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Evaluating a Metacognitive Tool on tte Search Behavior of Education Graduate Students in Digital Lib

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EVALUATING THE EFFECTIVENESS OF METACOGNITIVE TOOL ON STUDENTS' INFORMATION SEARCH BEHAVIOR IN DIGITAL LIBRARIES

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BARBARA BLUMMER
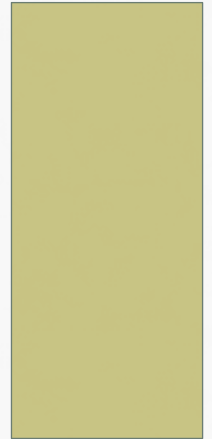
INFORMATION PROBLEM

- Education graduate students have difficulty locating information (Hill & Hannafin, 1997 ;Land & Green, 2000 ;Blummer, Lohnes, & Kenton, 2009)

- Controversy over best approach for library instruction

- Cognitive demands on users are excessive in digital libraries

LACK OF EXISTING RESEARCH

- Idea tactics (Bates, 1979)

- Metacognition

- Information problem solving research

- Think aloud & usability studies

HOW TO ADDRESS MISSING ELEMENTS

- Tabatabai & Luconi (1998)-experts vs novices

- Land & Greene(2000)- related outcomes to participants' domain, system, & metacognitive knowledge

- Tabatabai & Shore (2005)- evaluation & metacognition as the two most important strategies in facilitating search success

- Metacognitive interventions -(Lin &Lehman, 1999; Wolf, Brush, & Saye 2003; Huttenlock, 2007; Kauffman, Ge, Xie, & Chen, 2008))

RESEARCH MODEL

- Problem solving activity that focused on using some of Bates' idea tactics to support students' search in Ebsco databases for information on a topic

PROBLEM SOLVING ACTIVITY
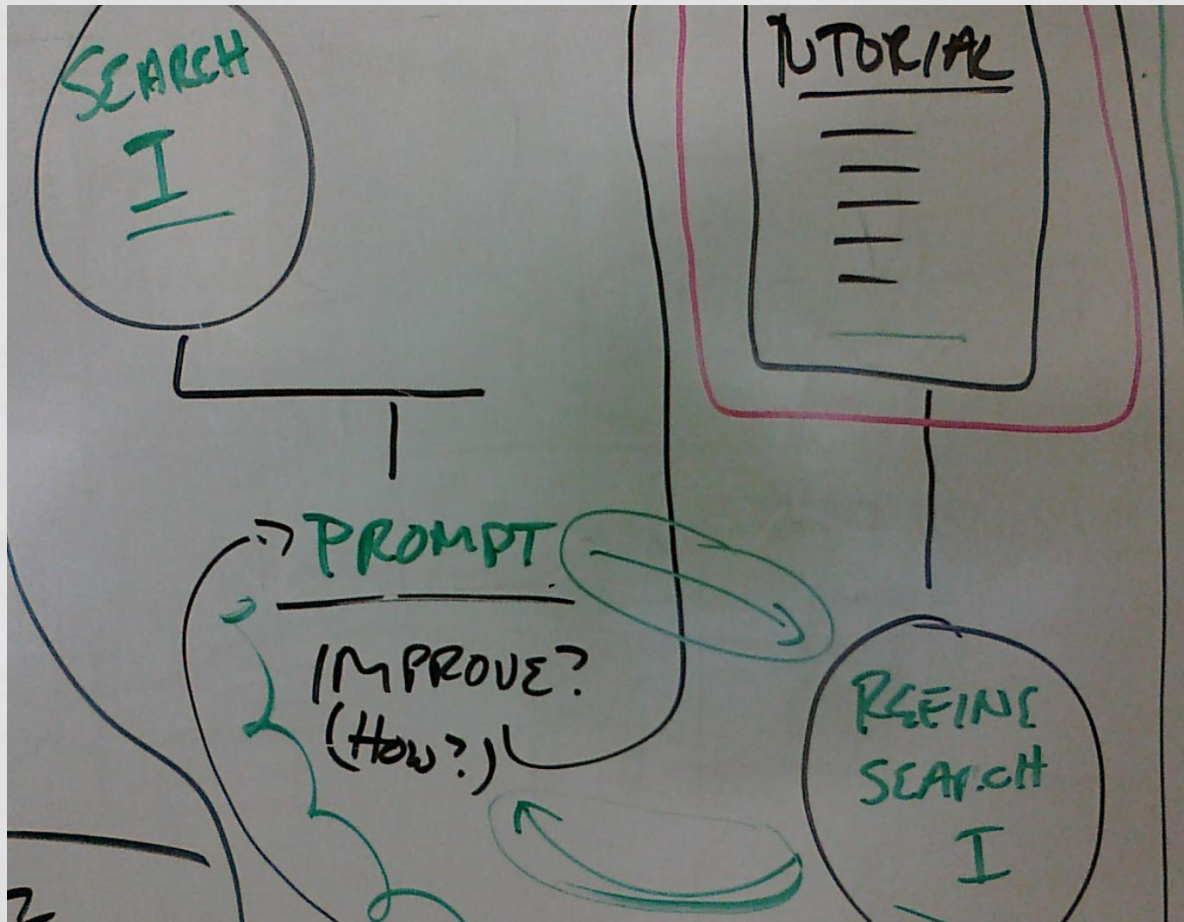
TUTORIAL

Metacognitive idea tactics tutorial

The objective of this tutorial is to enhance individuals' search strategies and to increase their satisfaction level with the results. In the earlier questions, you began to identify areas where your search could be improved. This tutorial offers idea tactics (Bates, 1979) used by professional searchers to improve outcomes. These tactics also resemble metacognitive strategies designed to promote individuals' knowledge of their cognition. All of the tactics offer the potential to improve your searches. They highlight efforts aimed at planning, monitoring and self-regulating search activities.

Select tactics based on your search needs.

RELEVANCE - Require assistance in selecting search terms?

These tactics help users select relevant search terms.

NUMBER - Dissatisfied with the number of your hits?

Click here for strategies that focus on broadening or narrowing searches.

EVALUATION - Reviewing your results?

Click here to learn tactics that center on evaluating search results to improve subsequent search outcomes.

STRATEGY - Do you need to devote more attention to devising a search strategy?

Access these tactics.

Bates, M. J. (1979). Idea tactics. *Journal of the American Society for Information Science, 30*(5), 280-289.

RESEARCH QUESTIONS

- What search techniques did participants demonstrate in their initial search?
- What general attributes were common among participants in their use of the tutorial?
- What search techniques did participants demonstrate in their final searches?
- How did the tutorial affect outcome of the problem solving activity?

EXPANDED ON PILOT STUDY

- Mixed method study of students' information seeking behaviors in 2009 revealed feelings of confusion & uncertainty when researching

- Respondents expressed dissatisfaction with their previous library instruction

- Graduate students were savvy searchers, but required instruction in techniques to locate and process information

PRESENT STUDY

- Searched Ebsco databases for information on a research topic

- Provided access to tutorial, revised search

- Post-activity interview

- Think aloud protocol/Camtasia

SAMPLE-PARTICIPANTS

- Convenience sample

- Volunteers were solicited from education graduate classes during the summer & Fall 2011

- Eight students including two males and six females of various ages enrolled in a College of Education's graduate programs

DESCRIPTION OF ACTIVITIES

- Participant performed search in Ebsco database
- Reviewed results
- Accessed tutorial, revised search as needed
- Post-interview on activity, tutorial, & obstacles

DATA CAPTURED

- Initial strategies, time devising strategy, strategies, time reviewing results, number of hits, number of records opened, scores for results
- Time in tutorial & components examined
- Revised researches, number, time devising strategy, strategies, reviewing results, number of hits, number of records opened, & scores for results
- Themes revealed during activity & in post-search interview

TECHNIQUES DEMONSTRATED IN INITIAL SEARCHES

Name	Locate terms from relevant articles	Use subject terms	Employ Boolean operators	Utilize Advanced Search	Change Search terms	Change databases	Apply limits	Truncate
Amy								
Lesley							1	
Daemon			2	2			1	
Shelly							1	
Mary						1		
Kathy	1		1	1	1	1	1	1
Dwaine						1		
Betsey			1	1				

TECHNIQUES DEMONSTRATED IN REVISED SEARCHES

Name	Locate terms from relevant articles	Use subject terms	Employ Boolean operators	Utilize Advanced Search	Change databases	Apply limits	Truncate
Amy		1	2	2			
Lesley	1		7	7	1		5
Daemon	3				1		3
Shelly		7	7	7			
Mary	4						
Kathy							
Dwaine	1		2	2			
Betsey					2	1	

TECHNIQUES DEMONSTRATED IN BOTH SEARCHES

Name	Locate terms from relevant articles	Use subject terms	Employ Boolean operators	Utilize Advanced Search	Change databases	Apply limits	Truncate	Change Search terms
Amy		1	2	2				2
Lesley	1		7	7	1	1	5	7
Daemon	3	2	2		1	1	3	8
Shelly		7	7	7		1		4
Mary	4				1			16
Kathy	1		1	1	1	1	1	3
Dwaine	1		2	2	1			2
Betsey			1	1	2	1		6

GENERAL ATTRIBUTES COMMON IN THE USE OF THE TUTORIAL?

- Majority of participants referred back to the tutorial during the activity, but the number of and motive for their accesses varied
- Kathy & Shelly's use of the Evaluation Index's Jolt tactic example
- Dwaine & Amy's use of Number Indexes Change tactic example
- Lesley's & Betsey's use of the Number Index's Meditate example

HOW DID THE TUTORIAL EFFECT THE OUTCOME OF SEARCHES?

- No impact on the number of revised searches participants performed

- Association between the amount of time in the tutorial & time spent revising search strategy, reviewing results, & number of records opened

- Negative relationship between time spent devising search strategy & participants' scores for relevance, the ability to answer the problem, & the quality of their last search

TUTORIAL'S EFFECT ON SEARCH CONT.

- Total time in the tutorial had no bearing on final search ratings for relevance, authoritativeness, ability to answer the problem, or quality of the last search. However, increased accesses to the tutorial led to higher scores in these areas. Those participants that accessed the tutorial more than once, with one exception, received a rating of three or above on the quality of their last search.

SEARCH OBSTACLES & PARTICIPANTS SATISFACTION LEVEL

- Broad results
- Too many/too few or no results
- Concerns about time
- Uncertainty & errors
- Uncomfortable with think aloud
- All expressed satisfaction with activity

DISCUSSION

- Idea generation & mental pattern breaking
- Inclusion of database search strategies with the idea tactics provided users additional techniques designed to enhance search results. Participants that focused on these examples, such as Dwaine and Lesley, demonstrated "idea generation," "mental pattern breaking," as well as improved database search techniques during their problem solving activities

USE OF TACTICS

- Participants used the idea tactics as Bates (1979) suggested to overcome obstacles they encountered during their problem solving
- Participants' behaviors during the present study support the information seeking research in their depiction of the obstacles that searchers face as well as the uncertainty they experience

VALUE OF TIME MANAGEMENT IN SEARCHING

- Participants that spent more time in the tutorial spent more time devising search strategy & that may have led to individuals' information overload
- Effective information problem solving required balancing attention to devising search strategy, reviewing results, & examining records
- Participants needed to review results and examine records to gauge the appropriateness of their strategies

INCREASED AWARENESS OF METACOGNITIVE ABILITIES WHILE PROBLEM SOLVING

- Tutorial facilitated their abilities to remember search techniques presented in previous library instructional classes.

- Supports Chen & Ge's (2006) findings on the helpfulness of the cognitive modeling system in facilitating individuals' thought processes. Lesley described it as having "enough information to actually help someone thinking."

AWARENESS OF METACOGNITIVE ABILITIES CONT.

- Participants' think aloud offered evidence of self-reflecting in their problem solving
- Kathy "I have learned with adult education a lot of things exist in databases other than just generic education ones"
- Lesley "I know I could probably go into one of those better articles and see what terms they use"

ADOPTION OF METACOGNITIVE BEHAVIORS IN PROBLEM SOLVING

- Impact of the indexes on Mary's, Betsey's, & Daemon's search behaviors especially in using appropriate keywords, plans, and sources

- Impact of tactic examples on Dwaine's, Amy's & Lesley's problem solving

FINDINGS SIMILARITIES TO INFORMATION USE RESEARCH

- Supports Miller's (1956) Information Processing Theory as individuals gathered new information from subsequent searches they utilized it to revise their strategies accordingly

- Highlights Dervin's(1992)Sense making concept as participants performed additional searches to gather information to enhance their understanding of the topic

- Study underscores the problem solving perspective of information search & IPS

TUTORIAL IMPROVEMENTS

- Replace the clip art with photographs
- Remove the quotations around search terms
  Include tips on how to access the Boolean AND operator
- Highlight Boolean operators
- Differentiate between keywords & subject terms
- Stress optimal number of search results varies
- Describe how Ebsco treats keywords as phrase
- Urge review of search strategies

RECOMMENDATIONS FOR FUTURE STUDIES

- Control the search environment
- Utilize a pre-survey to track participants' domain, system & metacognitive knowledge, as well as their age, their major, their student status, and the year they obtained their undergraduate degree
- Interview potential participants & include a "test think aloud" session

THANK YOU

- Questions?

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