Counting What Students in Information-Related Fields See as “Information:”
A Content Analysis of Visual Images

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Introduction

- Students in information-related fields not only interact with information for everyday-life purposes but also tackle the issues regarding information in their coursework and research.
- Although students and scholars in all these disciplines study “information,” they may study information from very different perspectives.
- Hartel developed the method and coined the term “iSquares”
  - A method and pedagogy to study the concept of “information”
- Research questions:
  1. How do students in information-related fields perceive the concept of information through drawing and writing on the iSquares?
  2. How similar or different their iSquares are?
Methods: Data Collection

- Follow Hartel’s (2014) iSquare protocol
- With instructors’ permissions, students were recruited from a required course from each department (LIS, IM, and CS)
  - junior-level undergraduate courses
  - first-year graduate-level courses
- All data were collected in classroom settings
## Participants

219 students at a large research university in northern Taiwan

<table>
<thead>
<tr>
<th>Gender</th>
<th>Students</th>
<th>N=219 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>125</td>
<td>57.08</td>
</tr>
<tr>
<td>Female</td>
<td>88</td>
<td>40.18</td>
</tr>
<tr>
<td>Choose not to identify</td>
<td>6</td>
<td>2.74</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>Students</th>
<th>N=219 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>19-20</td>
<td>103</td>
<td>47.03</td>
</tr>
<tr>
<td>21-22</td>
<td>54</td>
<td>24.66</td>
</tr>
<tr>
<td>23-25</td>
<td>47</td>
<td>21.46</td>
</tr>
<tr>
<td>Over 26</td>
<td>12</td>
<td>5.48</td>
</tr>
<tr>
<td>Blank</td>
<td>2</td>
<td>.91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Students</th>
<th>N=219 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIS</td>
<td>68</td>
<td>31.05</td>
</tr>
<tr>
<td>IM</td>
<td>73</td>
<td>33.33</td>
</tr>
<tr>
<td>CS</td>
<td>78</td>
<td>35.62</td>
</tr>
</tbody>
</table>
CONTENT ANALYSIS

- A 25-question codebook mainly based on Hartel (2014a, 2014b), Tsai (2015), and relevant literature
- Two major parts of the codebook:
  1. Composition and elements
  2. Perspectives and connotations of the information concept
- Three major revisions and several minor adjustments
  - Testing with approximately 5%, 8%, and 10% of the 219 iSquares (i.e., 12, 18, and 21 iSquares) by the researcher and two other coders with LIS background
- Chi-square tests were used to reveal differences among the three disciplines
Preliminary Findings
Expressions of programming languages or binary codes: $\chi^2(2, N=219)=14.622, p=.001$
Information is the combination of 0 and 1/is created through 0 and 1.
– IM undergraduates (n=4)

Information is the combination of 0 and 1/is typically binary 0 and 1/is constructed by 0’s and 1’s/0101 represents it.
– CS undergraduates (n=4)

Information is nothing more than 0 and 1/is consisted with 0 and 1/binary world with algorithm.
– CS graduate students (n=5)
Representation elements

LIS

IM

CS

[Diagram with various elements and symbols]

[Diagram with a human head and mind elements]

[Diagram with a symbol and a dollar sign]

[Diagram with a digital figure and a dollar sign]
Conceptual elements: Human Images

\( \chi^2(2, \, N=219)=17.460, \, p<.001 \)
Conceptual elements: ICT and Print Materials

Print materials: \( \chi^2(2, N=219)=11.121, p<.01 \)
Perspectives on Information: Information as Process

\[ \chi^2(2, N=219) = 14.237, \ p = .001 \]
Perspectives on Information: Information as Knowledge

Nothing found in this category
Perspectives on Information: Information as Thing (metaphor)

\(\chi^2(2, N=219)=8.746, p<.05\)
Perspectives on Information: Big Data

\( \chi^2(2, N=219) = 6.776, p < .05 \)
Information is anything/can be everything/everything on earth/everything we learn/everything in the universe.

Information is like the air— it is everywhere.

– IM undergraduates (n=13)

Information is everything around you/everything happened/almost everything everywhere

– CS undergraduates (n=7)
Conclusion

- LIS students tend to use more complex compositions and metaphor, include image of human beings, print documents, and express the concept of uncertainty, information-seeking processes, and the DIKW hierarchy
- IM students tend to express the concept of big data
- CS students tend to use simple coding/icon as representations
Future studies can further (1) investigate other individual differences (i.e., age, gender) from iSquares and (2) incorporate an image-elicitation interview so that we can better understand and interpret the concept of “information” in this rapidly changing world.
THANKS!

Any questions?
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