teacher Role Orientation



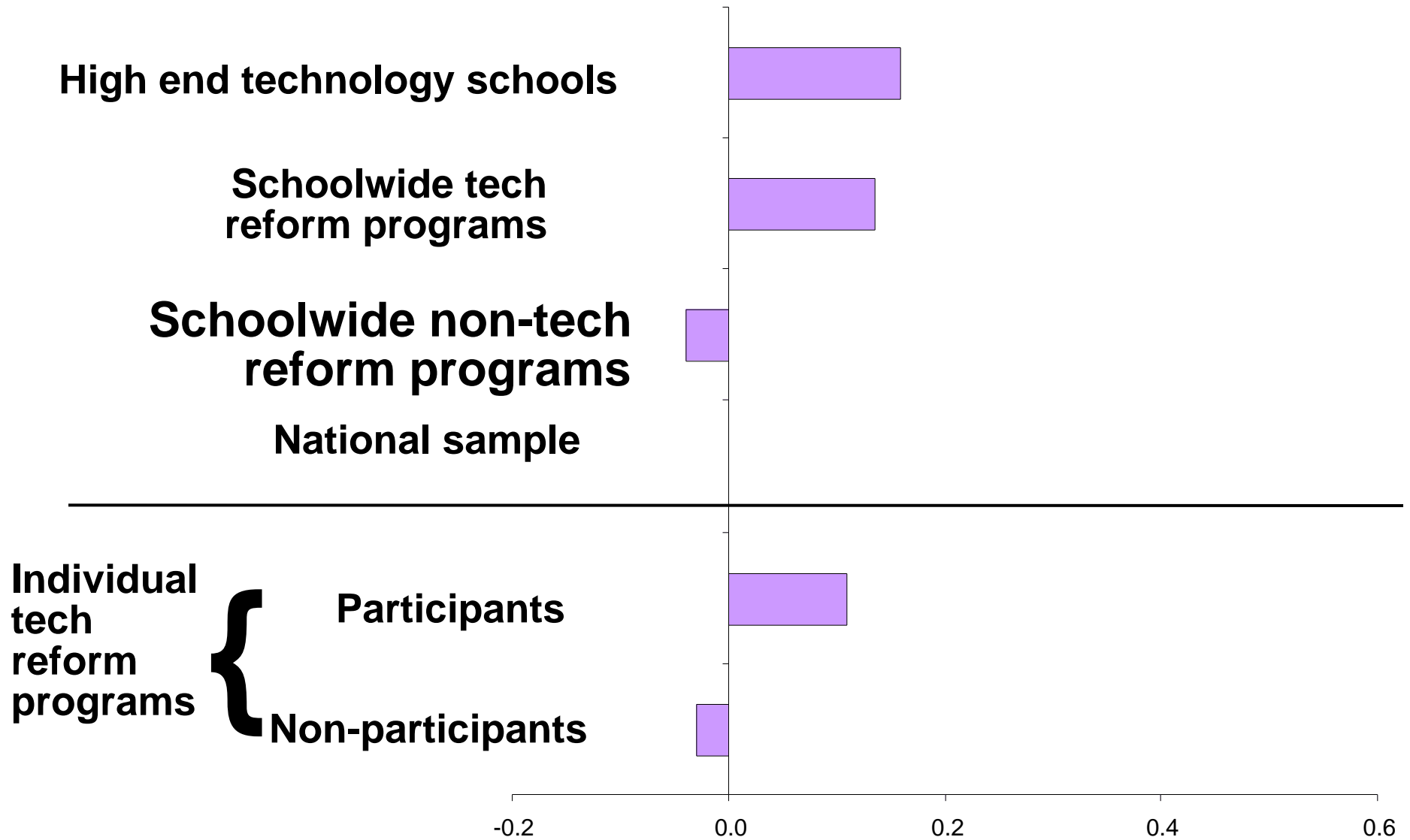
Extent and Variety of Constructivist Computer Use by School Work Culture



Structural and Personal Predictors of Constructivist Practice and Pedagogical Change

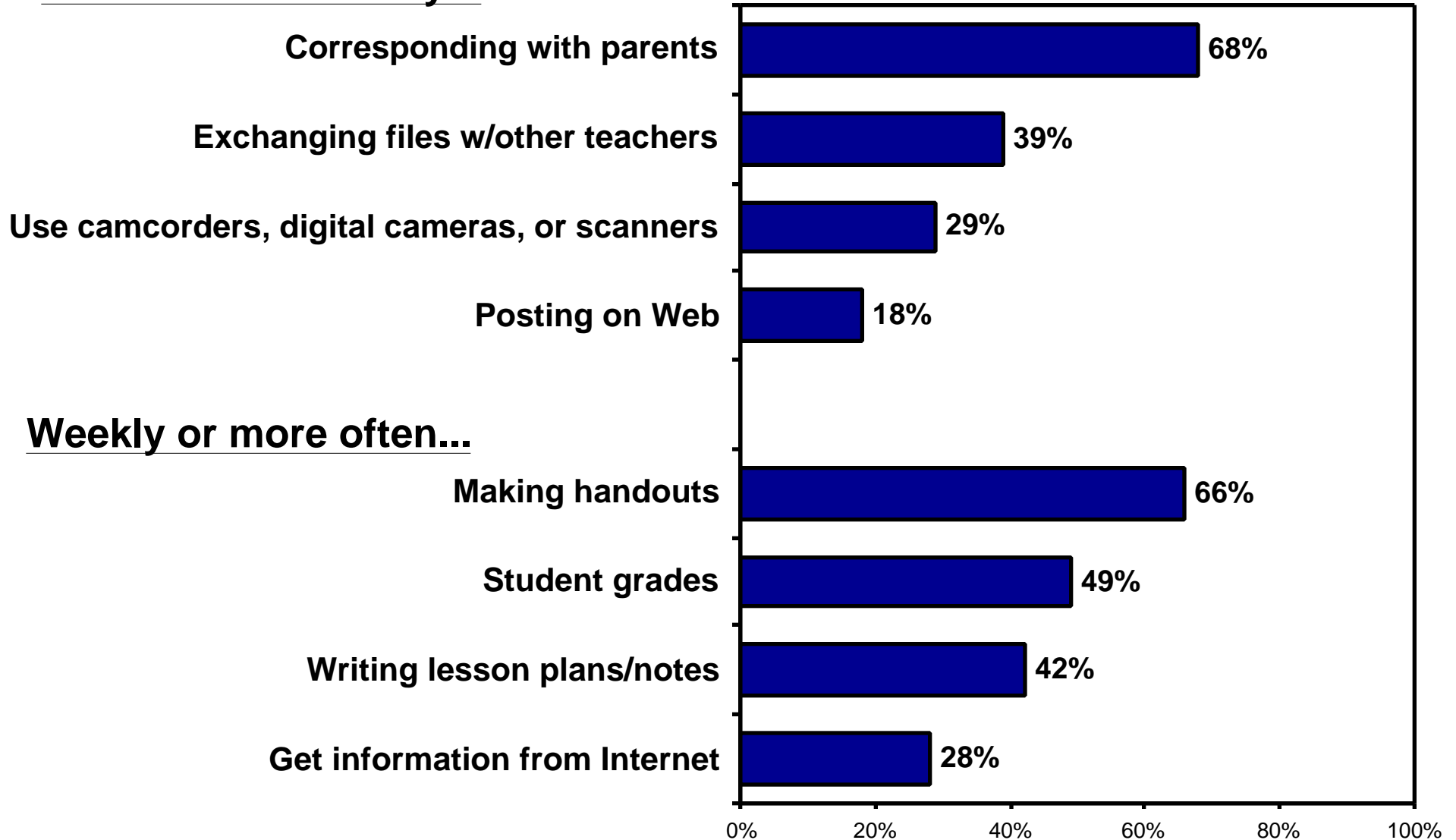
- Lots of technology available
- Schoolwide technology reform program present
- Teacher has a professional role orientation and personal involvement in reform programs
- Professional school culture exists

Constructivist Change in Teaching Compared to the National Sample

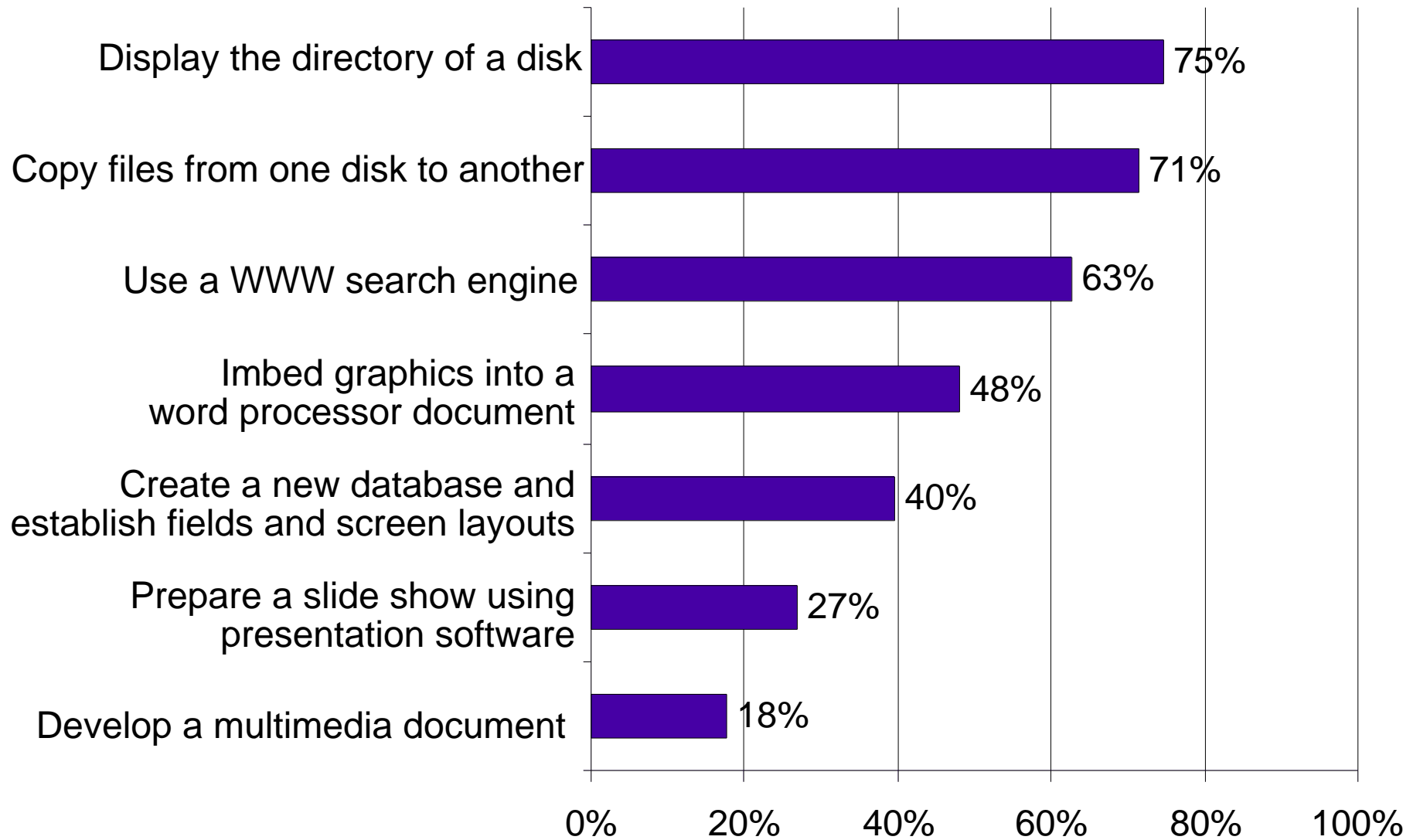


Professional Uses of Computers

At least Occasionally...



Percent of Teachers Who Report They Have The Following Specific Computer Skills



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