XOVIs – Analytics and Visualization for Sugar and OLPC

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Overview

• Peering into data about usage of laptops
• Learning Analytics
  – 1) measurement, 2) collection, 3) analysis and 4) reporting
• Visualization is part of the reporting section
  – Tends to be most memorable, because of its visual component
  – Reporting should be more than just visualization
• XOVis as an add-on to existing and new projects
  – Existing projects can add a school server and “do analytics”
  – New projects can implement integrated analytics along with each school deployment.
History

- Paraguay – Raúl Gutiérrez Segalés and Morgan Ames
- Jamaica – Leotis Buchanan and Sameer Verma
- Australia – Martin Abente Lahaye
- India – Anish Mangal and Sameer Verma
- Nepal – Martin Dluhos, Andi Gros, Sameer Verma
- Other:
  - Red Azúcar/Montar un cliente
  - Sugar Network
- See http://www.olpcsf.org/node/204
XOVis

Written by Martin Dluhos
https://github.com/martasd/xovis
Methodologies

- Qualitative
  - In-class observation
  - Interviews
    - Children, parents, siblings, teachers, principals, local community

- Quantitative
  - Assessment tests as proxy
  - Metadata

One corroborates the other.
Metadata

• Not a bad word.
• Metadata is data about data.
  – Data: Creative work by the child.
  – Metadata: time of creation, duration, collaboration, save-and-resume, etc.
• Metadata acts as a proxy for engagement.
• Engagement is a proxy for learning.
• Observing aggregates.
The Datastore

- User data is stored in Sugar using a datastore written in Python.
- The front-end (user interface) to the datastore is the Journal activity.
- The Journal activity allows for storage, retrieval, searching, indexing, sorting etc. as contained in the datastore.
- In addition to the Journal as an expression of the datastore, we can extract relevant bits about the data stored as metadata.
Metadata: The data about data

```python
#write header row
writer.writerow([
    "idx",
    "act",
    "icon_color",
    "activity_id",
    "keep",
    "mime_type",
    "mtime",
    "preview",
    "share_scope",
    "timestamp",
    "title",
    "title_set_by_user",
    "uid"])
```
XOVis:
Cloud-based analytics and visualization dashboard

Cloud

What happens at school?
Central management for orchestration, monitoring and analytics is done in the cloud.

Micro-cloud appliance at school acts as a local mirror for content and management.

Laptop with child has some offline content. It works in school and can go home.
Each child’s work is automatically stored in a Journal on her laptop
This work is distilled into metrics at the school micro-cloud appliance.
Metrics from school appliances are synced with the cloud to generate analytics.
What happens when the Internet connection breaks or slows down?
We use “eventual consistency” to synchronize data between each school and the cloud.
Apache CouchDB™ is a database that uses JSON for documents, JavaScript for MapReduce indexes, and regular HTTP for its API.

Database, Aggregation, Offline Sync, Document Storage, NoSQL, etc.
CouchDB supports “eventual consistency” through incremental replication and conflict management between CouchDB instances at the schools and a central location, such as the Ministry of Education.
xovis

• Github: https://github.com/martasd/xovis

• Install
  – Online: ./scripts/install_xovis.sh
  – On top of XSCE (Use ansible. See instructions)

• Process (go to /opt/xovis/xo-stats folder)
  – Get all metadata to CSV (./process_journal_stats.py all)
  – Get activity stats (./process_journal_stats.py activity)
  – Push into DB (./process_journal_stats.py dbinsert xovis --deployment olpc –server http://admin:admin@127.0.0.1:5984)

• Use
XOVIs: Quest for Data

Select a deployment site:

Activity Frequency

- Web
- Office
- Develop
- Turkelit
- Weather
- Abacus
- Measure
- Physics
- SimpleGraph
- Speak
- Alcedarium
- Calculate
- Chat
- Ecosys
- Finance
- IconChange
- Implore
- InfoSlicer
- RC
- Labyrinth
- Memory
- Moon
- MusicKeyboard
- Flippy
- Portfolio
- Record
- Ruler
- ShareStats
- TeamTeamEdit
- Terminal
- TurboArtDuba
- WikipediaEN
- Words
- XoScope

Launched Instances

Built using Highcharts JS
XOVis: Quest for Data

Files Created

Activity Files Generated
XOVis: Quest for Data

Time of Day Activity Use
XOVis: Quest for Data

Select a deployment site:

Activity Frequency
Files Generated
Activities Shared
Time of Day Use
Use by Month
Use by Year
Use of Each Activity by Year
Use of Each Activity by Month

Activity Use By Months

Launched Instances
Select a deployment site:

- Activity Frequency
- Files Generated
- Activities Shared
- Time of Day Use
- Use by Month
- Use by Year
- Use of Each Activity by Year
- Use of Each Activity by Month

XOVis: Quest for Data

Activity Use By Years

Launched Instances

Year

Built using Highcharts JS
Runs in a browser
Scope

• Add multiple schools or deployments
  – Within a country
  – Across countries

• Compare certain stats across multiple deployments
Development continues

https://github.com/martasdsd/xovis