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The Impact of Tagging/Metadata Creation Exercises on College Freshmen's Metacognitive Skills

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Background

Tagging[1] is the process of specifying keywords, categories, and other identifying information for online informational and creative digital objects such as photos, audio clips, video clips and text pages so that it can be searched for and located by others. In addition, tagging makes it possible to thematically connect similar objects to one another on the Web, creating a semantic web, which some see as the next evolutionary step in the internet (Berners-Lee, Hendler & Lassila, 2001). Many (if not most) college students already know how to tag themselves and their friends in photos and status updates posted on social networking sites such as Facebook, and use the tagging facility to build "friends of a friend" (FOAF) networks or easily find a specific person in an online social website. Less apparent however, is their ability to create meaningful or useful metadata labels for other online objects. Tags are used to provide information about information, and the act of tagging involves a number of metacognitive (knowing about knowing) skills, including the recognition of the essential, key identifiers of the object being tagged as well an

[1] Note – we are not talking about the type of "tagging" which involves painting graffiti logos or names on buildings.

understanding of the "other" (unknown searcher) and what that person brings to the search. These skills require tagger to:

- think about classifying, characterizing and uniquely identifying one object from another,
- recognize the influence that their prior knowledge has on this classification and identification process (and in turn, the prior knowledge of those searching for that object),
- understand how objects are connected into a shared semantic network.

Since tagging is a relatively new phenomena for most (outside of library science) and to date little research has been done on students' tagging abilities or the relationship between tagging and academic college achievement, the proposed study will be exploring new ground as our conceptions of knowledge and knowing evolve with the technology (Wilder & Ferris, 2006). Furthermore, as with much of the user-created Web 2.0, it is evolving as a grassroots process. There is no oversight or international administrative body – anyone can use anything as a tag word. Cultural dependence is a given but tagging can help students think about 'the other'/reader and also think about how the object they are tagging fits into the larger semantic web. For example, a student in Namibia might tag a bowl of porridge with the word "oshifima" but this would probably mean that only other Namibians would ever find his/her picture. Adding the tag words "porridge" and "Namibia" would make it possible for students in other countries to find the picture and also help all understand that oshifima is a kind of porridge that is eaten in Namibia.

Tagging is fast becoming a necessary technological literacy skill and an integral

component in the ability to use technology to create, communicate and collaborate (ISTE, 2007). Helping students understand how informational and creative pieces are shared globally in a meaningful way will help ensure that they are capable of contributing their own innovations and ideas to that global sharing process as well as find and access work which they recognize as relevant and useful to them. Being able to categorize and link information together and be aware of what they know as part of a bigger knowledge space is a critical 21st century skill (Raine, 2007) for students moving forward.

Current Project

The plan for the current study was to build on previous work in which a repeated, game-like online expository writing activity was used to help pre-service language arts teachers develop descriptive writing skills (Wilder & Mongillo, 2007). Similarly, the current study sought to qualitatively address the following questions:

- Will repeated feedback from peers help students improve the word choice and accuracy of their tags? Will their tags reflect the salient characteristics and key pieces of identifying information regarding the picture or paragraph they are asked to tag?
- Will repeated feedback from peers help students improve the appropriateness of their tags for the reader/searcher? Will tags be based on a sufficiently comprehensive awareness of what the reader/searcher already knows and is familiar with?
- Will continued tagging experiences help students gain a better understanding of how concepts relate to and are associated with one another as part of a

semantic web?

During the Spring 2009 semester data was collected from a series of interactive expository text writing activities given to 28 students in two Basic Skills remedial reading courses at a mid-sized northeast US public university. These expository text writing activities were run in a series of weekly trials in which each trial had students describing a picture or paragraph prompt in such a way so that peers (also in the study) could uniquely identify it out of a set of similar prompts. Peer guesses (with an explanation of why they thought it was what they have guessed) were then returned to the text writers and became a form of feedback to help hone their descriptive writing ability. Students were also asked to tag the object they were describing. At the beginning of the study, the concept of "tag word" was explained to the students, but subsequent weekly instructions were limited to requests for "*3 or 4 'tags' - key identifying words that someone might search for this picture* [o*r text*] *on*".

Each trial began on Monday morning, with students being asked to respond with their description and tags by Wednesday night. On Thursday morning, students were given three descriptions and tags submitted by their peers and asked to make their guesses by Sunday night. Each week, all students were writers of one description and guessers of three other descriptions. All descriptions, tags and feedback guesses were submitted as anonymous posts to online discussion threads using the university's learning management system. The activities included:

- Week 1: describing a specific dog/apple/flower/cactus from a picture showing a set of similar dogs/apples/flowers/cacti; guessing the target item from peers' descriptions

- Week 2: describing a specific African mask/Greek urn/John Deere tractor/beige moths from a picture showing a set of similar African mask/Greek urn/John Deere tractor/beige moths; guessing the target item from peers' descriptions
- Week 3: provide cloze words for short paragraphs on History of the Plains/Nigeria/Dutch East India Company/Body Measurements from a set of similar short paragraphs; guessing the target paragraph from peers' cloze words
- Week 4: provide cloze words for short paragraphs on Drug-Alcohol Addiction/Rock Formation/Colorado River/NYC Traffic from a set of similar short paragraphs; guessing the target paragraph from peers' cloze words.

Neither pictures nor paragraphs were specifically identified in the prompt text and did not have titles or labels. For example, the picture of a German shorthaired pointer had no text information and the prompt simple asked participants to write about the target "dog".

Results

Twelve out of the 28 students submitted tags during the four weeks; however only five submitted tags consistently. Because of the low participation, the study did not provide enough data to examine the above research questions. It did, however, yield some interesting exploratory data on how college freshmen tag online pictures and paragraphs. Since five of the participants did post tag words for all four weeks, it was decided to analyze these results as part of a pilot case study. The analysis consisted of looking at each of the five chosen participants' tag words for each week, in terms of:

1. Did they include key terms that effectively and succinctly identified the proper category (and sub-category) for the target object/paragraph? In other words, would an online search using the tag words include this object as part of the returned results; e.g. tagging a picture of Yankee stadium with the word "baseball" rather than "sports" which would be too broad or "Jeter" which would be too narrow.
2. Did the tag words they provided indicate an understanding/acknowledgement of the background knowledge of the "other" (reader/searcher who would be using those key words to find that object)? Would these be words that an average English-speaking adult would use to find this object; e.g. "worm" rather than "nematode". (Note: it was assumed that the participants, when they themselves were searchers, were able to generate key words that resulted in successful searches, however this assumption may not hold and needs validation.)
3. Did the tag words they provided indicate any understanding/comprehension of how the object was connected to semantically-similar objects? In addition to specific key terms, did they also include broader and/or related category terms, e.g. tagging a picture of Duke Ellington with the terms "Jazz" and "African-American" in addition to "Duke Ellington".

Initial analysis shows that while most of the tags included key terms that could be used to effectively identify the object, many of the tags contained extraneously and often misleading terms as well. For example, in the first week, Jim tagged a picture of a small round cactus with a yellow flower with the terms "round, cactus, yellow flower" and a

search on Google Images returned pictures very similar to the one he was writing about. On the other hand, Nick's terms for the same cactus, "Pumkin [sic] Cactus , Yellow Pumpkin flower cactus, Pumkin Spots" returned a hodgepodge of images including pictures of pumpkins and pumpkin-apple butter. In the second week, Jim's tags for a picture of a beige moth were "Butterfly, wing, moth", which returned images of moths and butterflies, whereas Andy's tags of "moth, beige" also returned images of beige moth-eaten sweaters.

When looking at whether the tag words indicated an understanding of the reader/searcher, again initial analysis indicates that some of the participants took this into account, while others did not. For example, in the second week, Chuck tagged a picture of a Greek krater with the terms "Ancient urn, plant holder." indicating that people might search for this picture based on the use they might have for that object. On the other hand, Nick's tags for a carved wooden African mask were "Facial mask, Squigley facial Mask, and Facial mask with cut-off mouth". In this case, his gender and/or linguistic background (Filipino-American) may have explained his use of the word 'facial' (as opposed to 'face') but 'squigley' and 'cut-off mouth' show a marked lack of recognition of the reader's perspective.

Similarly, some, but not all of the tags suggest an understanding of how the object is semantically connected in a conceptual network. In the first week, Chuck tags a picture of a German short-haired pointer with "Medium sized dog, Short haired dog. Muscular dogs."; denoting that this object belongs to each of these sets of dog types. In the third week, he tags a paragraph about the Dutch East Indies Company with the terms "Dutch companies, dutch east india company, 1602", showing an understanding of the

specific organization within a larger set of organizations (Dutch companies) and within a historical era. At the same time, Andy's terms "dutch, east india company, power" [comma between 'dutch' and 'east india company' in the original] indicates a rather novice attempt to tie the organization to the larger set of powerful trade organizations. Likewise, a paragraph about the history of the mid-west grasslands (explaining that the Native Americans were moved to reservations and the grasslands plowed up for growing cattle feed) was tagged by Jim with the terms "indians reservations grasslands", where the paragraph could fit into a text about Indians, reservations, or grasslands. Stacey, however chose the terms "Indians, change, grasslands", again indicating a novice attempt to associate the paragraph to a greater concept of colonizing change.

Discussion

Although the current study was unable to answer the original research questions, it has provided some valuable pilot data for further inquiry. One such study might involve giving participants explicit instruction in tagging, both from a searcher and tagger standpoint. For example, participants might be asked to create tags for images and/or text passages and then use those tags to see if they come up with results which are similar to the object they are tagging. This could also be combined in another online game-like experience in which peers used their tags to search and then responded with the URL to the object they thought was closest to the target, providing implicit feedback as part of a referential communication task as in previous studies.

Explicit instruction could also be given in terms of connecting objects within a larger semantic web, perhaps by using concept mapping software as a base exercise. For

image objects, participants could search within broad categories on Flickr or Google Images and see how many categories an object can fit into. For text passages, participants could start by linking phrases within the paragraph up to explanatory pages in Wikipedia or other online resource sites that provide additional background information for the concepts discussed.

Although little exploration has been conducted thus far, further research into helping students attain these skills is necessary. It is important to remember that for these students, 21st century literacy skills is not only about being able to successfully find and use information from the shared knowledge space, but also being able to create and publish information to that space that can be found and used by others.

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