MUSEUM EDUCATION: CREATION, IMPLEMENTATION, AND EVALUATION OF
A WEB-BASED ELM FORK NATURAL HERITAGE MUSEUM

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Evaluation of museum audiences both in their physical and web-based spaces is a necessary component of museum education. For smaller museums without the personnel or knowledge to create a website and evaluate the on-line audience, using a web-based learning tool may be able to help these museums properly maintain an online site. A web-based Elm Fork Natural Heritage Museum (WBEFNHM) was created during the 2008 fall semester at the University of North Texas. The site included photographs and information from specimens housed within the physical Elm Fork Natural Heritage Museum. The site was available to three non-science majors’ biology laboratory courses, and three science majors’ biology laboratory courses during the 2009 spring and fall semesters. Student use of the WBEFNHM was tracked and found no significant difference between the amount of time science majors and non-majors spent on the site. This evaluation helps in understanding future use of an online EFNHM.
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by

Melissa Lundeen
ACKNOWLEDGMENTS

I would like to thank my husband Benjamin Lundeen, my dad George Dunning, my mom Shirley Dunning, and my sister Kendra Dunning for being supportive in all things I decide to do in life.
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CHAPTER 1

INTRODUCTION

A museum has to renew its collection to be alive, but that does not mean we give on important old works.  

David Rockefeller

While our society builds museums, these museums build our society. They offer a wealth of educational and research opportunities to the general public through both their physical and virtual presence. The growth and change that has taken place for physical museums can be compared with the growth and change which has taken place for their virtual counterparts. Both have redefined themselves by offering their audiences new opportunities to explore and learn from their collections. Most importantly both have taken measures to evaluate their audience’s needs for determining what will and will not work within their physical and virtual spaces. These evaluations are pertinent to the growth and development within both physical and virtual museums. Evaluation of virtual museums may include qualitative and quantitative data in order to answer questions about the demographic information or behavior of their visitors to their websites. This information can help museums re-define, or re-organize their websites once they understand who their visitors are and what they do while visiting.

This research addresses quantitatively evaluating website usage of a small natural history collections housed within Universities. To reach this topic, the introduction addresses a brief history of natural history museums specifically at universities and how focus has changed within their settings; and how technology has played a role in that
change. Discussing the changes in focus and technological changes which have taken place within physical museums builds a platform in which to discuss the creation of web museums. Web museums are discussed within the literature review, as well as the problems university natural history museums face that may inhibit creation and evaluation of university web museums. The literature review ends with a discussion on how data about audience behavior on museum websites has been collected and leads to the methodology used to create and evaluate a web-based natural history museum at the University of North Texas. The results and discussion add to the current knowledge of web audience behavior for museum websites, as well as provide insight for other university natural history museums needing an effective way for creating and evaluating their sites.

Brief History of Museums

The word museum originates from the Greek word museum which means house of the muses (Boylan, 2000). Created in Alexandria, Egypt during 290 BC, the first museum was a collection of objects from nature and art as part of the Library and Academy at Alexandria (Boylan, 2000). Although it did have a collection of objects, the 2,000 year old Alexandrian museum would not resemble a modern museum; instead it was more a place for philosophical discussion with only a few collected objects (Britannica, 2010). Similarly, the Lyceum of Aristotle, over 800 years old, can be compared with the first museum of Alexandria, in that it was mainly a place for teachings, but Aristotle is speculated to have kept specimens for observations (Boylan,
After this time, little is known about the specific growth of museums for hundreds of years; and it was not until the 17th and 18th centuries within Europe when more information about their growth can be evidenced. It was during the 17th and 18th centuries that wealthy Europeans began personal collections of fine art and natural curiosities (Burcaw, 1997, p. 26). While these collections were rarely viewed by the public, it was from these small personal collections which public museums grew. The private collection of the physician Sir Hans Slone which was sold to King George the II and donated to the Old Royal Library began the famous British Museum in 1759. The collection of 71,000 objects donated to the museum contained books, art, and specimens from the natural world (http://www.britishmuseum.org/). This growth of small personal collections growing and becoming donated for museum use is especially true for university natural history collections. Furthermore, during the 18th and 19th centuries, university faculty members began collecting, storing, and preserving collections which started as cabinets of curiosities, which growing into rooms, and for some, buildings filled with rocks, minerals, plants, and animal specimens (Danilov, 1996). An influential university museum within the United States is the Harvard Museum of Comparative Zoology (MCZ). This museum was started in 1859 by Jean Louis Rodolphe Agassiz, who when given a position at Harvard University, brought the new teachings of comparative zoology along with a personal collection to start the MCZ in 1859 (http://www.mcz.harvard.edu/about/index.html). A similar story of a personal collection by a university faculty member is of that of the Peabody Museum at Yale. The collection
was opened in 1876 and grew so rapidly a new building was constructed in 1924 (http://www.peabody.yale.edu/archives/ypmhistory.html).

All kinds of museums, both on and off campuses grew during the 18th and 19th centuries; in 1876 there were an estimated 200 museums within the US. The number continued to grow exponentially during the 1950s and 60s as seen in Table 1.

Table 1
*The Number of Museums within the United States* (Burcaw, 1997, p.32)

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of museums in US</th>
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<tr>
<td>1876</td>
<td>200</td>
</tr>
<tr>
<td>1919</td>
<td>600</td>
</tr>
<tr>
<td>1940</td>
<td>2,500</td>
</tr>
<tr>
<td>1965</td>
<td>5,000</td>
</tr>
<tr>
<td>1974</td>
<td>7,000</td>
</tr>
<tr>
<td>1996</td>
<td>7,500</td>
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These museum results taken from Burcaw illustrate rapid growth between the 1950s and 1960s; however, questions arise when considering estimates taken by the National Conference of State Museum Associations in 1998 which estimated over 15,000 museums in existence within the US (http://www.aam-us.org/aboutmuseums/abc.cfm).
Were previous museum surveys wrong? Or has history of growth and change been a variable to re-define what a museum is?

Defining a Museum

A museum is a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment.  
(http://icom.museum/definition.html)

This definition of a museum is the most recent out of eight definitions listed by the International Council of Museums (ICOM). The first definition of a museum according to ICOM was written in 1946, the same year ICOM was developed, and reads as follows:

The word "museums" includes all collections open to the public, of artistic, technical, scientific, historical or archaeological material, including zoos and botanical gardens, but excluding libraries, except in so far as they maintain permanent exhibition rooms.  (http://icom.museum/hist_def_eng.html)

Both definitions include institutions such as zoos, and botanical gardens, though they do not maintain collections, or storage and preservation of specimens that began university natural history collections. Even more interestingly, the most recent definition of a museum incorporates exhibits of “intangible heritage.” So if you are a permanent, non-profit organization with the purpose to educate the public, then you are a museum. The variety of museums in existence can be found within a statement from the American Association of Museums:

...In addition, every type of museum is represented by AAM’s institutional members, including art, history, culturally specific, natural history, science, military, maritime, and children’s museums, as well as aquariums, zoos, botanical
Because such a variety of museums are in existence, this study narrows the focus to the evaluation of “traditional” museums, or museums based on objects within a collection.

The Audience of Museums

The first public museum displays, beginning in the 1800s, were collections of objects by persons of wealth and education presented within glass cases for viewing by the museum visitors (Alexander, 1997). Their beginning, museum collections, and knowledge about the collections passed down by their curators, were the focus of museums and their exhibits (King, 2001, p. 19). These early museum exhibits were developed by financers, who kept their own interests as well as curator knowledge in mind (Robinson, 1928). While past museum exhibits and programs were focused on the collection, shifting from the needs of the collection to the needs of the audience has been realized within museums (King, 2001, p. 19). The path to becoming audience centered, or at least understanding the audience, began in the early 1900s (Robinson, 1928). It was in 1906 when the American Association of Museums (AAM) was created among other things to “…develop standards and best practices, gathering and sharing knowledge, and providing advocacy on issues of concern to the entire museum community” (AAM, http://www.aam-us.org/aboutaam/index.cfm). This organization, along with providing communication between museums, also provided communication and collaboration between university professors and AAM directors. This collaboration led to the first studies in visitor behaviors at museums, as described within a 1928 paper by a professor
of psychology from Yale, Edward Robinson (Robinson, 1928). In this study, Robinson began a two year long visitor study by observing visitors as they viewed exhibits; his questions focused on what exhibits visitors stopped to look at and how long they stayed at the exhibit (Robinson, 1928). These measurements are known as the attracting power and holding power of exhibits (Loomis, 1987); and today they are still used to gauge the success of museum exhibits (Sandifer, 2003; Hsi, 2003). From the 1920s until today, research about museum audiences has continued to grow, producing data describing who visits museums and why (Volker, 1996; Booth, 1999). No matter the type of museum, or amount of visitors a museum receives, it is thought that the more information collected about the visitors, the more likely the museum is able to understand its audience and how to communicate with them. Changes in the ways museums have communicated with their audience can be seen in how museum exhibits have changed, and the addition of technology implemented within museums.

Communication with Audience

Discussion and development of communication models between the museum and its visitors began in the late 1960s, to the early 1970s (Hooper-Greenhill, 1994, pp. 37-53). In the beginning these “communication models” took a unidirectional form. The curator determined what they thought the visitor should know and wrote informational messages or literature to display alongside a particular collection. This type of one-way communication between the curator and visitor was questioned during the 1960s and these models began to change (Burns, O’Connor, and Stocklmayer, 2003). For instance a
model developed by Knez and Wright (1970) showed the pathway in which a message flows, but unlike other models they added a feedback (or evaluation) loop from the visitors to the curators so the curators would be able to determine if their message was interpreted as indented (see figure 1) (Hooper-Greenhill, 1994, p. 47).

Figure 1. Flow of communication from curator to the visitors.

For example, a curator might display a dragonfly life cycle as a part of their collection. They would encode this message within an exhibit by displaying a preserved dragonfly nymph and dragonfly adult (primary medium) along with written information and photographs (secondary medium) about the life cycle of a dragonfly. The feedback from the visitor to the curator could include a short test in which the visitor answers questions they learned from the exhibit, which gives information to the museum curator as to what information or messages were getting through to visitors. Communication from the curator must be effective in teaching information to an audience; so when communication models were being developed, the curator as the sole figure in how to use these media for
communication to the visitor came into question (Chen, Chuan Kun and Ming Chyuan, 2006). Museums began to hire persons knowledgeable in educational theory and psychology to bring new ideas on how museum objects could be used for educational purposes and how objects could be used to communicate with their audience (Hein, 2006, p. 344). A new idea and way of communicating with the audience through the primary medium/or objects was the development of the “discovery room.” Developed in 1974 at the Smithsonian, this discovery room was a cafeteria like room were families could sit together and check out artifact boxes containing fossils and bones which could be handled instead of only viewing them within glass cases. This room became so popular, families wanting to check out boxes had to take tickets and wait for openings (White, 2007). That first discovery room is still located within the Smithsonian, and the idea has been replicated by other national museums, as well as university museums. Some museums incorporate multiple discovery rooms centered on different topics; for example, the Mayborn Museum at Baylor University has 16 different discovery rooms, each centered on a separate theme and offering hands on interaction with exhibits and museum objects (http://www.baylor.edu/mayborn/index.php?id=15615). These rooms offer not only a new way for visitor interaction with museum objects, but also allow communication for sight impaired visitors giving them the opportunity to “see” the object (Hooper-Greenhill, 1994, p. 12). The ability to handle primary medium or museum objects was a change in the communication with visitors; however, the changes within the secondary medium or labels and information have seen even more changes due to the progression of information technology. Museum exhibits began offering more than
labels, photographs, and written information about their objects; they began adding multisensory approaches, most notably through the use of audio tours. Audio tours have been used within museums for the past 40 years, evolving from cassette tapes to iPod® mobile digital devices (Apple Inc, appletm@apple.com) (Dowden and Sayre, 2007, p. 35). Audio tours allow the visitor to personalize their visits by giving the opportunity to listen to extra information about the objects and exhibits. Not only has audio technology evolved, but the personalization of tours has grown with the additional use of PDA (personal digital assistant) devices, giving visitors visual displays of information. These devices allow the visitor to choose audio and visual information about particular objects within museums using a touch screen computer. While some museums provide visitors the opportunity to check out PDAs for the day others are creating applications which visitors may download onto their own PDA devices, specifically the iPhone® mobile digital device. For example, the American Museum of Natural History has a dinosaur application for the iPhone® or iPod touch® mobile digital device which gives viewers the ability to view hundreds of dinosaur images with additional information about each (Hollington, 2010). Being able to use their own PDA allows the visitor to be comfortable using the device, and since it is their own they can focus on the provided information and not the technology (Makoto and Lydens, 2007). The implementation of these devices into the museum scene allows for another level of evaluation with the visitors; specifically, the effects of the technological variable has on the visitor, and whether or not it is successful at keeping the visitors attention at an exhibit (Donald, 1991). Sandifer (2003) did find the attracting and holding power of exhibits using novel technology is
positively correlated with the amount of time visitors spend at an exhibit (Sandifer, 2003). Use of PDA devices and other computer technology within museums, creates an augmented reality for the visitor, or an information enhancement of the real world (Bederson, 1995). This augmented reality through technology is being used quantitatively, by giving greater amounts of information, and qualitatively by giving a different experience in viewing and experiencing the museum objects (Mintz, 1998 pp. 20-27). While the primary objects were once the center of museum displays, at times the evaluation of displays has focused on evaluation of how the technology is used instead of the content being delivered. Not only has computer technology within the museum changed, but computer technology outside the museum, specifically the World Wide Web, has allowed museums to branch into the WWW world. This opportunity has given museums a new medium to express themselves and communicate to their web visitors. As is necessary for evaluation, this communication must incorporate a feedback loop from the visitor to the curator, which is also necessary for the evaluation of the web visitors. The types of evaluations and how they are accomplished will be discussed within the literature review in Chapter 2.

Research Question and Objectives

This research sought to evaluate the efficacy of online museum use and answer the following research question:
Can the assessment of student use of an online museum, via a web-based learning tool, be used as an aid to determine the value of incorporating similar evaluative techniques by other university museums?

Objective I: Create an on-line version of the Elm Fork Natural Heritage Museum via the web-based learning tool, Blackboard™ learning system (Blackboard Inc, www.blackboard.com).

Objective II: Implement the on-line site by offering access to students enrolled in Biology laboratories (majors and non-majors).

Objective III: Quantitatively evaluate the on-line site by measuring what components are being used and to what extent.

Using a Web-Based Learning Tool for Evaluation

A publicly accessible web site is available for the Elm Fork Natural Heritage Museum (http://efnhmuseum.unt.edu/), and contains contact information, collection information, a lesson plan for food webs and disease vectors, and links to the benthic ecology laboratory. This website was created in collaboration with Dr. Kennedy with the UNT libraries multi-media development laboratories (MMDL). To date this website has not been evaluated, and overall use of the site is unknown. Once a semester new material is updated to the website, it is sent to the MMDL which posts it onto the site. For this study the ability to post written information and photographs to the website without a third party led to the use of the web based learning tool Blackboard™. Once the Blackboard™ site is set up by the instructional designer, the instructor, or in this case the curator of the site was able to add specimen photographs and information to the site at anytime. More importantly, this web based learning tool allowed the instructor (or
curator) to track the time visitors spent on the site as well as what specific information
visitors were looking at while visiting the site.

Methodology

A web-based Elm Fork Natural Heritage Museum (WBEFNHM) started to be
developed during the fall 2008 semester using the web based learning tool Blackboard©. Information posted to the site included specimen information and photographs of selected plant and animals (see Chapter 3). Students from six different biology laboratories were given access to the site during the fall and spring semesters of 2009, and their use of the site was tracked during this time. Information collected about how students used the site included:

- Number of students logged onto the site
- Number of students logged onto the site more than one
- Average time science majors spent on the site
- Average time non-science major spent on the site
- Average time was spent on the site from each of the six labs

During the spring 2009 semester, two of the laboratory classes, which had access to the WBEFHNHM site, also visited the physical Elm Fork Natural Heritage Museum site on campus for participation in activities developed for their classes (see appendix). Information collected from the WBEFNHM about these two specific laboratories included:

- The time students spent on the WBEFNHM before visiting the physical museum
• The time students spent on the WBEFNHM after visiting the physical museum

The information collected from this study was used in determining who might be more likely to use a WBEFNHM and what they would use on the site. Evaluation of this site will help determine where time should be spent on the continuing development the WBEFNHM, and/or what information could be posted onto a publically accessed site.
CHAPTER 2

LITERATURE REVIEW

Museums Leaving the Building

If GM had kept up with technology like the computer industry has, we would all be driving $25 cars that got 1000 MPG.

*Bill Gates*

Undeniably computer technology, and specifically the World Wide Web (WWW), has changed many aspects of day to day life; not excluding how people visit museums. For example, if interested in going to the Dallas Museum of Nature and Science, you could log onto their website and find out what time they are open, what they offer in their collections, what IMAX shows are playing, and even print your admission tickets ([http://www.natureandscience.org/](http://www.natureandscience.org/)). The Internet and www, were introduced to the general public in the early 1990’s, and today over 360 million people have access to the Internet (Britanica, 2010). There are currently 167 on-line science and natural history museums listed for the US compared to a total 1,507 museums listed (Virtual Library and Museum PageVLMP, 2006). The objectives of these sites vary depending on what they want to achieve with their website including the content they present and the audience they wish to target. In a study done by Teather (1999) a survey of 33 museum websites gave the following reasons for creating a website, with the most often cited first included:

- Promotion/Marketing
- Education
• Wider access
• Provide information
• Entertainment
• Community awareness/outreach
• Revenue generation
• WWW presence
• General service
• Not sure

In all cases websites allow museums to reach a broad and more diverse audience; furthermore, creation and experimentation of museum website design and interactivity prepare for the museum visitors of tomorrow, which include a tech savvy generation experienced with computers and multimedia through school, work and recreation (Loran, 2005). Today, museum educators are collaborating with computer programmers to develop online sites to complement physical museum visits and provide online visitors spaces for unique learning opportunities (Howes, 2007, p. 74). Developing unique learning spaces for online visitors was not the case in the beginning development of museum websites when museum professionals worried that posting too much information onto the site would deter physical visitation (Teather, 1998). While the visits to museum websites can out number physical visits sometimes as much as 3 to 1 (Cunliffe, 2002), research has shown that the presence of a museum website actually increases interest in physical museum visitation (Thomas, 2005). At first the use of web museums was viewed as the death of museum ideology, and it is only within the past few years when
the educational potential of both the physical and virtual spaces combined has been realized (Howes, 2007). Just as communication between the curator and the visitor changed within the physical museum, communication between museum websites and their visitors have also changed. Museum websites containing general information about their collection, and photographs of museum objects paired with written information; can be compared to the early physical museum displays of objects within glass cases. On the other hand, some museums offer completely online “experiences” for their visitors impossible to duplicate within their physical spaces. A great example is the Bell Natural History Museum where they offer an online activity which allows online visitors to build a diorama while learning specific plant and animal information about each specimen chosen to add to their diorama (see figure 2).

Figure 2. A virtual marsh diorama. Designed online using the “build a diorama” program on the Bell Natural History Museum website (designed on April 15th 2010)
The Bell Natural History Museum, located at the University of Minnesota, has an exceptional museum website containing museum and specimen information, as well as interactive activities as the one described above. Web development for most University natural history museums is stymied due to the variety of problems faced by their physical spaces.

University Collections and Web Development

While national museums have the funding to support development and redesign of their websites by employing web designers and project managers specifically to work on their websites (Burnette, 2010); smaller museums find the cost for development and maintenance of a website hard to justify (Cunliffe, 2002). A small collection defined by the Small Museum Administrators’ Committee (SMAC), has an annual budget of $350,000 or less, a staff of five or fewer, and one or more staff members with multiple roles within the museum (Spinazze, 2007, p. 122) Small museum collections are identified as having less than 50,000 specimens (Prather et al., 2004). Most collections do not come close to having a budget of $350,000; most have a few thousand dollars, or no calculated budget (Snow, 2005). Justification for universities to create digital collections is hard to see when there are so many other problems already facing university collections such as, minimal funding, understaffing, and lack of space within facilities (Plantania, 1997; Snow, 2005; Gabel, Johnson, Larson, 2007). Although one might think they are sheltered within an umbrella of university funding, for several collections on US campuses this has not been the case; for example, the 150 year old, 1.5
million specimen large, natural history collection at Virginia Tech has been scattered throughout other US institutions due to state budget cuts (Dalton, 2003). Struggling museum collections still have reason to explore online options, with the same reasons as their national counterparts, in that a web presence can promote the physical site, and in return demonstrate collection worth (Teather, 1999). University museums should begin web endeavors with knowledge of past web development mistakes, one of which is ignoring evaluation of their web audience (Hertzum, 1999). The undertaking website development, whether the web goal is for promotion of the physical site, or a completely separate educational site, requires evaluation to determine if the goals are being met. Evaluative research already conducted on web museum audiences and their behavior help in understanding general needs of users, and how they use a museum website to complement physical museum visitation (Kravchyna, 2002).

Web Audience

Similar to developing a museum exhibit, during all stages of developing and implementing a museum website, it is important to evaluate the websites use by the web audience. Within physical museums, the web audience can be evaluated quantitatively, by tracking time users spend on the site, and qualitatively through the use of web surveys, both of which are important in evaluating web resources (Davoli, 2005). Quantitative evaluation of websites includes user “hits,” and time spent on the website. This information can be downloaded from log data files, which tracks user information by an Internet Protocol (IP) commuter address (Atterer, 2006). The inherent fault in tracking
through an IP address is that the computer, especially when located within a public setting, can be used by more than one person. While some researchers may be quick to dismiss evaluation through log data based on its faults, it does produce mass amounts of un-biased tracking of user behavior for information which can be used for statistical analysis (Peacock, 2002). The majority of visitor information collected about visitor behavior from museum websites however, has been collected mostly through web based surveys directly posted to museum websites (Dawson, 2009; Kravchyna, 2004; Goldman 2004; Chadwick, 1999). These surveys, which are directly posted to a museum website, are also faulty in that collected information is only from visitors choosing to respond to the web survey. Those who do not choose to participate in survey evaluations; even when they are using the site are un-accounted for. Questions included on web surveys seek answers about motivations of the user to visit the website, information about user demographics, and use of the website (Kravchyna, 2002; Goldman, 2004; Chadwick 1999) Information collected about web users and their behavior on the site helps determine what information visitors are most interested in and in turn, key to this research.

Elm Fork Natural Heritage Museum (EFNHM)

The Elm Fork Natural Heritage Museum is located at the University of North Texas in the Environmental Education, Science and Technology (EESAT) Building. The room is a laboratory space assigned for the collection by the College of Arts and Sciences and is directed by Dr. James H. Kennedy. The collection contains about 16,000 plant
specimens, 100,000 aquatic insects, and 25,000 terrestrial insects. Birds, mammals, reptiles, and amphibians are also a part of the collection but do not make up the majority since they are predominantly educational specimens, while the insect and plant collection is a continuing research collection. The aquatic and terrestrial insect collections within the museum are updated with specimens collected and preserved by masters and doctoral graduate researchers and undergraduate students from the aquatic and terrestrial entomology classes offered by Dr. Kennedy. Use of the collection has included college laboratories and most recently Drawing I art students (ART 1500). The collaboration between the Center of Visual Arts and Design (CVAD) and the EFNHM provided the ART 1500 (Drawing 1) students the opportunity to sketch museum specimens during two separate class times and incorporate their work into a final project for the class. Additional use of the collection includes elementary level activities during Saturday science events, summer camps, and public school tours at the Elm Fork Education Center located in the EESAT Building.
CHAPTER 3

METHODOLOGY

Creation of the Web Based Elm Fork Natural Heritage Museum

During the spring semester of 2009, and continuing into the fall 2009 semester, a web based Elm Fork Natural Heritage Museum (WBEFNHM) was created using the web-based learning tool Blackboard™ learning system (Blackboard Inc, www.blackboard.com). A web based learning tool was used to develop and evaluate the WBEFNHM because web based learning tools provide integrated environments of various technologies to support both educators and learners needs. Blackboard™ is the web-based learning tool used by the University of North Texas, as well as 70% of US colleges and universities named the most connected campuses by Forbes (Bradford, 2007). Using a web based learning tool provided the convenience of uploading information without the need for a second party; so the curator easily learned how to post information onto the site without the need for an experienced web designer or web manager. Blackboard™ offers a variety of course tools for posting content information as well as instructor tools for student management. Course tools available on Blackboard™ include: course content page, announcements, calendar, discussions, learning modules, mail, media library, search, and web links. Instructor tools available include: grade book, manage course section, grading forms, group manager, tracking, and selective release. Not all course tools were used for this study; the following list provides a brief explanation of which tools were used and how:
• An announcements page used to alert students when new information is added to the site.

• A course content of ‘homepage’ displaying general information about the museum as well as links to specimen information sheets and informative Power Point® presentations (Microsoft Corporation, www.microsoft.com).

• A calendar displaying museum hours for visitation of the physical museum

• A discussions board used as an open space to leave comments about the site.

• Mail used as a contact option for students to get in touch with the site

• Web links to other museum websites, databases, instructional resources, and examples of primary literature.

• Description of Posted Information on the WBEFNHM

The homepage of the EFNHM Blackboard™ included four main sections: general information about the EFNHM; photos and specimen information sheets; an all about insects section; and an all about plants section (see Figure 3).

Figure 3. Screen shot of the WBEFNHM homepage.
The creation of the EFNHM Blackboard™ focused on the specimens housed in the physical museum; therefore, the majority of posted content included specimen photographs and habitat information from local species. Clicking on the link for photos and specimen information sheets lead students to another page with links from a variety of categories including; amphibians, birds, fish, insects, other invertebrates, mammals, plants, and reptiles. The species, listed by common name, included within each of these categories is provided below:

- **Amphibians**: Bullfrog
- **Birds**: Barn owl, blue jay, common goldeneye, helmeted guinea fowl, snowy egret
- **Fish**: Mosquito fish, spotted gar
- **Insects**: Beetles, butterflies and moths, caddisfly, crane fly, dragonfly, praying mantis, swallowtail butterflies
- **Other Invertebrates**: Black widow spider, mussels
- **Mammals**: Armadillo, beaver, black tailed jack rabbit, bobcat, coyote, opossum, ringtail, thirteen-lined ground squirrel
- **Plants**: American star-thistle, eastern cottonwood, side oats gramma, vanilla, water hyacinth, willow tree
- **Reptiles**: Cottonmouth, turtle

The 33 specimen sheets contained one or more photographs of the actual museum specimen and a text box with classification information. Informative animal sheets also included no more than a page of written information with a description of the specimen, habitat information, diet and reproduction (see appendix). On the other hand, plant information sheets included no more than a written page with range information, growth
and reproduction, and human uses (see appendix). Specimens were chosen by the curator based on quality of the specimen, the ability to photograph, and personal interest. For examples of specimen information sheets see Figures 15-18 within the appendix. While specimen photographs and information make up the majority of the EFNHM Blackboard™, information on collecting and preserving was presented using PowerPoint® presentations. This information was included onto the site serving as supplemental information the curator would provide during a museum tour or presentation.

The PowerPoint® presentations featured UNT graduate students from various laboratories; one shows the steps of pressing a plant, while the other shows techniques in capturing terrestrial insects.

Sampling Frame and Museum Visitation

Six Biology laboratories were selected as the population for this study. Three of the laboratories were intended for non-science majors, while the other three were assumed to consist of biology majors.

- Biology 1082 (Biology for Education Majors),
- Biology 1112 (Contemporary Biology for Non-science Majors),
- Biology 1132 (Environmental Science for Non-science Majors),
- Biology 1730 (General Biology I),
- Biology 1740 (General Biology II),
- Biology 1744 (Honors Biology for General Biology II)
These laboratories were selected in order to focus on a sample in which all students were enrolled in biology laboratories, but they consisted of both science and non-science majors. Students in all the listed laboratories were granted access to the EFNHM Blackboard™ by the UNT instructional designer. Students were given access to the site on the first day of the spring 2009, and fall 2009 class schedule. While the website indicated that anyone may visit the physical museum, scheduled lab visitation to the museum was determined through scheduling between the museum director, curator, and laboratory coordinators. Because of scheduling conflict, laboratory visitation was conducted only during the spring 2009 semester. The laboratories which were able to visit the museum based on class scheduling were the BIOL 1082 (biology for education majors lab) and the BIOL 1744 (honors biology laboratory). The honors biology laboratory visited the museum during the week of April 28, during which time they were studying plant and insect interactions. These laboratories (Honors Biology) laboratories (8 total) were able to visit the EFNHM during a week of class presentations in which they would otherwise be let out of lab earlier than usual. After discussion with the laboratory supervisor, it was determined the best information to give during the visit should include topics on plant and insect interactions (see appendix for full lesson). The Biol 1082 laboratory classes (6 total), visited the physical museum during the week of April 20 at a time when they were studying ecosystems, and the museum lesson was tailored to give information about food webs (see appendix for full lesson).
Tracking Student Use

The web-based learning tool, Blackboard™, not only provides the earlier mentioned benefits, but also allows for the tracking of individual students and other report types. While reporting types include a summary of activity, tool usage, file usage, and other reports (see Figure 4), the student tracking tool was the only tool used for this study.

![Figure 4. Screen shot of the WBEFNHM tracking page.](image)

This decision was made by the researcher, so that all data was retrieved by a single tool. For example, although this study did look at the usage of different tools offered to the students (mail, discussion, calendar, etc.), this information was not downloaded using the
“Tool Usage” report type (see Figure 4), but was instead sorted from information taken from the student tracking report. Table 3 illustrates what raw data looks like when it is downloaded from the student tracking report, and exported into a spreadsheet software program.

Table 2

Example of Tracking Data Downloaded from WBEFNHM

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section</td>
<td>First Access</td>
<td>Last Access</td>
<td>Sessions</td>
<td>Total Time</td>
<td>Mail</td>
<td>Discussions</td>
<td>Calendar</td>
<td>Web</td>
<td>Links</td>
<td>Content Folders</td>
<td>Files</td>
</tr>
<tr>
<td>BIOL1720001</td>
<td>0</td>
<td>0:00:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>BIOL1720003</td>
<td>22-Jan-09</td>
<td>12-May-09</td>
<td>4</td>
<td>0:00:28</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL1744523</td>
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<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL1744514</td>
<td>28-Jan-09</td>
<td>29-Mar-09</td>
<td>2</td>
<td>0:00:18</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL1720002</td>
<td>0</td>
<td>0:00:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL1132001</td>
<td>30-Jan-09</td>
<td>30-Jan-09</td>
<td>1</td>
<td>0:00:24</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL1720003</td>
<td>0</td>
<td>0:00:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL1710001</td>
<td>8-Feb-09</td>
<td>8-Feb-09</td>
<td>1</td>
<td>0:00:39</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL1720002</td>
<td>0</td>
<td>0:00:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL1720002</td>
<td>0</td>
<td>0:00:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL1132003</td>
<td>0</td>
<td>0:00:00</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This information was downloaded at the end of the spring and fall 2009 semesters. This information included student names, laboratory identification, the total amount of time spent on the EFNHM, and the number of sessions spent on separate tools (mail, discussion, calendar, web links, content folders, files). Once this data is downloaded into an Excel® spreadsheet (Microsoft Corporation, www.microsoft.com), organization for the spreadsheet by column heading can be achieved using the “sort and filter” request. For example, if information was needed about how many students from a
specific class had logged onto the site, the “sort and filter” allows the evaluator to remove all other classes from the spreadsheet except that class in order to determine the number which logged on.

Preparing Data for Statistical Analysis

After the student tracking data for the semester was downloaded and exported to an Excel® spreadsheet, the data had to be organized in a variety of ways to answer certain questions. The results section starts by presenting the number of students which had access to the web-based site for each semester, and the number of students which chose to log onto the site during each semester (spring 2009, and fall 2009). This descriptive information was broken into the total number of students out of the total sample which logged on, as well as the total number of students from each class (Biol 1082, 1112, 1132, 1710, 1720, 1744) which logged on. Further questions about the significant difference between how the site was used were answered using the statistical software SPSS. Figure 5 illustrates what questions were asked and the statistical test used to analyze the responses.
For Question A, in order to compare the time spent on the site between science majors and non-majors, an independent t-test was chosen. This test allows for the comparison of means from two normally distributed populations, and determines whether there is a statistically significant difference between the two means. This test uses the
mean, standard deviation, and number of cases in order to determine a $t$ value and its probability. Normal distribution of the populations is an underlying assumption for this test; however, when sample sizes are greater than 15, as they are in this case (see results), violations to this assumption can be dismissed (Stern, 2008, pp. 219). This is also true for violations to the assumption that populations are of equal variance (Stern, 2008, pp. 219).

For Question B, in order to compare the time spent on the site between the six different laboratory classes, a one-way analysis of variance (ANOVA) was used to determine if a significant difference existed. This test can be used to determine if two or more independent samples come from populations with different means (Stern, 2008, p. 245). Underlying assumptions for an ANOVA include the normal distribution of the dependent variable, which may be transformed if needed (see Figure 7). Also a Levene test of homogeneity of varience must be done to determine if the assumption that all variances are equal can be accepted (Stern, 2008, pp. 246-247).

For Question C, in order to compare the amounts of time spent on the WBEFNMH before and after visitation to the physical museum, a paired $t$-test was used. Paired $t$-tests are used when the comparison of means can be connected; for example, this study uses the same students before and after physical museum visitation in comparing the time they spent on the WBEFNMH.

Transforming Data

Although, the large size of the samples used would allow statistical tests to be performed without assuming normality, a histogram and Q-Q plot for the data was done,
to determine the departure from normality (see figure 6). Because of the high positive skew, the spring 2009 data was log transformed to a base of 10, which in turn affected departure from normality as seen in Figure 7, the second column. The fall 2009 data was similarly transformed due to high positive skew.

Figure 6. Transformation of data and normality.
CHAPTER 4

RESULTS

Table 3

*The Number of Students with Access to the Web Based Elm Fork Natural Heritage Museum (WBEFNHM) and the Percentage which Logged onto the Site during the 2009 Spring and Fall Semesters*

<table>
<thead>
<tr>
<th>Semester</th>
<th>Number of Students with access</th>
<th>Number which logged on</th>
<th>Number which logged on more than once</th>
<th>Percent which logged on more than once</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring 2009</td>
<td>1,833</td>
<td>1,234</td>
<td>605</td>
<td>33.01%</td>
</tr>
<tr>
<td>Fall 2009</td>
<td>1,822</td>
<td>1,052</td>
<td>365</td>
<td>20.03%</td>
</tr>
</tbody>
</table>

Of the 1,900 students with access to the WBEFNHM during the spring 2009 semester, 1,251 students, or 65.84% of the sample logged on at least once during the spring 2009 semester. During the fall 2009 semester, of the 1,822 students who had access to the WBEFNHM, 1,040 students or 57.08% of the sample logged on at least once. of the sample that logged on at least once during the semester.
Table 4

*The Number of Students within Each Class with Access to the WBEFNHM during the 2009 Spring Semester*

<table>
<thead>
<tr>
<th>Class (BIOL)</th>
<th>Number with access</th>
<th>Number which logged on</th>
<th>Number which logged on more than once</th>
<th>Percent of class logged on more than once</th>
</tr>
</thead>
<tbody>
<tr>
<td>1082</td>
<td>154</td>
<td>122</td>
<td>75</td>
<td>48.70%</td>
</tr>
<tr>
<td>1112</td>
<td>209</td>
<td>137</td>
<td>73</td>
<td>26.45%</td>
</tr>
<tr>
<td>1132</td>
<td>630</td>
<td>462</td>
<td>240</td>
<td>38.10%</td>
</tr>
<tr>
<td>1710</td>
<td>304</td>
<td>179</td>
<td>80</td>
<td>26.32%</td>
</tr>
<tr>
<td>1720</td>
<td>359</td>
<td>214</td>
<td>86</td>
<td>23.96%</td>
</tr>
<tr>
<td>1744</td>
<td>177</td>
<td>120</td>
<td>51</td>
<td>28.81%</td>
</tr>
</tbody>
</table>

Note. The shaded area represents the non-science major courses.

During the spring 2009 semester, the percentage of students logging onto the WBEFNHM was greatest for the 1082 (Biology for education majors) class, and the class with the least students logging on by percentage was 1720 (Biology II for majors).

Table 5

*The Number of Students within each class with Access to the WBEFNHM during the 2009 Fall Semester*

<table>
<thead>
<tr>
<th>Class (BIOL)</th>
<th>Number with access</th>
<th>Number which logged on</th>
<th>Number which logged on more than once</th>
<th>% of class logged on more than once</th>
</tr>
</thead>
<tbody>
<tr>
<td>1082</td>
<td>100</td>
<td>55</td>
<td>25</td>
<td>25.00%</td>
</tr>
<tr>
<td>1112</td>
<td>346</td>
<td>210</td>
<td>69</td>
<td>19.94%</td>
</tr>
<tr>
<td>1132</td>
<td>577</td>
<td>365</td>
<td>138</td>
<td>23.92%</td>
</tr>
<tr>
<td>1710</td>
<td>436</td>
<td>262</td>
<td>87</td>
<td>19.95%</td>
</tr>
<tr>
<td>1720</td>
<td>152</td>
<td>80</td>
<td>20</td>
<td>13.16%</td>
</tr>
<tr>
<td>1744</td>
<td>211</td>
<td>80</td>
<td>26</td>
<td>12.32%</td>
</tr>
</tbody>
</table>

Note. The shaded area represents the non-science major courses.

During the fall 2009 semester, the percentage of students logging onto the WBEFNHM was greatest for the 1082 (Biology for education majors) class, and the class
with the least students logging on by percentage was 1744 (Honors Biology II for majors).

![Graph showing mean and standard deviation between amounts of time spent on the WBEFNHM between science majors and non-majors during the 2009 spring semester. The shaded area represents the non-science major courses.]

**Figure 7.** Mean and standard deviation between the amounts of time spent on the WBEFNHM between science majors and non-majors during the 2009 spring semester. The shaded area represents the non-science major courses.

**Table 6**

<table>
<thead>
<tr>
<th>Major</th>
<th>N</th>
<th>Mean (min:sec)</th>
<th>Standard Deviation</th>
<th>Standard Error</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-science</td>
<td>721</td>
<td>1:00</td>
<td>.644</td>
<td>.024</td>
<td>.736</td>
</tr>
<tr>
<td>Science</td>
<td>513</td>
<td>1:02</td>
<td>.739</td>
<td>.033</td>
<td></td>
</tr>
</tbody>
</table>

*Note. Time represented in minuets and seconds.*

The independent samples *t*-test determined that the mean time spent on the WBEFNHM did not differ significantly between science and non-science majors for the spring 2009 semester. The mean time spent for science majors was 1.7957 (*SD* = 0.73895) and that of the non-science majors was 1.7824 (*SD* = 0.64384). A Levene’s test
for equality of variances indicated the assumption of homogeneity of variance had been violated and equal variance could not be assumed $F(1, 1232) = 12.731, p < 0.05$. The difference between the mean time spent on the WBEFNHM was assessed with a $t$-test for independent samples and the difference between the means was not significantly different at the 0.05 level, $t(1232) = 0.337, p = 0.736$.

Figure 8. Mean and standard deviation between the amounts of time spent on the WBEFNHM between science majors and non-majors during the 2009 fall semester. The shaded area represents the non-science major courses.

Table 7

<table>
<thead>
<tr>
<th>Major</th>
<th>N</th>
<th>Mean (min:sec)</th>
<th>Standard Deviation</th>
<th>Standard Error</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-science</td>
<td>630</td>
<td>0:33</td>
<td>.510</td>
<td>.020</td>
<td>.230</td>
</tr>
<tr>
<td>Science</td>
<td>422</td>
<td>0:30</td>
<td>.491</td>
<td>.024</td>
<td></td>
</tr>
</tbody>
</table>

Note. Time represented in minutes and seconds
The independent samples $t$-test determined there was no significant difference in the amount of time spent of the WBefNHM between majors and non-majors. The mean time spent for science majors was 1.4841 ($SD = 0.49108$) and that of the non-science majors was 1.5222 ($SD = 0.50953$). A Levene’s test for equality of variances did not indicate the variances of the time spent differed significantly $F(1, 1050) = 0.107, p > 0.05$; therefore the assumptions to the homogeneity of variance were not violated. The difference between the mean time spent on the WBefNHM was assessed with a $t$-test for independent samples and the difference between the means was not significantly different at the 0.05 level, $t(1050) = -1.204, p = 0.229$.

**Figure 9.** Mean and standard deviation between the amounts of time spent on the WBefNHM between the six laboratory classes during the 2009 spring semester. The shaded area represents the non-science major courses and means with the same letter are not significantly different from each other.
Table 8

The Number of Students from All Classes during the 2009 Spring Semester

<table>
<thead>
<tr>
<th>Class</th>
<th>n</th>
<th>Mean (min:sec)</th>
<th>Standard Deviation</th>
<th>Standard Error</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
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<td>122</td>
<td>1:33</td>
<td>.728</td>
<td>.066</td>
<td></td>
</tr>
<tr>
<td>1112</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1710</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1720</td>
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Note. Mean time represented in minutes and seconds.

The ANOVA was significant, $F(5, 1899) = 4.714, p < .05$. Thus students within
different laboratories did have a significant effect on the amount of time spent on the
WBEFNHM. A Turkey HSD was used to examine the differences between the
laboratory classes and it was found the 1744 (honors biology) class differed significantly from all other classes. The 1082 (biology for education majors) differed significantly from all other courses except when compared to the 1112 (contemporary biology) course which is also a non-science majors course.

Figure 10. Mean and standard deviation between the amounts of time spent on the WBEFNHM between the six laboratory classes during the 2009 fall semester. The shaded area represents the non-science major courses.
Table 9

*The Number of Students from all Classes during the 2009 Fall Semester*

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Differences among the mean time spent on the WBEFNHM by students within different laboratory classes for the fall 2009 semester was assessed with a one-way ANOVA. A Levene’s test for equality of variances did not indicate the variances of the time spent differed significantly $F(5, 1046) = 2.192, p > 0.05$; therefore the assumptions of homogeneity of variance were not violated. The ANOVA was not significant, $F(5, 1046) = 1.397, p > .05$. Thus the laboratory in which students were enrolled, did not have a significant effect on the amount of time spent on the WBEFNHM.

![Figure 11](image)

*Figure 11.* Mean and standard deviation between the amounts of time spent on the WBEFNHM before and after visitation by the BIOL 1744 (honors biology) during the 2009 spring semester.
The time students spent on the WBEFNHM before and after visiting the EFNHM was examined by taking the time students spent on the EFNHM before ($M = 935.4486$, $SD = 1389.25076$) and after the museum visitation ($M = 3.6262$, $SD=14.01382$). Students spending zero time on the WBEFNHM both before and after visitation were omitted from the sample. A $t$-test for paired samples showed the difference between the means was significant, $t (107) = 6.943$, $p < 0.05$. The honors biology students spent more time on the WBEFNHM before than after visiting the physical Elm Fork Natural Heritage Museum.

![Figure 12](image_url)

*Figure 12*. Mean and standard deviation between the amounts of time spent on the WBEFNHM before and after visitation by the BIOL 1082 (biology for education majors) during the 2009 spring semester.

The time students spent on the WBEFNHM before and after visiting the EFNHM was examined by taking the time students spent on the EFNHM before ($M = 242.6455$, $SD = 1389.25076$) and after the museum visitation ($M = 3.6262$, $SD=14.01382$). Students spending zero time on the WBEFNHM both before and after visitation were omitted from the sample. A $t$-test for paired samples showed the difference between the means was significant, $t (107) = 6.943$, $p < 0.05$. The honors biology students spent more time on the WBEFNHM before than after visiting the physical Elm Fork Natural Heritage Museum.
$SD = 536.45730$) and after the museum visitation ($M = 15.4000, SD=54.43340$).

Students spending zero time on the WBEFNHM both before and after visitation were erased from the sample. A *t*-test for paired samples showed the difference between the means was significant, \( t (110) = 4.413, p < 0.05 \). The biology for education majors students spent more time on the WBEFNHM before than after visiting the physical Elm Fork Natural Heritage Museum.

![Figure 13](image-url)  
*Figure 13.* The number of sessions spent within the WBEFNHM between science majors and non-majors during the 2009 spring semester.

During the spring 2009 semester, the most viewed tool was the discussion board which was viewed 7,069 times by non-science majors, and 1,915 times by science majors. The least viewed were the content files which were viewed 144 times by non-science majors, and 1,291 times by science majors.
Figure 14. The number of sessions spent within the WBEFNHM between science majors and non-majors during the 2009 fall semester.

During the fall 2009 semester, the most viewed tool were the content folders which were viewed 886 times by non-science majors, and 300 times by science majors. The least viewed were the content files which were viewed discussion board which was viewed 57 times by the non-science majors and 19 by the science majors.

Discussion Board Postings

The discussion board on the WBEFNHM was intended for use as an open discussion board where students were free to comment or ask questions about anything on the site. It was during the spring 2009 semester when any comments/discussion
between visitors was left on the board. These comments can be broken into three separate categories including:

- Questions visitors had about what the site is.
- Comments related directly to specimen information.
- Discussion relating to museum ethics.

Complete conversation from each of these categories can be found in table A of the appendix. The first category (questions visitors had about what the site is) included comments for ten different students. For the most part these students were confused as to why they had access to the site, and whether or not it was a separate class (see full discussion in appendix). More than likely this confusion stems from the predominant function of UNT’s Blackboard for online class materials; however, the passage below is taken verbatim from the WBEFNHM and is the first written information of the homepage, which states the purpose of the site and was meant to stop confusions.

**WELCOME TO THE ELM FORK NATURAL HERITAGE MUSEUM BLACKBOARD SITE**

This is NOT a class. This is a resource designed for your exploration! It includes collection information, photographs, and informative learning modules.

Don't forget to check out the toolbar on the left for informative web links to aid in your scientific discovery.

Since this passage was left on the site, and there was only confusion during the spring 2009 semester and not during the fall semester, the site should continue to leave the previous statement on the homepage.

The second category (comments related directly to specimen information), would be considered the most applicable for this study since it is feedback from the visitor about
information directly relating to content chosen by the curator. In this study only one
visitor to the WBEFNHM left a comment directly relating to the specimen information.
This visitor stated they were impressed with the website and surprised by the capability
of a cottonmouth to deliver a bite underwater and would be cautious of this fact (see
appendix for exact comment). This comment notified the curator what the visitor was
reading on the site; in addition, the information focused on by the visitor was
information, which may have directly affected them if they were to come in contact with
a snake. Since this was the only comment left on the site by a visitor which directly
relates to specimen information, it would be a good idea to include more animal and plant
information which would relate directly to a visitor. For example, a section for persons
interested in hiking may find information on identification of venomous snakes and
poisonous plants useful before heading out into the field.

The majority of the discussion board was dominated by the third category
(discussion about museum ethics), which was between seven students, whom left a total
of 15 comments on the board. Although these comments where not related directly to
any information specimen information on the WBEFNHM, one student did mention they
read information about how to make a “kill jar” from the PPT on insect collecting. The
conversation was started by one person whom voiced their opinion about whether or not
is right to kill animals for a collection. Since they mention making an insect collection
can be related to killing humans, they would be considered an extremist by most
standards. The conversation is joined by one other person whom argues with the first
person about having such extreme ideas. For the most part, the conversation continues
between the two visitors and highlights issues including: consumer choices, “green” marketing, vegan lifestyles, and distinguishing what is ethical to kill (see appendix for full conversation). Interestingly, neither student cited any information to back up points they were trying to make during their conversation, although one student did claim they would be able to backup all information “based on facts”. While this conversation was dominated by two very opinionated persons, it was interrupted a couple other visitors’ suggesting the two should meet for coffee and discuss their opinions in person instead of talking to each other over the discussion board. Although the majority of the posted discussion was not related to anything on the museum website, it does provide ideas as to what topics students are interested in discussing. Future discussion board could include separate categories for discussion, and provide links to primary research about those topics; this would give visitors the change for independent research into topics while using published resources organize and backup their opinions.
CHAPTER 5
DISCUSSION

Results from this user evaluation of the WBEFNHM can be used to help decide if and how this site can be offered to other University classes. Knowing too what extent the site is being used by students aids in determining if time should be spent on continuing the site. Since developing and posting specimen information takes time, this time should be used only on the development of a desirable resource. Looking at the number of students who logged onto the site during both the spring and fall semesters is one way to decide if the resource is valuable to them (see Table 2). While the students logging onto the site only once could have done so in order to see what the site offered, the students logging on more than once are considered repeated visitors and could have done so because they had a personal desire to use and learn from the site. While there is no defined percentage of students that must log onto the site in order to make it worthwhile, both semesters show less than half of students using the site. About 32% of the population was repeated users during the spring 2009 semester, and 20% during the fall 2009 semester (see Table 2). Although these percentages seem low, it is important to remember that these students were logging onto this site by their own choice since the use of the site was not a part of their laboratory curriculum. Students choosing to visit the WBEFNHM were participating in an act of free-choice learning, or learning outside of a required classroom setting (Falk, 2001).
Because the Elm Fork Natural Heritage Museum is a museum of the natural sciences, considering the use of the site between science and non-science majors was important in determining if one group of students used the site more than others. Typically, persons visiting a museum of natural history or science have a personal interest in the subject; therefore, someone majoring in science may be stereotyped as a person who enjoys learning about science more than someone who has not majored in the subject. However, students majoring in science may or may not use a science resource as much as someone not majoring in science as was shown in the amount of time spent on the WBEFNHM which was not significant between the two groups (see figure 8 and figure 9.) Further analysis between science and non-science majors was done in analyzing the use of the site by the 6 separate classes, 3 of which were science major courses and 3 of which were non-science courses. During the fall semester there was no significant difference between the classes; however, during the spring semester a significant difference was found between the amount of time the biology for educators’ course spent on the site, and the honors biology course spent on the site. Since the results were not the same for each semester, it is hard to determine what may have caused the significant difference during the spring semester. Interestingly, these two courses were also the two courses that visited the physical museum as a class at the end of the semester. Knowing they were making a trip to the museum later in the semester may have inspired them to visit the WBEFNHM before making a trip to the physical location. This inference is strengthened when looking at figures 12 and 13, showing a significant difference in the amount of time these two courses spent on the WBEFNHM before
rather than after visiting the physical museum. Using a web resource before visiting a museum is not un-common; in fact, it was found that visitors to museum websites are more likely to use a web resource before visiting a museum than they are to use the website after visiting a museum (Marty, 2007).

While there was not a difference between the amount of time science majors and non-majors spent on the WBEFNHM during both the spring and fall semesters, there was a difference in what they were looking at while on the site. During both the spring and fall 2009 semesters the number of times the discussion board was viewed by non-majors was greater than science majors (see figures 14-15). Non-science majors viewed the site close to four times more than science majors during the spring semester, and three times more during the fall semester. It was the spring semester in which the discussion board was viewed more than any other part of the WBEFNHM; being viewed 8,984 times compared to the content folders being viewed 5,278 times and the content files being viewed 1,435 times. Interestingly the conversation on the discussion board was between seven students, which posted 15 comments total (see appendix A). These 15 comments were viewed close to 9 thousand times mostly by students not actively involved in the conversation. Although the conversation was not directly related to posted content, it did relate to ethical questions about museum collections (see Discussion board pg. 45). This type of conversation would be synonymous to conversation between visitors at physical museums, where discussion may not relate to the visit or collection whatsoever. While the large amounts of people visiting the discussion board may seem surprising, physical museums can also be places with opportunities for social gathering with family and
friends. Some museums have gone as far as offering rental spaces for business meetings and birthday parties, providing a place for meetings and celebrations. Social interaction is one reason museum goers visit physical museums; likewise, this opportunity can be a reason to visit online museums as well. The trend of social networking websites has seen an explosion of usage since their creation; likewise, these sites are being used by museums to post information, share photographs, and give “fans” an opportunity to leave comments on their profile pages. While a social networking site page offers the convenience of uploading photographs and basic contact information, it doesn’t offer the ability to track users for evaluations of the site.

Implications for Future Research

This study set out to determine if UNT students would use a web-based Elm Fork Natural Heritage Museum, and if a web-based learning tool could be used in effectively evaluating student use. Focusing on time-based behaviors of the online visitors, this research can be built upon by continuing similar research during future semesters or focusing on qualitative aspects of the on-line site. Other methodologies for evaluating this or other WBEFNHM sites could include online surveys for gathering information about the visitors’ personal interests and prior experience with museums.

Since this is the first research project directly related to the use of the Elm Fork Natural Heritage museum and a Web-based Elm Fork Natural Heritage museum, the opportunities to conduct research within the physical museum and on the web based museum are plenty. Hopefully, further research into the use of the museum as a desired
UNT resource will continue in the hands of eager graduate students with a desire to work in science education.

Conclusion

This study was conducted for the purpose of exploring how a web based museum is used by their visitors, specifically within a University setting. Using a web-based learning tool provides the skeleton for building a museum site that is easy to use by people unknowledgeable in website development. Using tools such as these provide museums with small budgets and lack of personnel the opportunity to develop their own web museums without hiring a specialized staff. Furthermore, Universities that provide their faculty and staff with web-based learning tools have a resource to develop a site with no outside costs. Results specific to this research found when students within science laboratories (both majors and non-majors) are offered a museum web resource their use differs only in the tools that are used on the site. Understanding this will help future Elm Fork Natural History Museum staff develop a site which can cater to a diverse population of learning styles and desires. Ultimately, this research project is meant to inspire more evaluative studies in museum website use and the importance of evaluation in order to develop a more user desired site.
APPENDIX

INFORMATION POSTED ON WBEFNHM
**Description**

Dragonflies are aquatic, predatory insects with an incomplete life cycle. They are found all over North America and most of the world.

**Life Cycle**

The dragonfly has a hemimetabolous life cycle which means they lack a pupal stage. It continuously grows and molts in the water and when the weather becomes warmer in the early summer, it will crawl out of the water onto a rock, or plant in order to dry out its exoskeleton which will crack and allow the adult to emerge with its fully developed wings.

**Habitat**

Immature dragonflies (nymphs) live and the bottom of shallow stream beds, and the shallow edges of lakes and ponds. They live around aquatic plants, or places where vegetation borders the water.

**Diet**

Both the nymph and adult are predatory. The nymphs will feed on other small insects, including other dragonflies; surprisingly, if large enough it will also feed on minnows, and tadpoles. The adults feed while flying through the air, and the majority of their diet comes from mosquitoes which make them a beneficial critter.

**Reproduction**

Upon emerging as an adult the dragonfly will reach sexual maturity within a week or less and mate while flying through the air. In order to ensure successful reproduction, males of some species will stay attached to the female until she lays her eggs onto the water or into the stem of an aquatic plant. Staying attached ensures competing males will not scoop out previous sperm in order to copulate with the female.

**Other**

Interestingly, the nymphs have internal gills in which they pump water in and out of their abdomen in order to extract oxygen from the water; however, this abdomen pumping ability can also aid in quick escape from predators by acting as a jet propeller; plus it has given them the cute nick name “butt-breathers”.

---

A.1. Example of an insect specimen sheet found on the WBEFNHM.
Black Willow tree (*Salix nigra*)

**Common names**
Black willow, swamp willow, goodegg willow

**Range and Habitat**
The black willow tree grows throughout the central and eastern United States. They are a facultative wetland tree species which means they will be found growing in wetlands most of the time. Also, they are deeply rooted in order to obtain water from the water table which makes them a phreatophytic species.

**Growth and Reproduction**
*Salix nigra* is a perennial, deciduous tree which means it is present all seasons of the year and sheds its leaves seasonally. It flowers in April – May producing yellow hairy catkins which are compact clusters of drooping, reduced, stalkless, unisexual flowers. May-July they turn to long reddish-brown capsules shaped like green beans. The seeds produced and dropped will remain dormant between 4 and 20 years until conditions are met for successful germination.

**Current and Past Uses**
The black willow has become a popular choice for the restoration, and prevention, of streambed erosion. If cuttings are planted at the right depth to the water table, and in the proper moisture and soil texture conditions then they can prevent flood damage. The wood of the black willow tree can used to make furniture, toys, and boxes; additionally, it was a source of charcoal to be used as gunpowder in pioneer times.
Nine-banded Armadillo (*Dasypus novemcinctus*)

**Description**

*Dasypus novemcinctus* gets the common name nine-banded armadillo from the nine bands that fall between the large shields covering the shoulders and rear of the animal. *D. novemcinctus* is about 16 inches in length, with a 1.5 inch tail. At 8-17 pounds the animal is well equipped to dig, with large strong claws.

**Habitat**

*D. novemcinctus* is originally from South America and is now found in Texas, Oklahoma, Kansas and Louisiana. The variable effecting where the armadillo lives is how hard the soil is since the Armadillo digs burrows for itself so must live where the soil is soft enough to dig. Regions of Texas which contain more sand are preferable habitats for the armadillo. When it digs a burrow it likes to be close to water. It will make the burrow about a meter deep and if it will be used for birthing, it will add dried leaves and other plant materials.

**Diet**

*D. novemcinctus* uses its claws to dig burrows as well as for its food. The armadillo is an omnivore and will eat insects and berries and sometimes can be found eating bird eggs.

**Reproduction**

Interestingly *D. novemcinctus* breeds in July, however, the embryo remains dormant until November. In November the embryo begins to grow and the armadillo with birth in March. It will always give birth to four identical young all originating from the same egg. This means the young will either be all female or all male.

**Other**

It is the state mammal of Texas!!

A.3. Example of a mammal specimen sheet found on the WBEFNHM.
Discussion Board Postings

Subject: response  Topic: Tell us what you think!

Author:  Date: February 19, 2009 2:40 PM

i think this website is great im impressed that a cottonmouth can deliver its bite underwater i had better watch out for those bad mamma jammamas

Date: February 12, 2009 5:42 AM

Since this is here for science purposes... Am I the only one who thinks that people who capture, kill, and pin/prop up insects and animals that they find to be fine specimens just as sick and twisted as serial killers who do the same with human animals? I understand there is a social barrier that somehow deems it unethical to do such things to those animals that we understand. We choose some to be companions, like dogs, cats, hamsters, etc.; yet some still have no problem taking the lives of those animals...or even humans. How is it truly ethical to do the same to ANY living creature? For that matter, who has the final word on what is considered a companion animal? I bet if I hung out with a deer everyday, we'd become pretty good friends. Evenso, cats are still dissected at high school and college levels. I don't want to get into the living-plant debate, as they are different on a cellular level. Carrots don't scream if I boil them alive; nor do they exhibit any sort of social behavior that I can recognize. I had to create an insect collection, in high school, and I may have cried each time I stuck something in the freezer, because my grade would have suffered if I tried to use any quicker, less torturous methods. That powerpoint on the website also suggests suffocating them in nail polish remover. I don't understand how either of those methods could seriously be mistaken for painless. Regardless, he method in which we take lives doesn't make it any less right or wrong. My teacher was extremely religious; however, I realized that many biologists don't seem to have very high ethical standards.

I gave strong consideration to forgoing the project, or using my sister’s from 2 years prior. She had a hard time with it herself. Forced to kill for a decent grade in AP Biology...why? I did, though, have the greatest, most diverse, and well set plant collection. It's still around somewhere. Just sayin... I think it's sick, twisted, unethical and wrong. I just wanted to put my opinion out there. I'm no PETA spokesperson, just a compassionate person.
Subject: Re: Pinning insects, dissection, vivisection, taxidermy  
Topic: Tell us what you think!

Author:  
Date: February 15, 2009 10:25 PM

This message is from a friend who is not in a science class, but found this article very interesting. This is his response to your argument...

It is great to have your own opinions, but please spend more time analyzing your points before you start sharing them.

First, you compare killing a person to killing a bug, most people would consider this pretty radical, but OK, if that is what you honestly believe. Would you really go kill a bunch of people to get an A in your bio class, because you did go kill a bunch of bugs. So either you are actually a serial killer, who needs psychological help, or you don’t practice what you preach.

Values are meaningless if you don’t not stick by them all the time, if you bend or break them every now and then, they are not values at all.

Setting aside that you don’t even actually believe what you are saying, it is still a flawed ideology. Have you ever played the Kevin bacon game? You know a person who knows a person who blah blah blah knows Kevin bacon, the idea is that through interpersonal connections we are all a lot more connected than we think. Well I can guaranty that you are one person removed from someone who kills animals, including bugs, on a regular basis. Every product you ever buy, the company kills animals. Even "green" companies have to build their story somewhere, and if animals live in antarctic, I am pretty sure some lived where that new "green" store just went up. It is impossible to have an ethical objection to someone somewhere down the line, killing an animal, like in dissection. Unless you are willing to go out into the woods with nothing but your birthday suit, and live off the land. Finally, I will tell you an Ethical stand point you can actually take, its quite simple, Don’t kill animals with your own two hands, and try to prevent unnecessary killing where you can. But you killed a bunch of bugs just to make the grade, so clearly you can’t even follow this simple and logically sound guide line. I have nothing against you, I just don’t want you to be confused on this issue, or confuse others.

-Have a nice day

Subject: Re: Pinning insects, dissection, vivisection, taxidermy  
Topic: Tell us what you think!

Author:  
Date: February 17, 2009 10:51 AM
Yeah, that was seven years ago. I think a 14 year old is allowed to be confused.
Life is valuable and you're nobody special to take it.

**Subject:** Re: Pinning insects, dissection, vivisection, taxidermy  
**Topic:** Tell us what you think!

**Author:**  
**Date:** February 18, 2009 7:49 PM

1.) My main point was that it is Impossible to not support an economy and a society that kills animals on a regular basis, so to bash society when you are just as much a part of it all is hypocritical. I did not say this was Right simple that it is and that if you live in a society you support this system.
2.) In my conclusion I offered a Different system of Ethics that you could actually follow without being a hypocrite in that you do not Kill anything by your own hands, and try to avoid any unnecessary killing.
3.) I never called myself special or implied at ANY point that I actively kill animals.
4.) I made my post to help show you that you where being just as unethical as the people you where calling cruel and twisted, that you where literally paying for the death of animals, that everything is Interconnected in a modern society, and it is Great to try and stop unnecessary cruelty or death to animals, But as long as you live in this Society you have NO room for your implied moral or ethical superiority.

Please try to read and understand my position as I read and understood yours, before you make implications to my personal actions or my beliefs, it is rude.

**Subject:** Re: Pinning insects, dissection, vivisection, taxidermy  
**Topic:** Tell us what you think!

**Author:**  
**Date:** February 20, 2009 2:04 AM

Well that just doesn't make any sense.
You know, socialism works best in theory, but it's just not the greatest model to use in real life.

Are you suggesting I not attempt to be the change that I would like to see? Are you encouraging others to just give up and not have radical ideas and opinions?
Why should I EVER let society dictate who I am on the inside?

I think you give American society far too much credit, and Americans, as individuals, far too little.
No, I can't take over the country and dictate everyone else's lives and how society is run; therefore, I support murder. Ok.
Instead of spending all my money on fur coats and leather gloves, I spend it on the difference that it costs for products that are free of animal products all together. It gets difficult and complicated, time consuming, and costly at times. This doesn't simply involve buying things have an animal-friendly tag on them, I mean I research down the line of it's creation, and down the line of WHO produces it.

Some things can't be helped, but we can only do so much at a time. It's worth it to me though. With that said, now you know I go out of my way NOT to support that system. I know where the money I spend goes, and that makes it worthwhile.

It's not all about animal rights either, or the fact that it's just disgusting and cruel. I do what I do for naturalist health reasons, which is where it all started, and for political reasons, which is what sealed the deal.

When you consume and use animal products, you are actively killing them. Just because you don't go work at a meat packing plant and sadistically torture them with your bare hands doesn't mean you aren't supporting those who do.

I do understand your opinion, but I feel it's very nearsighted. Let me briefly respond to each point in specific.

1. It is not impossible to not support the actions of your society. Nobody fully supports everything the society they live in does. That's where activists come from. Some people simply disagree and continue to blindly support it...the average American, lazy and lacking conviction. There are people who do everything in their power not to support those things. Heck, I don't drink soda for health reasons, but if I do feel the need, I won't touch coca-cola products because of the way their company treats their workers and supports murder. Trust me, with enough research and knowledge on that which you really care about, you can support it as close to 100% as you can get.

2. I don't recall your different system of ethics that you speak of. I'll have to go back and look. Chances are, I'm happy with how I'm rollin' as it is. I'm healthy, I'm goal-oriented, I have opinions, beliefs, convictions, and I show my compassion where I can.

3. There's nothing wrong with being special. Everyone should be the most special person in their own world...why? Because life is precious and your's is most special and precious to you. Just because you don't physically boil an animal alive until its shrieks die off and you know it's dead...doesn't mean that when you bite into that greasy, artery and colon clogging piece of bacon that you didn't support it. Supply and demand...that's how it works. You eat it once, they assume you'll do it again...so they'll do what they did again.
4. I don't understand where I'm being unethical. Give me one example of where I'm going wrong. I'm forced by law to support some things. Sure, the FDA and their little conspiracy with the meat and dairy industries...all over the place. Can I, or will I ever try to, single-handedly tear down that empire? No. But I can start small and do what I can to support what I believe. I understand that everything is connected and I go pretty far down the line in knowing where what I use comes from. I think you fail to acknowledge how seriously many people take their lifestyles. I'm vegan. I'm happy. I'm healthy. I'm well-informed.

Subject: Re:Pinning insects, dissection, vivisection, taxidermy Topic: Tell us what you think!

Author: Date: February 21, 2009 11:53 PM

My point has always been to Do what you can, which is exactly what you are talking about now. I have also been arguing that no matter what you do there is some cost to life. Through everything you buy, even when you track down the company, as far as it can go, they still need a Building, and other such things that cant come into existence without impacting the environment. You also seem to be conceding this point. My argument as to your Ethics goes hand in hand with the above. As long as you are a part of society, it is Fine to critique it and or look for ways to change it, but not look at it as some sort of Morally superior outsider. Also, you would have people respect your belief system, while calling them horrible monsters, no one will respect you if you do not first respect them, and the reasoning behind their beliefs. As much as you may deny it, there are reasons behind not being Vegan, beyond simply enjoying the taste of meat/wanting to hurt animals.

You want to talk about being well informed, please tell me where you draw the line on killing, being "Wrong" Archaea, Bactiera, Eukarya, which of these Domains is wrong to kill? I am gonna go ahead and assume you are going to just IGNORE the Majority of life diversity that falls under the first two Domains, and just go to Eukarya, so within Eukarya, Animalia, Plantae, Fungi, Protista, and Prokaryota, which of those is wrong to kill, Im just gonna Guess you only find it wrong to kill Animalia, So you are just Discounting a Massive majority of life on this planet, So then we get into animals that have no brains at all, or Very simple ones. Is it wrong to kill ANYthing in the kingdom Animalia. Or just the stuff that can "scream" as you said in an earlier post. Of course we DO have a test for when animals reach a certain, In my opinion, important mental state as far as Conservation and care for their lives is concerned. We have an effective test for determining if an Animal is Self aware, or in other words, that the animal can recognize that it is, A singular entity. Where do you draw the line, How do you justify that mark off point, when is it No longer wrong to kill stuff. How do you ethically justify that cut off point?

I think that it is fine to do what you can for your cause, Posting messages about how Bug collectors are Horrible serial killers is not going to Change anyones mind. If you read back, I
make a comment as to your influence on other people, you should try and be aware of this. Saying things like you did in your first post, lowers peoples opinions of you and your cause. Especially when you respond to my posts the way you did the first few times, with simple mindless tag lines. This response is good. You clearly state your point, you don't come off sounding over the top. If you want to bring about change, you need to start small, and keep your rhetoric reasonable. It is also important to understand the stance of your disinters, unless you want to sound like someone with their fingers in their ears, yelling as loud as they can.

If you read this, your only response should be to explain where you draw the line at killing being wrong. Other than that point, we seem to agree on most things. To clear up the last two misconception you might still have. When I say support society, I do not mean that you think it is ok what society is doing, I mean that you pay money into it. You can not argue that you do not, because I know if nothing else, you pay money to the university, which I can guaranty does not follow your guide lines for dealing with animals. The other point, could be that you feel you are not acting morally superior, all I can say to that, is if you honestly do not think you are, you come off sounding like you are, and since you have not made the sacrifice of removing yourself from society and showing that you actually hold to your values, you can feel it's wrong all you want, but you shouldn't act like, or treat yourself, like you are better than anyone else. I am however very interested in learning where you draw the line, and how you justify it, so please, do respond to that point.

Subject: Re: Pinning insects, dissection, vivisection, taxidermy
Topic: Tell us what you think!

Author: Date: February 24, 2009 11:56 AM

Funny you mention that. Just earlier today, I was thinking about how they mass produce juices and things. I imagined a massive amount of berries being squished and processed and it upset me a little that I don't know enough about them to know how it affects them.

I do feel bad sometimes when I eat a carrot.

As far as bacteria goes, I am a supporter of probiotics as opposed to anti-biotics.

I honestly only read the first couple sentences of a few paragraphs so that's all I'm responding with.

Subject: Re: Pinning insects, dissection, vivisection, taxidermy
Topic: Tell us what you think!

Author: Date: February 24, 2009 10:48 PM
I think the 2 of you should really continue this discussion in person over coffee. Unless of course, you're marching in support of the coffee bean's right to life.

:)

Subject: Re:Pinning insects, dissection, vivisection, taxidermy

Topic: Tell us what you think!

Author: 

Date: February 26, 2009 10:40 AM

yeah y'all should email each other instead of this

Subject: Re:Pinning insects, dissection, vivisection, taxidermy

Topic: Tell us what you think!

Author: 

Date: February 15, 2009 10:27 PM

Ok, now this is my own personal response to your argument...

I am sure you’re not the only one out there, but you’re one of very few. I can’t say I agree with you. In fact I think your argument is rather weak. How is the comparison of killing bugs relate at all to the acts of a serial killer? Serial Killers kill for sport the thrill of the chase. Oh, and also it’s humans killing fellow humans. Not at all related to humans killing bugs and or animals, there is no comparison. Scientists that collect bugs specimens and other living specimens do so to further scientific knowledge and understanding. I myself have never had to do a bug collection and I am so thankful. Not because it’s simply unethical but because bugs to me are creepy crawlers, and I avoid them at all costs. Certain clothing materials are byproducts of bugs. As we walk down the sidewalk we might be stepping on ants and numerous amounts of little bugs. Does that bother you knowing you killed those innocent ants? And don’t tell me that when a mosquito has bitten you, you don’t slap and kill it. Bugs are an essential part of the environments life cycle. And if scientist didn’t’ research them and collect them we would not be able to decipher non-poisonous from poisonous or how they benefit the environment or ones that are detrimental to certain types of plants. Ok the animals you mention as “pets” are called domestic animals and have been domesticated for literally thousands of years. Yeah, if you hung out with a deer enough I’m sure it wouldn’t be skittish of you after a while, but deer are still primitive animals they live in a primitive environment. They would not fit in to a house or apartment, and definitely not in a city. There is a reason we have the domestic animals we have today. The dissection of animals is to further educate young scholarly minds. And I am pretty sure they’re dead before you start dissecting them. You personally don’t have to kill them. Perhaps they die of natural causes? Who knows? I do know that human’s have been dissected for a long, long time is that abhorrent too? I’m talking dissection to further understand the workings of the human body not to obtain a cause of death. Dissection is again a scientific tool used to better understand the workings of an organism. It’s great to have an opinion. And
everyone is entitled to his/her own, but please if you’re going to spout off on an issue make sure you’re semi-informed. If not informed at least come up with a good argument backing your ideas.

Subject: Re:Pinning insects, dissection, vivisection, taxidermy Topic: Tell us what you think!

Author: 

Date: February 18, 2009 1:17 AM

The whole point is to be radical in examples. That's the only way to get a point across when it is of such that has been so long and deeply trampled on by social mores and norms.

To be honest with you, no, I don't slap mosquitos. Why would I? Does a cow kick you in the face when you milk it? They probably should...because cow milk is for calves, not adult humans...but they don't.

Just because a deer doesn't fit comfortably in an apartment doesn't mean it deserves to be hunted for fun, and displayed on a mantle.

To get the amount of animals needed for vivisection or simple science class dissections, you can't honestly believe that they all just naturally die in their original habitat and get collected for such proceedings. They were intended to die for that purpose. For the most part, the amount used is hardly ever even necessary. Do you remember truly learning anything from those frogs in 7th grade? Or the clams that kids just flung around the classroom?

I fail to see where I'm mis-informed as though I've been rambling on about false information, and not a personal opinion. Just because our opinions differ, does not mean that one, or the other, is misinformed. Perhaps, if anyone, you are misinformed about the fact that all of these other living things feel pain, and were given life to live.

If you want a novel about each and every single reason behind why I think life in valuable in creatures other than just humans, you might have to sponsor the publishing costs.

Subject: Re:Pinning insects, dissection, vivisection, taxidermy Topic: Tell us what you think!

Author: 

Date: February 18, 2009 10:00 AM

"If you want a novel about each and every single reason behind why I think life in valuable in creatures other than just humans, you might have to sponsor the publishing costs."

On the other hand, you might be called out to justify your opinions. Why not be excited at the opportunity to share your evidence, instead of feeling burdened by everyone else's "ignorance"?
Why write a book full of opinions when I can base it all on fact?

I have to agree with a majority of your points. Initially when I read the other argument I strongly desired to find the person and punch them in the face. If you are going to complain about being grouped in random generalizations she could at least avoid grouping others in the same manner. You are correct in saying that she would probably be better off if her delivery didn't appear as if everyone else is nothing in the face of her supreme wisdom. But this is coming from someone she would probably assume to be a primitive, violent, and even dull individual. And I'm going to assume all of those scientific advances that have been made over the years to ensure that she doesn't die of some easily preventable disease, via vaccines, is going to be overlooked in the due to an honestly narrow minded approach to life.

On another note, really and truly if it sucks so much here why not leave? If America as a whole is a corrupt society why continue to take advantage of its opportunities? Something she has yet to answer.

Thank you for your calm and rational arguments.

Maybe you should make a visit to the museum. I went last semester for a class. None of the animals in our museum were killed for the purpose of being pinned or stuffed. If you take a visit, they could tell you all about their collecting methods. Which from what I remember weren't so terrible. Most of the collection was donated, but those specimen that they are collecting now are mostly roadkill, so technically they're doing us a favor and keeping our roads clean after reckless drivers make a mess. I'm a vegetarian and I completely I agree with what you're saying, but I don't think you should assume that our museum is doing the unethical things that you've mentioned.
the person who wasted their time typing all this bull shit needs to be hung up on display for being the worlds ignorant human being.
REFERENCES


Museum of Nature and Science Dallas, Texas http://www.natureandscience.org/

Platania, Steven (1997). The building of the University of New Mexico Fish Collection: Case study of a small university collection. American Society of Ichthyologists and Herpetologists.


