Managing Collaborative Teacher Inquiry: Cognitive Lessons From Implementation In A Computerized Network Setting

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What troubled us?

Research:

Shows traditional teaching ⇒ weak problem solving skills

Explores Learning difficulties

Assists developing instruction & materials

Shows improvement in problem-solving skills

Practice:

Fostering problem solving is accepted goal for teachers

Yet, Research-based Instruction is not implemented
What we hoped would help

Analysis:
Research based instruction requires teachers to:

• Transfer responsibilities to students
• Change concepts and habits
• Coordinate new and traditional agenda

Leads to:
• Fear from trying out new practice
• Give up what does not work on first shot

Yet,
For change to occur teachers must face their fears

Solution:

Collaborative Physics Teacher Inquiry

Teachers reflect on the very process of applying a new classroom practice
Feldman, Hammer, Eylon & Bagno show:
Teacher inquiry
  • Enriches teachers' interpretations of class events
  • Supports teachers in a process of change

Implementation:

Workshop: collaborative teacher inquiry
  on promoting problem solving skills

Important elements:

Introductory constructivist workshop:
  Introduce research, Induce concern

Yearlong meetings:
  Leader imports Research + Curriculum
  Teachers Autonomous to implement
  Discussion: external + internal innovations
Formative evaluation

2 workshops, ~ 7 Motivated, experienced teachers
Diverse schools, ~ 30 students per teacher

Matriculation exam

Results:
Teachers' concerns
Students problem solving

Fear of trying out new instruction
Give up what does not work on first shot

What we concluded

Research Based Instruction +
Concerned and Experienced teachers +
Collaborative Inquiry

Did Not Help!
What helped?

3rd workshop:

Introductory workshop:

Beyond concern ⇒ Ownership

Yearlong meetings:

Management framework where teachers follow action research steps:

- Analyze existing practice
- Suggest new practice
- Try
- Evaluate and Refine
Flag man (presenter) method:

- All: Analyze, Plan instruction
- Set goals
- Construct materials

Presenter:
- Discussion of presenter experience
- Evaluation: What’s wrong
- Documentation:
  - What happened, difficulties
  - Peers: Feedback

All:
- Revision: What’s next?
- What's the solution?
- Trying Out

Class
Teacher
Group

Management framework implementation:
9 learning cycles, interwoven with other activities, in person and computerized setting (accessibility)
Results:
Teachers implemented and refined new practices

Teachers' feedback: "computerized implementation is better. Helps learn the lessons, gain from peers"

Following teachers' request ⇒ 7 computerized cycles

What we concluded

1) Research Based Instruction + Teachers with Ownership and Experience + Management Framework for Collaborative Inquiry Helped

2) Setting is important in making management framework effective
**Why is setting important?**

Setting ⇒ Implementation of management framework
Management features ⇒ Teachers' performance

**What we hope to learn:**

Identification of important management features

**What is the research plan?**

Comparison of computerized vs. in person setting

Trial session first third of a yearlong workshop
2 in person, 4 computerized cycles

Data: Paper + electronic documents
Video of meetings, Protocol e-conferences
How does setting shape implementation?

**Media:** visual (text and figures) vs. spoken

*Need to transfer most of the interaction to e-forums*

**Accessibility:** connection from home vs. commuting

*Possibility for several updating*

**Verification:** Actual participation vs. attendance

*Possibility to change norms, to require participation*
Management framework implemented differently:

In person setting:
   Reporting documentation, peer feedback, discussion in 3 hour afternoon meeting at the Weizmann

In computerized setting:
   **Friday: Editing**
      Presenter e-talks to workshop leader
   **Monday: Distribution**
      Presenter sends documentation to e-forum
   **Monday-Wednesday: Reading, writing**
      Peers read documentation and write feedback at home
   **Wednesday: Distribution**
      Peers send feedback to e-forum
   **Thursday 18\(^{00}\): Distribution**
      Presenters send questions to e-forum
   **Thursday 22\(^{00}\)-23\(^{00}\): Discussion**
      All participate in e-conference
Management features

Distinct vs. combined steps of learning cycle

Distribution of documents and textual chat vs. spoken conversation

Extended vs. confined timetable

Obligatory vs. optional participation

Are these management features important for promoting teacher inquiry?
Performance of inquiry in computerized setting

Documentation

<table>
<thead>
<tr>
<th></th>
<th>In person</th>
<th>Computerized</th>
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<tbody>
<tr>
<td>Continuity</td>
<td>Fragmented, cut by peers questions</td>
<td>Complete unit</td>
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</tbody>
</table>

Peer feedback

<table>
<thead>
<tr>
<th></th>
<th>In person</th>
<th>Computerized setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent</td>
<td>Clarification questions and remarks</td>
<td>Suggestions for improving Instruction and materials, clarification questions</td>
</tr>
</tbody>
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Formulating questions

Only in computerized setting

Discussion

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<thead>
<tr>
<th></th>
<th>In person</th>
<th>Computerized</th>
</tr>
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<tbody>
<tr>
<td>Structure</td>
<td>Minutes to 1 hour, Divergent, not focused on initial question, interrupted by clarifications of documentation</td>
<td>Three ~ 20 minutes sessions, focused on presenter questions</td>
</tr>
</tbody>
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Management features

- Distinct steps of learning cycle
- Distribution of documents
- Extended timetable
- Obligatory participation

Performance of teacher inquiry

- Comprehensive, clear and concise documentation
- Suggestive Feedback that refer to class materials
- Commitment of teachers to formulate questions
- Focused, informed and tolerant discussion
Writing and sending $\Rightarrow$ time to rethink
Report and feedback $\Rightarrow$ no accompanying
Clarification, informed feedback

No interruption
For
Clarifying Questions

Peers informed what happened in class
Higher editing standards

Chat, no body
Language ⇒ need for anchor
Time, resources while writing
Management features:

- Distinct steps of learning cycle
- Distribution of documents
- Extended timetable
- Obligatory participation

Collaborative teacher inquiry:

- Comprehensive, clear and concise documentation
- Suggestive Feedback that refer to class materials
- Commitment of teachers to formulate questions
- Focused, informed and tolerant discussion

Teachers:

In tailoring existing research based instruction, while changing perceptions and practice