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

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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)

SINQ

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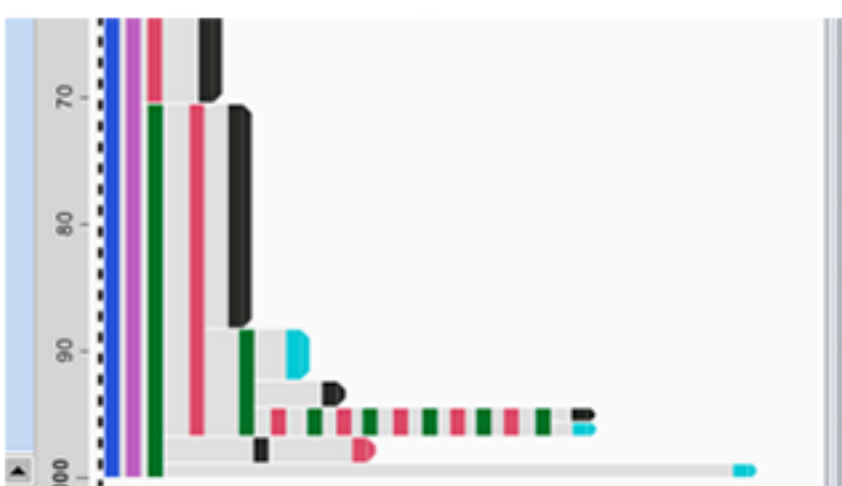
We conducted a case study of SINQ with six children, ages 8-11, and collected log data of their interactions in the app. We applied learning analytics on this log data using a visual analytic tool called LifeFlow.

Abstract: Learning analytics to analyze science inquiry participation
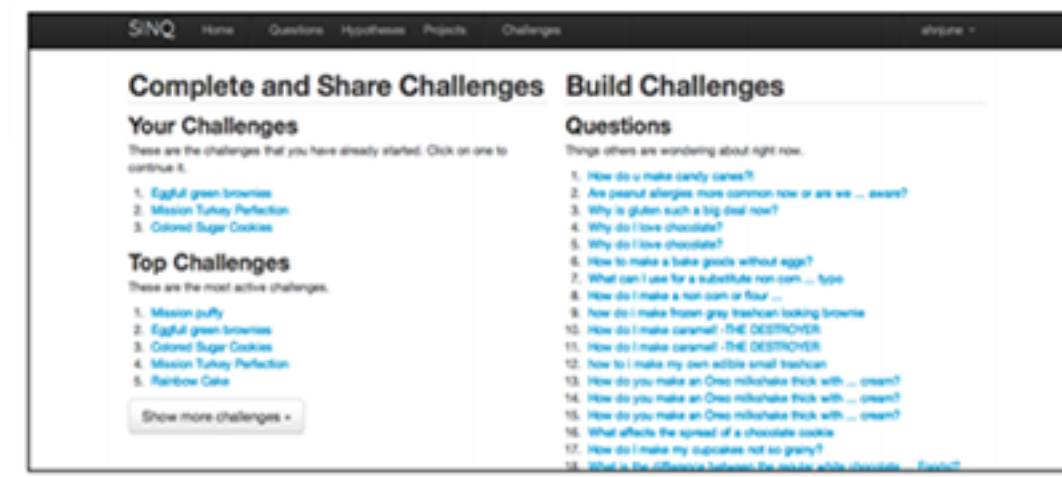
First prototype of SINQ: Members contribute elements of inquiry (e.g. questions, hypotheses, projects) to collaboratively create science projects (challenges) that they can implement.

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

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

SINQ leverages social vetting to provide collective feedback.

Science inquiry through micro-contributions, agregation, and vetting

We deployed SINQ in an afterschool 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 SINQ to create potential cooking projects by adding questions, hypotheses, and investigation ideas.
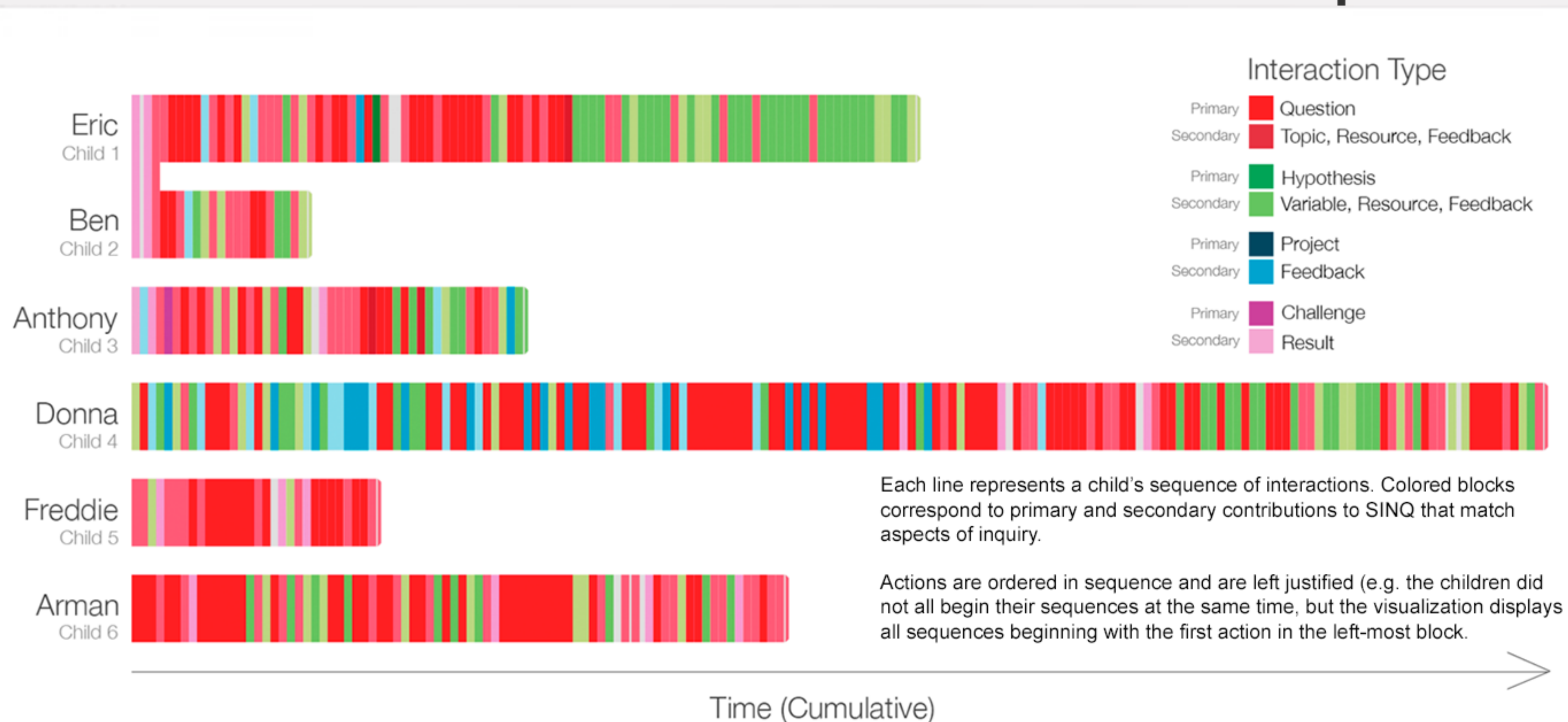
Kitchen Chemistry
Clegg et al. (2012)
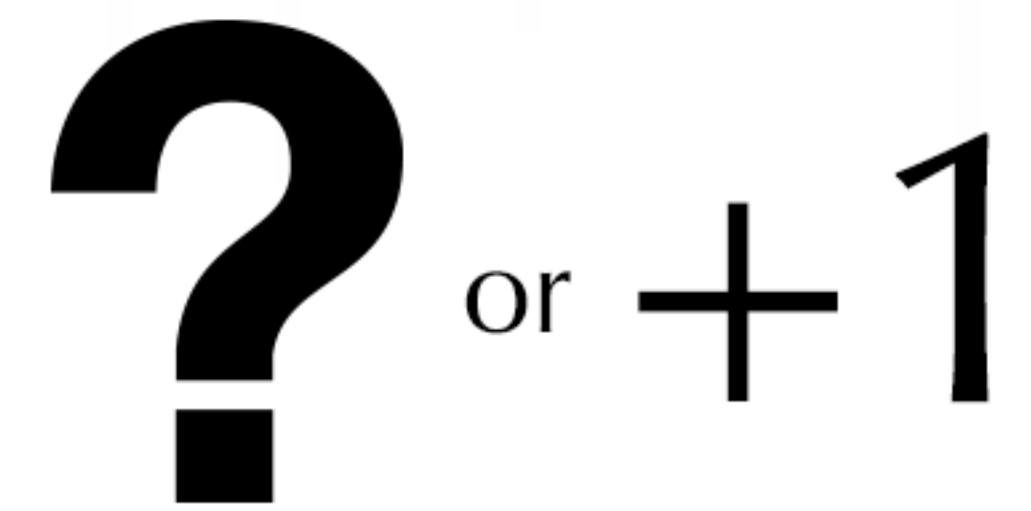
We coded contributions of a question, hypothesis, project, or result as **Primary actions**. **Secondary actions** were contributions of topics, resources, and voting attached to primary actions.

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

Interaction Type

Primary — Question
Secondary — Topic, Resource, Feedback

Primary — Hypothesis
Secondary — Variable, Resource, Feedback

Primary — Project
Secondary — Feedback

Primary — Challenge
Secondary — Result

Eric — Child 1
Ben — Child 2
Anthony — Child 3
Donna — Child 4
Freddie — Child 5
Arman — Child 6

Each line represents a child's sequence of interactions. Colored blocks correspond to primary and secondary contributions to SINQ 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.)

Time (Cumulative)

Longitudinal Information Visualizations of Learner Activities in SINQ

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

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 SINQ. Some sequences are longer and others short.

Findings: Learning analytics to analyze science inquiry participation

Collect deeper data on each individual learners in SINQ to create profiles of their inquiry skills.

Scaffold learner transitions between activities within the scientific inquiry process.

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

Conclusion: Exploratory work in learning analytics and science inquiry

References:
Ahn, J. et al. 2012. SINQ: Scientific INQuiry learning using social media. In Proceedings of the SIGCHI conference on Human Factors in Computing Systems Extended Abstracts(New York, NY, USA, 2012), 2081–2086; Ahn, J. 2011. The effect of social network sites on adolescents' social and academic development: Current theories and controversies. Journal of the American Society for Information Science and Technology. 62, 8 (2011), 1435–1445; Clegg, T. et al. 2012. Technology for promoting scientific practice and personal meaning in life-relevant learning. Proceedings of the 11th International Conference on Interaction Design and Children (New York, NY, USA, 2012), 152–161.