The Social Shaping of Cloud Computing: An Ethnography of Infrastructure in East St. Louis, Illinois

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Metro East Settlement House (MESH)

- 104-year-old settlement house in East St. Louis
- Mission: "To empower individuals and families to move out of poverty"
- Funded by state and federal government grants, The United Way, and individual donors
- In 2012, MESH served 27,760 direct clients across 15 community-based programs

Community-Based Services

- Child-care services
- Afterschool programming for teens
- Job training programs for adults
- Adult day care programs for senior citizens

What Is Cloud Computing?

- "Both the applications delivered as services over the Internet and the hardware and systems software in the data centers that provide those services" (Armbrust et al., 2010, p. 50).
- "A powerful system for producing, storing, analyzing, and distributing data, information, applications, and services to organizations and individuals" (Mosco, 2014, p. 6).



The Social Shaping of Technology

- A response to technological determinism. The field is concerned with the social, political, and economic forces shaping technology and its consequences.
- Technology is not neutral. Researchers investigate how politics become embedded in the design of technological artifacts (e.g., Winner, 1986).



Infrastructure Studies

- Infrastructure is "sunk" into, inside of, other structures, social arrangements and technologies (Star & Ruhleder, 1996, p. 113).
- In their moments of emergence, infrastructures can be a site of intense conflict (Edwards et al., 2007, p. 24).
- Social justice focus: inclusion and exclusion (Bowker & Star, 1999; Star, 1999).



Research Problem

There was a gap in the literature on the social shaping of cloud computing software in U.S. industrial suburbs with unique political, economic, historical, and cultural backgrounds, such as East St. Louis, where high rates of poverty exist.



Research Question

How do broader political, economic, historical, and cultural contexts shape cloud computing and its consequences within a community-based organization in East St. Louis, Illinois?



Research Overview

- Ethnography of infrastructure (Star, 1999)
- 11-months of fieldwork (June 2013 - April 2014)
- Volunteer project manager at MESH
- Observations & interviews with case workers, managers, and directors

Ethnography of Infrastructure

- Used to study "large-scale technical systems in the making or to examine the situations of those who are not served by a particular infrastructure (Star, 1999, p. 380).
- "Its strength has been that it is capable of surfacing silenced voices, juggling disparate meanings, and understanding the gap between words and deeds" (Star, 1999, p. 383).



Data

- ~360 hours of observation (June 2013 – April 2014)
- Informal interviews with social workers, managers, and directors
- Audio recordings of staff meetings
- Software manuals & technical documentation
- State & federal policy documents

Findings

1. Infrastructural tensions shaped the ETO implementation.
2. A lack of interoperability exacerbated tensions.
3. The agency of human service professionals at MESH influenced the implementation.

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Infrastructural Tensions

- "Infrastructural tensions" (Jackson et al., 2007) between external stakeholder demands and internal organizational needs shaped the ETO implementation.
- External (Funders): expected MESH to use cloud computing software to satisfy their needs.
- Internal (MESH): purchased software to influence policy & gain new sources of funding.



External & Internal Infrastructural Dimensions (Social Aspects)

External Stakeholder Dimensions	Infrastructural ← Tensions →	Internal Organizational Dimensions
State and federal government agencies	Lack of funding for IT support at MESH	Influencing public policy
The United Way	External pressures on MESH to adopt centralized IT	Generating new funding sources
Illinois Framework	Existing IT systems failed to surface invisible work	Understanding community needs

External & Internal Infrastructural Dimensions (Technical Aspects)

External Stakeholder Dimensions	Infrastructural ← Tensions →	Internal Organizational Dimensions
eCornerstone (government-mandated information system)	Lack of interoperability	ETO for-profit cloud computing software
Visit Tracker (client management system)	Standardization (external) versus flexibility (internal)	Spreadsheets and Microsoft Word documents
Parents as Teachers (curriculum)	Increasing need for "configurational technology" (Fleck, 1994)	Paper (applications, surveys, etc.)

Discussion

- The ETO software implementation exposed a broader conflict between how funders and MESH viewed the potential of cloud computing.
- Recommendations are provided for stakeholders interested in designing cloud computing software applications to meet the needs of both funders and community-based organizations.



Designing Fair, Equitable, and Effective Information Infrastructures

- Ethical guidelines should be considered to promote more "fair, equitable, and effective" (Busch, 2011) information infrastructures within human services organizations that provide state-funded welfare programs.



Designing Fair, Equitable, and Effective Cloud Computing Software

1. **Delegate to subsidiary bodies when possible**.
2. Use precaution.
3. **Do minimal violence**.
4. Make accountable standards.
5. **Encourage the voice of publics through participation**.
6. Use the most appropriate form of standard.
7. Ask about path dependence.
8. Design appropriate tests.
9. Open new avenues to thinking and acting by making routine things habitual.
10. Review standards, tests, and indicators frequently.
11. Use law experimentally. (Busch, 2011, pp. 300–308)



Policy Recommendations

<u>Recommendation 1</u>

- State policymakers should develop flexible, interoperable software platforms for community-based organizations.



Policy Recommendations

<u>Recommendation 2</u>

- State policymakers should engage community-based organizations as key stakeholders in the development of flexible, interoperable platforms.

Policy Recommendations

Recommendation 3

- State policymakers should create legal guidelines for community-based organizations interested in using flexible, interoperable software to repurpose data.



Policy Recommendations

Recommendation 4

- State policymakers should increase funding for IT capacity within community-based organizations that are required to use state-mandated IT systems.



Conclusion

- Research shows how networked information systems can fail to meet the needs of community-based organizations that provide state-funded public assistance programs.
- Research shows why state MIS need to be flexible enough to meet the needs of both funders and community-based organizations.

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Thank you

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