The Information Revolution in Illinois: A Community Informatics Perspective

Kate Williams

ABSTRACT Based on community informatics theory, this paper focuses on the big question of community informatics and the specific research question here is to find the social origins and development of the information revolution in the local community. Through investigating the uses of IT in local institutions in Illinois, this study portrays the basic social footprint of the information revolution. There are four main areas to report on: firstly, the internet speed tests reveal continuing digital divides; secondly, despite that, IT use is generally well developed, but differences persist between the IT leaders and the organization leaders;
第三，令人惊讶的本地信息技术故事可以从参与者在任何给定的社区中汲取，而且，特定的网络结构可能会成为这些本地领导者的资源。我们的发现证明了社区中的一个主要成分，即数字技术成为基础设施的一部分，这被称作信息革命。这一革命已经迅速影响了社会的各个方面，有人表示受益，而对另一些人来说则是数字鸿沟。本文介绍的是美国伊利诺斯州十个社区的研究情况。社区信息学（CI，Community informatics）研究在提出重大问题的同时也非常注重实际。就这一意义上来讲，也可以称作巴斯德象限（Pasteur-quadrant）研究③。它既非纯理论研究，也非纯应用研究，而是在提问和回答疑问的同时，为当前实际或政策问题提供解决方案。本文涉及的社区信息学重大问题是：信息社会中的社区是可能的吗？即，社区存在吗？如何存在？正如农业和工业社会遭遇数字生产模式对其经济方式的破坏，我们所熟悉的那种社区也正受到威胁。但正如当工业社会取代农业社会时，社区并未消亡，而是以新的形式再度出现。我们感兴趣的正是信息时代社区经历的“破坏——建设”过程。

图书馆虽然通常是政府资助机构，但它们同时也是服务于社区并以社区为基础的机构。因而图书馆也需要社群信息学知识以规划未来，尤其对服务本地社区的公共图书馆来说更是如此。因此，西方的社群信息学以研究、课程作业和服务的形式植根于图书馆与情报学专业及信息学院运动（ischools）④中。

本文的具体问题是探寻信息技术在社区中的社会起源。到底发生了什么事？都有谁参与了？未来将如何发展？

当我们投入大量人力、物力将社会重组为信息社会时难免会遇到棘手的问题。在美国，政策和经费将宽带作为当前的数字鸿沟。结果如何呢？宽带优先我们现在在哪些方面可以做得更好？历时三年，斥资72亿美元，美国政府将于2013年完成在无宽带服务地区或宽带服务不足的地区安装宽带。这是2009年奥巴马政府经济刺激法案的一部分⑤。资金分配给两个项目：宽带倡议计划（BIP，Broadband Initiatives Program）和宽带技术机遇计划（BTOP，Broadband Technology Opportunities Program）。BTOP对无宽带服务地区的定义是根本无

1. Williams为这个现象罗列了一个简短的术语列表。按照时间顺序从1962—1996，分别为：计算机革命、知识经济、地球村、科学技术革命、第三次浪潮、后工业革命/后服务革命、信息革命、信息技术和网络社会[1]。早期术语主要源自Beniger总结的列表[2]。

2. 如果我们有更多来自世界各地的报告会怎样呢？这就是社群信息学领域的成果。通过实证研究构建大众所需的理论从而使社会得以运作。

3. 洛易斯·巴斯德（Louis Pasteur）发明了巴氏杀菌法，解决了人们因喝变质牛奶而生病这一难题，同时也证明了疾病的微生物理论，也就是说，他是证明微生物存在的人之一。Stokes探讨了巴斯德象限研究的独特价值[3]。

4. 信息学院运动是指那些为适应数字技术在当代社会的核心地位而对自身进行重塑或重组的学院和专业。大多数（并非所有）是图书馆情报学专业，大都位于北美洲；中国成员包括南京大学信息管理系和武汉大学信息管理学院。信息学院运动关注信息和信息的技术，其研究经费高于一定程度。更多信息见http://www.ischools.org。

5. 国家电信与信息管理局[4]和农村公用事业服务[5]。前者隶属于美国商务部，负责BTOP计划。后者隶属于美国农业部，负责BIP计划。
法实现快速互联网访问的人口普查区。服务不足的地区是指低于 40% 的家庭使用宽带服务的人口普查区。

除光纤安装外（“地上工程”），BTOP 将其资金的约 10% 用于以拓展宣传和教育（特别是在公共计算机中心）为目标的宽带使用推广以及数据采集和共享（“地上工程”）。参与这些工程的图书馆估计有 1,205—3,408 家，其中许多图书馆又有多个分馆，这就意味着更广泛的参与度。香槟—厄巴纳地区对这一工程、厄巴纳—香槟高速宽带（UC2B, Urbana Champaign Big Broadband）在其区域内沿街安装了光纤，并为服务不足地区的家庭、当地政府，以及包括公共图书馆在内的非盈利机构提供光纤到户服务。另外一个主要的联邦计划是“教育折扣计划”（称为 eRate），该项目在 2011 年斥资 22.3 亿美元补贴电信和网络运营商，以便他们可以以折扣价向学校图书馆提供网络接入服务（电信普遍服务管理公司）。这两项计划说明宽带是目前美国关于数字鸿沟政策和经费的主要着眼点。对其情况进行研究可以为所有人提供参考。

社区信息学研究实验室自建立之初就致力于此，这由学生和学者组成的研究团队由伊利诺斯大学厄巴纳—香槟分校教授阿卜杜勒・阿耶卡利和笔者主持。我们研究诠释了社区信息学的巴斯德象限方法，也反映出社区信息学对研究、教学和服务的整合。这一点至关重要，原因有二：首先，世界上很少有用于社区研究并能雇起众多研究者的资助；其次，对图书馆员和信息从业者的职业培训也必须囊括社区的实际经验。我们的工作内容包括：

- 为联邦项目规划担任顾问，帮助召集相关研究人员。
- 为 UC2B 起草计划书，帮助指导这一计划。
- 召集伊利诺斯项目负责人在 eChicago 上进行年度报告和讨论。
- 收集香槟—厄巴纳地区非盈利组织和政府机构以及伊利诺斯州其他 9 个社区的数据以了解当前数字化实践，及宽带可用后可能发生的变化。
- 帮助开发本地维基（cuwiki.net），作为一项全国范围的, 以社区为信息源和信息对象的信息共享运动的一部分。
- 使有意从事图书馆员和其他社工工作研究生通过参与以下活动而得到培训：
  - 访谈
  - 调查
  - 撰写技术报告
  - 编辑本地维基
  - 在本地公共图书馆提供技术支持
  - 参与公开会议

本文将探讨指导社区信息学研究实验室研究活动的主要概念和假设（理论），使用的方法和部分成果，最后将总结和讨论这些成果的意义。

2 理论

信息革命的研究至少有三种互补的方法：技术的，历史的和社会学的。这三种方法在不同层面上运作。技术方法学存在于工程学和计算机

[1] 人口普查区是美国人口普查局使用多年的地理单位。每个区域所辖人口约 1,500 人。这些人口普查区多年来一直尽量保持固定不变，以利于与往年相对比。（http://www.census.gov/geo/www/geo_defn.html#BlockGroup）

[2] 这一估值是基于美国商务部国家电信与信息管理局联邦项目官员高梅・韦弗 (Gwenn Weaver) 和美国图书馆协会 (http://www.2ch.net, http://www.uc2h.net) 提供的数据。


[4] 本地维基以开放源代码为基础，正在世界范围内迅速发展，见 http://www.localwiki.org。虽然有 Facebook, QQ 这样集合人类知识的大众化商业工具，本地维基运动反映了人们对本地控制、以本地为中心的非商业众包和信息共享的兴趣，可能变化甚微的市场更能经得起考验。这也成为社群信息学的研究课题。

科学，它通过设计某种产品解决实际问题，因而可以说是在微观层面运作。如果这一问题具有普遍性，那么中观研究就会产生重大影响。正是这一研究法发明的许多设备，构成了信息社会的基础架构。历史研究，即对宏观层面的研究，将重点放在较长一段时间内所发生的变化，关注随着新技术标准化或成为基础架构所引起的大范围的社会变迁。对信息革命的分析都应包含技术研究法和历史研究法。

第三种方法，笔者称之为社会学研究法，分析中观层次的现象。这一研究法不是将重点放在新设备的发明或历史性的转变，而是着重考究围绕一个新设备或系统而发生的社会互动及情境。这类研究特别关注较早采用信息技术的场所和机构。有些学者认为，技术革新是带有破坏性的，正如 Schumpeter 关于资本主义的观点，即资本主义是“创造性的破坏”[18][38]。破坏与建设几乎同时进行。数字技术也是如此。Kling 发现工作场所并非按技术的设计者和研究者预想的那样简单地采用技术，相反，新技术的采用往往要经过争论、采用、拒绝采用、重新采用等过程[19–20]。这些发现也是其他人所见的现实，因此，Kling 对这一新领域的命名——社会信息学——被广泛接受。

比社会信息学稍早一些出现的社群信息学应用于社会组织学和其他理论，专注于社会公平问题，专注于本地社区和公民社会。随着数字技术的经济和文化的基础，它也开始分化社会。表达这种分化的早期术语为“数字鸿沟”[1][21]，后来称为“数字不平等”[22]。一些人成为数字精英，利用信息技术，管理社会，充分参与经济等领域。与之伴随的是另外一些人，他们不能按照自己的利益操纵电子网络，或达到数字精英那样的程度。除了社会公平，社群信息学还依赖“黑客伦理”(hacker ethic)。Hi- manen 在对参与计算机创新技术的工人进行的研究中解释了这一概念[21]。黑客伦理中蕴含了这样的认知，即数字技术具有改善人们生活的潜力[3]。本地社区是社群信息学研究的领域，因为它与其他一切赖以生存的日常生活的空间(对被社会排斥的人来说更是如此)[25]。

本地社区通过三种方式获取新技术。首先，从市场上购买。这一途径的困难在于新价格不菲，因此资金匮乏的社区只好过没有新技术的日子或使用较少或老式的工具和办法。其次，通过公共政策获取。不同级别的政府项目(本地、省级和国家级)根据各自的规划为社区配置新技术。这一方式可以解决经费问题，但是存在另外的问题，即公共政策获取的技术是否满足社区的需求。最后，通过社区的自身组织获取。即使是“无技术”或“少技术”的社区也可以通过收集社会资本——社会网络可得的资源——获取技术[4]。还有公共政策和本地社会资本合作的实例。先于联邦宽带项目的技术机遇计划(宽带技术机遇计划 BTOP 也因其得名)以这种方式做成了几个案例，这是用自上而下的资源完成自下而上的改变的问题[29–30]，换言之，自中央政府，精英的资源实现草根变革的问题。

近 20 年关于数字鸿沟的研究证明它不仅仅涉及技术获取、技能、社会和技术是数字不平等的其他方面[6]。本报告的目的是描述信息技术在伊利诺斯州本地机构中的使用情况。通过这一自下而上
3 方法

伊利诺斯州位于美国中部或中西部，从北至南 613 公里，从东至西 340 公里，人口 1300 万。全美第三大城市芝加哥 (人口 300 万) 位于北部，都会区有诸多城镇，都会区以外即为种满玉米和大豆的田野。玉米种植和肉制品生产一直延伸到州的最南端。还有一些规模小些的城市镶嵌在田野风景中。我们第一个方法任务就是要为伊利诺斯州取样。

我们先找出联邦宽带计划覆盖的城市和社区，以便以后可以对这些“自上而下”的项目进行研究。为了能够代表芝加哥城和整个伊利诺斯州，我们选取了芝加哥的 4 个社区②，伊利诺斯州的其他 6 个城市，北部两个，中部两个，南部两个 (见图 1)。我们将香槟和厄巴纳视为一个城市，因为位于两个城市分界处的大学将这两个城市紧密地联系在一起，而且也是两市经济的支柱。

![伊利诺斯州地图](image)

图 1 伊利诺斯州地图
注: 包含 102 个县; 芝加哥的放大图显示了 77 个社区。阴影地区为本研究取样的 6 个城市和 4 个芝加哥社区。

① 采访问题和书面问卷可以通过邮件向作者索取。
② 芝加哥大学的城市社会学家在上上世纪 20 年代将芝加哥划分为 70 个社区 (有时等同于居民区)，这些社区经过微小的调整，仍然在研究和规划中使用。
表1为10个社区的基本资料。芝加哥的4个社区人口主要为少数民族，非裔、波多黎各裔和墨西哥裔是这个城市最主要的少数民族。他们通常比其他芝加哥人贫穷，无业或从事收入不多的服务工作。他们比该城的其他地区经历着更大的数字不平等，包括更多使用宽带。

芝加哥外的6个城市中，雇佣人数最多的机构是医院、基础教育学校（从幼儿园到12年级）和当地政府。按照各市中等家庭年收入，从高到低排列，香槟-厄巴纳排在第一位，其迄今为止最大的雇主是该州的旗舰大学，另有一所较大的社区学院；然后是罗克福德（Rockford），有两家大型工业企业；汽车和航空工业；第三位是小城匹茨菲尔德（Pittsfield），它附近有一所监狱主要雇佣当地居民，它的主要经济活动是农业生产；第四位是卡本代尔（Carbondale），一个地处农村的大学城；根据收入排在第五和第六位的城市各自有显著的少数民族人口。

坎卡基（Kankakee）人口中62％为非裔或拉美裔。其最大雇主之一为人体血液处理厂。东圣路易市（East St. Louis）人口中99％为非裔，这里曾经是繁荣的工业中心。随着工厂关闭，白人外逃[31]，许多城市街区杂草丛生，路灯和路灯也已撤走，公共服务薄弱或几乎不存在。40年中唯一的大雇主是一个赌场，面朝小镇，坐落在停泊在密西西比河上的一艘大船上。表1中为各市的其他值，作为以上摘要的补充。

### 表1 10个社区的人口统计资料

| 地点 | 城市或社区 | 人口 (2010年) | 非裔美国人比例(%) | 拉美裔比例(%) | 中等家庭收入 ($) | 贫困率 (%) | 民主党/共和党 *
<table>
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<tbody>
<tr>
<td>北部</td>
<td>芝加哥</td>
<td>48,743</td>
<td>98</td>
<td>1</td>
<td>34,767</td>
<td>25</td>
<td>无</td>
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<td></td>
<td>恩格尔伍德</td>
<td>30,654</td>
<td>97</td>
<td>0.1</td>
<td>19,743</td>
<td>42</td>
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<tr>
<td></td>
<td>洪堡公园</td>
<td>56,323</td>
<td>41</td>
<td>53</td>
<td>29,605</td>
<td>33</td>
<td>无</td>
</tr>
<tr>
<td></td>
<td>皮尔森</td>
<td>35,769</td>
<td>3</td>
<td>82</td>
<td>34,573</td>
<td>27</td>
<td>无</td>
</tr>
<tr>
<td>中部</td>
<td>罗克福德</td>
<td>152,871</td>
<td>23</td>
<td>16</td>
<td>48,211</td>
<td>19</td>
<td>52/46</td>
</tr>
<tr>
<td></td>
<td>坎卡基</td>
<td>27,537</td>
<td>43</td>
<td>19</td>
<td>38,692</td>
<td>25</td>
<td>47/51</td>
</tr>
<tr>
<td>南部</td>
<td>香槟-厄巴纳</td>
<td>122,305</td>
<td>17</td>
<td>6</td>
<td>69,497</td>
<td>14和12</td>
<td>52/45</td>
</tr>
<tr>
<td></td>
<td>匹茨菲尔德</td>
<td>4,576</td>
<td>6</td>
<td>1</td>
<td>44,897</td>
<td>12</td>
<td>31/67</td>
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<tr>
<td></td>
<td>东圣路易斯</td>
<td>27,006</td>
<td>99</td>
<td>0.5</td>
<td>23,016</td>
<td>39</td>
<td>56/42</td>
</tr>
<tr>
<td></td>
<td>卡本代尔</td>
<td>25,902</td>
<td>28</td>
<td>5</td>
<td>39,785</td>
<td>31</td>
<td>55/41</td>
</tr>
<tr>
<td></td>
<td>芝加哥</td>
<td>2,695,598</td>
<td>34</td>
<td>29</td>
<td>54,077</td>
<td>21</td>
<td>74/25</td>
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<tr>
<td></td>
<td>伊利诺州</td>
<td>12,830,632</td>
<td>15</td>
<td>16</td>
<td>69,658</td>
<td>13</td>
<td>58/41</td>
</tr>
</tbody>
</table>

* 2008年总统选举民主党与共和党投票比率

对各市调查前，我们会从当地报纸收集关于技术的新消息，利用机构名路查找当地机构，从以下类型机构中寻找两人进行采访：

- 县政府
- 市政府
- 公共图书馆


总第三卷 第二〇五期 Vol. 39. No. 205
4 调查结果

主要有四个方面结果需要报告。首先，网速测试暴露出数字鸿沟仍然存在。其次，尽管如此，信息技术应用总体来说得到了很好的发展，但是在信息技术负责人和机构负责人间也存在差异。第三，所有城乡居民数据都能讲述令人颇感意外的当地信息技术起源的历史。最后，一些特定组织网络是这些地方负责人可依靠的资源。

4.1 各领域内仍存在网速差异

如表2所示，在我们调查的各领域仍然存在数字鸿沟。有些网速快，有些网速慢。从表2可以看出出各个领域内部的机构之间，上传和下载速度都存在很大差异。上传速度一般比下载慢，这不利于大体积文件的创作。从表2还可以看出，在一些案例地区政府机构宽带网速高于非盈利机构，不过也有例外。10个社区都是如此。由此看来，市场并未做到以人们可负担的价格将高速宽带接入所有社区，所以，需要公共政策的干预。

表2 各机构办公室网速

<table>
<thead>
<tr>
<th>机构范围</th>
<th>经济基础</th>
<th>下载（兆位/秒）</th>
<th>上传（兆位/秒）</th>
</tr>
</thead>
<tbody>
<tr>
<td>媒体 (N=13)</td>
<td>私立或非盈利</td>
<td>4.4 - 678</td>
<td>3.5 - 517</td>
</tr>
<tr>
<td>市/县政府 (N=11)</td>
<td>公立</td>
<td>9.1 - 562</td>
<td>10.1 - 280</td>
</tr>
<tr>
<td>公共图书馆(N=10)</td>
<td>公立</td>
<td>1.6 - 556</td>
<td>5.0 - 92</td>
</tr>
<tr>
<td>大学 (N=7)</td>
<td>公立</td>
<td>27.0 - 534</td>
<td>11.2 - 272</td>
</tr>
<tr>
<td>教会 (N=18)</td>
<td>非盈利</td>
<td>10.5 - 516</td>
<td>0.04 - 513</td>
</tr>
<tr>
<td>学校 (N=9)</td>
<td>公立</td>
<td>10.6 - 496</td>
<td>7.9 - 340</td>
</tr>
<tr>
<td>医院 (N=9)</td>
<td>私立或非盈利</td>
<td>13.8 - 313</td>
<td>19.3 - 206</td>
</tr>
<tr>
<td>网络服务运营商(N=5)</td>
<td>私立</td>
<td>11.1 - 209</td>
<td>10.9 - 281</td>
</tr>
<tr>
<td>社区机构 (N=24)</td>
<td>非盈利</td>
<td>2.1 - 198</td>
<td>1.0 - 57</td>
</tr>
<tr>
<td>工会 (N=6)</td>
<td>非盈利</td>
<td>5.7 - 92</td>
<td>3.2 - 44</td>
</tr>
<tr>
<td>商会 (N=5)</td>
<td>非盈利</td>
<td>10.2 - 36</td>
<td>2.0 - 21</td>
</tr>
<tr>
<td>总计 (N=117)</td>
<td>—</td>
<td>1.6 - 678</td>
<td>0.04 - 517</td>
</tr>
</tbody>
</table>

注：公立;财政拨款;私立;盈利机构;非盈利机构;由会员制和捐赠资助的机构。网速测定用的是电信工人的网络工具，网址为 http://speedmatters.org。
有些领域的一些机构，尤其是政府机构的宽带速度已经相当快。这些主要是被联邦宽带计划确认为新宽带服务扶持对象的机构，包括当地政府、图书馆、大学、学校和医院（美国医院分为政府资助的公立医院，私立非盈利医院和私立盈利医院）。媒体机构和教会也在扶持范围内。虽然没有参与联邦宽带计划，但是有些媒体机构和教会已经在使用高速宽带。有些当地媒体充分利用了数字内容传输带来的机遇，有些教会也把握这一机会与教徒和其他人通过数字渠道沟通，如对礼拜仪式和唱歌表演进行录像，甚至通过网络传送给无法参加礼拜的教徒，还有其他形式的拓展服务。

香槟－厄巴纳地区的宽带计划在全国来说是有些特殊的，它伸入到社区更深层，除政府和大型非盈利机构外，还接到更多当地机构，如教会、社区机构、工会和商会。相比政府资助的机构，这些机构规模通常较小，力量较薄弱，网速也慢。

当然一个健全的社区需要各种类型的机构。但是总体来说，全国宽带计划主要面向宽带服务不足的领域，而非没有宽带的领域，参见表2中我们所研究的各类型机构。

4.2 本地机构和信息技术负责人顺应信息技术应用潮流

虽然有些机构还没有使工作流程适应于计算机和网络，但是大多数机构已经做到了。在各类机构中情况都是如此。有的医院为来访者和病人提供无线网络，医生使用虚拟私人网络（VPN）在家办公，有医院评论认为放射科发送数码图像耗尽了宽带容量。有的教会用大屏幕举行礼拜仪式，四个人负责摄影，两人负责照相，牧师则在讲坛上使用平板电脑。有的学校在教室中安装了56台数码放映机；有的学校提供虚拟高中课程教学；还有的学校为家长开办计算机课程。有个工会使用twitter，虽然出乎他们的意料许多会员还没有使用它，倒是罗列工作岗位的网页最为有用。有一所社区大学正在讲授应用程序开发。有的电台称其网站不再是空中广播的附属物，因为它们的听众已经超越了本地区；有的当地报社虽然没有自己的网站，但使用Facebook。许多机构称用伊利诺斯州数字鸿沟计划的拨款建立了公共计算机实验室。公共图书馆继续使用基于网络的流通系统，许多图书馆的数据库和其他核心职能的运转都通过网络。有个图书馆为110个本地图书馆提供服务器或虚拟服务器。有的商会为当地经济发展计划建立网站，也许最引人注目的是其中一个城市的如下报告：

地理信息系统（GIS，Geographic Information Systems）对我们来说很重要，因为我们工作中的85%需要依赖空间工作……包括路灯，路牌在内的城市中的所有基础设施都需要清查和跟踪，我们利用GIS将所有这一切联系在一起。我们甚至将工资单和财务数据都连到GIS中，这样利于做分析。我们可以检索某一栋建筑，查看其网络插口的位置，看到什么设备放在什么位置，甚至是在哪一间办公室，这对我们来说非常有帮助。目前我们的网络阻碍现有的一些应用，包括GIS。

总体来说，本地负责人正改变着他们所在的机构。他们当中有些可以得到很多帮助：’我们的信息技术部门有11个人全方位服务于2000名用户’；有些却很少；’我就是信息技术部门，我们的信息技术部门只有我一人。’

正如表3所示，在信息技术使用方面，信息技术负责人显然领先机构负责人。这一表格的依据是我们对受访者所提的28个“是非”问题。最后一系列的星号表明，信息技术负责人肯定回答的比例远超出机构负责人。在编程和开源软件应用方面的差异比较不明显，但是使用推特的情况怎样呢？编辑推特呢？在11个使用项中，信息技术负责人遥遥领先。被誉为网络组织者①的信息技术助手的角色仍然很重要。

### 表3  机构负责人和信息技术负责人对信息技术的具体使用情况

<table>
<thead>
<tr>
<th></th>
<th>总计 ( N = 100 ) (%)</th>
<th>信息技术负责人 ( N = 51 ) (%)</th>
<th>机构负责人 ( N = 49 ) (%)</th>
<th>差距 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>……在网上查询信息吗？</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>……用计算机创建文档吗？</td>
<td>99</td>
<td>100</td>
<td>98</td>
<td>2</td>
</tr>
<tr>
<td>……使用手机吗？</td>
<td>98</td>
<td>98</td>
<td>98</td>
<td>0</td>
</tr>
<tr>
<td>……日常工作中收发邮件吗？</td>
<td>96</td>
<td>94</td>
<td>98</td>
<td>-4</td>
</tr>
<tr>
<td>……用无线上网吗？</td>
<td>96</td>
<td>100</td>
<td>92</td>
<td>8</td>
</tr>
<tr>
<td>……拍摄数码照片吗？</td>
<td>94</td>
<td>98</td>
<td>90</td>
<td>8</td>
</tr>
<tr>
<td>……使用电子数据表吗？</td>
<td>94</td>
<td>100</td>
<td>99</td>
<td>12</td>
</tr>
<tr>
<td>……用手机发短信吗？</td>
<td>92</td>
<td>94</td>
<td>90</td>
<td>4</td>
</tr>
<tr>
<td>……共享自己制作的照片、音频和视频吗？</td>
<td>90</td>
<td>94</td>
<td>86</td>
<td>8</td>
</tr>
<tr>
<td>……使用即时通讯吗？</td>
<td>88</td>
<td>94</td>
<td>82</td>
<td>12</td>
</tr>
<tr>
<td>……用手机收发邮件吗？</td>
<td>86</td>
<td>90</td>
<td>82</td>
<td>9</td>
</tr>
<tr>
<td>……使用社交网站吗？</td>
<td>86</td>
<td>90</td>
<td>82</td>
<td>9</td>
</tr>
<tr>
<td>……使用维基吗？</td>
<td>85</td>
<td>92</td>
<td>78</td>
<td>15 *</td>
</tr>
<tr>
<td>……使用手机浏览网页吗？</td>
<td>84</td>
<td>88</td>
<td>80</td>
<td>9</td>
</tr>
<tr>
<td>……阅读在线公告吗？</td>
<td>75</td>
<td>75</td>
<td>76</td>
<td>-1</td>
</tr>
<tr>
<td>……记录数码影像吗？</td>
<td>73</td>
<td>84</td>
<td>61</td>
<td>23 *</td>
</tr>
<tr>
<td>……在线聊天吗？</td>
<td>73</td>
<td>84</td>
<td>61</td>
<td>23 *</td>
</tr>
<tr>
<td>……录制数字音频吗？</td>
<td>71</td>
<td>80</td>
<td>61</td>
<td>19 *</td>
</tr>
<tr>
<td>……使用网络电话吗（如 Skype）？</td>
<td>67</td>
<td>76</td>
<td>57</td>
<td>19 *</td>
</tr>
<tr>
<td>……创建或维护网页吗？</td>
<td>60</td>
<td>71</td>
<td>49</td>
<td>22 *</td>
</tr>
<tr>
<td>……加入电子讨论组吗？</td>
<td>60</td>
<td>73</td>
<td>47</td>
<td>26 *</td>
</tr>
<tr>
<td>……在讨论组或公告栏中发布信息吗？</td>
<td>60</td>
<td>67</td>
<td>53</td>
<td>14</td>
</tr>
<tr>
<td>……使用记账软件吗？</td>
<td>57</td>
<td>63</td>
<td>51</td>
<td>12</td>
</tr>
<tr>
<td>……用其他方式在网上发布信息吗（如博客）？</td>
<td>55</td>
<td>57</td>
<td>53</td>
<td>4</td>
</tr>
<tr>
<td>……使用 UNIX 操作系统和开源软件吗？</td>
<td>41</td>
<td>67</td>
<td>14</td>
<td>52 *</td>
</tr>
<tr>
<td>……编程吗？</td>
<td>35</td>
<td>57</td>
<td>12</td>
<td>45 *</td>
</tr>
<tr>
<td>……主持或编辑讨论组或公告栏吗？</td>
<td>25</td>
<td>35</td>
<td>14</td>
<td>21 *</td>
</tr>
<tr>
<td>……增加或修改维基条目吗？</td>
<td>18</td>
<td>29</td>
<td>6</td>
<td>23 *</td>
</tr>
</tbody>
</table>

注：星号标注处为机构负责人与信息技术负责人差距较大的应用
4.3 起源

本地负责人和信息技术负责人提及了上世纪 80 年代的早期发展，90 年代对本地社区信息网络的组织以及早期为了使城镇能够走在时代前列所做的工作。在六个区域中，曾经的技术引领者——大学图书馆和报社——依然走在前列。在芝加哥的四个社区中，我们的受访者一般没有如此悠久的技术背景，但那些确实有过的，也创造了不少早期的信息技术辉煌。

上世纪 80 年代香槟-厄巴纳市政府从打字机和大型机转为使用个人电脑；1984 年洪堡公园社区的一家机构开始使用 Mac 电脑，因为主管这个的志愿者在一家使用 Mac 电脑的公司做技术支持。1986 年匹茨菲尔德一家电台开始使用电脑，用于处理音频。1986 年本康奈尔大学有了网络连接，速度是每秒 56K。1989 年一家配有四台公共检索计算机的公共图书馆在皮尔森馆开馆。

上世纪 90 年代，伊利诺斯州的皮奥里亚（Peoria，不在我们的研究范围内）最先建立了自由网。始于 1986 年的自由网渐渐流行起来；免费、自由获取的计算系统使人们可以通过调制解调器在自己的电脑上随时访问，获取本地信息、共享邮件、新闻组和聊天等。我们研究范围内的香槟-厄巴纳和罗克福德①继皮奥里亚后创建了自由网。这些早期免费的通向刚起步的互联网的路径，同城镇里的个人和机构展示了计算机的功能。例如：香槟县委员会（县最高立法机关）早在 1994 年就将会议议程和会议记录公布在草原网（PrairieNet）上。西尼西比山谷自由网（Simmisissippi Valley Free-Net）也以同样的方式激起了罗克福德。草原网由图书馆学校全体教员创建，西尼西比自由网由在当地图书馆工作的图书馆学校学生创建。这些项目促进了当地负责人之间的合作，也为他们抓住新技术和财政拨款的机遇做好了准备。

同样，坎卡基的一家报社为了提高日报的订阅量开通了拨号上网服务。一所学校组织社区共同支持一项始于 1986-1987 年的互联网接入计划。这为学校和社区之间的合作定下了基调。在拨号上网时代提供网络服务的报社是如此成功，以至于它在 2012 年接通宽带的坎卡基地光纤计划中发挥了先锋作用。

4.4 “远离聚光灯”的系统

从采访记录中看有两个相对显著的系统对当地机构起到了帮助作用。其中之一为伊利诺斯州数字鸿沟资助计划，每年都会拨款直到今年的州财政预算危机不得不中断(2)。另一个是联邦教育折扣计划(eRate)。一位受访者解释说 eRate 要求资助机构形成并使用一个为期三年的技术计划。在资助后，她所在机构已经完成了一个三年计划周期，并觉得非常有帮助。此外，在与各机构讨论后我们总结了十个主要系统（见表 4）。我们称之为“远离聚光灯”的系统，因为他们并非典型的信息技术系统，但是受访者反映这些系统帮助了他们学习和实施新技术。

因此，即使是规模小或贫困社区的当地人也通过专业机构进入到有关信息革命的国家话语中。我们称这些机构“远离聚光灯”是因为他们并非广为人知的信息技术的信息源。但是他们是其所在领域活动的专家，这显然是更加重要的。依照受访者的反馈，在采纳信息技术时这些机构是可信赖的，有所帮助的。他们是促进信息技术有效利用的观察、最佳实践和支撑的主要源泉。

采访中提到的 10 个地方或全国性系统中有 9 个的支撑作用是由信息技术负责人提到的。信息技术负责人似乎比机构负责人更多接触信息技术的帮助者和新概念。唯一的例外是在伊利诺斯农村工作的农业局主管，他使用宽带的激励来自农业部，这并不奇怪，因为他与美国农村各机构保持长期的特殊联系。

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② 消除数字鸿沟资助计划，http://www.ildceo. net/dceo/Bureaus/Technology/Technology + Grants + Programs/4-Eliminate + the + Digital + Divide. htm
表 4 帮助 10 位受访者学习、规划和采用信息技术的专业组织

<table>
<thead>
<tr>
<th>系统</th>
<th>领域</th>
<th>主要采访对象</th>
</tr>
</thead>
<tbody>
<tr>
<td>大都市芝加哥医疗保健理事会</td>
<td>医疗保健</td>
<td>医疗信息技术主管</td>
</tr>
<tr>
<td>伊利诺斯州医疗卫生信息交换中心</td>
<td>医疗保健</td>
<td>医院首席信息官</td>
</tr>
<tr>
<td>医疗保健信息管理人员学院</td>
<td>医疗保健</td>
<td>医院首席信息官</td>
</tr>
<tr>
<td>伊利诺斯州南部县新一代 911 计划</td>
<td>公共安全</td>
<td>县信息技术主管</td>
</tr>
<tr>
<td>国家紧急电话求助组织伊利诺斯分会（INENA）</td>
<td>公共安全</td>
<td>县信息技术主管</td>
</tr>
<tr>
<td>伊利诺斯云计算</td>
<td>学校</td>
<td>学校信息技术主管</td>
</tr>
<tr>
<td>伊利诺斯计算教育家</td>
<td>学校</td>
<td>学校信息技术主管</td>
</tr>
<tr>
<td>高级工程任务组</td>
<td>技术领导</td>
<td>图书馆信息技术主管</td>
</tr>
<tr>
<td>伊利诺斯州首席技术执行官</td>
<td>技术领导</td>
<td>学校信息技术主管</td>
</tr>
<tr>
<td>伊利诺斯州农村事务部</td>
<td>农业</td>
<td>农业局主管</td>
</tr>
</tbody>
</table>

5 总结与意义

本文对伊利诺斯州 10 个社区的研究仅是研究项目的首个报告，该研究项目旨在描绘本地社区的转变，即信息革命的社会足迹。

经研究发现了本地社区变革的三个主要因素：网络组织者（在本地组织中有信息的专业人士）；作为数字技术与网络早期采纳者的本地组织；计算机素养（基于本地负责人对技术的使用情况）。这是使一个本社区跨越数字鸿沟的主要组成部分。

我们已经将焦点放在领导者身上，现在还需要找出领导者与社区其他方面的关联情况。搭一座跨越数字鸿沟的桥梁是任务之一，而激励和动员人们过桥的任务又大有不同。另外，从社区角度来看，问题仍是这些机构间的互动。这种互动在多大程度上促进了以信息之城为目标的社区文化转变？

此外，正如上文提到的，联邦宽带计划在这些城镇中又有何影响？计划是如何实施的？采访结束时正值计划即将开始实施。

最后，本研究只是基于美国一州的几个社区。我们需要扩大范围，找一些有代表性的社区，这样获得的研究结果才能代表全美国。我们还需要在其他许多国家进行这一研究，这样才能获得我们需要的全球知识。

感谢莱恩·泽里普（Brian Zelip）的现场调查和数据收集工作，感谢阿卜杜勒·阿尔卡利麦特（Abdul Alkalimat）的明智建议，感谢伊利诺斯州和中国社群信息学研究实验室的其他同仁；感谢本研究的参与者，与我们分享了他们的宝贵经验和时间；还要感谢赞助者：福特基金会（通过与密歇根大学的合作），伊利诺斯大学社群信息学项目/数字融入中心。

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org/dlib/january99/kling/01kling.html.


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英国文化、传播与创新工业部长 Ed Vaizey 于2013年3月27日宣布撤销“公共借阅权”(Public Lending Right, PLR)办公室。PLR 的法定责任将由大英图书馆委员会(The British Library Board)承接管理。文化、媒体、体育部门(DCMS)在2012年夏季曾经为此举行过一次商议，经过英国国会批准，该项转让的时间定在2013年10月1日。

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资料来源：
1. 大英图书馆的报导: http://pressandpolicy.bl.uk/Press-Releases/Public-Lending-Right-transfer-618.aspx

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The Information Revolution in Illinois:
A Community Informatics Perspective
by Kate Williams, University of Illinois at Urbana-Champaign, USA

Introduction

A social transformation is underway worldwide, toward using digital technology as the basic infrastructure. This has been called an information revolution. It has rapidly impacted all aspects of society, as a boon for some and a digital divide for others. This paper presents research on ten local communities in the state of Illinois, USA.

Community informatics (CI) research asks big questions and yet is also very practical. In this sense, it is what has been called Pasteur-quadrant research. Not pure research, not applied research, but posing and answering big questions and providing solutions to current practical or policy problems. The big question for this paper and for community informatics as a whole is this: Is community possible in the information society? That is, does it exist, and how? As agricultural and industrial societies around the world meet the economy-shattering digital modes of production, community as we know it is under attack. But just as when industrial societies replaced agricultural ones, community did not vanish; it reemerged in new forms. It is this destructive-constructive process we are interested in, but in our information era.

Libraries are community-serving and community-based organizations, even though they are also usually government agencies. So community informatics knowledge is also needed in order to plan the libraries of the future. This is especially true for public libraries, which serve local, geographic communities. So community informatics has taken root in library and information science programs and ischools in the West, through research, coursework and service.

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1 The author expresses her gratitude to Brian Zelip for his field work and data collection, Abdul Alkalimat for his wise advice, and others in the Community Informatics Research Lab in Illinois and China; the study participants who shared their experience and time; and Yu Liangzhi, Jiang Hong, Chen Jianlong and Lai Maosheng. Thanks also to two funders: the Ford Foundation through a partnership with the University of Michigan, and the University of Illinois Community Informatics Initiative/Center for Digital Inclusion.

2 Williams (2001) provides a short list of terms for this phenomenon. In chronological order from 1962 to 1996, they are: computer revolution, knowledge economy, global village, scientific-technological revolution, third wave, post-industrial post-service revolution, information revolution, informationalism, and network society. A key source for the earlier terms is a list assembled by Beniger (1986).

3 What if we had 1, 2, many such reports from provinces all over the world? This is what the field of community informatics produces. It uses empirical research to build theory that all of us need in order for our societies to function.

4 Louis Pasteur solved the problem of people getting sick from drinking spoiled milk by inventing pasteurization, but he also proved the germ theory of disease, that is to say, he was among those to establish the existence of micro-organisms. Stokes (1997) discusses the unique value of Pasteur-quadrant research.

5 Ischools are a group of schools and programs which have rebranded or reorganized themselves in response to the centrality of digital technology. Most but not all are also LIS program and are in North America; Chinese members include Nanjing University Department of Information Management and Wuhan University School of Information
The specific research question in this paper is to find the social origins of the information revolution in the local community. What is going on? Who are the actors? How is it unfolding?

There are certainly important problems to solve as we see massive human energy and funds invested in reorganizing societies into information societies. In the US, policy and funds are targeting broadband as the digital divide of the moment. What is the result? What can we now do better with broadband? In 2013 the US government is completing a three year, $7.2 billion effort to install broadband in un- or underserved areas of the US. This effort was part of the Obama administration’s economic stimulus legislation in early 2009. Funds were distributed via two programs: the Broadband Initiatives Program (BIP) and the Broadband Technology Opportunities Program (BTOP). BTOP defined unserved areas as census block groups where fast internet is not available at all. Underserved areas were defined as census block groups where fewer than 40% of residents subscribe to broadband service. (Smeltzer 2009)

Along with the fiber installations (“below ground projects”), close to 10% of the BTOP funds is allocated to promoting broadband use by outreach and education, especially at public computing centers but also by data collection and sharing (“above ground” projects). Estimates of the number of libraries involved in these projects range from 1,205 to 3,408, and many are multi-site libraries so they signify an even broader involvement. Champaign-Urbana has its project, Urbana Champaign Big Broadband (UC2B), which has installed internet fiber across the area along streets and offered fiber-to-the-premise to homes in underserved areas and to local government and non-profit agencies, including local public libraries. The other major federal program is nicknamed eRate; it spent $2.23 billion in 2011, subsidizing telecommunications and internet providers to enable schools and libraries to get discounted access. (Universal Service Administrative Company, no date) These two programs illustrate how broadband is the current focus of national digital divide policy and spending, and everyone can learn from them if we study the situation.

The Community Informatics Research Lab, a research team of students and scholars led by UIUC Professor Abdul Alkalimat and the author, has been involved in this since the start. The activities illustrate the Pasteur-quadrant approach of community informatics. They also reflect CI’s close integration of research, teaching and service. This is crucial for two reasons. First, there is rarely funding to study local communities around the world with large paid research staffs. Second, professional

Management. Their focus is on the intersection of people, information and technology and their research funding is above a certain level. For more see http://www.ischools.org.

6 National Telecommunications and Information Administration (2013) and Rural Utilities Service (2010). The first agency is part of the US Department of Commerce and has administered BTOP. The second is part of the US Department of Agriculture and has administered BIP.

7 A census block group is a geographic unit used by the US Census Bureau for many decades. It is an area that is home to roughly 1,500 people. These units are kept as stable as possible over the years to make comparisons possible over time. (http://www.census.gov/geo/www/geo_defn.html#BlockGroup)

8 This estimate is based on data from Gwenn Weaver, Federal Program Officer, National Telecommunications and Information Administration of the US Department of Commerce, and ALA 2013.

9 Urbana Champaign Big Broadband, http://www.uc2b.net.
training for librarians and information professionals needs to include actual experience in communities. Our work has included:

- consulting on the design of the federal program and helping convene interested researchers,
- drafting a successful broadband proposal from Champaign-Urbana, UC2B, and helping guide that project
- convening Illinois project leaders for annual reports and discussions at eChicago
- collecting data on local non-profit and government agencies in Champaign-Urbana and nine other Illinois communities to understand current digital practices and how they might change once broadband is available
- helping develop a local wiki, cuwiki.net, as part of a national movement towards better information sharing by and about local communities
- teaching graduate students who are preparing for librarianship and other work in communities by immersing them in interviews, surveys, technical report writing, local wiki editing, tech support in local public libraries, and participation in public meetings.

This paper will discuss the key concepts and assumptions driving the research (“Theory”), methods used, and selected findings. In conclusion it will summarize and discuss the implications of the findings.

Theory

There are at least three complementary approaches to the study of the information revolution: Technical, historical and sociological. Each of these three approaches operates at a different level. The technical approach is found in engineering and computer science. It operates at the micro-level in the sense that it designs something to solve a practical problem. If the problem is widespread, micro-level research can have big implications. This is the research that invented many of the devices that have become the infrastructure of the Information society. The historical approach, by which I mean macro-level, focusses on change over long periods of time, observing large scale social shifts as new technology

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10 Local wikis are growing around the world based on an open source tool; see http://www.localwiki.org. While there are also popular commercial tools for aggregating human knowledge, from Facebook to QQ, the local wiki movement reflects people’s interest in locally controlled, locally-focused non-commercial crowdsourcing and information sharing that might outlive the vagaries of the marketplace. Studying these is yet another opportunity for community informatics.

11 Williams (2012, reprinted in Williams et al 2012) examines this role in Chicago Public Library; Roy et al (2010) report a volunteer program connected with an LIS program; and Urbana Free Library currently partners with the University of Illinois to offer its patrons a “tech volunteer” service.

12 Just two examples of this approach include Bush (1945) and Nelson (1965).
becomes normalized or becomes infrastructure. Both the technical and the historical approaches should always be accounted for in any analysis of the information revolution.

The third approach, which I call the sociological, examines phenomena at the meso-level. Rather than focusing on inventing a new device or on broad historical transformation, this research focusses on social interactions and context surrounding a new device or system. This research has focused on the workplaces and organizations that were the early adopters of information technology (IT). Scholars argued that technological innovation can be disruptive, in the way Schumpeter (1942, p 83) argued that capitalism was “creative destruction.” Destruction and construction occur almost simultaneously. This has certainly been true of digital technology. Kling (1980, 1999) discovered that workplaces did not simply adopt technology in the way early engineers and developers had envisioned; rather there was contention, adoption, refusal to adopt, repurposing, and so on. As others were seeing the same reality, his name for the new field was accepted: social informatics.

Emerging later, community informatics uses social informatics and other theory to focus on the social justice question, that is to say, on the local community and civil society. As the digital became the infrastructure for our economies and cultures, societies split. An early term for this was the “digital divide” (Williams 2001, van Dijk 2005) and later “digital inequality.” (DiMaggio and Hargittai 2001) There arose digitally literate elites using IT to manage society and participate fully in the economy and so on. And alongside them are others not able to manipulate electronic networks in their own interests, or to the same degree. Along with the social justice foundation, community informatics relies on the “hacker ethic.” Himanen (2001) explained this concept in his study of the technical workers who carry out computer innovation. The hacker ethic includes the awareness that digital technologies have the potential to make life better for people. Local community is the terrain for community informatics research because it is the space for daily life (especially for the socially excluded) that all else depends on. (Williams and Durrance 2010)

Local communities adopt technology in three ways. One, the marketplace. The challenge here is that new technology costs more, so poor communities make do without, with less, or with older tools. Two, public policy. Government programs at various levels (local, provincial, national) equip communities according to their plans. This can solve the financial challenge, but there is still the challenge of whether the technology-by-public-policy achieves what the community needs. Three, community self-organization. Even have-less or have-not communities can adopt technology by marshaling social capital—resources available through social networks. There are instances where public policy and local social capital can work together; the Technology Opportunities Program which preceded the federal broadband rollout and inspired its name (Broadband Technology Opportunities Program) managed this

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13 Examples of this approach include Marx (1867/1887), Mumford (1934), Jones (1982), and Castells (1996).

14 A good example of how researchers do combine approaches (technical, historical, and/or sociological) is Nelson’s book, Computer Lib: You Can and Must Understand Computers Now (1974), which is in fact an early community informatics text.

15 For more on social capital see Lin (1999); for two studies of social capital facilitating local technology use, see Alkalimat and Williams, 2004, and Williams, 2011.
in at least a few instances; it is the problem of bottom-up change using resources that come from top-down. (Williams 2007, 2007a) Another way of putting this is the problem of local grassroots change using resources from the center, from an elite.

Close to twenty years of research on the digital divide has demonstrated that it is more than just access to technology; skill, support, and motivation are other aspects of digital inequality. The objective of the study reported on here is a portrait of IT use in local institutions in Illinois. From this bottom-up portrait, we can estimate how broadband might be useful in these locales and suggest future research, policy and practice.

This paper uses data from our broadband research to investigate the origins of the information revolution. Community informatics is interested primarily in people’s use of digital tools, and secondarily in the tools themselves. This is because it sees the information revolution as a social process and not purely a technical one.

Our question here is how are local leaders using information technology now? How did they get there? Where are they going with respect to IT use? In a typical large national project, as we have said, the model is that transformation is sparked or enabled from the top down—from the federal planners to the community. Our experience is that there is also a process of innovation from below. Sometimes these two processes can join together. Sometimes they conflict. Sometimes they are like the saying, “Two ships passing in the night.” This means they interact very little or not at all.

So the data here concerns innovation from below. It was collected by visiting and interviewing local organization leadership and IT staff across the state of Illinois.17

Method

Illinois is a state in the central or Midwestern United States, 613 kilometers miles north to south and 340 kilometers east to west. It is home to 13 million people. At the north is the third largest US city, Chicago (3 million people), and a spreading metropolitan area of many towns and cities. At the edge of the metropolis the corn and soybean fields start. Crop and meat production continue to the southern tip of the state. Other much smaller cities are spread across the rural landscape. So the first methods task was to sample this state.

We identified the cities and communities where federal broadband projects were underway so that we could later examine those projects for a study looking at innovation from the “top down.” To represent

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16 Helpful explanation of the multiple dimensions of the digital divide, or of digital inequality, can be found in Clement and Shade (1998), DiMaggio and Hargittai (2001), and van Dijk (2005). Williams (2001) summarizes and comments on earlier empirical data on the digital divide. Yan and Sun (2012) provide an analysis based on the Chinese experience.

17 The interview questions and written questionnaire are available by emailing the author.
the city of Chicago and the entire state, we selected four community areas 18 in Chicago and six cities in
the state, two northern, two central, and two southern, as in Figure 1. We investigated both Champaign
and Urbana as one city because they are so closely linked on account of the very large university located
on the boundary between the two cities, dominating the economy.

Table 2 below profiles the ten communities. Populations in the four community areas in Chicago are
predominantly ethnic minority: African American, Puerto Rican, or Mexican. These are the largest ethnic
minorities in the city. They are also typically poorer than other Chicagoans, either not employed or
working mostly service jobs for inadequate pay. They also experience greater digital inequality than
other parts of the city, including less access to broadband.

In the six cities outside Chicago, the largest employers in the counties are hospitals, K-12 schools, and
local government. Considering each city from highest to lowest median annual household income,
Champaign-Urbana comes first. Its largest employer by far is the state’s flagship university. There is also
a large community college. Second is Rockford, which has two large industrial employers: auto and
aerospace systems. Third is the small town of Pittsfield, which has a nearby prison that employs local
people; it is a small town very closely tied to agricultural activity. Fourth is Carbondale, a large university
town in a rural county. The fifth and six cities by income each have large ethnic minority populations.
Kankakee is 62% African American or Latino. One of their largest employers is a human blood processing

18 Urban sociologists at the University of Chicago in the 1920s divided the city into more than 70 community areas,
which are sometimes held equivalent to neighborhoods. With very few adjustments, these same geographies
continue to be used in research and planning.
facility. East St. Louis, 99% African American, was once a thriving industrial center. It suffered such factory closings and white flight (Hamer 2011) that many city blocks are now overgrown with weeds, street signs and lights have been removed, and public services are weak or non-existent. The only new large employer in 40 years is a casino located on a large boat moored in the Mississippi River facing the town. Table 1 provides other measures for each city, complementing these brief profiles.

<table>
<thead>
<tr>
<th>Location</th>
<th>City or Community Area</th>
<th>Population</th>
<th>Percent African-American</th>
<th>Percent Latino</th>
<th>Median family income</th>
<th>Poverty rate</th>
<th>Democrat/Republican</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicago</td>
<td>Auburn-Gresham</td>
<td>48,743</td>
<td>98%</td>
<td>1%</td>
<td>$34,767</td>
<td>25%</td>
<td>na</td>
</tr>
<tr>
<td></td>
<td>Englewood</td>
<td>30,654</td>
<td>97%</td>
<td>0.1%</td>
<td>$19,743</td>
<td>42%</td>
<td>na</td>
</tr>
<tr>
<td></td>
<td>Humboldt Park</td>
<td>56,323</td>
<td>41%</td>
<td>53%</td>
<td>$29,605</td>
<td>33%</td>
<td>na</td>
</tr>
<tr>
<td></td>
<td>Pilsen</td>
<td>35,769</td>
<td>3%</td>
<td>82%</td>
<td>$34,573</td>
<td>27%</td>
<td>na</td>
</tr>
<tr>
<td>North</td>
<td>Rockford</td>
<td>152,871</td>
<td>23%</td>
<td>16%</td>
<td>$48,211</td>
<td>19%</td>
<td>52/46</td>
</tr>
<tr>
<td></td>
<td>Kankakee</td>
<td>27,537</td>
<td>43%</td>
<td>19%</td>
<td>$38,692</td>
<td>25%</td>
<td>47/51</td>
</tr>
<tr>
<td>Central</td>
<td>Champaign-Urbana</td>
<td>122,305</td>
<td>17%</td>
<td>6%</td>
<td>$69,497 and $57,253</td>
<td>14% and 12%</td>
<td>52/45</td>
</tr>
<tr>
<td></td>
<td>Pittsfield</td>
<td>4,576</td>
<td>6%</td>
<td>1%</td>
<td>$44,897</td>
<td>12%</td>
<td>31/67</td>
</tr>
<tr>
<td>South</td>
<td>East St. Louis</td>
<td>27,006</td>
<td>99%</td>
<td>0.5%</td>
<td>$23,016</td>
<td>39%</td>
<td>56/42</td>
</tr>
<tr>
<td></td>
<td>Carbondale</td>
<td>25,902</td>
<td>28%</td>
<td>5%</td>
<td>$39,785</td>
<td>31%</td>
<td>55/41</td>
</tr>
<tr>
<td>Chicago</td>
<td></td>
<td>2,695,598</td>
<td>34%</td>
<td>29%</td>
<td>$54,077</td>
<td>21%</td>
<td>74/25</td>
</tr>
<tr>
<td>Illinois</td>
<td></td>
<td>12,830,632</td>
<td>15%</td>
<td>16%</td>
<td>$69,658</td>
<td>13%</td>
<td>58/41</td>
</tr>
</tbody>
</table>

Table 1. Demographics of 10 communities: 2010 population; percent African American; percent Latino; median annual family income; percent living in poverty; and the ratio of those voting Democratic in the 2008 presidential race compared to those voting Republican.  

In approaching each city, we collected news stories about technology from local newspapers, used directories to find local organizations, and recruited a pair of people to interview from the following types of organizations:

- County government
- City government
- Public library
- Public school district
- Community college

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We spoke with the director or a senior manager designated by the director (referred to here as “organization leader”) and a person they identified as their information technology person (“IT leader”). Interviews (N=101) lasted one hour or less and included 26 questions asked verbally, a two page written questionnaire (N=100), and an internet speed test run on one of the organization’s computers. (N=117, using additional speed tests at organizations in Champaign Urbana from a parallel study: Williams, Alkalimat and Sackmann 2012) Following US regulations, data collection was carried out after a brief process of getting each person’s written consent to proceed and to record the interview for transcription.

Findings

There are four main areas to report on. First, the internet speed tests reveal continuing digital divides. Second, despite that, IT use is generally well developed, but differences persist between the IT leaders and the organization leaders. Third, surprising local IT-origin stories can be drawn from the participants in any given town. And finally, particular networks appear to be resources for these local leaders.

Speed gaps persist in each sector

Every sector that we studied is experiencing a digital divide between those with faster internet and those with slow, as Table 2 indicates. That table shows wide ranges of uploading and downloading speeds measured in each sector. Uploading is generally slower than downloading, discouraging people from creating sizeable content. Table 2 also shows that while government agencies are in some cases working with faster broadband than non-profits, there are exceptions. This is true across all ten locations. So the market has indeed failed to bring affordable and fast broadband to all these communities; the public policy is warranted.

Certain organizations in several sectors, especially the government agencies, are already accessing fairly fast broadband. These are primarily the sectors recognized by the federal broadband program as eligible for the new broadband services: local government, libraries, colleges, schools, and hospitals. (Hospitals in the US are either public, government funded, private non-profit, or for-profit) Exceptions to this rule are the media organizations and churches. Some of them are already working with fast broadband without any federal broadband attention. Some local media have seized the opportunity presented by digital content delivery. Some churches too are seizing the opportunity to interact with their members.
and others via digital channels: Sunday services and choir performances videorecorded and even webstreamed for people who cannot get to church, and other forms of outreach.

The broadband project in Champaign Urbana was unique in the nation for reaching deeper into the community, past the government agencies and large non-profits to connect many more local institutions: churches, community organizations, labor unions, and the chamber of commerce. These organizations are typically smaller and more vulnerable than the government funded ones and their measured speeds are slower.

Of course all types of organizations are needed for a healthy community. But on the whole the national broadband program is targeting the broadband have-less, not the broadband have-nots, when you look at the types of organizations in our study and in Table 2.

<table>
<thead>
<tr>
<th>Range of Internet speeds (megabits per second)</th>
<th>Economic basis</th>
<th>Downloading</th>
<th>Uploading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media (N=13)</td>
<td>Private or non-profit</td>
<td>4.4 - 678</td>
<td>3.5 - 517</td>
</tr>
<tr>
<td>Public Library (N=10)</td>
<td>Public</td>
<td>1.6 - 556</td>
<td>5.0 - 92</td>
</tr>
<tr>
<td>College (N=7)</td>
<td>Public</td>
<td>27.0 - 534</td>
<td>11.2 - 272</td>
</tr>
<tr>
<td>Church (N=18)</td>
<td>Non-Profit</td>
<td>10.5 - 516</td>
<td>0.04 - 513</td>
</tr>
<tr>
<td>School (N=9)</td>
<td>Public</td>
<td>10.6 - 496</td>
<td>7.9 - 340</td>
</tr>
<tr>
<td>Hospital (N=9)</td>
<td>Private or non-profit</td>
<td>13.8 - 313</td>
<td>19.3 - 206</td>
</tr>
<tr>
<td>ISP (N=5)</td>
<td>Private</td>
<td>11.1 - 209</td>
<td>10.9 - 281</td>
</tr>
<tr>
<td>Community Organization (N=24)</td>
<td>Non-Profit</td>
<td>2.1 - 198</td>
<td>1.0 - 57</td>
</tr>
<tr>
<td>Labor Union (N=6)</td>
<td>Non-Profit</td>
<td>5.7 - 92</td>
<td>3.2 - 44</td>
</tr>
<tr>
<td>Chamber of Commerce (N=5)</td>
<td>Non-Profit</td>
<td>10.2 - 36</td>
<td>2.0 - 21</td>
</tr>
<tr>
<td>All (N=117)</td>
<td>--</td>
<td>1.6 - 678</td>
<td>0.04 - 517</td>
</tr>
</tbody>
</table>

Table 2. Internet speeds measured at the offices of each organization, reported as a range from lowest to highest, downloading speed and uploading speed, in megabits per second. Also shown is the economic basis for each sector: public (tax funded); private, that is, for profit; and non-profit, that is, funded by membership and/or donations. Speeds were measured using a Communications Workers Association tool online at http://speedmatters.org.

Local organizations forging ahead with IT use, IT leaders too

While some organizations had not adapted their workflows to computers and the internet, most had. This was true of every type of organization. A hospital provides free WIFI for visitors and patients, a VPN for doctors to work from home, and comments that the radiology department “eats up the bandwidth” sending digital images. A church holds services using a big screen, four people on videocameras and 2 on still cameras. Another minister uses a tablet in the pulpit. A school system has just installed 56 data projectors in its classrooms; another is teaching virtual high school classes; another brings parents in at night for computer classes. A labor union is using twitter although not many of the members are on twitter yet, to their surprise; the webpage with job listings is the most useful. A community college is teaching app development. A radio station says their website is no longer an appendage to their on-air broadcasts because their audience is spread beyond the local area; a local newspaper without websites
uses Facebook instead. A number of organizations report building public computer labs with State of Illinois Digital Divide grant money. Public libraries maintain web-based circulation systems, and many organization operate databases and other central function via the web. One library hosts servers or virtual servers for 110 other local libraries. A Chamber of Commerce builds websites for local economic development projects. Perhaps the most remarkable to us was this report from one city:

GIS [Geographic Information Systems] is a big thing for us, because about 85 percent of what we do is based on spatial work. [...] All the infrastructure that the city owns, streetlights, signs, all have to be inventoried, all have to be tracked and we use the GIS system to put all this together. We can even tie payroll to GIS, and we also tie GIS to our financials, so we can do some analysis. We can call up a building and look at where the network jacks are, we can see what equipment is where and in what office, so that’s been very helpful. Right now our network is choking on some of the existing applications, GIS being one of those.

So, in general, local leaders are transforming their organizations. They may do so with lots of help: “Our IT department is 11 people with 23 degrees supporting 2,000 users.” They may only have a little help: “I’m it, a one-man IT department.”

At the same time, the IT leaders are ahead of the organization leaders as far as using IT broadly. Table 3 demonstrates this. It is based on 28 yes-no questions we asked of interviewees. Asterisks in the last column mark the IT uses where many more IT leaders than organization leaders answered, Yes, I do this. Gaps in programming and using open source software are easy to understand. But what about in using Wikipedia? Editing Wikipedia? Here and in a total of 11 uses, IT leaders are out in front. The IT helper role, what is called the cyberorganizer,\(^\text{20}\) is still crucial.

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Table 3. Specific uses of IT as reported by the organization leaders and IT leaders, shown from most to least commonplace. Asterisks indicate uses where organization leaders and IT leaders differed the most; in each case the IT leaders were more likely to report those uses.

**Origin stories**

Local leaders and IT leaders mentioned early developments in the 1980s; organizing to get a local community information network in the 1990s; and ways that early work kept the town ahead of times. In the six small towns, early leaders seem to remain leaders: the university, the library, the newspaper. In the four community areas, our study participants generally did not have the long background, but those who did had early IT victories to tell us.

In the 1980s Champaign-Urbana's city government switched over from typewriters and a mainframe to personal computers; in 1984 a Humboldt Park community organization got its first computers, Macs, since the volunteer in charge worked as tech support in a company that had Macs. In 1986 a Pittsfield radio station got its first PC and used it for audio processing. In 1986 the state university in Carbondale got its internet connection: the speed was 56K per second. In 1989 a public library opened in Pilsen with four public access computers.

In the 1990s, a town not in our study, Peoria, Illinois, was the first to establish a free-net. Free-nets started in 1986 and were catching on: free, open access computer systems that many people could reach at any given time by modem from their own computer, to get local information, share email,
newsgroups, chat, and so on. Two of the cities in our study followed Peoria and created Free-Nets: Champaign-Urbana and Rockford.21 These early and free avenues to the fledgling internet introduced many individuals and organizations in those towns to what computers could do. For instance, the Champaign-County Board, which is the top legislative body at the county level, was posting its agendas and minutes on PrairieNet by 1994. Sinnissippi Valley Free-Net galvanized Rockford in much the same way. PrairieNet was founded by library school faculty. SinnFree was founded by library school students who worked in local libraries. These projects prepared local leaders to partner with each other and grab opportunities for new technologies and grants.

Similarly, in Kankakee, a local newspaper opened a dial-up internet service in order to increase subscriptions to its daily paper. And a school organized its local community to back a plan to get internet access starting in 1986-1987. This set the tone for school-community collaborations. And The success of the newspaper’s internet service provision in the dial-up age positioned the paper to spearhead a local Kankakee Fiber project to get broadband in 2012.

**Key networks ‘out of the limelight’**

There were two relatively visible networks that appear in the interview transcripts as helping these local organization. One is the State of Illinois Digital Divide grant program, which has been making grants each year until this year’s state budget crisis emptied the program.22 The other is the federal eRate. An interviewee explained that eRate requires its funded organizations to develop and keep in use a three year technology plan; since receiving funds, her organization has practiced a three year planning cycle and found it very helpful. In addition, ten key networks appeared in our discussions with these organizations and are listed in Table 4. We call them “out of the limelight.” What this means is that they are typically not IT networks, but the interviewees mentioned them as helping them learn and implement new technologies.

So local leaders, even in small or disadvantaged communities, are plugged into national discourses regarding the information revolution via professional associations. We call these associations ‘out of the limelight’ because they are not well known sources of information on IT. But they are expert on the activity of that sector, which is evidently more important. According to our interviewees, they are trusted and helpful when it comes to IT adoption. They are key sources for ideas, best practices, and support for new and effective uses of IT.

Ten regional or national networks were mentioned in the interviews. In nine of the ten cases, it was the IT leader who mentioned depending on them. It seems as if the IT leader is better connected to IT help and new ideas than the organization leader. The only exception was the Farm Bureau director working in rural Illinois. It is reasonable that the broadband stimulus was partly directed through the Department

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21 Newby (1995) and Fox (1995) provide historical accounts of Champaign Urbana’s Prairienet and Rockford’s SinnFree.
of Agriculture, because the former has a longtime special relationship with organizations in rural America.

Table 4. Ten respondents mentioned professional networks that helped them learn, plan and adopt IT. Nine of the ten were IT leaders; only one was an organization leader.

<table>
<thead>
<tr>
<th>Network</th>
<th>Sector</th>
<th>Key interview contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metropolitan Chicago Healthcare Council</td>
<td>Health care</td>
<td>Medical IT director</td>
</tr>
<tr>
<td>IL Health Information Exchange Authority</td>
<td>Health care</td>
<td>Hospital CIO</td>
</tr>
<tr>
<td>College of Healthcare Information Management Executives</td>
<td>Health care</td>
<td>Hospital CIO</td>
</tr>
<tr>
<td>Counties of Southern Illinois 911 Next Generation project</td>
<td>Public safety</td>
<td>County IT manager</td>
</tr>
<tr>
<td>Illinois Chapter of the National Emergency Number Association (INENA)</td>
<td>Public safety</td>
<td>County IT manager</td>
</tr>
<tr>
<td>Illini Cloud</td>
<td>Schools</td>
<td>School IT director</td>
</tr>
<tr>
<td>Illinois Computing Educators</td>
<td>Schools</td>
<td>School IT director</td>
</tr>
<tr>
<td>Advanced Engineering Taskforce</td>
<td>Tech Leaders</td>
<td>Library IT director</td>
</tr>
<tr>
<td>Illinois Chief Technology Officers</td>
<td>Tech Leaders</td>
<td>School IT director</td>
</tr>
<tr>
<td>Illinois Rural Affairs Council</td>
<td>Agriculture</td>
<td>Farm Bureau director</td>
</tr>
</tbody>
</table>

Summation and Implications

This study of ten Illinois communities is only the first report from a research program to map the transformation of the local community, the basic social footprint of the information revolution.

Our findings point to three key factors in local community change: Cyberorganizers (IT leaders working with local organizations); local organizations that are a base for early adoption of digital technology and the Internet; and computer literacy based on how local leaders use digital technology. These are the main components of how a community has been able to cross the digital divide.

Now that we have focused in on the key aspects of leadership, we need to find out how this leadership connects with the rest of the community. Building a bridge across the digital divide is one task, but motivating and mobilizing people to cross over is quite a different set of tasks. Further, from a community point of view the question is also how these institutions interact with each other: To what extent does this add up to a culture shift in the community toward becoming an information city?

In addition, as we have said, what is the impact of the federal broadband projects in these towns? How did they work? These interviews were done just as that work was beginning.

Finally, this research is based on a set of communities in one part of the USA. We need more extensive work toward a representative set of communities so that we can generalize our findings to represent the entire US. We also need to replicate this research in many countries so that we can move toward the global knowledge we need.
Bibliography


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