

# Indiana University



## **LEVERAGING TECHNOLOGY TO KEEP AMERICA COMPETITIVE (LEVTECH)**

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# DIFFERENT TERMS

<b>Others</b>	<b>American</b>
ICT	Technology integration
Student teachers	Preservice teachers
Beginning teachers	Induction teachers (1-3 years)
Teachers	Inservice teachers



# WHAT IS ICT?

- Technology integration
  - “...the incorporation of technology resources and technology-based practices into the daily routines, work, and management of schools” (Technology in Schools Taskforce, p. 1)
- Jonassen’s (1996) classification
  - Learning about technology
  - Learning from technology
  - Learning with technology
- Type classification
  - Type I
  - Type II
- Centered classification
  - Teacher-centered
  - Student-centered (constructivist)



# U.S. DEPARTMENT OF EDUCATION

- Details need for technology savvy students and teachers to maintain an internationally competitive society (National Educational Technology Plan , 2004)
- “The problem is not necessarily lack of funds, but lack of adequate training and lack of understanding of how computers can be used to enrich the learning experience” (U.S. DOE, 2004, p. 22)
- Preparing Tomorrow’s Teachers to Use Technology (PT3)
  - 1999 – 2003
  - Over \$750 million
  - Projects on new methods for preparing future teachers to effectively integrate technology into their teaching (Pellegrino, Goldman, Bertenthal, & Lawless, 2007)



- “While much has and will continue to be spent on information and communication technologies, very little of a systematic nature at the K-12 or higher education level is known about what people have been doing, why they followed the path they did, and what impact it is having on things that matter – what teachers do and the resulting student learning outcomes” (Pellegrino et al., 2007, p. 54)



# THE STUDY THAT PROMPTED ANOTHER

- National Center for Education Statistics (Kleiner, Thomas, & Lewis, 2007)
- 1,439 degree-granting four-year institutions with teacher education programs for initial licensure
- Survey to determine types of technology experiences institutions provided preservice teachers
  - “integrating technology into instruction” (reported by 100% of respondents)
  - “the use of Internet resources and communication tools” (100%)
  - “using technology to address content standards” (99%)
  - “using multimedia for instruction” (95%)
  - “using technology to access or manipulate data to guide instruction” (90%)
- CAUTION: “... reports of topics taught within programs should not be taken to mean that the topics were taught in any depth or breadth across the curriculum. Rather, the estimates only indicate that these topics were taught *at least to a minimal degree...*” (Kleiner, Thomas, & Lewis, 2007, p. 6)



# METHODS FOR INCORPORATING TECHNOLOGY IN PRESERVICE PROGRAMS

- 93% taught educational technology within methods courses
- 79% included technology experiences pre-service teachers' field experiences
- 51% offered a 3- or 4-credit hour educational technology course to pre-service teachers
- 34% offered a 1- or 2-credit hour course
  - (Kleiner, Thomas, & Lewis, 2007)





## **PERHAPS WE'RE NOT TEACHING THE RIGHT THINGS...**

**Teachers believe in the benefits of technology, but why is this not transferring into the classroom?**

# PERHAPS WE'RE NOT TEACHING THE RIGHT THINGS?

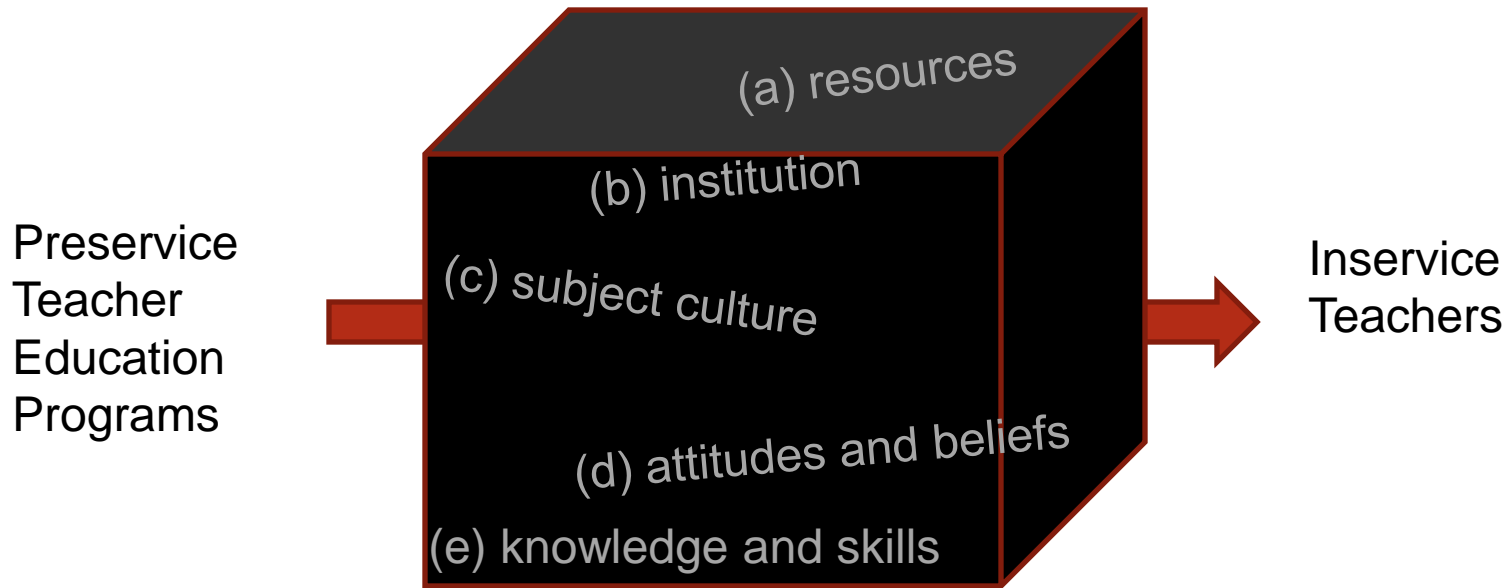
- "...today these [technology] courses are ubiquitous in teacher education programs; however there may be a discrepancy between what is taught in a majority of pre-service instructional technology courses and what is practiced by teachers in American schools" (Betrus & Molenda, 2002, p. 21)
- US teachers use technology for following purposes:
  - using the Internet for research
  - using computers for recreational/incentive purposes
  - utilizing drill-and-practice software
  - using for teacher planning (Hart, Allensworth, Lauen, & Gladden, 2002)
  - having students use word processing to complete writing activities (Becker, 2001; U. S. DOE, 2003)



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**PERHAPS THERE ARE TOO MANY  
BARRIERS?**

# THE BLACK BOX



Hew & Brush, 2007



# OVERCOMING BARRIERS

- What teachers find meaningful with regard to technology
  - knowledge of instructional problems that technology can help solve
  - knowledge of specific technology that can solve those instructional problems
  - knowledge of *how* the specific technology can help solve those instructional problems (Zhao, 2003)



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**PERHAPS TECHNOLOGY NEEDS TO  
BE INTRODUCED IN A SPECIFIC  
CONTEXT?**

# SUBJECT-SPECIFIC TECHNOLOGY USES

- Personally meaningful to teaching practices or educational setting
- Particular technological resources must be relevant to teacher's educational problems
- "...for teachers to use technology, they need to develop knowledge that enables them to transfer technological potentials into solutions to pedagogical problems, which are very local and deeply situated in their own contexts" (Zhao, 2003, p. 4)



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**PERHAPS WE'RE NOT TEACHING  
THEM IN THE RIGHT WAY...**

# WHAT ABOUT INDUCTION TEACHERS?

- Survey 412 first-year elementary teachers
  - teacher education programs, schools, and parents
  - access to computer resources and technology support
  - (Strudler, McKinney, Jones, & Quinn, 1999)
- Longitudinal case 4 teachers
  - easy access to technology resources and equipment in schools
  - agendas need to be aligned
    - between classroom teachers and support personnel
    - between school vision, implementation strategies, and evaluation
  - (Pierson, 2005)



# WHAT IS THE BEST PRACTICE FOR TEACHING PRESERVICE TEACHERS TECHNOLOGY?

- Stand-alone technology “skills” classes do not provide adequate or appropriate experiences
- Little empirical evidence that other methods and models are more effective
  - Courses that blend technology skills and technology integration (Algozzine et al., 1999)
  - Technology skills courses coupled with field experiences (Brush et al., 2002; Glazewski & Brush, 2003)
  - Project-based courses that focus specifically on technology integration strategies (Marra, 2004)
  - Tiered series of courses that are infused within the entire teacher education program (Appleman & Brush, 2003; Sanzone, Hunt, & Bevill, 2002)
  - Combination of multiple approaches (Kay, 2006)
  - Research is individual case studies, little to no evaluative data
- Review of 68 studies discussing various strategies (Kay, 2006)
  - “...only a handful of studies have carefully and rigorously pursued the evaluation process. The jury is still out on which strategies work best...” (p. 395).



# INITIAL THOUGHTS AND REASONS FOR STUDY

- We keep saying that we don't know the most effective way to teach
- Things we teach get lost when preservice teachers change to inservice teachers
- Look to the things that work for inservice teachers
- This may ease the transfer



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## WHAT PROMPTED THIS STUDY

# 2006 NCES STUDY

- 2512 Post-Secondary Institutions
  - 57% have initial licensure programs
  - 95% response rate from 1439 institutions
- Included public, private non-profit and private for-profit
- Prevalence of initial licensure programs
  - 83% of public
  - 58% of private non-profit
  - 10% of private for profit
- Private non-profits make up 61% of the institutions offering teacher licensure (880 institutions)
- Public institutions make up 36% (523 institutions)
- Private for-profits make up 3% (36 institutions)



# TECHNOLOGY INTEGRATION FINDINGS

- 100% teach the integration of technology into instruction
- 99% curriculum planning using technology
- 97% content specific technology tools
- 95% multimedia digital content for instruction
- 90% data to guide instruction
- 89% technology in assessing student achievement with regard to state standards
- 82% digital portfolios
- 79% assessment and evaluation strategies that involve technology
- 52% how to teach via distance learning

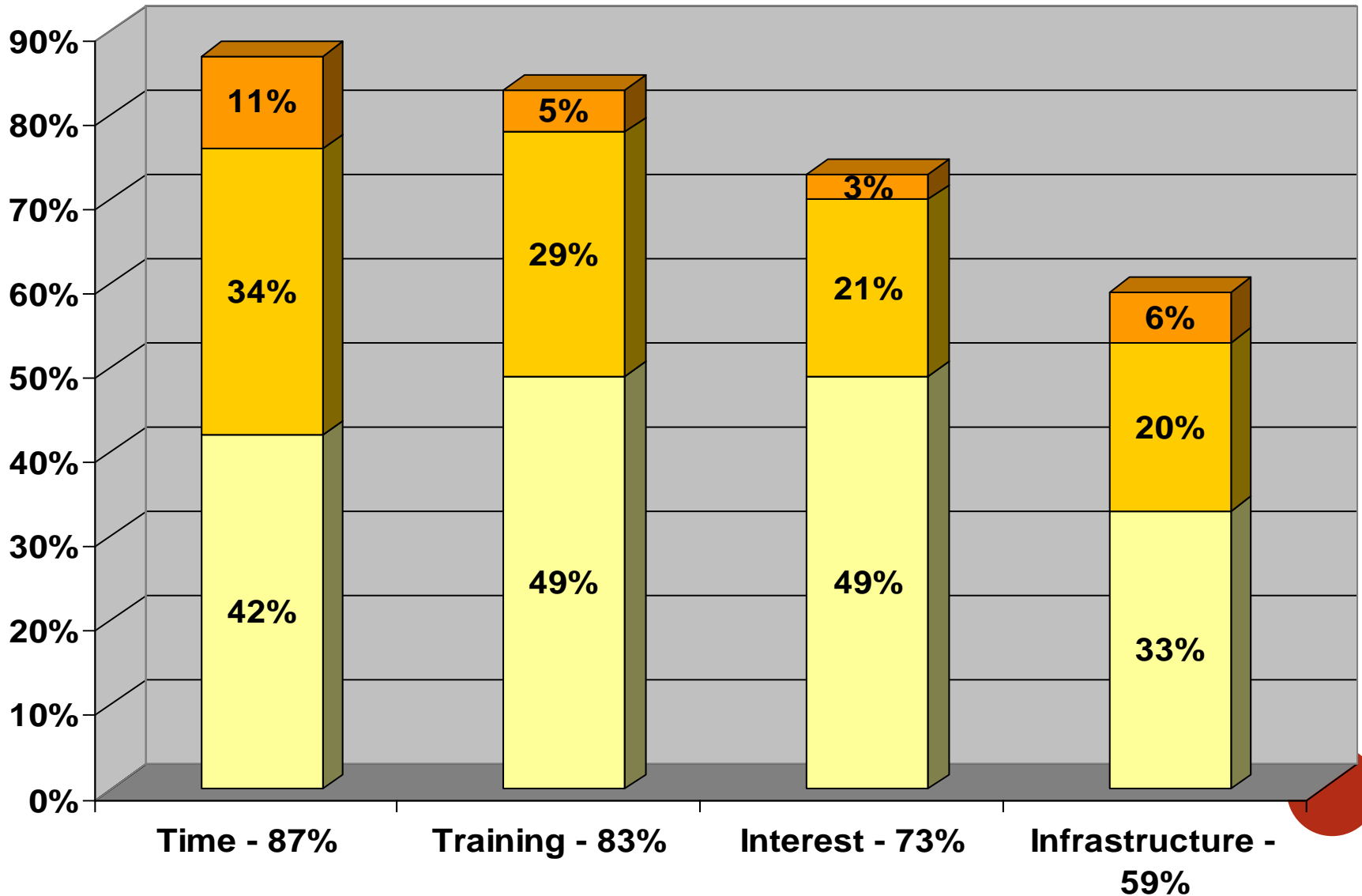


## HOW INSTRUCTION IS DELIVERED

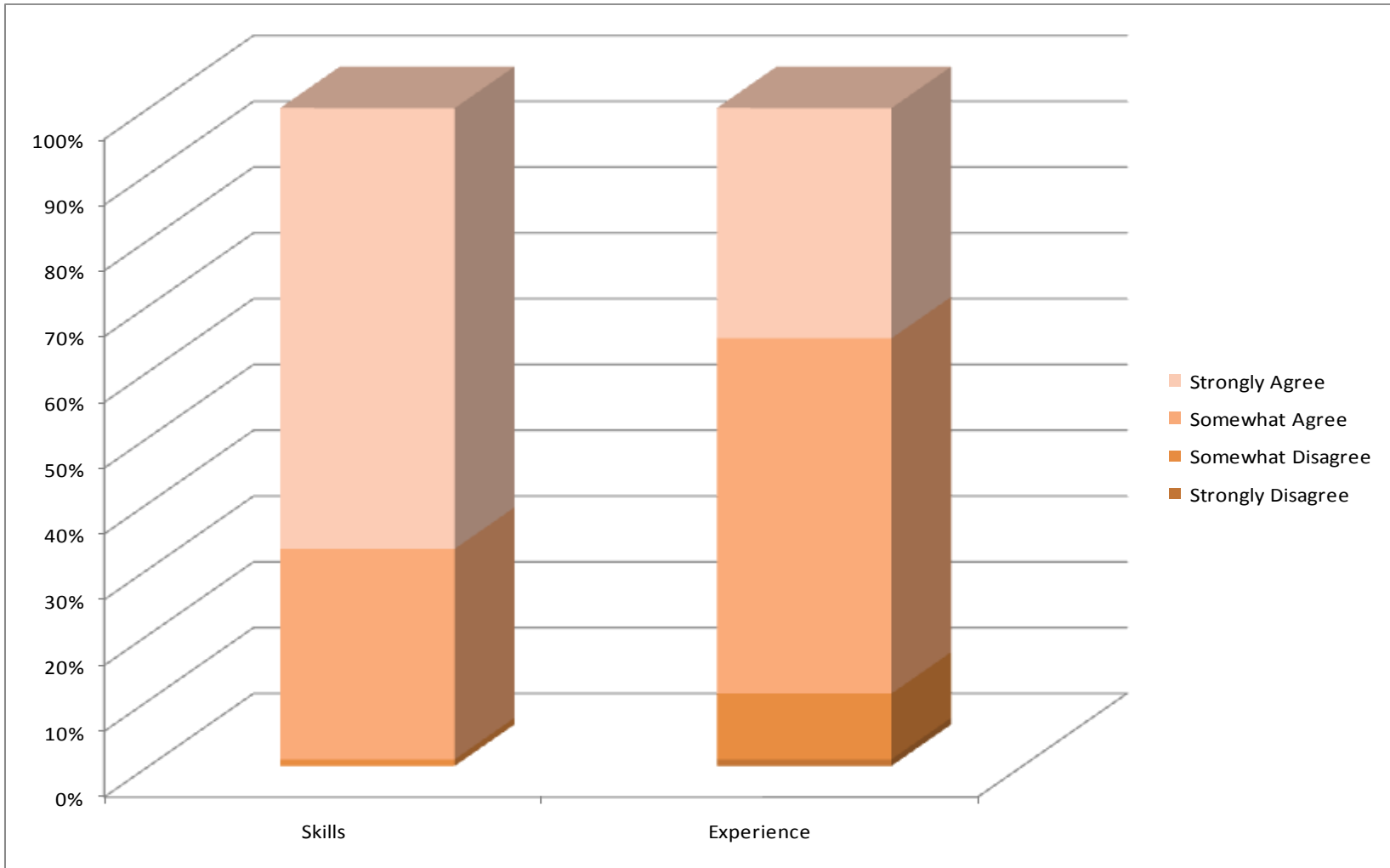
- 93% within methods courses
- 79% in field experiences
- 71% in content courses
- 51% in stand-alone 3-4 credit course
- 34% in stand-alone 1-2 credit course
- 3-4 credit stand-alone courses are more prevalent in public and larger institutions
- 79% of institutions reported little or no difference between the preparation of elementary and secondary teacher candidates



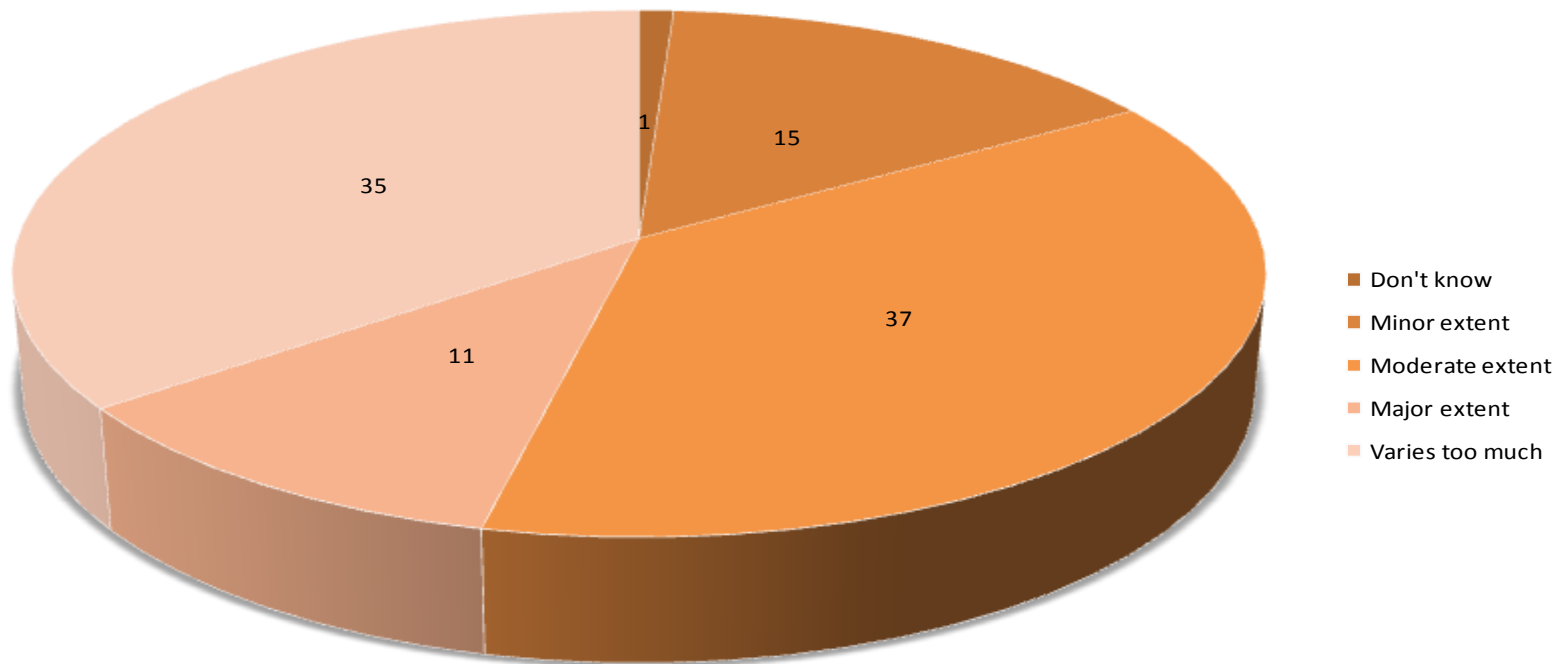
# BARRIERS TO TEACHING TECHNOLOGY: *TEACHER EDUCATION FACULTY*



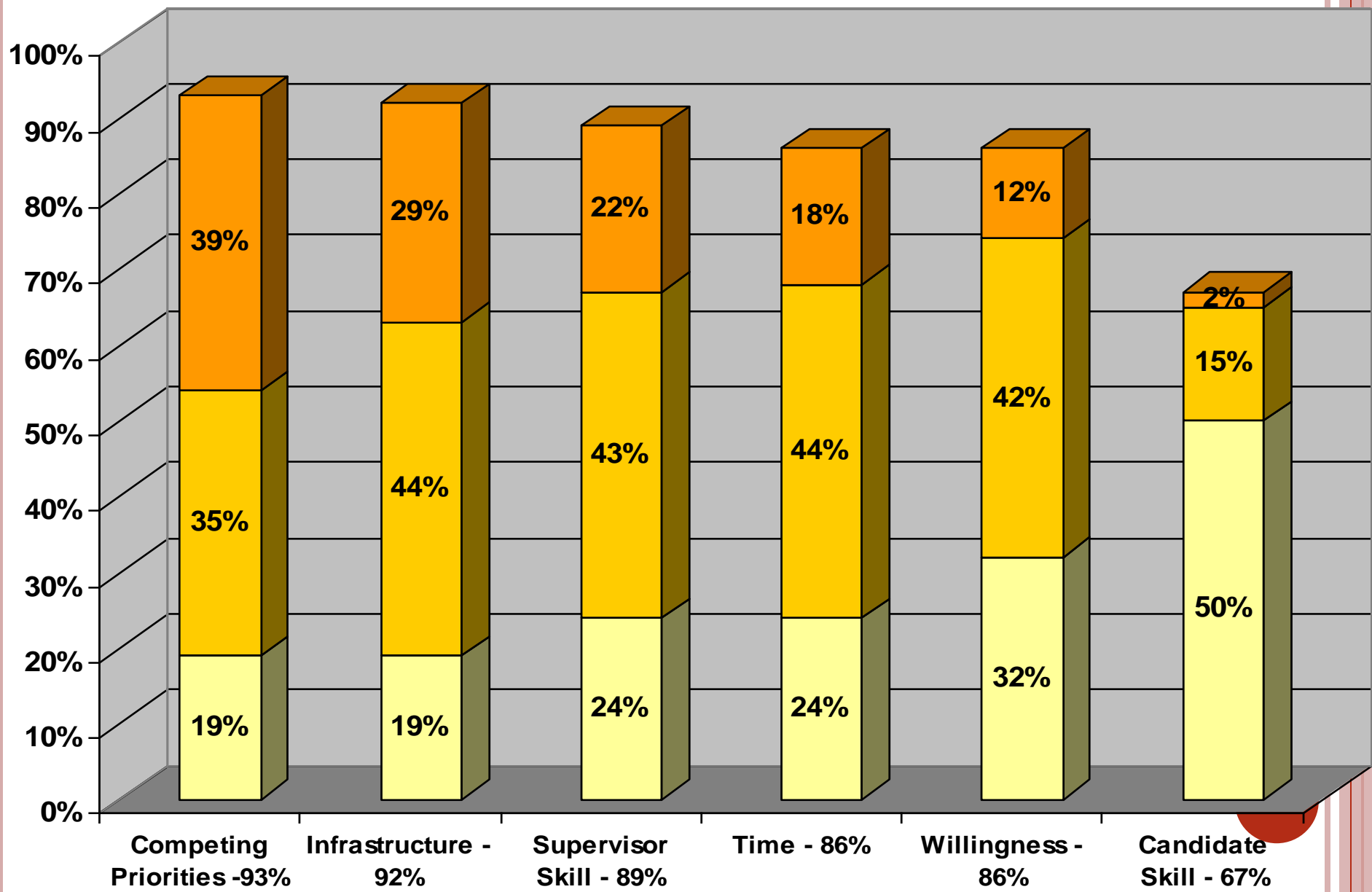
# PRESERVICE TEACHER CAPACITY

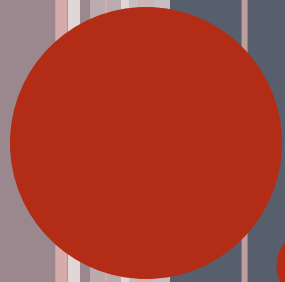


# TECHNOLOGY USE IN FIELD EXPERIENCES



# FIELD EXPERIENCE BARRIERS





# THE LEVTECH PROJECT

# LEVTECH OVERVIEW

- Leveraging Technology to Keep America Competitive
  - \$3.1 Million contract
  - US Department of Education, Office of Educational Technology
- The LevTech Project focuses on current research in the use of technology in education
  - Preservice education in instructional technology
  - Professional development in instructional technology
  - Use of technology for assessment
  - Improved methodologies for evaluating educational technology initiatives



# LEVTECH: NATIONAL STUDY

## ○ Examine:

- content and methods related to technology integration covered in pre-service teacher education programs
- how these experiences align with research-based practices and technology standards
- the impact these experiences have on teaching practices in K-12 classrooms
- gaps between the technology skills/experiences pre-service teachers acquire as part of their teacher education programs, and the technology skills and experiences that practicing teachers utilize and find meaningful in their classrooms



# COMPREHENSIVE LITERATURE REVIEW

- How are preservice teachers being prepared to use technology?
  - Teacher education programs
    - Topics (e.g., integrating technology into instruction)
    - Experiences (e.g., large lectures)
  - Teachers' uses
    - Supporting teaching and lesson planning or low-level student uses (e.g., drill and practice)
  - Successful induction experiences
  - Suggestions for preparing successful integrators (e.g., ISTE standards, resources, applied practice)



# RESEARCH QUESTIONS

- What technology experiences are included in preservice teacher education programs, and how do these compare to technology experiences supported by the research literature?
- What technology experiences do teachers
  - Find relevant and meaningful to their teaching and learning practices
  - Integrate into their teaching and learning practices?
- What are the similarities and differences between the technology experiences included in teacher education programs and the technology experiences teachers
  - Find relevant and meaningful to their teaching and learning practices
  - Integrate into their teaching and learning practices?




# OVERVIEW

## Teacher Education Program

- Phase 1
  - Educational technology faculty (n=1,283)
  - Screening instrument
- Phase 2
  - Selected educational technology faculty (n=150)
  - Phone interview and documents
- Phase 3
  - Teacher education program (n=10)
  - Site visits

## Inservice Teachers

- Phase 1
    - Induction teachers (n=1,500)
    - Screening instrument
  - Phase 2
    - Accomplished technology-using induction teachers (ATI) (n=50-100)
    - Accomplished technology-using experienced teachers (ATE)(n=50-100)
    - Phone interview and documents
  - Phase 3
    - ATI (n=10) & ATE (n=10)
    - Site visits
- 

# PHASE 1

## Teacher Education Programs

- Educational Technology Faculty
- N=1283
  - Descriptive responses of how technology is integrated
  - Recommend teacher education programs for Phase 2

## Teachers

- Survey of general induction teachers (*1-3 years experience*)
  - Descriptive responses of how technology is integrated
  - Recommend accomplished technology-using teachers for Phase 2



## PHASE 2

### Teacher Education Programs

- Phone interviews
  - 150 Educational Technology Faculty
- Gather resources
  - Technology course artifacts
  - Required texts and readings
  - Program requirements (online)
  - Practicum requirements (online)

### Teachers

- Phone interviews of selected accomplished technology-using induction teachers
  - artifacts
- Phone interviews of selected accomplished technology-using experienced teachers
  - artifacts



## PHASE 3: TEACHER EDUCATION PROGRAMS

- Case site visits of teacher education programs
  - Purposefully selected from phase 1 & 2 to be representative of different conditional matrix patterns
  - Number will depend on number of patterns
- Observations
  - Ed tech classes, school environment, classroom environment
- Artifacts
  - Class materials, student samples, etc...
- Interviews
  - Pre-service teachers, teacher education faculty, educational technology faculty, etc...



## PHASE 3: TECHNOLOGY-USING TEACHERS

- Case site visits of accomplished technology-using teachers
  - Purposefully selected schools with induction and experienced teachers from phase 2 that are representative of different conditional matrix patterns
  - Number will depend on number of different patterns
- Observations
  - lesson, school environment, classroom environment
- Artifacts
  - lesson plans, student samples, etc...
- Interviews
  - principal, teachers, media specialist/ computer teacher, etc...



# SAMPLING PROCEDURES

- Educational technology faculty
  - Population recruited from 4-year institutions offering elementary and secondary education programs
- General induction teachers
  - Population recruited through constituent groups (principals, superintendents)
- Accomplished technology-using induction/experienced teachers
  - Self-nominated and peer-nominated | Organizations
- Case site visits of teacher education programs
  - Based on results from phase 1 & 2
- Case site visits of accomplished technology-using teachers
  - Based on results from phase 1 & 2



# POTENTIAL CHARACTERISTICS FOR SELECTION OF PHASE 3 CASES

## ○ Teachers

- Student achievement
- Adequate yearly progress score (AYP)
- Socio-economic status
- Racial, economic, geographic diversity
- Rural/suburban/urban diversity
- Teacher education program

## ○ Teacher education programs

- Size of institution
- Governance structure - public/private
- Geographic diversity
- Representative nature of programs offered



# PHASE 3 INSTRUMENTS

- Teacher Education Program
  - Competency rubrics (e.g. ISTE/NETS-T)
  - Best practices rubric
  - Teacher education program technology resources checklist
  - Educational technology faculty interview protocol guide
  - Methods faculty interview protocol guide
  - Administrative interview protocol guide
  - Pre-service teacher interview protocol guide
- Accomplished technology-using teachers
  - K-12 technology resources checklist
  - Administrator interview protocol guide
  - Technology teacher interview protocol guide
  - Teacher lesson observation guide
  - Teacher interview protocol guide



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