Open Educational Resources (OER) and State-Level Policies: A Network Analysis

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INTRODUCTION

While almost half the states in the United States have considered or adopted legislation to support the use of Open Educational Resources (OER), little is known about the impact of state-level policies on the number of contributions from faculty affiliated with institutions within those respective states. **This analysis examines the relationship between state-level policies and number of faculty OER contributions**.

RESEARCH QUESTIONS

- ❑ **What is the relationship between number of faculty OER contributions and state-level policies?**
- ❑ **Do faculty affiliated with institutions in states where policies are in effect contribute more OER than faculty affiliated with institutions in states where policies are not in effect?**

$$H_0: \mu_{\text{policy states}} - \mu_{\text{non-policy states}} = 0$$
$$H_1: \mu_{\text{policy states}} - \mu_{\text{non-policy states}} \neq 0$$

METHOD & ANALYSIS

The data set for this analysis included **all contributors from the 50 US States and District of Columbia for textbooks published on openstax.org as of April 2019** (N=1,308). Contributions were tallied and weighted by type to reflect each role's level of investment:

Contributor Role (as defined on openstax.org)	Weight
Senior Contributing Author. Write detailed outlines and hone the textbook framework to ensure logical, consistent coverage.	1.3
Contributing Author. Draft chapters based on the outline, including main text, features, cases, images, and assessments.	1.2
Reviewer / Consultant. Provide candid and constructive criticism during each step, from outline to chapter drafts.	1.1

Contributor institution data were then aligned with states and coded according to the existence of a state-level OER and/or general textbook affordability policy, information collected April 2019 from the **Scholarly Publishing and Academic Resources Coalition Policy Tracker** at sparcopen.org.

Analysis was two-prong. First, to visually investigate the relationship between the number of contributions and affiliated states, **an ego network analysis** was performed utilizing NodeXL. Then, an **independent samples t-test** was conducted to investigate the significance of the relationship of contributions within policy states (n=22) and non-policy states (n=29).
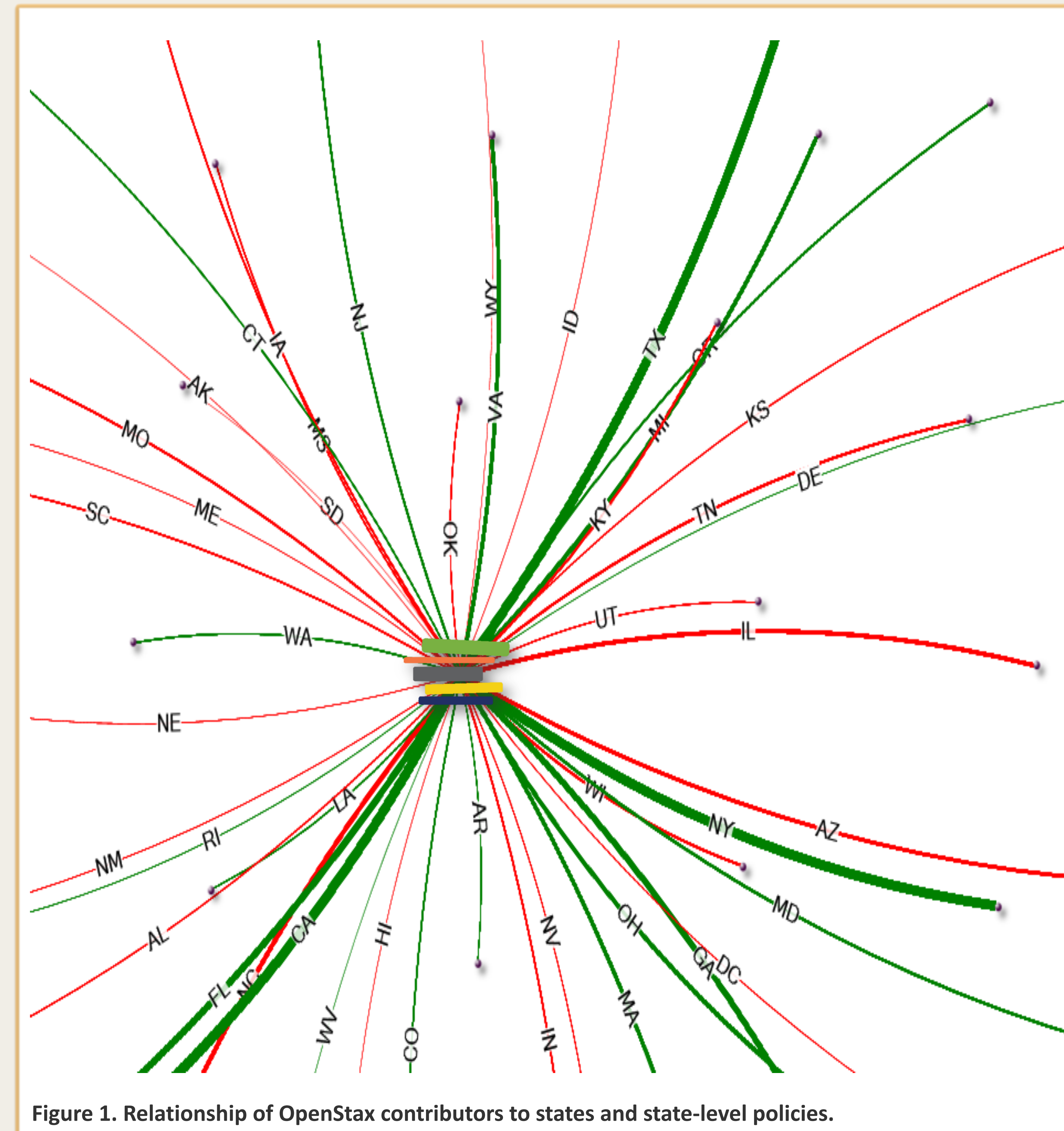

Figure 1. Relationship of OpenStax contributors to states and state-level policies.

Social network analysis is a broad research strategy that conceptualizes social structures as networks, with ties connecting members and channeling resources.

Otte, E., & Rousseau, R. (2002). Social network analysis: A powerful strategy, also for the information sciences. *Journal of Information Sciences, 28*(6), 441–453.

RESULTS

Network Analysis. Figure 1 (center) depicts the visual relationship between OER contributions and the states with which contributions were affiliated. OpenStax is the central actor of the network, and states are color-coded according to the existence of state-level policy (green) or lack of policy (red). Line density (rather than length) reflects the strength of the relationship vis-à-vis overall number of contributions.

Independent Samples T-Test. An independent samples t-test compared the number of contributions from states with and states without existing OER and/or textbook affordability policies. Tests were performed comparing both unweighted and weighted means. The boxplot in Figure 2 depicts standard deviations. Levene's Test indicated unequal variances ($F_{(1,25.9)}$ = 12.72 unweighted, 12.63 weighted, p=.001). The resultant data were interpreted accordingly.
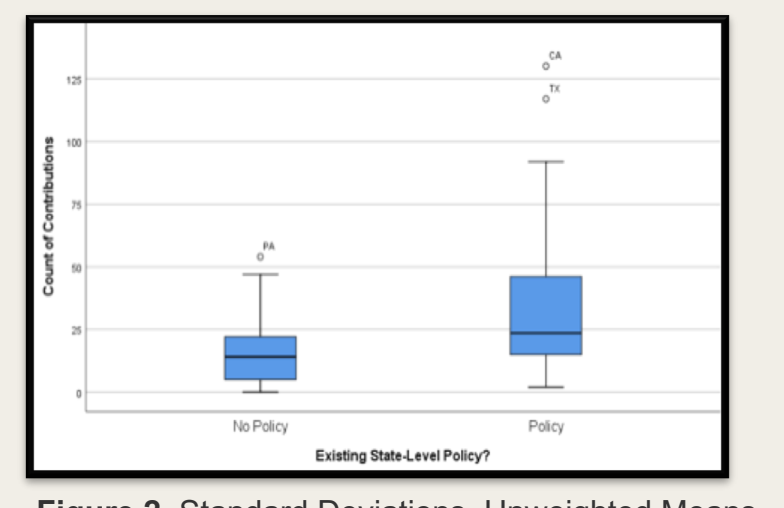

Figure 2. Standard Deviations, Unweighted Means

There was a **significant difference in the unweighted means** for contributions from states with policies (M=38.05, SD=35.512) and states without policies (M=16.24, SD=13.897); t(49)=2.726, p=.011.

There was **also a significant difference in the weighted means** for contributions from states with policies (M=43.468 SD=40.661) and states without policies (M=18.521 SD=15.926); t(49)=2.724, p=.011. Based on these data, **the null hypothesis is rejected:**

Faculty affiliated with institutions in states with existing policies contribute significantly more OER than faculty affiliated with institutions in states without existing policies.

DISCUSSION

While the data analyzed here cannot be interpreted to confirm a causative relationship between the existence of state-level policies and the number of OER contributions, the significant correlation is clear and instructive: faculty affiliated with institutions in states where policies exist make significantly more contributions than faculty in states where policies do not exist. **Even if indirectly, these results speak to the impact – or perhaps even the reciprocal relationship – between the existence of state-level policies and the number of contributions from faculty affiliated with institutions in those respective states.**

In looking toward future studies, while network analysis proved helpful to generate a visual relationship, a more powerful use of these tools would be to explore connections between states and other actors, and/or how the dynamics of OER communities manifest and relate to one another in social media environments.

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How might (social) network analysis tools help further explore the dynamics of OER communities?