Designing and Doing TPACK-Based Professional Development

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Have you seen this commercial?
Have you seen this commercial?

“Design a house around this.”
“Design a lesson around this?”
“The tail wagging the dog”
Technology Integration PD Needs:

(a brief exercise)
Knowledge needed?
Knowledge needed?

Technological Knowledge (TK)

Pedagogical Knowledge (PK)

Content Knowledge (CK)
Knowledge needed?
Knowledge needed?
Knowledge needed?
Available technologies
Access
Socioeconomics
Cultural diversity
Languages
Families
Time
Geography
District
Expectations
Student knowledge
Physical space
Interpersonal dynamics
Basic needs
Attitudes
Teacher knowledge
Contexts
Neighborhoods
Basic needs
Contexts
Knowledge Needed?

(Your teachers?)
Types of PD?

- Technological Knowledge (TK)
- Pedagogical Knowledge (PK)
- Content Knowledge (CK)
Types of PD?

- Technological Knowledge (TK)
- Pedagogical Knowledge (PK)
- Content Knowledge (CK)
• Instructor-led sessions (6 types)
• Individualized learning (4 types)
• Collaborative learning (5 types)
• Data-based inquiry (3 types)
• Materials & approaches development (2 types)
• Instructor-led sessions (6 types)
• Individualized learning (4 types)
• Collaborative learning  (5 types)
• Data-based inquiry    (3 types)
• Materials & approaches development (2 types)

See: http://etpd.wm.edu/
• Instructor-led sessions (6 types)
• Individualized learning (4 types)
• Collaborative learning (5 types)
• Data-based inquiry (3 types)
• Materials & approaches development (2 types)

See: http://etpd.wm.edu/
Types of PD?

- Technological Knowledge (TK)
- Content Knowledge (CK)
- Pedagogical Knowledge (PK)
- Technological Content Knowledge (TCK)
Types of PD?

Focus: Matching technologies’ affordances to instructional goals
- Instructor-led sessions (6 types)
- Individualized learning (4 types)
- Collaborative learning (5 types)
- Data-based inquiry (3 types)
- Materials & approaches development (2 types)

See: [http://etpd.wm.edu/](http://etpd.wm.edu/)
• Instructor-led sessions (6 types)
• Individualized learning (4 types)
• Collaborative learning (5 types)
• Data-based inquiry (3 types)
• Materials & approaches development (2 types)

See: http://etpd.wm.edu/
Types of PD?

- Technological Pedagogical Knowledge (TPK)
- Technological Knowledge (TK)
- Pedagogical Knowledge (PK)
- Content Knowledge (CK)
Types of PD?

Focus: Sharing & testing general management strategies
- Instructor-led sessions (6 types)
- Individualized learning (4 types)
- Collaborative learning (5 types)
- Data-based inquiry (3 types)
- Materials & approaches development (2 types)

See: http://etpd.wm.edu/
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See: http://etpd.wm.edu/
Types of PD?

- Technological Pedagogical Content Knowledge (TPACK)
- Technological Knowledge (TK)
- Technological Content Knowledge (TCK)
- Pedagogical Knowledge (PK)
- Content Knowledge (CK)
- Pedagogical Content Knowledge (PCK)
“The TPACK Game”
“The TPACK Game”
“The TPACK Game”

Content Standards

Technological
Pedagogical
Content
Knowledge
(TPACK)

Contexts
“The TPACK Game”
“The TPACK Game”

- Content Standards
- Technologies
- Types of Learning
- Pedagogical Content Knowledge
- Technological Knowledge
- Contexts
- Knowledge
“The TPACK Game”

- Content Standards
- Technologies
- Types of Learning
- (Other)
<table>
<thead>
<tr>
<th>Learning by Design</th>
<th>Inquiry &amp; Reflection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modeling</td>
<td>Developing TPACK</td>
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<tr>
<td>Self-Assessment</td>
<td>Microteaching</td>
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<td>Instructional Planning</td>
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<tr>
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</tr>
</tbody>
</table>
Teachers’ planning:

Page 9-20
Complete historical background.
Begin John Smith. Why was he not a reliable source? What were his main goals?

Odyssey
Cont.
Discuss chapter 1+2. Review IIIiad background. What vi happened. How do the Greeks see the gods?

Text pg 20-21

How does this affect their decision making? Assign chapter 3-4. Discuss as much as possible.

Who are Menelaus and Helen?
Teachers’ planning:

- Situated
- Contextual
- Activity-based
- Routinized
Since:
Since:

Educational technologies

not well integrated (yet).

Teachers' planning content-focused, activity-based.

Learning activities differ by discipline.

Technology integration interdependent T, P, C(nt), C(xt).
Since:

Educational technologies not well integrated (yet).
Since: Educational technologies not well integrated (yet).

Teachers’ planning
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<thead>
<tr>
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Since:

- Educational technologies not well integrated (yet).
- Teachers’ planning content-focused, activity-based.
- Learning activities
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Learning activities differ by discipline.
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- Teachers’ planning content-focused, activity-based.
- Learning activities differ by discipline.
- Technology integration
Since:

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Educational technologies not well integrated (yet).

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Learning activity types.
Curriculum-based Learning Activity Types
<table>
<thead>
<tr>
<th>Activity Type</th>
<th>Brief Description</th>
<th>Possible Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read Text</td>
<td>Students extract information from textbooks, historical documents, census data, etc.; both print-based and digital formats</td>
<td>Web sites, electronic books</td>
</tr>
<tr>
<td>View Presentation</td>
<td>Students gain information from teachers, guest speakers, and peers; synchronous/asynchronous, oral or multimedia</td>
<td>PowerPoint, Photostory, iMovie, MovieMaker, Inspiration, videoconferencing</td>
</tr>
<tr>
<td>View Images</td>
<td>Students examine both still and moving (video, animations) images; print-based or digital format</td>
<td>PowerPoint, Word, Photostory, Bubbleshare, Tabblo, Flickr</td>
</tr>
<tr>
<td>Listen to Audio</td>
<td>Students listen to recordings of speeches, music, radio broadcasts, oral histories, and lectures; digital or non-digital</td>
<td>Podcasts (&quot;Great Speeches in History,&quot; etc.), Audacity, Garageband, Odeo, Evoca, Podcast People</td>
</tr>
<tr>
<td>Group Discussion</td>
<td>In small to large groups, students engage in dialogue with their peers; synchronous/asynchronous</td>
<td>BlackBoard, discussion in Wikispaces, eboards</td>
</tr>
<tr>
<td>Field Trip</td>
<td>Students travel to physical or virtual sites; synchronous/asynchronous</td>
<td>Virtual fieldtrips, Photostory to develop their own virtual</td>
</tr>
</tbody>
</table>

Example Social Studies Activity Types
http://activitytypes.wmwikis.net
## Example Social Studies Activity Types

<table>
<thead>
<tr>
<th>Activity Type</th>
<th>Description</th>
<th>Resources</th>
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<tr>
<td>Conduct an Interview</td>
<td>Face to face, on the telephone, or via email students question someone on a chosen topic; may be digitally recorded and shared</td>
<td>Audacity, MovieMaker, iMovie, digital camera</td>
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<td>Artifact-Based Inquiry</td>
<td>Students explore a topic using physical or virtual artifacts</td>
<td>Digital archives</td>
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<tr>
<td>Data-Based Inquiry</td>
<td>Using print-based and digital data available online students pursue original lines of inquiry</td>
<td>CIA World Factbook, Thomas, census data, Excel, Inspire Data</td>
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<tr>
<td>Historical Chain</td>
<td>Students sequence print and digital documents in chronological order</td>
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<td>Students piece together print and digital documents to develop a story</td>
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<td>Historical Prism</td>
<td>Students explore print-based and digital documents to understand multiple perspectives on a topic</td>
<td>Wikispaces, Google Pages, Inspiration using links</td>
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[http://activitytypes.wmwikis.net](http://activitytypes.wmwikis.net)
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<tr>
<td>Do a Presentation</td>
<td>Students share their understanding with others; oral or multimedia approach; synchronous or asynchronous</td>
<td>PowerPoint, Photostory, Moviemaker, iMovie, Audacity</td>
</tr>
<tr>
<td>Engage in Historical Role Play</td>
<td>Students impersonate an historical figure; live, video-taped, or recorded</td>
<td>Moviemaker, iMovie, Audacity, digital camera</td>
</tr>
<tr>
<td>Do a Performance</td>
<td>Students develop a live or recorded performance (oral, music, drama, etc.)</td>
<td>Photostory, Moviemaker, iMovie, Audacity</td>
</tr>
<tr>
<td>Engage in Civic Action</td>
<td>Students write government representatives or engage in some other form of civic action</td>
<td>Web, email, videoconferencing</td>
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Example Social Studies Activity Types
http://activitytypes.wmwikis.net
Learning activity options:
- Read text
- Answer questions
- View presentation
- View images (video)
- Research
- Complete charts/tables
- Group discussion
- Write a report
- Create an illustrated map
- Develop a knowledge web
- Do a presentation
- Design an exhibit
Learning activity options:

- Read text
- Answer questions
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- View images (video)
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<th>Tools</th>
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<td>Group discussion</td>
<td>Blackboard, Wikispaces, eboards</td>
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<tr>
<td>Research</td>
<td>Digital archives, Notebook software, index cards</td>
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<tr>
<td>Develop a knowledge web</td>
<td>Inspiration, PowerPoint, Word, Mindmeister</td>
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<tr>
<td>Create an illustrated map</td>
<td>Paper/pencil, Google Earth, PowerPoint</td>
</tr>
<tr>
<td>Design an exhibit</td>
<td>Poster board, Wikispaces, PowerPoint, Glogster</td>
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<td>Face-to-face</td>
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<td>Wikispaces</td>
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Social Studies

• Knowledge building (x 15)
• Knowledge expression
  • Divergent (x 21)
  • Convergent (x 6)
Mathematics

- Consider (x6)
- Practice (x3)
- Interpret (x6)
- Produce (x5)
- Apply (x3)
- Evaluate (x4)
- Create (x4)
World Languages

- Listening  (x7)
- Speaking  (x13)
- Writing  (x21)
- Reading  (x10)
- Viewing  (x5)
“So, where’s the technology?”
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TPACK

- exploring
- developing
- assessing
# Assessing Teachers’ Knowledge

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<thead>
<tr>
<th>observation</th>
<th>interview</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Observation Image" /></td>
<td><img src="image2.png" alt="Interview Image" /></td>
</tr>
</tbody>
</table>

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<tr>
<th>artifacts</th>
<th>self-report</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3.png" alt="Artifacts Image" /></td>
<td><img src="image4.png" alt="Self-report Image" /></td>
</tr>
</tbody>
</table>

- **Observation:**
  - Observation
  - Artifacts
  - Self-report

- **Interview:**
  - Interview
  - Observation
  - Artifacts

---

**Interview Questions:***

1. How do you solve my past technical problems?
2. I can learn technology easily.
3. I keep up with important new technologies.
4. I frequently play around the technology.
5. I know about a lot of different technologies.
6. I have the technical skills I need to use technology.
7. I have had sufficient opportunities to work with different technologies.
8. I have sufficient knowledge about mathematics.
9. I can use a mathematical way of thinking.
10. I have various ways and strategies of developing my understanding of mathematics.
11. I have sufficient knowledge about social studies.
12. I can use a historical way of thinking.
13. I have various ways and strategies of developing my understanding of social studies.
Assessing Teachers’ Knowledge

Observation

Interview

Artifacts

Self-report

1. I know how to solve my class technical problems.
2. I can learn technology easily.
3. I keep up with important new technologies.
4. I frequently play around the technology.
5. I know about a lot of different technologies.
6. I have the technical skills I need to use technology.
7. I have had sufficient opportunities to work with different technologies.

CK (Content Knowledge)

Mathematics

I have sufficient knowledge about mathematics.

I can use a mathematical way of thinking.

I have various ways and strategies of developing my understanding of mathematics.

Social Studies

I have sufficient knowledge about social studies.

I can use a historical way of thinking.

I have various ways and strategies of developing my understanding of social studies.
<table>
<thead>
<tr>
<th>Criteria</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Curriculum Goals &amp; Technologies</strong></td>
<td>Technologies selected for use in the instructional plan are strongly aligned with one or more curriculum goals.</td>
<td>Technologies selected for use in the instructional plan are aligned with one or more curriculum goals.</td>
<td>Technologies selected for use in the instructional plan are partially aligned with one or more curriculum goals.</td>
<td>Technologies selected for use in the instructional plan are not aligned with any curriculum goals.</td>
</tr>
<tr>
<td>(Curriculum-based technology use)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Using technology in teaching/learning)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Technology Selection(s)</strong></td>
<td>Technology selection(s) are exemplary, given curriculum goal(s) and instructional strategies.</td>
<td>Technology selection(s) are appropriate, but not exemplary, given curriculum goal(s) and instructional strategies.</td>
<td>Technology selection(s) are marginally appropriate, given curriculum goal(s) and instructional strategies.</td>
<td>Technology selection(s) are inappropriate, given curriculum goal(s) and instructional strategies.</td>
</tr>
<tr>
<td>(Compatibility with curriculum goals &amp; instructional strategies)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>“Fit”</strong></td>
<td>Content, instructional strategies and technology fit together strongly within the instructional plan.</td>
<td>Content, instructional strategies and technology fit together within the instructional plan.</td>
<td>Content, instructional strategies and technology fit together somewhat within the instructional plan.</td>
<td>Content, instructional strategies and technology do <strong>not</strong> fit together within the instructional plan.</td>
</tr>
<tr>
<td>(Content, pedagogy and technology together)</td>
<td></td>
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Available: [http://activitytypes.wmw wikis.net/Assessments](http://activitytypes.wmw wikis.net/Assessments)
TPCK - Technological Pedagogical Content Knowledge

NEW: Subscribe to the TPACK newsletter by sending a blank email to sympa@lists.wm.edu, with the following text in the subject line: subscribe TPACK.news FirstName LastName. You can access recent newsletters by going to TPACK news I, Jan 09, and TPACK news II, Feb 09.

NEW: The TPACK survey developed through a collaboration between Iowa State and Michigan State, currently at version 1.1 is available here in PDF and in Word formats. Also, note the survey developed by Archambault & Crippen (2009) has also been published.

What is TPACK?

Technological Pedagogical Content Knowledge (TPACK) attempts to capture some of the essential qualities of knowledge required by teachers for technology integration in their teaching, while addressing the complex, multifaceted and situated nature of teacher knowledge. At the heart of the TPACK framework, is the complex interplay of three primary forms of knowledge: Content (CK), Pedagogy (PK), and Technology (TK). See Figure above. As must be clear, the TPACK framework builds on Shulman's idea of Pedagogical Content Knowledge.

Definitive descriptions of TPACK can be found in Mishra & Koehler, 2006, or through any of the other links in the "Learn more about TPACK" box on the right margin of this page, or on the left margin of every page.

http://www.tpack.org
Welcome to the Learning Activity Types Wiki!

This is a virtual place for folks interested in learning to "operationalize TPACK" (Technology, Pedagogy, and Content Knowledge) via curriculum-based learning activity types (ATs) to get up-to-date information, and (more importantly) participate in the vetting and refining of the activity types in each of the curriculum areas in which activity type development is happening.

The curricula in which we are developing and refining learning activity type taxonomies appear on the left. Those that have taxonomies available for your perusal and feedback have links to other pages in this wiki. Links to online surveys to use to provide feedback are included on live curriculum area pages.

Thanks for visiting, and please bookmark this site so that you can come back as this wiki grows.

Judi Harris & Mark Hofer  
School of Education, College of William & Mary  
Williamsburg, Virginia USA

(The "got TPACK?" button displayed above was designed by Purva Mishra for the SITE TPACK SIG.)

http://activitytypes.wmwikis.net
TPACK Newsletter
sympa@lists.wm.edu
In subject line:
subscribe tpack.news YourFirstName YourLastName
Designing and Doing TPACK-Based Professional Development

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