Using #SocialMedia and #LearningAnalytics to understand how #Children #Engage in #ScientificInquiry

Children are increasingly using social media tools in their lives. In addition, there is great interest in understanding how to design and evaluate social technologies to aid in children's learning and development. We describe two research endeavors that begin to address these issues.

**Abstract:** Children and social media

Ahn (2011)

We introduce SINO, a social media application that encourages children to practice Scientific INquiry skills through collaborative participation.

**Abstract:** Social media and science learning

Ahn, Gubbels, Kim, & Wu (2012)

First prototype of SINO: Members contribute elements of inquiry (e.g., questions, hypotheses, projects) to collaboratively create science projects (challenges) that they can implement.

SINO allows for micro-contributions and lowers the cost of participation.

SINO is designed as a platform to aggregate micro-contributions into coherent wholes.

SINO leverages social vetting to provide collective feedback.

Science inquiry through micro-contributions, aggregation, and vetting

We deployed SINO in an after-school program called Kitchen Chemistry (KC), that engaged elementary school children in scientific inquiry projects through cooking.

A total of six children (ages 8-11), participated in KC. They used SINO to create potential cooking projects by adding questions, hypotheses, and investigation ideas.

Kitchen Chemistry

Clegg et al. (2012)

We coded contributions of a question, hypothesis, project, or result as Primary actions. Secondary actions were contributions of topics, resources, and voting attached to primary actions.

Entries in the log data detail an action type, the user that carried out the action, the time stamp at which the action occurred, and a list of properties of the action.

**Methods and Analysis**

Primary & Secondary actions

<table>
<thead>
<tr>
<th>Interaction Type</th>
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<tbody>
<tr>
<td>Primary</td>
</tr>
<tr>
<td>Question</td>
</tr>
<tr>
<td>Topic, Resource, Feedback</td>
</tr>
<tr>
<td>Hypothesis</td>
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<tr>
<td>Primary</td>
</tr>
<tr>
<td>Variable, Resource, Feedback</td>
</tr>
<tr>
<td>Project</td>
</tr>
<tr>
<td>Secondary</td>
</tr>
<tr>
<td>Feedback</td>
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<tr>
<td>Primary</td>
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<tr>
<td>Challenge</td>
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<tr>
<td>Secondary</td>
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<tr>
<td>Result</td>
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</tbody>
</table>

Each line represents a child's sequence of interactions. Colored blocks correspond to primary and secondary contributions to SINO that match aspects of inquiry.

Actions are ordered in sequence and are left justified (e.g., the children did not all begin their sequences at the same time, but the visualization displays all sequences beginning with the first action in the left-most block).

Longitudinal Information Visualizations of Learner Activities in SINO

We conducted a case study of SINO with six children, ages 8-11, and collected log data of their interactions in the app. We applied learning analytics on this log data using a visual analytic tool called LifeFlow.

**Abstract:** Learning analytics to analyze science inquiry participation

Time (Cumulative)

Some KC learners began their SINO interactions by exploring and asking questions (red blocks). Other children began by adding results to existing challenges, which are fully developed projects on SINO (pink blocks), or voting on hypotheses (green blocks) before moving on in their inquiry process.

Findings: Learning analytics to analyze science inquiry participation

Findings: Entry points into inquiry

Some children contributed many questions, or secondary actions related to questions, in their interaction sequences. The sequence visualizations can also shed light on how deeply children engaged with inquiry in SINO. Some sequences are longer and others short.

Findings: Entry points into inquiry

Collect deeper data on each individual learner in SINO to create profiles of their inquiry skills.

Scaffold learner transitions between activities within the scientific inquiry process.

The sequential pathways that learners take in SINO suggest diverse thought processes.

Conclusion: Exploratory work in learning analytics and science inquiry

References
