Citation Indexes for Online Interdisciplinary Learning

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Citation Indexes for Online Interdisciplinary Learning

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Overview

- Citations (also known as references) acknowledge the intellectual uses of others’ work and represent scholars’ influence and impact.
- Web links in adaptive hypermedia systems, like the WWW, make the cited material immediately accessible for novice learning.
- How can web links serve as socio-cognitive instruments and what will citation indexes for online, interdisciplinary learning look like?
GIS Web Links Study

- A study was undertaken to investigate the student use of citations and web links in Geographic Information Science (GIS)

- Debate about GIS
  - Geographic Information Science or Geographic Information System?
  - A tool or a science?

- There is consensus about the multi- or inter-disciplinary nature of GIS
Study Questions

- What are the different types of citations & web links that can be found in instructional materials?
  - Online teaching materials have a rich set of citations and hyperlinks.

- Why do students use citations and web links?
  - Citations and web links in learning materials serve as instruments of cognition.
Study details

- Senior year undergraduates and Masters and PhD (n=26-45)
- Course: Introduction to GIS
- Methods of Delivery:
  - Traditional Classroom (lectures – n=90)
  - GIS Lab (ArcView and ArcInfo)
  - Interactive Learning Modules (ILM) in WebCT
Methods to collect use/user data

- Online surveys
  - Demographic survey
  - Survey about each ILM
- Focus group interviews
  - Gather data and verify gaps in surveys
- Logs
  - Customized scripts for following the user as they followed web links and navigated within WebCT
    - Navigational links and other functional links disregarded
Data analysis

- **Use/Non Use Counts and frequencies**
  - How many students used or did not use web links?
  - How many web links used/not used?
  - How often were they used/not used?

- **Nature of web links**
  - Pre-existing categorization schemes were chosen (Duncan et al, 1981 and LCSH, 2000)
  - Categorization of Form (type), Content (+ label), Context (purpose)
Results – Nature of web links

- GIS (not unusually) is a visually rich discipline and there were a total of 130 images in the ten ILMs.
- No web link was used to criticize or dispute.
- Instead the predominant contexts (instructional purpose) were 1) definition, 2) explanation, 3) example, and 4) illustration.
- The predominant form is books.
- The predominant text content is quotation followed by images.
Results – Use/Non Use

Use/Non Use

- The number of students who did not use the citations and links is greater than those who used them.
- Citations (i.e., traditional bibliographic citations not linked to full-text as web links) were not used at all.

Reasons for Non Use

- Ranged from technical problems faced by student in learning WebCT to time management.
Reasons for Use

- Starting points: “Citation offers a starting point from which to become really familiar with the history and information about GIS.”
- Further details: “I wanted to receive more information about what ArcView has to offer.”
- Clarification: “I was curious to know more about Ian McHarg. Confused because I thought he did something else.”
Rudiments of cognition

- Written comments analyzed in terms of
  - Anxiety
    - Web links generated greater negative responses
  - Arousal
    - Ambivalent results
  - Attention
    - Some web links were good at this (interactives)
  - Motivation
    - Stimulated curiosity in some and presented nothing new to others
  - Self-regulation – as above (for motivation)
Results from focus groups

- Probed reasons for use/non use and how citations and web links can further learning
  - *Categorize* in terms of *Required, Recommended* and *Optional* (Reading Lists)
  - *Present* citations as web links
  - *Highlight* web links (*current mechanisms inadequate*)
  - *Compile* (not just embed)
  - *Integrate* different computing environments
  - *Rate* and *make explicit* the *quality* of web links
  - *Increase* citation searching awareness (*expert skill*)
Remarks

- We know a great deal about use of citations by researchers and we also know a great deal about student information and learning behaviors.
- Less is known about how components such as web links affect student learning.
- The evidence appears to be mounting that cognitive overload (like information overload) is a very real problem to students and students and both information organization and visualization displays need to be improved.
More remarks

- The instructor designing the ILMs was very sensitive; there are only 16 bibliographic citations (five unique) and 20 web links. Yet many did not use them.

- System features for WWW 1) to generate citation lists and indexes from hyperlinks embedded in learning materials and 2) improve web link displays and labeling.
Recognition of teaching

- Citation indexes play an important role in the evaluation and assessment of research
- Learning/User Citation indexes have the potential to inform peer review committees of the innovations and productivity of teaching faculty
Outstanding questions

- **Why? (the so what question)**
  - Card catalog studies - no ‘oral citations’
  - Citation studies - ‘concept symbols’ and ‘discipline-oriented discourse communities’
  - Adaptive hypermedia, instructional design, information behavior studies - Web links are information pathways making greater amounts of information available at clickpoint; Learning is not being helped by current mechanisms for web links

- **How and What? (the implementation questions)**
  - How can this be done and what should be indexed?
User citation indexes for learning

Building or developing citation indexes for learning materials and educational users

- In educational digital libraries such as MERLOT, instructional materials created by one may often be used by many.

- Can this “learning/teaching use citation” be captured?
  - Can annotation, review, personal collection frameworks be leveraged for this?
  - Can ‘instructional use (citation) indexes’ be developed around this framework?
  - What will ‘user citation indexes” look like?
Indexing relationships

DNA from the beginning.

Found in 39 personal collections
1. ...
2. ...
3. Biology collection

Human Genome Project

Merlot resource

One peer review

Merlot resource
References

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Thank You!

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The End