That’s wonderful, but what are they going to talk about — G. B. Shaw, (when told that India and Britain were joined by cable)

The technicalities matter a lot, but the unifying vision matters even more — T. Nelson
Thanks
TPACK’d and ready to go!

@punyamishra
@matthewkoehler
Hot Air

Ballast
Hot air + Dead weight!
1. How we came to TPACK
2. What is it anyway?
3. The spread of an idea
4. Some examples...
5. Developing & Measuring TPACK
6. Looking ahead...

</START>
How we came to TPACK?
WAYBACK MACHINE – HISTORY OF TPACK
WAYBACK

1999
Hands on Contextualized Authentic Connected to *practice*

Learning by *doing*
design experiments

Brown, 1992; Cobb, Confrey, diSessa, Lehrer, & Schauble, 2003; Design Based Research Collective, 2003
design experiments

Learning Technology by

+ Faculty/Staff

Problems of practice
Diverse expertise

Distributed across the team

Faculty tended to be content experts

Masters students (teachers) tended to know more about technology
design Tasks

Example: Design an online course (e.g. a masters level course in literacy)

Learn technology as needed

Web-design, video editing, FTP, CMS, collaborative learning, communication tools, etc.
design experiments

Learning Technology by

Time - a whole semester
Course - Release
Financial Support
Equipment
Graduate Students

Friday, March 16, 2012
2002

It’s working!!

Collaboration allowed for sharing expertise

Learning was contextualized

Multiple technologies were being learned

Learners were engaged

Distributed knowledge was becoming shared by individuals
How to talk about it?

Shulman (1986)

Content knowledge

Pedagogical knowledge

Something missing - **Pedagogical Content Knowledge**: Knowledge about how to teach a particular subject matter.

Knowing how to teach math is different from knowledge about math, or knowledge about teaching in general.
2002

Shulman 1986

C —- P
Workshops

C — P

T
Learning Technology by

- C: Content
- P: Pedagogy
- T: Technology
- R: Representations

*Didn’t get a lot of attention*
Learning Technology by

C : Content
P: Pedagogy
T: Technology
R: Representations

* Didn’t get a lot of attention
2004

TPCK Unveiled

(First publication of the TPCK in 2004)

* Didn’t get a lot of attention
TPCK Evolves

(Published in 2005)

* Didn’t get a lot of attention
TPCK is re-conceptualized as a framework

* People start seeing valuable connections to their work
And how are we supposed to pronounce this again? ToothPiCK?
TPACK

Technological Pedagogical AND
Content Knowledge
TPCK gets a new Name

EDITORS’ REMARKS
Ann D. Thompson
Punya Mishra

Breaking News: TPCK Becomes TPACK!

For those of us interested in the construct Technological Pedagogical Content Knowledge and the clarity it brings to our work with preservice and inservice teachers, the acronym TPCK has been somewhat problematic. The consonant heavy, TPCK is difficult to say and even getting the letters in the correct order is a challenge for most of us. It is not surprising, thus, that both undergraduate students and inservice teachers tend to be put off when confronted with this unfriendly set of consonants. We have found ourselves apologizing every time we introduce the idea because it does tend to suggest the type of educational jargon for which we educators have received much (justifiable) criticism. TPCK is actually a simple, yet powerful idea and the complicated name and acronym does disservice to its utility and power.

technology, content and pedagogy that honors the interdepend these three important parts of teacher education and teaching. Em ing creating the total package for effective teaching and teacher ed will help bring clarity and simplicity to developing knowledge of d effective ways to help teachers take advantage of technology.

Products from the 9th Annual NTLS will go far beyond the rei of TPCK and will include the publication of a new ISTE book on of digital video in classrooms (developed within the TPACK fram a new agenda for legislative advocacy for funding for technology in tion, and suggestions for new directions for research and practi TPACK. Readers will see the unveiling on these products in ec and articles in each of the major journals in our field.

* People can pronounce it now
So what?

The framework comes from similar circumstances

A keen interest in developing teachers skillful use of technology

Deeply rooted in practice

In a way that communicates and connects to a variety of stakeholders
So what?

What you communicate is as important as how you communicate.
The framework has to be complex enough
What is it anyway?
Deconstructing

TPACK

1. Content Knowledge (CK)
2. Pedagogy Knowledge (PK)
3. Technology Knowledge (TK)
Framework is..

- Conceptual
- Descriptive
- Inferential
- Analytical
- Applied
Framework is not ..

Prescriptive

Complete
The spread of an idea
Handbook of
Technological Pedagogical
Content Knowledge (TPCK)
for Educators

Edited by the
AACTE Committee on Innovation and Technology

* 2008
Technology, Pedagogy and Content Knowledge (TPACK) SIG

SITE SIG Community Group

This SITE SIG Community Group is the official place to connect with all the members of this SIG. Join this SITE SIG Community Group Today!

Catalyzed by much interest at the SITE 2007 conference and launched during SITE 2008 by Judi Harris, Matt Koehler, Mario Kelly, and Punya Mishra, the Technology, Pedagogy, and Content Knowledge (TPACK) SIG seeks to bring together

Chairperson Info

Candice Figu

Mark Hofer
Over 300 scholarly articles
Over 20 Dissertations
Several Textbooks include TPACK

Individuals have used TPACK in their courses

TE programs have used TPACK (MSU, Iowa State)

Unified San Diego School District uses TPACK as one of its 3 pillars for professional development
39 institutions

Comprehensive standards (National Professional Standards)

Online Resources (full, rich exemplars) spanning content areas, grades, and contexts

Support network

Support at each institution
Tremendous opportunities

Along with some challenges
Some examples...
Lets get real!
What is an Educational Technology?
There is no such thing
Single Function Device!!
LOSS OF CONTROL
The problem
Most technologies are **NOT** designed for education!
But
Users redefine technologies
Why is this important?
Only repurposing makes a technology an educational technology.
Repurposing is a creative & innovative act
The crucial mediating role played by the teacher...
Teacher proof
Curriculum
Break out of the box
The transformative aspects of technology
examples!
Distance to moon

since the tape was recorded at Houston. From the minimum delay in Armstrong’s replies (last column of the 2nd row) an upper bound for the Earth-Moon distance was found, $d_{EM} < (4.5 \pm 0.7) \cdot 10^8 \text{ m}$.

<table>
<thead>
<tr>
<th>Replies from</th>
<th>Time delays (s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.35 ± 0.25</td>
</tr>
<tr>
<td>Houston</td>
<td>1.55 ± 0.15</td>
</tr>
<tr>
<td>Armstrong</td>
<td>4.05 ± 0.25</td>
</tr>
</tbody>
</table>

TABLE I: Time delays of the replies in the 3-minutes conversation between Houston and Armstrong during which the famous sentence “one small step for man, one giant leap for Mankind” can be heard. The errors represent the ranges of values measured by the 10 groups of students with
Representing educational tensions
And now repurposed!
Had some fun with cloning and transformations in geometry. Some groups got it and others...not so much. Made for great discussions, though, about transformations and isometry. And they learned a little bit more technology, too :)

8 hours ago · Like

This is an amazing idea! Can I share this with one of my colleagues that teaches geometry?

6 hours ago · Like

I bet they had fun doing it! Did you use the tripod like in class, or did a friend just hold the camera? I plan on doing this with my classes also. :-)

6 hours ago · Like

This album was awesome to look through...such an awesome use of tech!

4 hours ago · Like

Please share! I would love to see what the other students came up with as well.

4 hours ago · Like

- I had 3 mini tripods (one from this summer and two that I purchased at Best Buy) so some objects to rest the camera on.
Moving to mathematics
Key question(s)

How do we develop it?
How do we measure it?
Developing TPACK
(Many ways...)

Friday, March 16, 2012
Learning by Design
Teaching & Reflection
TPACK Development
Instructional Modeling
Learning Activities
Measuring TPACK
Inter-connected Issues
Finding TPACK

Where do we look?
1. Knowledge

A. Knowledge in each of the seven components

B. Self-report of knowledge, and connections between T, P, and C
2. Artifacts

A. Speech

B. Lesson Plans

C. Documents (e.g., Syllabi)
3. Practice

A. Classroom Observations  B. Self-reported Practices
4. Impact on Students

A. Understanding

B. Motivation

C. Test Scores
One example

From our masters program

Year 2 - Summer

Four years of data

Four years of data

In our Masters Program

TK
**d=.50**

TCK
**d=.63**

TPK
**d=.65**

TPACK
**d=.73**

Friday, March 16, 2012
One example

Used one survey only

Of teacher knowledge

In one program
Let Me Count the Ways
Let Me Count the Ways

Lots of TPACK work (several hundred papers)

Only a small percentage of that work tries to measure TPACK outcomes

Most of it is in Math-Science
Let Me Count the Ways

Much of the work is idiosyncratic

Great diversity in measures of TPACK

Not a lot of attention being paid to Reliability and Validity
Connect the Dots
Connect the Dots

Work is needed to connect these measures to one another

Surveys of teachers perceptions
Assessments of teacher knowledge
To assessments based on teacher observations
To assessments of teacher artifacts (lesson plans)
Effectiveness
Effectiveness
Effectiveness

What counts as a TPACK intervention?

How to pool results?

Using different measures?
Working on ...

Finding TPACK - (Measuring it)
Counting TPACK - (Tracking the Field)
Connecting the Dots - (Lining up the Measures)
Effectiveness - (Meta Study)
Looking ahead...
Learning for the new millennium...
$$\left( \sum_{k=2}^{n-1} \frac{n!}{k!(n-k)!} \right) + 1$$

n, k ≥ 2

Foundational Disciplinary Knowledge

Creativity Collaboration Innovation
A false dichotomy
(in)Disciplined learning
7 trans-disciplinary habits of mind
(for the 21st Century)

Mishra, Koehler, & Henriksen (2011)
7 trans-disciplinary habits of mind
(for the 21st Century)

Perceiving, Patterning, Abstracting,
Embodied Thinking, Modeling, Playing
Synthesizing
Summing up
New ecology
Standard solutions
Creativity
Is the only solution
Consider the Total PACKAGE
and we get there...
playful process
repurposing existing tools
An advertisement!
Something was not right!
Now for the...
That’s wonderful, but what are they going to talk about — G. B. Shaw, (when told that India and Britain were joined by cable)

The technicalities matter a lot, but the unifying vision matters even more — T. Nelson
Thank you!

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