Conceptualizations of Technology in the Information Field

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ABSTRACT
The interdisciplinary nature of the information field (iField) calls for a greater understanding of how iSchool scholars engage with information technology in their research. The purpose of this article is to study how much emphasis iSchool scholars put into studying technology, and how they conceptualize technology in their research. Using content analysis as our method of investigation, we coded journal articles published by tenure track faculty members between 2008 and 2010 from five iSchools (Drexel, Michigan, Pittsburgh, Syracuse, and Washington). We report preliminary empirical evidence showing a microscopic view on the diversity in how iSchool scholars engage with technology, one of the fundamental components in the iField.

Keywords
Technology conceptualizations, information technology, information field, iSchools.

INTRODUCTION
The information field (iField) has grown rapidly over the course of the last three decades. Through the creation of organizations like the iCaucus (http://ischools.org/) and the continued expansion and development of new iSchools, the field has become formally established as a scientific discipline. The interdisciplinary iSchool community brings together scholars from a diversity of research disciplines such as library science, computer science, management, communication and many others to address challenges related to various facets of information (Zhang & Benjamin, 2007). As the iField expands and becomes more recognized by funding agencies, recruiters and scholars, the need to understand how research in the field is conducted and conceptualized by the interdisciplinary group of iSchool scholars becomes more salient. Thought leaders in the iField have suggested several formal and informal conceptualizations of research in the iField with information, technology, people, and organization/society being the fundamental components of the iField (Wobbrock, Ko, & Kientz, 2009; Wu, He, Jiang, Dong, & Vo, 2012; Zhang & Benjamin, 2007). While these conceptualizations differ slightly, there seems to be collective agreement that technology is a fundamental component in iField research projects. To our knowledge, empirical research providing a microscopic view of how technology is being conceptualized by the iSchool scholars is still rather scarce. Drawing on previous conceptualizations and expanding on the recent work from Zhang, Liew, & Hassman (forthcoming), this study aims to address the two main research questions below:

- How much emphasis do iSchool scholars put into studying the technology component? Is the study of technology a core or peripheral component in iSchool research?
- How do iSchool scholars conceptualize technology in their research?

The importance of such an investigation is two-fold: to help iSchool scholars better communicate and position their work in this interdisciplinary research space, and to uncover how the iField’s conceptualization of technology differs from other fields of research.

CONCEPTUAL FRAMEWORK
Broadly, technology is defined as “any technological inventions and innovations that extend human mental or physical abilities” (March & Smith, 1995; Zhang, Liew, & Hassman, forthcoming). In the context of the iField, technology may include hardware, software, procedures, infrastructure, platforms, applications, resources as well as services used throughout the information life cycle (e.g., acquisition, processing and communication). In this study, we use Orlikowski & Iacono’s (2001) conceptualizations of technology as a lens to investigate how iSchool scholars conceptualize technology in the iField. We adopted this coding scheme since it has been tested to be a suitable framework for both the Information Systems and Information Science disciplines (Sawyer & Huang, 2007).
We extended Orlikowski’s and Iacono’s (2001) conceptualizations to include the “implied” category as a way to better identify whether technology is treated as a core or peripheral component within iField research. Table 1 summarizes our coding scheme based on Orlikowski & Iacono’s framework.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal</td>
<td>Technology is absent from the study.</td>
</tr>
<tr>
<td>Implied</td>
<td>Technology is mentioned in the motivations/implications of the study but is not the research focus.</td>
</tr>
<tr>
<td>Proxy</td>
<td>Technology captured through surrogate measures (i.e., user perceptions, diffusion rates, and spending in dollars).</td>
</tr>
<tr>
<td>Ensemble</td>
<td>Dynamic interactions between people and technology focusing on the way technology is developed or used (i.e., development project, production network, embedded system, and structure).</td>
</tr>
<tr>
<td>Tool</td>
<td>Engineered artifact and its features designed to serve certain purpose (i.e., labor substitution, productivity increment, information processing).</td>
</tr>
<tr>
<td>Computational</td>
<td>Algorithms and models created to increase the capabilities of technology to handle and process information.</td>
</tr>
</tbody>
</table>

Table 1. Coding scheme for technology conceptualizations

**METHOD**

We used content analysis as the method to investigate how iSchool scholars conceptualize technology in their research. Using a purposive sampling strategy, we selected the first five iSchools that were members of the iCaucus as our sample (Drexel University, University of Michigan, University of Pittsburgh, Syracuse University, and University of Washington). We then retrieved all the peer-reviewed academic journal articles of tenure track faculty members published from 2008 to 2010. We acknowledge that leaving out conference proceedings from our sample may limit our findings to only scholars who primarily publish in journals, but included only journal articles to make the coding task feasible. Out of 372 articles identified, we successfully retrieved and analyzed 368 full length articles.

Coding of articles for technology was conducted in two phases. The first phase was done in an exploratory fashion with the goal to test and refine the coding scheme. Another small set of papers were then coded and discussed to further verify and refine the scheme. Once the researchers achieved mutual understanding with at least 70% coding agreement, the remaining articles were then coded by the two researchers in the second phase. Raw agreement on technology coding was above 70% before the discussions involving the third researcher and 100% after the discussions.

**PRELIMINARY FINDINGS**

Table 2 shows the distribution of technology codes from our sample. The most dominant conceptualization of technology in the iField is the computational view (31%), followed by the ensemble view (19%). We also want to highlight that we found technology to be absent in 16% and implied in 10% of the total articles, which indicates that there may be some conceptualizations of technology by iSchool scholars that are not covered by Orlikowski & Iacono’s conceptual framework, leaving us room for future work.

At the school level, the computational view is only the most prevalent view in Drexel (40%), Michigan (32%), and Pittsburgh (66%). Syracuse shows a stark difference, where none of the articles conceptualize technology using the computational view. The most prevalent view for Syracuse is proxy (30%), followed by the ensemble view (28%). Washington scholars mainly engage with technology using the ensemble view (27%).

**CONCLUSION AND FUTURE WORK**

Preliminary findings show that iSchool scholars engage with technology as a core component in their academic research. This is evidenced by technology being part of the main research focus in 75% of the articles in our sample. Our data also shows that iSchool scholars do not only adhere to one single conceptualization of technology in this interdisciplinary field of research. Thus, we can conclude that technology is a core component of interest to the scholars in the iField, and there are variations on how they conceptualize technology in their research.

As part of our future work, we plan to expand and refine our current coding scheme to better fit the diverse conceptualizations of technology in the iField. While the framework from Orlikowski & Iacono provides a starting point to better understand how iSchool scholars engage with technology, we are aware that this framework is conceived for the Information Systems discipline, and may not be sufficient to explain some unique technology conceptualizations in the iField (e.g., book as a form of technology).
<table>
<thead>
<tr>
<th>Technology</th>
<th>Nominal</th>
<th>Implied</th>
<th>Proxy</th>
<th>Ensemble</th>
<th>Tool</th>
<th>Computational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drexel (n = 91)</td>
<td>13%</td>
<td>9%</td>
<td>11%</td>
<td>9%</td>
<td>19%</td>
<td>40%</td>
</tr>
<tr>
<td>Michigan (n = 66)</td>
<td>15%</td>
<td>11%</td>
<td>11%</td>
<td>27%</td>
<td>5%</td>
<td>32%</td>
</tr>
<tr>
<td>Pittsburgh (n = 76)</td>
<td>9%</td>
<td>7%</td>
<td>1%</td>
<td>8%</td>
<td>9%</td>
<td>66%</td>
</tr>
<tr>
<td>Syracuse (n = 69)</td>
<td>23%</td>
<td>12%</td>
<td>30%</td>
<td>28%</td>
<td>7%</td>
<td>0%</td>
</tr>
<tr>
<td>Washington (n = 66)</td>
<td>20%</td>
<td>15%</td>
<td>11%</td>
<td>27%</td>
<td>18%</td>
<td>9%</td>
</tr>
<tr>
<td><strong>Total (n = 368)</strong></td>
<td>16%</td>
<td>10%</td>
<td>13%</td>
<td>19%</td>
<td>12%</td>
<td>31%</td>
</tr>
</tbody>
</table>

Table 2. Distribution of technology categories.

REFERENCES