Assessing Perceived Usability of the Data Curation Profiles Toolkit Using the Technology Acceptance Model

Tao Zhang, Purdue University  
Lisa Zilinski, Carnegie Mellon University  
D Scott Brandt, Purdue University  
Jake Carlson, University of Michigan - Ann Arbor
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The Data Curation Profiles Toolkit (DCPT)

- Created at Purdue for librarians to engage researchers in discussion about data
  - Interview protocol
  - Capture information about a dataset across lifecycle
  - Explore how data are used and managed
  - Identify data curation needs
  - Document generated from data interview
Using the DCPT

- Three-stage process

Preparation ➔ Interviews ➔ Constructing DCP

- DCPs as community resource
  - Understand researcher needs with data
  - Inform development of data services

- Data Curation Profiles Directory
  http://docs.lib.purdue.edu/dcp/
Assessing the DCPT

- Various data collected on how the DCPT has been used
- Study on effectiveness of the DCPT
  - Carlson (2013): Increased users’ confidence in discussing data sharing, but time and effort for developing DCP as barrier to use the DCPT
  - Brandt & Carlson (2013): Users recognized utility and impact, and strongly suggested further enhancement for data curation needs (as opposed to data management)
Motivation

- **Formal** and **structured** assessment of the DCPT to reveal factors affecting:
  - User perception
  - Intention to use
  - Difficulties
  - Areas to be improved

- **Challenge for usability evaluation**
  - Time limit
  - Task performance measures
Technology Acceptance Model (TAM)

- Perceived usability (PU and PEOU)
  - Predict user acceptance and actual usage of technical systems/tools
  - Critical for overall user experience

Source: Davis (1989)
Methodology

- **Survey** of potential determinants of perceived usability
  (28 questions measured in 5-point Likert scale)
  - “I have experience in conducting one-and-one interviews.”
  - “It takes ___ time to learn the DCP Toolkit.”
  - “I can adjust the questions in the DCP Toolkit for use in different situations.”

- **PU, PEOU, and Intention to Use** the DCPT
  - Questionnaire measures adopted from Davis (1989)

- **Open-ended questions**
  - Difficulties and obstacles
  - Areas that user liked and could be improved
Methodology

- Survey sent to 895 registered users of the DCPT website in Dec. 2013
  - 28 measures of determinants
  - 221 responses (24.7%) in a month
  - Most respondents are professional librarians with data management related responsibilities

- Data analysis
  - Likert ratings of determinants -> Exploratory Factor Analysis -> Regression Analysis
  - Qualitative analysis of open-ended responses
Exploratory Factor Analysis

- Correlations between variables result from sharing of factors
- Uncover underlying structure of a large set of measured variables
Factor Analysis Results

- Seven factors extracted for 84.2% of total variance
  - Applicability
  - Time
  - Complexity
  - Experience and Share
  - Training and Help
  - Extensibility
  - Interviewee Requirements

- Factors in regression models to predict PU, PEOU, and Intention to Use
Regression Results

- Multivariate, stepwise regression models

\[ \text{PU PEOU Intention to Use} = \text{Factors 1-7} + \text{error} \]

<table>
<thead>
<tr>
<th>Perceived Usefulness</th>
<th>Estimated $\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicability</td>
<td>3.00</td>
</tr>
<tr>
<td>Experience and Share</td>
<td>2.38</td>
</tr>
<tr>
<td>Training and Help</td>
<td>1.17</td>
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</table>

<table>
<thead>
<tr>
<th>Perceived Ease of Use</th>
<th>Estimated $\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicability</td>
<td>1.12</td>
</tr>
<tr>
<td>Time</td>
<td>-1.11*</td>
</tr>
<tr>
<td>Complexity</td>
<td>-1.59</td>
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<tr>
<td>Interviewee Requirements</td>
<td>-1.71</td>
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</table>

<table>
<thead>
<tr>
<th>Intention to Use</th>
<th>Estimated $\beta$</th>
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</thead>
<tbody>
<tr>
<td>Applicability</td>
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</tr>
<tr>
<td>Time</td>
<td>-0.41</td>
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<tr>
<td>Complexity</td>
<td>-0.38</td>
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<tr>
<td>Training and Help</td>
<td>0.29</td>
</tr>
<tr>
<td>Extensibility</td>
<td>0.33</td>
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</tbody>
</table>

*p-value = 0.064, sample size > 250 needed to show significance
Regression Results

- Multivariate, stepwise regression models

\[ \text{[Intention to Use]} = \text{PU, PEOU} + \text{error} \]

<table>
<thead>
<tr>
<th>Intention to Use</th>
<th>Estimated $\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>PU</td>
<td>0.156</td>
</tr>
<tr>
<td>PEOU</td>
<td>0.054 ($p = 0.07 &gt; 0.05$)</td>
</tr>
</tbody>
</table>

- All regression models $R^2$ around 0.5
Open-ended Questions

- Questions asked in the survey:
  - “If you used the DCP Toolkit in the past, did you encounter any difficulties? If yes, please explain.” (n=46)
  - “If you plan to use the DCP Toolkit, what would be the obstacles you may encounter?” (n=62)
  - “What are the things you like about the DCP Toolkit?” (n=69)
  - “What are the things you think should be improved in the DCP Toolkit?” (n=54)

- Qualitative analysis method
  - Two independent researchers reviewed and coded responses
  - Two iterations, 66.8% agreement on initial coding and 100% consensus on final coding results
Open-ended Responses

Themes:

- Amount of time required to use the DCPT vs. depth of information from completed DCP
- Structure and format of the toolkit
- Alignment of the DCPT with particular context
- Using the DCPT to engage faculty and library community
Open-ended Responses

- Finding the right balance
  - **Time** required for both researchers and interviewees
  - **Depth of information** in DCP as good utility

- Applicability
  - Adapting structure and format to contexts
  - Making decisions based on results

- Extending the DCPT
  - Compact, “lite version”; online tool
  - Focus on particular data types or fields
  - Community building based on DCPs
Quantitative vs. Qualitative Results

- The balance between time and value
  - Interviewee Requirements affect Perceived Ease of Use
  - Complexity and Time affect Intention to Use
  - Time requirement vs. thoroughness in open-ended responses

- Training and Help
  - Significant in regressions on Perceived Usefulness, Intention to Use
  - Open-ended responses requested additional help on:
    - Adaptations for different purposes
    - Transforming collected information into DCPs and making decisions
Conclusion

- Technology-Acceptance Model useful for assessment
  - Factor analysis & regressions
  - Significant factors identified for Perceived Usability & Intention to Use
- Open-ended responses complement quantitative results
- Usability improvement of the DCPT
  - Reduce time requirement
  - Increase flexibility
  - Training and help
DCP: What We’ve Learned & Going Forward

DCP 1.0

Preparation
Interviews
Constructing DCP

Paper-based

DCP 2.0

Preparation & Training
Interview/Interact
Profiles/Best Practices
Utilizing Outputs

Tech-based

DCP 2.0 Roadmap Workshop,
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Thank you!

Tao Zhang, D. Scott Brandt  
Purdue University  
USA  
zhan1022@purdue.edu  
techman@purdue.edu

Lisa Zilinski  
Carnegie Mellon University  
USA  
ldz@cmu.edu

Jake Carlson  
University of Michigan  
USA  
jakecar@umich.edu