6-2010

Peer Production of Online Learning Resources: A Social Network Analysis

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A Social Network Analysis

Beijie Xu and Mimi Recker, Utah State University

**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
  - teacher A
  - parent of
  - project B (adapted from project A)
  - teacher B

**Institutional Social Networks**

directed, weighted networks

![Diagaram of network with nodes and edges labeled](image)

<table>
<thead>
<tr>
<th></th>
<th>View network</th>
<th>Copy network</th>
</tr>
</thead>
<tbody>
<tr>
<td>nodes</td>
<td>teacher users</td>
<td>teacher users</td>
</tr>
<tr>
<td>arc</td>
<td>B viewed A's project(s)</td>
<td>B copied A's projects(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>

**Summary of the Two Networks**

<table>
<thead>
<tr>
<th></th>
<th>View Network</th>
<th>Copy Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>in-degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>View network</td>
<td>Copy network</td>
</tr>
<tr>
<td>in-degree</td>
<td>the number of users who have viewed user A's project</td>
<td>the number of users who have copied user A's project</td>
</tr>
<tr>
<td>out-degree</td>
<td>the number of users whose project(s) have been viewed by user A</td>
<td>the number of users whose project(s) have been copied by user A</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 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

- Cliques seem to correspond to teacher subject areas:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Math</th>
<th>Science</th>
<th>Social studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language arts</td>
<td>x x x x</td>
<td>x x x</td>
<td>x x x</td>
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<tr>
<td>Math</td>
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<tr>
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<td>x x</td>
<td>x x x</td>
<td>x x x</td>
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<tr>
<td>Social studies</td>
<td>x x</td>
<td>x x</td>
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</tr>
</tbody>
</table>

This material is based in part upon work supported by the National Science Foundation under Grant Number 0840745. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.