Supporting Montessori Observation with Technology

Wildflower Schools
Our Principles

- Authentic Montessori Environment
- Teacher-Led School
- Shopfront Setting
- Lab for Innovation
- Seamless Learning Community
- Commitment to Equity
- Attention to Beauty
- Focus on Nature
- Decentralized Network
Our Question

Can we use technology to support Montessori observation and record-keeping while preserving an authentic Montessori environment?

<table>
<thead>
<tr>
<th>New and better information</th>
<th>Preserve the environment</th>
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<tbody>
<tr>
<td>- More comprehensive</td>
<td>- No screens</td>
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<tr>
<td>- More objective</td>
<td>- No tests</td>
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<tr>
<td>- New types of information</td>
<td>- No impact on children’s activities</td>
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<tr>
<td>- Easier to see long-term trends</td>
<td>- Decreased burden on teacher</td>
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Why We Think This Is Important
Areas of Exploration

1. Tools to gather information automatically
2. Tools to help teachers record their own observations
3. Better systems for viewing and making meaning of the information
1: Embedded Sensors
1: Embedded Sensors (continued)
1: Cameras
1: Cameras (continued)
1: Cameras (continued)
1: Cameras (continued)
1: Cameras (continued)
1: Cameras (continued)
2: Smart Pens
2: Smart Watches

Subtly mark key moments
- I am presenting now
- I am gathering together the class

Set up subtle haptic taps for chosen events
- Student $A$ is engaging with material $B$
- Student $C$ chose the work I presented to them yesterday but then quickly disengaged
3: Visualizing the Sensor Data
3: Visualizing the Sensor Data (continued)

Regions of the Wildflower Classroom
Hover over a region to see which children were in this area.

Practical Life
- Alice: 20.5%
- Bob: 19%
- Chris: 14.1%
- Dave: 12.4%
- Eliza: 12%
- Fred: 7.8%
- George: 6.5%
- Helen: 4.2%
- Ivan: 3.9%
- Jack: 2.6%
- Kelly: 2.2%
- Linda: 1.9%
- Oscar: 1.6%
- Peter: 1.3%
## 3: Inferring Standards Mastery

### Elliott's CCSS Math

#### Counting & Cardinality

- **Know number names and the count sequence.**
  - K.CC.A.1 Count to 100 by ones and by tens
  - K.CC.A.2 Count forward beginning from a given number within the known sequence (instead of having to begin at 1).
  - K.CC.A.3 Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

- **Count to tell the number of objects.**
  - K.CC.B.4 Understand the relationship between numbers and quantities; connect counting to cardinality.
    - K.CC.B.4a When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.
    - K.CC.B.4b Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.
  - K.CC.B.5 Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration, given a number from 1–20, count out that many objects.

- **Compare numbers.**
  - K.CC.C.6 Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.
  - K.CC.C.7 Compare two numbers between 1 and 10 presented as written numerals.
Research Directions

- Guide presentations/follow-up
- Independence of student choices
- Interactions between students
- Design of prepared environment
- Patterns of lesson engagement

- Concentration/normalization
- Lesson progress
- Socio-emotional development
- Executive function development
- Evolving social networks