Peer Production of Online Learning Resources: A Social Network Analysis

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Peer Production of Online Learning Resources
A Social Network Analysis

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**Instructional Architect**
- A web-based application for teachers to freely find, gather, and produce instructional activities for their students.
- Teachers can share these resulting activities, called **IA projects**.

**Teacher Interactions**
- **View action**
  - created
  - viewed
  - teacher A
  - project A
  - teacher B

- **Copy action**
  - created
  - copied
  - parent of
  - teacher A
  - project A
  - teacher B

**IA Social Networks**
- **directed, weighted networks**
  - View network
  - Copy network

<table>
<thead>
<tr>
<th>nodes</th>
<th>teacher users</th>
<th>teacher users</th>
</tr>
</thead>
<tbody>
<tr>
<td>arc</td>
<td>B viewed A's project(s)</td>
<td>8 copied A's project(s)</td>
</tr>
<tr>
<td>weight</td>
<td>the number of times B viewed A's project(s)</td>
<td>the number of times B copied A's project(s)</td>
</tr>
</tbody>
</table>

**Project Creation, View, Copy**
- The mean number of IA projects created initially increases as the number of views increases but then saturates except for a peak when out-degree = 25.
- The mean number of IA projects created does not saturate as a function of the number of copies and exhibits an increasing trend.
- The copy action appears to be a better metric for describing meaningful user's activity in the IA network, as opposed to the view action.

**Clique Analysis**
- **Clique**: a subgraph in a network in which every two vertices are connected by an edge.
- **K-clique**: a clique of k vertices.
- **K-clique-community**: the union of all k-cliques that can be reached from each other through a series of adjacent k-cliques.

The largest 3-clique-communities

**Summary of the Two Networks**

<table>
<thead>
<tr>
<th></th>
<th>View Network</th>
<th>Copy network</th>
</tr>
</thead>
<tbody>
<tr>
<td># of in-degree</td>
<td>Avg Max</td>
<td>Avg Max</td>
</tr>
<tr>
<td></td>
<td>5.12 83</td>
<td>3.63 36</td>
</tr>
<tr>
<td># of out-degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.41 83</td>
<td>1.76 18</td>
</tr>
<tr>
<td># of viewers / copies</td>
<td>988 700</td>
<td>298 217</td>
</tr>
<tr>
<td></td>
<td>1283</td>
<td>388</td>
</tr>
</tbody>
</table>

- The view network is much denser.
- From a user perspective, viewing represents an action with a much lower “cognitive” cost (a simple click) compared to a copy action (which represents a decision to use/adapt the content). The difference in cognitive cost is reflected in the much sparser copy network compared to the view network.

**Cliques seem to correspond to teacher subject areas:**

- Language arts: 763 5335 4629 4635 5068
- Math: x x x x x
- Science: x x x x x
- Social studies: x x x x