Change and Adoption: Scaffolding Your New Faculty Workshop Experience

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AAPT Physics and Astronomy New Faculty Workshop
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• Scaffolding
• Transparency

Scaffolding: National Research Council 2015
Build a useful scaffold for your NFW experience

• Anticipate steps in building teaching expertise
• Apply a framework for making wise instructional choices
• Identify aspects of your context that matter most
Plan:

1. Developing expertise
2. Wise instructional choices
3. Context matters
University science teaching is changing

1. Developing Expertise
University science teaching is changing

1. Developing Expertise
RBISs
Research Based Instructional Strategies

Close relatives:
EBIPs
Evidence Based Instructional Practices

1. Developing Expertise
Figure 5. Changes in Faculty Teaching Practices, 1989 to 2014
(\% Marking “All” or “Most” Courses)

% of Faculty


- Student evaluations of each other’s work
- Cooperative learning (small groups)
- Group projects
- Student-selected topics for course content
- Extensive lecturing
- Class discussions

Eagan et al. 2016

1. Developing Expertise
Figure 5. Changes in Faculty Teaching Practices, 1989 to 2014 (% Marking “All” or “Most” Courses)

- **STEM**
- All other disciplines

Hurtado et al. 2011

1. Developing Expertise
EPIC model of adoption

Exposure  Persuasion  Identification  Commitment

1. Developing Expertise

EPIC model of adoption

87.1% Physics Faculty, 2009

Exposure (Familiar with RBISs)  Persuasion  Identification  Commitment (Using RBISs)

Henderson & Dancy, 2009

1. Developing Expertise
NFW Participants

- Exposure ✓ ✓ ✓ ✓
- Persuasion ✓ ✓ ✓ ✓
- Identification ✓ ✓ ✓ ✓
- Commitment ✓ ✓ ✓ ✓

Chasteen, 2018
Exposure
Persuasion
Identification
Commitment

Novice
Expert
On the way to expertise, you might...

- Struggle to organize new information effectively.
- Have fewer automated processes.
- Work harder & feel less efficient than usual.
- Notice yourself “doing school” vs “sense-making”
Part 1 Takeaways:

• Be aware of EPIC: Exposure, Persuasion, Identification, Commitment
• Rely on supports to help you develop expertise and build robust knowledge structures. E.g., scripts, templates, etc.
• Notice when you are “doing school” vs “sense-making” – invest in sustainable adoption with the latter
1. Developing expertise
2. Wise instructional choices
3. Context matters
On the way to expertise, you might...

- Struggle to organize new information effectively.
- Have fewer automated processes.
- Work harder & feel less efficient than usual.
- Notice yourself “doing school” vs “sense-making”
Having a framework will help:

You will encounter:

- Evidence of effectiveness
- Use:
  - Sample(s)
  - Demo(s)
  - Case(s)
- Implementation advice
- Discussion/application

<table>
<thead>
<tr>
<th>RBISs:</th>
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<tbody>
<tr>
<td>Just In Time Teaching (JITT)</td>
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<tr>
<td>Labs</td>
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<tr>
<td>Tutorials</td>
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<td>Interactive Lecture Demo</td>
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<tr>
<td>Think-Pair-Share/ Peer Instruction</td>
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<tr>
<td>Open Source Physics</td>
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<td>PhysPort/comPADRE</td>
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</tbody>
</table>
Crucial questions to ask about RBISs

• Why use this?

• What aspects are essential?

• What are the potential pitfalls?
Why use this?

**Hypothetical RBIS A**
- Students work in pairs
- Short conceptual questions
- One cycle takes a few minutes

**Hypothetical RBIS B**
- Students work in teams of four
- Multi-part problems/cases
- One cycle takes 20-30 minutes

2. Wise Instructional Choices
2. Wise Instructional Choices
Other kinds of learning...

- Learning How to Learn
  - Becoming a better student
  - Inquiring about a subject
  - Self-directed learners

- Foundational Knowledge
  - Understanding & Remembering:
    - Information
    - Ideas

- Application
  - Skills
  - Thinking: critical, creative, practical
  - Managing Projects

- Caring
  - Developing new:
    - Feelings
    - Interests
    - Values

- Human Dimension
  - Learning about:
    - Oneself
    - Others

- Integration
  - Connecting:
    - Ideas
    - People
    - Realms of Life

Fink 2003
Affordances

• **What a technology/approach/environment offers**

• What it makes possible

• May include:
  • Usefulness
  • Usability
  • Educational functionality
  • Social functionality

• Could be desirable or not
Affordances: E.g., CHALK

- What a technology/approach/environment offers
- What it makes possible
- May include:
  - Usefulness
  - Usability
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  - Social functionality
- Could be desirable or not

Stable place to record ideas

Students see multiple panes/phases of thinking; editable

Standing, Writing, Seeing

Often used by only the instructor; may be used collaboratively

2. Wise Instructional Choices
Why use this?

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What kinds of learning can it address?
What are its key affordances?

2. Wise Instructional Choices
Crucial questions to ask about RBISs

- **Why use this?**
  - What kinds of learning can it address?
  - What are its key affordances?

- **What aspects are essential?**
Fidelity of adoption

High Quality Reproduction

What’s essential?

What’s adaptable?

Li et al. 2015

2. Wise Instructional Choices

Image: Jordanhill School D&T Dept, CC BY 2.0
Minimum increment

2. Wise Instructional Choices
What aspects are essential?

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Fidelity of adoption? Minimum increment?

2. Wise Instructional Choices
What are the potential pitfalls?

• Common “mistakes” (non-optimal implementations)?
• Ways to avoid them?

2. Wise Instructional Choices
Potential pitfalls

“[Student] comments on the use of polls is generally mixed, but encouraging.

One of the general takeaways, that you had already warned me about, is that such things can be useful, but one has to be very careful how one uses it.

I enjoyed the [method] and aim to use it more in the future, but it requires a lot of thought to make it productive. And even more to have the students recognize the value :-)

2. Wise Instructional Choices
What are the potential pitfalls?

• Common “mistakes” (non-optimal implementations)?
• Ways to avoid them?

2. Wise Instructional Choices

Ask:
• NFW Facilitators
• Each other

NFW practice sessions – you will get several main pitfalls out of the way here.

These may not always be articulated in the published literature…
1. Developing expertise
2. Wise instructional choices
3. Context matters
Common hurdles in adopting/sustaining RBISs:

• Training
• Time
• Incentives
• Tensions with professional identity

3. Context Matters

Brownwell & Tanner 2012
3. Context Matters

Institutional context

- Time
- Incentives
- Identity

Research
Teaching
Service
Context: Institutional Differences

3. Context Matters
3. Context Matters

Context:
Career Stage Differences

Research
Teaching
Service
Evaluation Criteria (Promotion/Tenure)

3. Context Matters
Does the overlap matter?

3. Context Matters
Bubbles exclude things, too:

SAYING NO

3. Context Matters
USING RESOURCES

3. Context Matters

- Online Repositories
- Teaching
- Service
- Institutional Grants/Releases
- Faculty/Teaching Center
- Others’ materials
3. Context Matters

Institutional context

Time
Incentives

Research
Service
Teaching

Magic Wand
Productive Alignment
Professional & Personal Identity Matters

- Who you are as a scientist, educator, mentor, colleague, person...
- Circumstances in which you best express your enthusiasm and passion...
Context and Identity

Hypothetical RBIS A
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What if you:
- Have multiple course preps in a term?
- Teach in rooms with fixed, tiered seating?
- Find it challenging to interrupt/improvise?
- Have a full set of course materials from a colleague and are teaching for the first time?

2. Wise Instructional Choices
Physics and Astronomy New Faculty Workshop: June 2018

The following questions may be helpful when deciding which RBISs (Research Based Instructional Strategies) to implement:

<table>
<thead>
<tr>
<th>Why use this RBIS?</th>
<th>What are the essential aspects?</th>
<th>What are the potential pitfalls?</th>
<th>How does this RBIS align with your context?</th>
<th>How does it align with your teaching personality, values, and goals?</th>
</tr>
</thead>
<tbody>
<tr>
<td>• For what kinds of learning goals and objectives is it well suited?</td>
<td>• What do you need to do to maintain fidelity?</td>
<td>• Common &quot;mistakes&quot; (non-optimal implementations)?</td>
<td>• Time and Effort</td>
<td>• How does it seem like a good fit?</td>
</tr>
<tr>
<td>• What are its key affordances?</td>
<td>• What's the minimum increment?</td>
<td>• Ways to avoid them?</td>
<td>• Support and Resources</td>
<td>• What might be challenging?</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Expectations in Your Role</td>
<td>• Are the challenges worth it now?</td>
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References & Resources:


