General and domain-specific influence of prior knowledge on setting of goals and content use in museum websites

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Abstract

This article explores the influence of prior knowledge on the setting of goals and use of content in museum website visits. Goal setting is a crucial process in organizing the activities of surfers in open environments, such as museum websites, where surfers faced ill-defined tasks. To this end, 12 graduate students were asked to surf through two museum websites in different domains (anthropology and natural sciences). Half of the participants had robust background in anthropology. Within each of these groups, half of the students had spent more than four years in graduate school, while the other half were first year students. Visited pages and concurrent comments were recorded, coded and analyzed. Results showed that domain specific knowledge influences goal setting process. Visitors with high domain knowledge tended to set larger and more consistent goal structures than first year students. Results showed also that general previous knowledge influences content use. Surfers with higher general skills tended to elaborate more on content and use more intensively the information available at the websites.

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1. Introduction

MENO: How will you look for it, Socrates, when you do not know at all what it is? How will you aim to search for something you do not know at all? If you should meet with it, how will you know that this is the thing that you did not know? Five Dialogues. Plato.

The existence of museum websites provides remarkable educational possibilities and implies crucial challenges. The experience of visiting a museum that once required relocating to within the boundaries of physical museums, now can occur in learners’ homes or classrooms. However, a virtual visit does not guarantee learning is taking place. There is a need to understand how informal learning takes place in virtual spaces. Since museums, virtual or real, are open spaces for learning and visitors are free to follow any path, studying the emergence of goals for the visit can help to shed light on how people learn in such settings. Different audiences could be expected to set different goals during visits and experience different outcomes from them. This article explores how individuals with different backgrounds set goals and use information in museum websites that provide content that can be either familiar or unfamiliar to them. In this way, we expect to understand how the learning experience in museum websites takes place and how it can be improved.

1.1. Previous knowledge and setting of goals: Why are they important?

Research on learner control of hypermedia has shown that learners possessing robust domain knowledge and high metacognitive skills make the most of ill-defined situations while less able learners learn better in more structured instructional environments (Steinberg, 1989). Free decisions in surfing are not necessarily beneficial to learning because learners tend to have inaccurate evaluations of their own performance and make decisions according with those inaccurate evaluations; only those with strong metacognitive skills and previous knowledge take advantage of the surfing freedom and make navigational decisions that promote learning. (Schnackenberg & Sullivan, 2000). That’s why Clark & Mayer (2003) have recommended that in the design of online learning environments learner control be permitted only for learners with high metacognitive skills or high prior domain specific knowledge.

The reason why prior knowledge and general skills influence learning in this type of complex situations is that previous knowledge drives setting of goals. The importance of goal setting for museum visits in general and museum website experience in particular rest on the fact that museums are rich, complex settings. From a cognitive perspective, museums, virtual or real, are open, ambiguous environments designed to fit the expectations and backgrounds of multiple kinds of audiences (Knutson, 2002). For visitors, goal-setting for either a web or physical visit is a critical process for the success of the visit and for learning in museums because the goals determine visitors’ paths and, as a result, learning. Goals that are consonant with disciplinary queries and questions that reflect the domain structure can make the difference between a superficial erratic visit and a meaningful learning experience. As observed in many other activities, metacognitive self-regulation and decision-making based on visitors’ goals play a central role in learning in museums (Zueck, 1988).
Goal-setting in real museums is influenced by previous knowledge of visitors because previous knowledge define the agendas, interests and domain understanding of visitors. Evidence for this shows that, in real museums, goals emerge as a consequence of the interaction between preset agendas, the real details of objects and their placement in a museum (Leinhardt, Tittle, & Knutson, 2002). In the same venue, research also shows that visitors of different ages establish quite different kinds of goals for their visits and experience different reactions to museum environments (Leinhardt et al., 2002) as if their different backgrounds defined fundamentally the uses they make with the exhibitions. In a non-trivial sense, the prior knowledge of visitors plays a central role in determining the goals that emerge and, in this way, influence the final visit experience.

That previous knowledge influences learning is not a new claim: both general and domain-specific prior knowledge influence human performance in tasks as different as scientific discovery (Shunn, 1999), social science reasoning (Voss, Tyler, & Yengo, 1983) and web-based search (Hsieh-Yee, 1993). General and specific knowledge are also crucial for learning in open-ended, ill-structured situations to the extent that domain-specific and general metacognitive skills are critical to the acquisition of any complex knowledge (Lawless & Kulikowich, 1996). What it is new is that we characterize the influence of previous knowledge as being general and domain-specific with respect to the setting of goals in the informal web-based world.

1.2. Domain specific and general influence of previous knowledge

Domain specific and general prior knowledge influence the use of museum websites in quite different ways. A deeper knowledge of a given field (domain knowledge) facilitates not only the cognitive processing of new information, for example using previous understandings to make sense of incoming data. Additionally, such knowledge permits one to parse, organize, and map the search space and thus to determine sub-areas of interest among all the available options at the website. General prior knowledge mediates between the goals that visitors have already established and the results of their actions. For instance, visitors can establish a goal to learn about cultural anthropology but to attain it they have to carry out a series of actions that are mediated by their general websurfing skills. Analogous to web-based research in which the users’ success depends on prior general knowledge about information search (e.g., surfing skills, knowledge of information search) and knowledge about the search domain (Hoelscher & Strube, 1999), the use of museum websites is shaped by the background that visitors have about both the content of exhibitions and general web skills. For the case of goal setting, we claim that domain specific prior knowledge influences the establishment of goals, while the general previous knowledge provides the means with which those goals are attained.

Goal setting is a complex process because it is not unidirectional and several elements interact simultaneously. Activity theory’s characterization of emergent goal setting emphasizes this point (Guberman & Saxe, 2002). Saxe (1992) has noted that activity goals emerge from the interaction among the activity structures (e.g., objectives of a task), the social interactions, the conventions and artifacts available in the environment, and the prior understandings of learners. In setting goals, real-museum visitors attend to three elements: the content knowledge provided by the exhibitions (activity structure), the navigational clues provided by the museum environment (conventions), and the initial goals they have (previous understandings). Goals are set not only because of visitor’s interests but also from the negotiation between interests with the navigational environ-
ment and with the content provided by the museum. Visitors seem to come with personal and disciplinary goals in mind. Different visitors have different purposes when they visit a museum and those goals promote different kinds of interaction. However, what seems ultimately to drive the interaction of visitors are the emerging goals that combine visitors’ initial goals and background with the incoming information and navigational possibilities of the museum. We assume that a similar process occurs in museum websites. Surfers develop goals and those goals determine use of information and navigational decisions. In the next section, we explore the process of setting emerging goals in museum websites.

1.3. The emergence of goals in museum websites

The inputs for the emerging shape of goals are basically the navigational environment of navigation, the initial goals of surfers, and the domain content. The environment of the museum website is any aspect that explicitly or implicitly gives information on possible website paths and content (but not the content itself) and on the users’ current location. The environment is the path that surfers must take to get to the content and it is the frame in which content is displayed. For example, to go to exhibitions, surfers must create a general representation of the space they are exploring that includes a representation of the mutual excluding options presented by the museum, sort of a labyrinth of forking paths. A given surfer can realize he or she has entered an exhibition because he or she finds explicit clues such as exhibition titles, pop-up windows or logos. The same surfer can know she or he has left an exhibition because of changes in the overall design in terms of color, font, or style. Environment is not content, but the relationship of visitors to content rests on the environmental mediation of it. Visiting surfers cannot use content for guidance if they get lost; further if content and environment are in conflict, for instance, in the case of pictures and other decorative details in the exhibition triggering the use of inappropriate previous knowledge (Harp & Mayer, 1998).

While the full range of the web environment is fixed, the goals of visiting surfers start from interests and inclinations of learners. Every visitor enters the museum (virtual or real) with at least some vague goals, even if it is only curiosity. For the researcher, these goals only become visible when visitors are faced with environmental dichotomies. Here, we need to make here the distinction between initial goals and emerging goals. Initial goals are pre-established by the identity, knowledge and preferences of learners. Emerging goals are those that appear when the initial goals are negotiated with the museum website affordances.

Content refers the disciplinary or domain specific information that surfers find on the website. It is the stuff that can be learned. Content is understood using previous knowledge, and in this sense, it is not independent of what learners already know. Features and cognitive demands of content vary across domains. While some domains can be characterized as highly deductive (for instance some areas of mathematics), others are principally inductive and depend on case-by-case analysis (for example historical approaches to social phenomena). This interaction between cognitive demands of the domain and the previous understandings of learners configures the activity structure for the visit. For Saxe (1992), the activity structure is determined by the prescribed objectives and rules of the activity. In the case of visits to museum websites, learners have to reconstruct the rules and objectives of the activity without an instructional guide. These objectives should be connected with disciplinary queries and structures, but this connection only happens when the learners pos-
Assess the necessary knowledge to activate disciplinary activity structures. The content is the underlying activity structure that the museum provides but it only can be activated in the presence of adequate individual knowledge.

Content, environment, and goals are complexly interrelated. In Fig. 1, we can see how in the preliminary definition of the task, surfers establish the first set of emerging goals according to their initial goals and the environment. Then, they look for places where they can accomplish those goals. However, the path through the environment is full of new bits of information that modify the first set of goals that led to the emergence of a second set. This loop evolution repeats, until surfers arrive at content. When surfers engage with content, they use the content information, and then they set new goals. We can expect differences among different audiences in sustaining and coordinating goals while on the path to and while using of content. General academic training, for example, could make some groups more likely to sustain and produce coherent sets of goals during long visits.

General and specific previous knowledge influences the development of goals in different ways. First of all, initial goals are part of general backgrounds of surfers. On one hand, the domain-specific knowledge of some surfers can make them initiate domain-specific queries moving them...
closer to relevant disciplinary areas or problems. On the other hand, the lack of such knowledge can lead to reliance on general knowledge to set goals. Once goals are established, surfers negotiate them through interaction with the environment. Thus, both general and specific previous knowledge is in use. General skills intervene in the process of moving to areas within the museum that contain information related to the initial set of goals. Surfers who lack specific-domain knowledge and those who have it, both rely on general surfing skills to move through the museum website. However, those with robust, general backgrounds make moves in the service of disciplinary relevant queries and questions. Specific domain knowledge intervenes in this process because it permits navigational information to be encoded and the museum space to be parsed in disciplinarily-relevant terms. An invitation to explore the online collection of “Sitio Conte, Panama” (Museum of Archeology and Anthropology, University of Pennsylvania) evokes a different response for archeologist than for other audiences.

The process of developing goals for museum visits is determined by the complex interrelation between general skills, prior domain knowledge, the initial surfer goals and the museum website environment and content. This study explores how visitors to museum websites, with different backgrounds, set goals, make navigational decisions, and attend to the exhibition content in the service of learning. We expect that audiences with different levels of domain knowledge and general skills, might elect quite different paths through the exhibitions, and might make different uses of the information they encounter.

2. Method

This project used a “surfing aloud process”. Each participant was asked to verbalize all thoughts while visiting the websites. The procedure is an adaptation of thinking-aloud methodologies that have proven to be an excellent way of accessing cognitive processing in a broad variety of tasks (Ericsson & Simon, 1993). Two independent variables were manipulated: the degree of general academic experience of surfers and their levels of familiarity with the museum website domain. To this end, participants varied in their time spent as graduate students and in their domain of specialization, while the museums websites they visited varied in domain (Archeology vs Natural Sciences). Instructions consisted of a three-paragraph text that explained to participants what was a thinking-aloud procedure and how they should proceed during the visit. No other specific goals or tasks were given in order to have navigational behavior as a dependent variable.

2.1. Participants

Twelve graduate students participated in this study. Four participants, who speak Spanish as a first language, were permitted to do their surf-alouds in Spanish (on websites written in English) because the author is a Spanish speaker. The other eight subjects who speak English as a first language did the task totally in English. Since subsequent data analyses indicated no performance differences between these groups, data were analyzed together. In order to manipulate the degree of content familiarity of participants, half had robust domain-specific backgrounds in anthropology and the other half were social science graduate students in other domains. In order to manip-
ulate the degree of general academic training, within each half, three had more than four years of graduate study, while the remainder had less than a year. These qualifications were distributed equally between the English and Spanish speakers.

2.2. Websites

Two museums were selected using three criteria: First, to be an important and well-known institution of cultural dissemination; second, to be complex enough to permit free and multifaceted surfer behavior; and third, to possess similar characteristics in terms of navigational clarity, domain knowledge availability, “size” and number of exhibitions.

In order to manipulate the museum domain, participants surfed in two different museums: The University of Pennsylvania Museum of Archeology and Anthropology (www.museum.upenn.edu) and the Museum of Natural Sciences of London (www.sciencemuseum.org.uk). The University of Pennsylvania Museum of Archeology and Anthropology website contains information on anthropological topics for both specialists and regular visitors. This website contains sections devoted to promote events and visits to the actual place, sections devoted to research and dissemination of the work done within the University of Pennsylvania, and sections that explain core anthropological findings and research to the general public. A section describing the museum itself and its history is also available. This website weaves content devoted to the general public (e.g., exhibits) and highly specialized information (e.g., articles). This website contains also a section devoted to the support of teaching and teachers.

The London Museum of Natural Science’s website presents information on natural sciences and technology, and the history and social implications of science. Additionally, it displays information on the museum itself and brief summaries of the exhibitions. The museum website provides a section devoted to support teaching and teachers. In general, the London Museum of Science website is directed to general public and does not present highly specialized information. In both museums, content information is separated from the main page by several levels of links; surfers have to make several clicks to go from the main page to the pages that display content information.

2.3. Procedure

The participants were asked to think aloud while they surfed freely through the two museum websites for 20 min. They were instructed to explore each of the two web sites freely and to think aloud while doing so. To familiarize participants with the thinking aloud procedure, an initial training in the Metropolitan Museum of Art of New York website (www.metmuseum.org) was done. Their question were answered after this training phase. The data consisted of a record of the pages that they visited, the order of the visits, and transcriptions of the audiotaped comments made while visiting. Order of visits was counterbalanced across the visits.

Coding. The pages were classified either as content pages that presented domain-specific information (e.g., exhibits, articles), or as navigational pages that presented information about what could be found in the museum (e.g., link pages). Learning might take place in content pages but not in navigational ones because in the later there was not domain information. Only navigational moves can be made in navigational pages.
Comments made by participants were parsed into idea units and coded into three main categories: environmental activity (surfers were attending or searching for navigational support), goal-directed activity (surfers were setting or using goals), and content activity (surfers were working on content). Within each of these categories, there were sub-codes that serve to further describe surfing behavior. For environmental activity, the surfers could be either generating a description of the website environment (description) or evaluating the design (evaluating). For the goal-directed activity, surfers could be trying to set a goal (setting a goal) or looking for something pertaining to a previously established goal (looking). For the content activity, participants could be elaborating the information in a productive way (elaborating), paraphrasing the information (paraphrasing), carrying out a metacognitive assessment (metacognition), or evaluating the content (content evaluation).

3. Results

Participants in the study visited a total of 208 pages. The overall surfing pattern shows that 53% of the visited pages were pages that provided content (domain-specific information). The anthropologists’ data shows that 48% of pages visited by them were content pages (i.e., pages that did not provided domain information). For the case of non-anthropologist, 58% of visited pages were content pages. When these distributions were evaluated using χ² tests, no significant results were found. Surfers distribute their exploratory activities between the environment, as defined before, and the content in a way that does not privilege either of these sources of information over the other. During visits, surfers made comments in each of the main coding categories of this study: Environmental activity corresponded to 29.9% of the comments, cognitive activity corresponded to 41.3%, and goal-setting activity corresponded to 5.4%.

The action of surfers was both content driven and navigational and the interaction among the environment, previous knowledge, content, and goals was observed. To understand this activity, differences among groups in terms of cognitive activities and uses of information need to be addressed. In the next, section we will delve into those differences and into the possible sources of such variations.

3.1. Influence of general learning skills: deeper elaborations

General learning skills and specifically, graduate study training, influenced surfers behavior and use of website information. Advanced students, independent of their familiarity with the domain, tended to expand more on the content while visiting fewer informational pages than first year students. In other words, advanced students concentrated their efforts on a few pages at greater depth instead of covering many of them in a superficial way. Deeper exploration of content pages, as we will see, was evidenced by the fact that advanced students produced more elaborating comments.

As seen in Fig. 2, students that had spent four or more years in graduate school tended to visit more navigational pages (61) than content pages (37). While students with a year or less visited more content pages (69) than navigational ones (41). χ² analysis results were significant for the distribution of data in these two variables (χ² (1, N = 208) = 12.9, p < 001).
The fact that advanced participants visited fewer content pages at more depth is consistent with the assumption that advanced participants possess skills that allowed them to engage with content. Advanced students produced 153 elaborating comments for 98 visited pages with a ratio of 1.5. Novice students produced 97 elaborating comments for 110 visited pages with a ratio of 0.88. A fruitful use of the website content implies narrowing the scope of the exploration to consider specific issues more deeply. The scope of the visit and the use of information compete for the user’s time. The difference between new and advanced students in elaboration was limited to content pages; Fig. 3 shows an interaction of type of page (navigational vs content) by type of visitor (advanced vs. newest) for elaboration of content. The statistical analysis for this distribution of frequencies was significant ($\chi^2(1, N = 260) = 4.69, p < 0.05$). Visitors’ levels of elaboration were higher for content pages independent of time in graduate school. For advanced students, this difference was even more marked. Content pages were moments of intense engagement for advanced students, they appeared to combine their own knowledge to the information available at the museum website. They did this through varied actions such as inferences, connections with previous knowledge, and organization of website information in broader knowledge structures (e.g., concepts, philosophical debates).
3.2. Specific-domain influence: convergent goal structures

Having higher levels of graduate study training makes students better at using the information that they spontaneously, not to say randomly, find in the museum. However, this is not enough to configure disciplinary relevant, fruitful events of learning. A comprehensive visit needs two complementary elements; first, the use of adequate interpretative or elaborative actions on the website such as those displayed by advanced students; second, the relevance of the topics on which this elaboration takes place. In this second dimension, specific domain knowledge exerted influence on the decisions made by anthropologists visiting an anthropology museum.

When anthropology students were faced with a museum that displayed anthropology content, a core difference between surfers who were familiar with content and those that were not was evident. Surfers with higher levels of domain knowledge tended to set more goals. Most of all the goals produced by participants were set by anthropologists visiting an anthropology museum (61%) (Fig. 4). However, anthropologists visiting a science museum produced approximately the same number of goals (15%) as other social science students who were visiting museums in an unfamiliar domain. This fact tells us that the intense setting of goals that anthropologists did at the University of Pennsylvania museum was a consequence of the interaction between previous knowledge of surfers and the content provided by the museum, and not due to a particular characteristic of anthropology visitors. When they were far from known grounds, anthropologists behaved pretty much as other social sciences students. Students from other social sciences visiting a science museum produced 13% of the goals. When they were at the anthropology museum they produced the 11% of the goals.

Anthropologists visiting an anthropology museum not only produced more goals, but also more connections among goals (see Fig. 5). Of the total number of connections among goals, 60% were produced by anthropologists at the University of Pennsylvania Museum of Archeology and Anthropology. However, it is not possible to say that anthropologists were better at connecting goals because the ratio between interconnections and goals did not differ highly among groups. Anthropologists visiting and anthropology museum produced more connections because
they had more goals to connect but not because they have a special connecting ability in familiar domains.

Summarizing, we can say that domain specific knowledge influences setting of goals because, while faced with information of familiar domains, surfers elaborated longer goal structures (more goals intensively connected) that permitted them to structure the visits around disciplinary core issues.

Even though the goal-setting activity was the least frequent activity among the main categories used in this study, the results are important because the goal-setting activity organizes all of the other actions of surfers. For instance, a surfer creating a sequence of four goals related to Egyptian archeology goes deeper to this topic than another surfer creating four content goals with no connection among them. Goals are not isolated cognitive actions but they structure all the other activities during the visit. That’s why goal-setting comments are naturally less frequent than other types of activity.

When surfers produce more goals, the sequences of elaborative actions and environmental activities tend to be shorter, as indicated by the ratio between the number of goals and the number of other cognitive actions (#other cognitive actions/#goals). In the case of anthropologists visiting an anthropology website, the ratio was 6.3. For all the other conditions, the ratio was 14.1.

Goals split the chains of cognitive actions and assign them a function within a longer plan. The behavior of participant 6, a fourth year anthropologist, is an example of this situation. In spite of all the other conditions (e.g., general knowledge) remaining the same, the change in this participant’s goal setting process was highly depending on the participant’s familiarity with the website’s domain. We can see in Fig. 6 that codes for goal directed activity (code 9) were not only more frequent but they were distributed more homogeneously during the visit to an anthropology museum. The sequences of elaborative and environmental actions were divided by goals. In the case of participant 6’s visit to the science museum, goals were concentrated in the first part of the visit and elaborative actions (codes 5 and 6) were concentrated in the second half. Chains of cognitive actions happened without being related to immediate goals. The following excerpts from participant 6’s visit to the University of Pennsylvania Museum of Archeology and Anthropology illustrate how goals modify and define the direction of other cognitive activities.
“CLICK IN RESEARCH. Of course I look at the Americas because that is the stuff that I do [looking]... Well, this is, none of these is about America [description]... that’s good... The Americas, here we go. CLICK IN THE AMERICAS. Oh, there is Copan stuff, Clovis
stuff, prehispanic, Bolivian Amazon... and Tikal? [description]. I never heard of any of this work on Bolivian Amazon so I wonder how they look like, I need pictures [metacognition]. CLICK IN BOLIVIAN AMAZON. Something in the 1950s, blah, blah. Ah ok. “The remain of landscape” [paraphrasing]. Oh, it’s Clark Erickson; his stuff is really good. I heard him talk on his stuff. He came a couple of years ago... [elaborating]”

In this case, participant 6 translates a strong interest in American archeology into environmental activity, to find information in this topic; and into content activity, to use the available information. When listing the topics in American archeology, this participant checks for disciplinary completeness, asking about Tikal (an important archeological site in Guatemala, not mentioned in the website’s list). The participant also makes metacognitive and navigational decisions based on prior knowledge (“I never heard of any...”).

The goal setting activity organizes the immediate cognitive actions and gives consistency to the visit as a whole. Participants go and come back to recurrent themes. Although this next excerpt comes from later in the participant 6’s visit, the participant sustains the same interests he had at the beginning. We can observe here how his interest in American archeology produces specific goals, such as finding out about specific archeological sites (e.g., Copan), that create a pattern of recurrent themes.

CLICK IN THE APPLIED SCIENCE CENTER. All right so, I’m looking over here at the applied science center [metacognition]. Let us see what is happening in the Americas. CLICK IN THE AMERICAS. Ok. What’s happening in Copan. CLICK IN COPAN I’m just sort of scanning through to see what they are talking about with regard to Copan. [description]. Well, I see they have cameras [paraphrasing].

Overall, participant six visited all the sections devoted to archeological places in America that were available at the museum website (Copan, Bolivian Amazon, Clovis). The visit was consistent in terms of the topics explored, permitting the participant to elaborate a complete image of what was being displayed on American archeology. However, such consistency was only possible because the participant set goals that were disciplinarily connected.

3.3. Summary

For the ill-structured task of visiting a web-based museum, it appears that having high levels of general knowledge (high experience) has an impact on surfing and reasoning behavior. The evidence for this is that high experience visitors elaborated more deeply on content pages than did non-experienced visitors. Visitors with high domain knowledge also produced more goals and more connections among goals than all other groups. Low-experience higher knowledge visitors seemed to support the establishment of goals but not the actions of elaboration, thus they did not benefit as much from meeting goals; while low knowledge-low experience visitors showed a more random, rapid “click” behavior. We take this to mean that high experience positions individuals to learn more through elaborating while high content and experience combined positions individuals learn more about the content domain offered by the museum because they are more effective goal setters in that context.
4. Conclusions

This study shows that goal setting depends on surfers’ domain specific knowledge. The interaction of museum environment, content and surfers domain knowledge produces clearly different exploratory patterns among different groups of visitors. When visitors have interests that can be linked to the pieces of information displayed at the museum, goals that represent the interaction between their interests and the affordances of the learning situation are set.

When surfers possess domain knowledge that is consonant with the options available in the museum, emerging goals form consistent structures that organize the exploratory activities in longer structures; structures that are consistent in many cases with disciplinary queries and debates. When this knowledge is lacking, surfers do not set many goals because of the distance between their interests and the things that they can see reflected in the museum.

At last, prior domain knowledge determines learning because it influences the goal setting process that drives the website use. Only people that have high levels of domain knowledge can find a productive path through the museum.

Something similar occurs with general knowledge. Surfers that have general prior knowledge are able to elaborate deeper in the content provided by the museum. Even though they do not explore the website according to large structures of goals, they have the potential of using productively any information they find. Surfers with general learning skills can carry out a broad range of cognitive activities; they can make inferences and interconnect the website information; they engage in active processing during reading and devote resources and time to understand what the exhibition is about.

Audiences that visit museum websites are usually non-specialized public that, as a norm, lack of high general learning skills and domain knowledge. Most of visitors to museum websites must not privilege use of content information over other types of activity. Most of them must miss the core of the disciplinary experience of museum visits. This creates a paradox that educational designers should not forget easily. One cannot search for what one does not know and one does not necessitate searching for what one already knows.

Most of the museum websites have complex and twisted paths to content; domain knowledge is not by any means the default of navigation, and elaboration of content is seldom supported. It is time to start designing museum websites attending to audiences’ characteristics; characteristics that, like surfers’ prior knowledge, mediate between the disciplinary content of exhibitions and the final product of learning. To do so, surfers need to be the focus of design and adequate descriptions of visiting audiences are necessary.

Further research is necessary to determine why surfers who are familiar with the websites’ domains produce more goals than regular visitors. One explanation may be simply that domain experts possess more goals. However that does not explain why an anthropologist can produce a considerable number of goals while surfing an archeological website and be unable to produce the same number of goals in an unfamiliar environment. An alternative explanation is that when a visitor’s interest and available information are similar, his or her goals resonate in the museum environment. Visitors tend to produce more goals based on the information and resources presented in the museum. These and other possibilities need to be explored.
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