Convergence and Divergence in Tagging Systems: An Examination of Tagging Practices Over a Four Year Period
Margaret E.I. Kipp <kipp@uwm.edu>
Information Organization Research Group (IOrg)
School of Information Studies, University of Wisconsin Milwaukee
https://pantherfile.uwm.edu/kipp/public/

INTRODUCTION
- early tagging research showed strong similarities to conventional indexing as well as substantial differences
- patterns in tagging show both divergence and convergence over time
- this study examines patterns in tagging of URLs over a 4 year period using the following questions:
  - What patterns of user tagging activity emerge through analyses of tags applied to a set of documents (URLs)?
  - To what extent do these patterns converge and diverge over time?

BACKGROUND
- Hammond et al. 2005, Sen et al. 2006: tag frequencies show convergence of terminology
- Kipp 2005, Kipp NASKO2007: tags are often related terms (in a thesaural sense) or similar terms which are not yet in the thesaurus
- Golder and Huberman 2006: tagging activity has predictable patterns and proportions stabilize after as few as 100 taggers
- Kipp and Campbell ASIST2006: tagging has many similarities to conventional indexing and substantial differences
- Kipp IA/Summit2007: non subject tags may be a sign of emotional involvement, reviewing function, deeper relationship with text

THEORY AND METHOD
- This study analyses changes over time in tags applied to 63 documents with up to 4 years data in order to track fluctuations in tagging.

RESULTS
- total number of posts: 56646 (2006) and 136656 (2008) increased by 2.88 times
  - popular URLs experienced a greater growth (maximum 15.36)
  - total number of tags: 163761 (2006) and 430451 (2008)
  - unique tags: 62% in 2006, 68% in 2008
  - user vocabulary length: 10 in 2006 (median 2), 24 in 2008 (median 2)
  - tagless entries: 6% in 2006, 7% in 2008
  - system/unfiled retains its popularity (system assigned tag for tagless entries)
  - popularity: 9 of 10 most popular items from 2006 sample still in top 10 in sample in 2008 (webmd was a newcomer to the list in 2008)
  - popular tags from 2006 in sample still popular in 2008 (health was a new popular tag in 2008)
- 3 Sample URLs: with different growth patterns
  - http://www.43folders.com/ (43folders - personal productivity site/blog)
  - http://www.gutenberg.org/ (gutenberg - public domain ebooks)
  - http://www.webmd.com/ (webmd - health information)

Fluctuations in Taggers and Tags
- significant positive correlation between # of users and # of tags
- significant positive correlation between # of tags and # of unique tags

Stability and Proportions of Tags
- many frequency graphs show top 6-7 items remaining relatively stable
- proportions of each tag as compared to total number of tags fluctuate, but have islands of stability
- tag decay (Russell ASIST2007), changes in perspectives, changes in terminology use over time

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DISCUSSION AND CONCLUSIONS
- early studies of tagging reported that convergence and stability were simply a matter of having sufficient users tag an item
- this study suggests tagging may always show fluctuations in item usage based on fluctuations in user interests in everyday life and emergent terminology
- librarians and information specialists can use these fluctuations to enhance search and browse by allowing terminology to change over time while still providing stable controlled vocabularies for long term information organisation and retrieval

INTER TAGGER CONSISTENCY
- inter indexer consistency studies show that indexers are not consistent (from 4% to 82% in Markey 1984): varies based on expertise of indexers, type of vocabulary used
- various methods: with centroid, centroid represents good indexing; without centroid: pairwise comparisons
  - e.g.: webmd
    - indexerv: 'health', 'medical', 'medicine', 'information'
    - indexerv: 'biology', 'diet', 'healthcare', 'webmd', 'medicine', 'medical', 'health', 'information', 'food'
    - with centroid: intertagger values ranged from 1% to 25%
    - pairwise: intertagger values ranged from 3% to 30%

INFLUENCE IN TAGGING
- positive correlation between time since initial posting and user vocab length (R2 = 0.198 p<0.05)
- comparing number of intersections between user tag lists and the tag cloud for an item shows an increase in intersections (most show small positive significant correlation)