Applying SAMR to classroom observations

• How can we leverage technology to create better (more reliable, and more descriptive) classroom observation tools?

• Developed over numerous studies:
  ○ USEiT Study
  ○ Newton Public Schools Cloud Computing Pilot
  ○ Mendon Upton (MA)
Components for observation tool kit

1) Running Narrative
2) Summary Checklist
3) Interval Checklist
Observation Summary Document

- Completed at the end of each observational period
- **Measures:**
  - Teacher-student interactions
  - Lesson purposes,
  - Classroom learning activities
  - Technologies used for those activities
  - General effectiveness rating
Time Interval Observation Form

Initially completed at the beginning of each observation, and then at fixed time intervals throughout remainder of the lesson.

Measures: students’ use of various technologies, student engagement, student organization (i.e. working groups of various sizes), and teacher role and activity
Using classroom observations to measure teaching and learning modalities

- **Teaching to whole class with computers** was noted when the teacher held a discussion with the entire class group and encouraged student participation with computers.

- **Lecture** was noted when the teacher presented information to the class without student participation.

- **Independent work** was noted when students were directed to complete work on their own facilitated by the teacher.
Example of data collected and analyzed from classroom observations

Percentage of pilot and comparison student activities observed with technology in use

<table>
<thead>
<tr>
<th>Major student activities using technology</th>
<th>Pilot Pre</th>
<th>Pilot Post</th>
<th>Comparison Pre</th>
<th>Comparison Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listened to a presentation</td>
<td>90%</td>
<td>86%</td>
<td>67%</td>
<td>71%</td>
</tr>
<tr>
<td>Engaged in discussion/seminar</td>
<td>25%</td>
<td>40%</td>
<td>13%</td>
<td>25%</td>
</tr>
<tr>
<td>Engaged in problem-solving/investigation</td>
<td>8%</td>
<td>50%</td>
<td>55%</td>
<td>17%</td>
</tr>
<tr>
<td>Engaged in reading/reflection/written communication</td>
<td>18%</td>
<td>89%</td>
<td>15%</td>
<td>14%</td>
</tr>
<tr>
<td>Worked on producing an artifact in a medium other than writing</td>
<td>0%</td>
<td>55%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Engaged in other activities</td>
<td>40%</td>
<td>83%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Example of data collected and analyzed from classroom observations

Summary of teachers’ classroom activities with and without technology

<table>
<thead>
<tr>
<th>Activities</th>
<th>Pilot</th>
<th></th>
<th>Comparison</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
<td>Post</td>
</tr>
<tr>
<td>Administrative</td>
<td>34%</td>
<td>27%</td>
<td>20%</td>
<td>22%</td>
</tr>
<tr>
<td>Whole-class instruction</td>
<td>31%</td>
<td>32%</td>
<td>46%</td>
<td>54%</td>
</tr>
<tr>
<td>Interacting w/ students</td>
<td>35%</td>
<td>41%</td>
<td>34%</td>
<td>24%</td>
</tr>
<tr>
<td>Technology use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrative</td>
<td>16%</td>
<td>12%</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>Presentation</td>
<td>75%</td>
<td>43%</td>
<td>66%</td>
<td>84%</td>
</tr>
<tr>
<td>Content-oriented use instruction</td>
<td>7%</td>
<td>45%</td>
<td>28%</td>
<td>7%</td>
</tr>
</tbody>
</table>
Example of data collected and analyzed from classroom observations

Average student engagement levels reported across pilot and comparison settings

<table>
<thead>
<tr>
<th></th>
<th>Pre/Pilot</th>
<th>Post/Pilot</th>
<th>Pre/Comparison</th>
<th>Post/Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Rating</td>
<td>3.9</td>
<td>3.8</td>
<td>3.6</td>
<td>3.6</td>
</tr>
<tr>
<td>Number of Intervals</td>
<td>116</td>
<td>132</td>
<td>118</td>
<td>140</td>
</tr>
</tbody>
</table>
Leveraging SAMR for Classroom Observations

Over 1-year study: 146 observations resulted in 3,510 minutes (58.5 hours) of classroom observations across all major subject areas in grades 5-12:

3 components of observation toolkit:
1. Running Narrative
2. Observation Summary Checklist
3. Time Interval Observation Checklist

Figure 2: Total classroom observations (# of minutes) conducted across grade level
Classroom observation: SAMR Analyses

**The SAMR Model**

- **S**ubstitution: Technology acts as a direct substitute, with no functional change.
- **A**ugmentation: Technology acts as a direct substitute, with functional improvement.
- **M**odification: Technology allows for significant task redesign.
- **R**edefinition: Technology allows for the creation of new tasks, previously inconceivable.
Classroom observation: SAMR Analyses

SAMR Analyses of Miscoe classroom observations (N=44) & Nipmuc High classroom observations (N=86)

- **No Use**
  - Miscoe Hill: 27%
  - Nipmuc High: 28%
- **Substitution**
  - Miscoe Hill: 64%
  - Nipmuc High: 53%
- **Augmentation**
  - Miscoe Hill: 9%
  - Nipmuc High: 17%
- **Modification/Redefinition**
  - Miscoe Hill: 0%
  - Nipmuc High: 1%
Classroom observation: EdTech Quintet Analyses

EdTech Quintet analyses of Miscoe (n=44) and Nipmuc (n=86) classroom observations
Welcome to the golden age of educational research and data science
Ideas for creating more informed reflections:

Student and Teacher drawings

Efficient student (and teacher) surveys

Classroom observations

Perhaps try and measure:
• Attitudes and perceptions
• Classroom practices (and preferences)
• Aspirations
• Engagement
• Time on Task
• Creativity
Connected Learning…
Learning Analytics…
Dynamic Data Visualization Tools…
Big Data…

…but for what purpose?

-Seymour Papert
Technology in the Schools: to support the system or render it obsolete. Milken Exchange on Education. July 1998.
Teacher and student data visualizations:

Demographics
Classroom practices
Attitudes and beliefs
Access to resources
Home access and use

Web-based, dynamic, data visualization pages:

Technology Use

- Frequency of recording audio or video
- Frequency of capturing/creating digital images
- Video Projects
- Multimedia
New Generation of Visualization Tools: LAC Student Profile example
New Visualization Tools: Predicting IB Diploma Pass Rates

http://www.analyticscollaborative.org/
Eventually, can we define (and empirically measure) exactly what you value and think is important?
Is your community ready to make use of it?

Demographics
- Are you a boy or girl?
  - Boy: [Bar chart]
  - Girl: [Bar chart]

Use
- Frequency of Tech Use
  - ELA Use
    - Never: [Bar chart]
    - A couple times a year: [Bar chart]
    - About once per month: [Bar chart]
    - Once every couple of weeks: [Bar chart]
    - A couple times per week: [Bar chart]
    - At least every week: [Bar chart]
    - Everyday: [Bar chart]
  - Math Use
    - Never: [Bar chart]
    - A couple times a year: [Bar chart]
    - About once per month: [Bar chart]
    - Once every couple of weeks: [Bar chart]
    - A couple times per week: [Bar chart]
    - At least every week: [Bar chart]
    - Everyday: [Bar chart]

Beliefs
- Beliefs
  - It is hard to concentrate on schoolwork when using technology.
  - Strongly Disagree
  - Disagree
  - Neutral
  - Agree
  - Strongly Agree

Comparing Subject-level Use
- English Language Arts/Reading
- Social Studies/History/Humanities/Geography
- Mathematics
- Science

Comparing Technology Use
- Your teacher delivers instruction to the class.
- The teacher uses a technology device/tool to present information to your class.
- I work collaboratively with pairs or groups of other students in class.

Comparing Technology Function
- Worked collaboratively with other students on a project.
- Taken notes in class using a computer or iPad.
- Used the Internet to research information.
- Downloaded or watched online video in class.

Mapping Beliefs
- I learn a lot in school everyday.
- I work hard in school everyday.
- I like connecting my learning to real life problems.
- I like collaborating with other students.
- I like to use technology in school everyday.
ATLAS
Looking at Data

Learning from Data is a tool to guide groups of teachers discovering what students, educators, and the public understands and how they are thinking. The tool, developed by Eric Buchovecky, is based in part on the work of the Leadership for Urban Mathematics Project and of the Assessment Communities of Teachers Project. The tool also draws on the work of Steve Seidel and Evangeline Harris-Stefanakis of Project Zero at Harvard University. Revised November 2000 by Gene Thompson-Grove for NSRF. Revised August 2004 for Looking at Data by Dianne Leahey.

Selecting Data to Share
Data is the centerpiece of the group discussion. The following guidelines can help in selecting data or artifacts that will promote the most interesting and productive group discussions. Data or artifacts that do not lead to a single conclusion generally lead to rich conversations.

Sharing and Discussion of Data
Discussions of some forms of data sometimes make people feel “on the spot” or exposed, either for themselves, for their students or for their profession. The use of a structured dialogue format provides an effective technique for managing the discussion and maintaining its focus.

A structured dialogue format is a way of organizing a group conversation by clearly defining who should...
Building and leading a school culture that values data informed dialogue to improve student learning

Megan Brazil, Elementary Principal, United Nations International School, Hanoi

In a ‘silo schools’ approach, teachers have generally been left to work independently on collecting, understanding and using their own classroom data to make decisions about instruction, planning and assessment. Many schools have not yet made the successful transition from individual to collaborative: to enable teams of teachers to collectively analyse learning data in order to improve learning outcomes for all students.
http://hippasus.com/blog/

rubenrp@hippasus.com

bebell@bc.edu

This work is licensed under a Creative Commons Attribution-Noncommercial-Share Alike 3.0 License.