

### **3-D Interactive Worlds as Educational Tools for Understanding Arctic Life**

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#### **Abstract:**

Interactive 3-D worlds and computer modeling can be used to excite interest in traditional dwellings constructed by indigenous groups in the Canadian High Arctic. General cultural trends toward the use of digital media show greater acceptance by students, teachers and the public. Consideration will be given to creating digital models that serve both research and teaching objectives. Beyond mere representation of past architectural forms, digital reconstructions can be used to delve into the behavior and performance of unique structures. In research and teaching, it is possible to model and investigate the response of these structures to the extreme environmental conditions of the North. A virtual laboratory can offer teachers case studies that motivate students in their studies of math, science and culture. Virtual worlds can also evoke emotive and effectual knowledge in indigenous users. Experiences derived from primary school and college students, and Paddle River Inuit Elders, who experienced digital reconstructions of Inuit dwellings in a 3D virtual theater (CAVE) at the University of Calgary are discussed. Results suggest that virtual environments may be useful in initiating and establishing archaeological interpretation and discourse, as well as assisting personal identity recovery. We take a case study approach that looks at content created on domestic architectural and cultural artifacts of the North. Finally, how this content can best be displayed is discussed in relation to the web, CAVES and 3D theatres.

#### **Public Archaeology: Giving Back to the Community**

In the US and Canada, archaeological project funding often stipulates that public opportunity for engagement be provided. The level of participation can be a simple website, a museum display or a presentation to the community of the archaeological discoveries. Digital imaging can become an essential part of this outreach effort (Addison 2000; Addison 2001; Bauerlein 2007; Carrozzino 2008; Sanders 2006). In an effort to make the authors' research findings on the Canadian High Arctic more accessible to a larger audience, interactive 3D worlds and computer modeling have been included to excite interest concerning traditional dwellings constructed by indigenous groups (Champion 2003).

With the expansion of broadband into remote communities in the North, it is now possible to extend the reach of these archeological discoveries to the desktop of a student's computer, far away from more conventional locations of museums in major and regional centres. In addition, there is the sensitive issue of repatriation of native artifacts. Virtual 3D artifact copies allow archaeologists to return sacred objects back to their original communities, while keeping valuable information from the artifacts available for research and study.

#### **Display and Interaction**

Finding the appropriate venue for artifact display and interaction requires sensitivity to the object's type and physical scale. Today, to access historic materials through the internet demands that any representation of an object be web-compatible. By placing artifacts in surroundings with other objects, a context is constructed for understanding the past. With artifacts that have deep cultural significance, there is also an opportunity to associate virtual objects with myths and ethnographic commentary. In addition, the growth of social media

allows users in remote communities to add their comments, stories, videos, or photos to websites with accessible virtual copies of artifacts, as part of a running dialogue that can be shared with the world.

For museums, this connection between the real and virtual offers exciting possibilities of linking physical displays with virtual interactive content. With arctic content, the authors have experimented with the web, kiosks, and 3D stereoscopic projection systems, including passive and active projection systems, autographic screens, CAVES and 3D theatres. These environments have been used both for teaching and museum exhibits. With lower 3D display costs on the horizon, the opportunity to augment museum exhibits and explore whole worlds will increase, particularly as greater access to artifacts occurs, previously restricted to researchers (Takenaka & Paul 2010).

### **Why create virtual objects: *Why laser scanning?***

Laser scanners over the last decade have become accepted tools for archaeologists who need to document objects from the size of an arrow head to the extent of a building or city. A major advantage of laser scanning is that measurements can be made off the 3D model without damaging the actual object, since repeated measurements can have an impact on small fragile objects. With laser scanners it is possible to acquire point measurements on a vast scale and at high fidelity. Laser scanners can be designed to capture minute detail, with resolutions as fine as 30 micros, providing researchers with a source of data not possible to acquire with more traditional hand measurement techniques.

Virtual 3D replicas also have distinct advantages over real objects by facilitating a systematic analysis of shape and form. This is particularly self-evident in the case of fragile pottery, where lasers scanning technology has been used to arrive at the shape of a vessel. In case of a partial vase, it has been possible to reconstruct the entire pot from the remaining pot shards. In an attempt to automate this process, researchers at the University of Tiburg have developed algorithms that can take a collection of pot shards and reassemble the pot into its most likely shape (Maaten, Lange and Boon 2009).

Long-range laser scanning technology can be used to create 3D images of a building or an entire archaeological site. By taking successive scans of a site over time it is possible to create a virtual record of the excavation. The authors' work on a house site in the high arctic on the shore of Richards Island, 3 km south of Kuukpak (69° 20.6'N and 134° 03.3'W), demonstrates that even in remote locations it is possible to use laser scanning technology in the documentation of archaeological sites ( Dawson, et al. 2009). Ultimately, this record serves both the researcher's need for measurements and the conservationist interests in monitoring the condition and state of a site over time. By combining the advantages of different laser scanners that capture data at different resolutions, it is now possible to have an accurate record at the scale of a city, the buildings and artifacts contained within it.

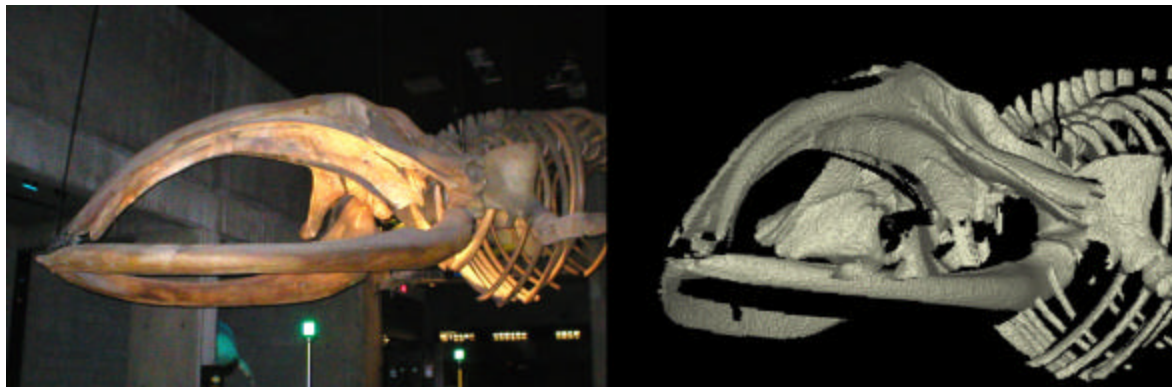
### **Case Study: The Reconstruction of a Thule Whalebone House**

The reconstruction of a Thule whalebone house provides a case study of laser scanning use for documentation and research that leads to public access to the results of archaeological research. The project's initial goal was to create a computer reconstruction of a traditional Thule whalebone house of the type found in the North American Arctic and Greenland. These domiciles were constructed by the Thule peoples, who are the cultural and biological ancestors of contemporary Inuit and Eskimo groups of the North American Arctic and Greenland. Thules had expanded eastward from the Bering Strait region into the Canadian Arctic by the late 12th or early 13th century. Unlike northwestern Alaska, the coastlines of the Eastern Arctic did not have a ready supply of driftwood to build houses. Consequently, their winter houses, composed of a main room, kitchen area, and entrance tunnel, were built with whalebone structures. A roof structure was erected over a house pit lined with flagstone. The raised sleeping platform, kitchen, and storage areas were also built from flagstone. The roof frame would have been covered with hide and a thick heavy layer of sod and with snowfall, an additional burden would have been placed on these structures (Maxwell 1985; McGhee 1978). Because these structures are encountered only in a collapsed state, archaeologists know little about how these enigmatic houses were actually constructed. Consequently, a virtual reconstruction of a three dimensional

model of a Thule house from archaeological data potentially could provide new insights into how these dwellings were built.

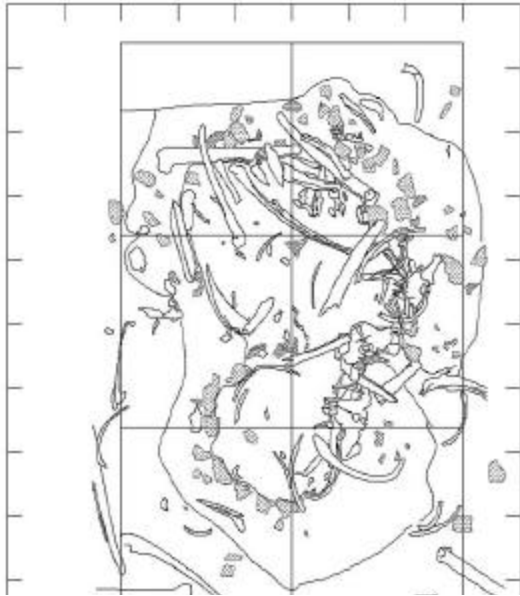
The reconstruction process would have been difficult, if not impossible to resolve using 2D drawings. Manual drafting or 2D CAD cannot easily solve a 3D structural system based on organic elements, such as the mandibles, cranium and maxillas of a whale. Beginning in 2003, the authors began exploring a strategy for creating 3D computer reconstructions of Thule whalebone houses based on earlier field studies. Ultimately, it was hoped that by working in a 3D environment, the potential arrangements of elements found at archaeological sites could be tested for their structural stability.

The first approach considered in solving the geometric problem of reconstructing the frame of the structure from whalebone was begun with the translation of 2D drawings of whale skeletons into 3D models. However, given the complexity of these organic forms, translation of drawings in plan and elevation proved difficult and time consuming. Laser scanning provided the only means for capturing a 3D image of this complex organic form. Fortunately, a mounted specimen of a North Atlantic Right Whale exists at the New England Aquarium in Boston (Fig. 1). The North Atlantic Right Whale (*Eubalaena glacialis*) is smaller than the Bowhead Whale (*Balaena mysticetus*) hunted by Thule groups, but both share a similar skeletal morphology. Using a Cyrax2500, a commercially available laser scanner, an accurate mesh with good accuracy (5mm) could be achieved (Boechler 2003; Johansson 2002). Once the million of points were converted into an optimized mesh, it was possible to extract the needed elements required for the reconstruction process.



**Fig. 1. North Atlantic Right Whale: Left - photo, Right – laser scan, New England Aquarium, Boston, MA.**

Modeling in virtual space, the reconstruction process was similar to building the actual physical structure. The first step involved importing the 2D CAD file of information collected at the Deblicquy site in 1994 (Dawson 2001). The plan for the largest and best-preserved house (Figure 2 ) served as the basis for 3D reconstruction. This CAD data provided essential information for the reconstruction, including the subterranean pit's topography, extent, and shape, which represent the dimensions of the enclosed space. The list of bone types and sizes was also essential to this reconstruction. This information helped to scale the individual elements built from the laser-scanning data. Bones used in the original structure included the mandible, maxilla, cranium, ribs, scapulas, and selected vertebrae. The second step involved extracting the pit from the topography using average depths and pit outlines in the original CAD file. A flagstone floor and elevated sleeping platform using virtual rocks whose shapes, sizes, and color were determined using actual rocks measured at the site. To begin the reconstruction process, we placed the major construction elements (cranium, mandibles, and maxillas) in their approximate locations found on the site. (Figure 3) (Dawson 2001; Levy et al. 2004).



**Figure 2. Thule whalebone house (QiLe-1) on Bathurst Island, Nunavut: (a) photograph of the archeological site and (b) computer-aided design (CAD) drawing.**



**Fig.3. Computer model of an arctic Thule whale bone house from Bathurst Island, Nunavut**

### **The Value of a Virtual Laboratory**

One criticism of computer modeling in archaeology is that models are merely pretty pictures. However, with the availability of high performance PC's, a researcher can answer questions about structures from the past. Using CAD and engineering design applications it is possible to simulate the lighting conditions inside a space or test the behaviors of structures under snow and wind loads. Structural analyses of Thule whalebone houses verified the structural stability of proposed reconstructions. Having conducted these analyses, we can state "We are not sure what they looked like, but at least we know that the proposed construct could have withstood the environmental harshness of the North, where snow and wind would have collapsed all but the strongest of structures". In the case of the Thule whalebone architecture, the authors have also used the results of the structural analysis to answer the questions:

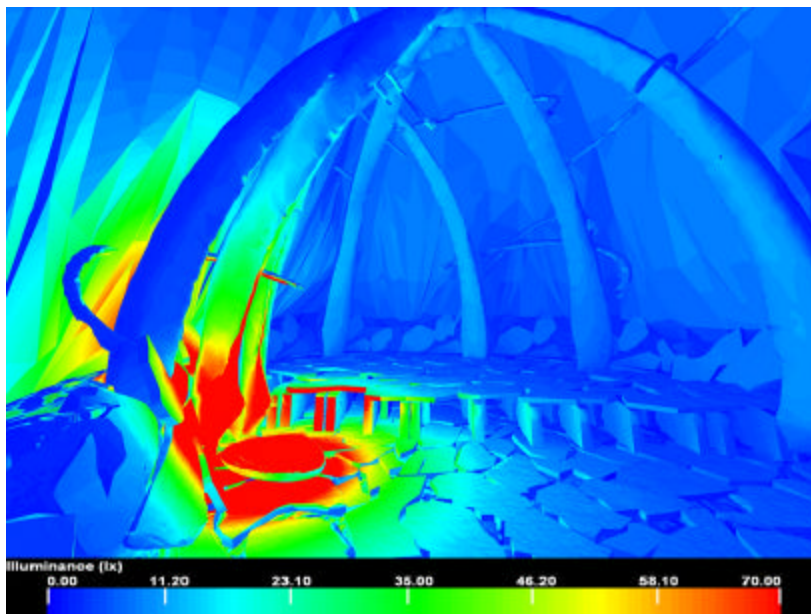
- Given the challenges of working with whalebone, to what extent were Thule houses structurally sound architectural forms?
- Did the use of whalebone in a symbolic capacity affect the structural integrity of whalebone houses?
- Would weaker structures have increased the level of maintenance required to keep the dwelling habitable, or even placed the structure in danger of collapsing?

Multiframe, an application used by structural engineers, was employed to conduct the actual analysis of the structural frame of the Thule whalebone house. Like many FEM applications, Multiframe has been used to understand potential modes of structural failure (Guarnieri, et al. 2005). With laser scanning technology, accurate 3D data can serve as the basis of these analyses (Silva, et al. 2010). Rather than generalized geometric models based on historical drawings, laser scanning can provide an important snap shot of a building's current condition. This approach can consider the rate of deterioration over time and how this degradation impacts structural stability. More important with structures subjected to potential catastrophic

failures from earthquake, considerable redesign efforts are needed to guarantee the integrity of a structure in the future. As an instructional tool, the approach used in this research, which incorporates cultural based content, has potential to stimulate students to learn more about math and science.

### **Light, Space and Activity: Modeling the Light from a Whalebone Lamp.**

Once completed, the reconstruction of a Thule Whalebone house can simulate light levels inside a Thule winter house. A whale-oil lamp provided light levels much lower than western architectural standards. Inhabitants doing domestic chores in a Thule whalebone house would have had to make greater use of their sense of touch. In order test this idea, replicas of *qulliq* lamps were crafted out of soapstone. A 60 watt light bulb was used as a standard. By calibrating this standard light source, it was possible to determine the illumination of a whale oil lamp. In testing replicas of a typical *qulliq* it was discovered that they would have been capable of producing light equivalent to a 15 watts light bulb (Dawson et al. 2007). Using this data, the computer modeled the illumination in the interior of the space. These light sources are most commonly found to one side of the sleeping platform (Ekblaw 1927; Jenness 1946; Mathiassen 1927). The reflection of surfaces, such as walls and floors, also influences how light is distributed inside buildings. For the purposes of this experiment, surfaces inside the whalebone house were considered to be reflective at 15%. Probably, this value is actually much lower due to the amount of soot that would have been deposited on the walls and floor of the dwelling. Using the Lightscape plug-in for 3D Studio Max, a pseudo color rendering of the interior of the house was created, mapping both luminance and illuminance. Luminance is a measure of how bright or dark a surface is perceived, while illuminance measures how much energy has fallen on the surface. Illuminance is also a function of the distance from the light source and is therefore, a useful measure for gauging the light available to perform domestic tasks (figure 4).



**Fig. 4. Illuminance Map, Interior of an Thule Whalebone House**

Inside these small dwellings, which lacked interior partitions, the distribution of light and shadow may have been used to “zone” areas of public and private space. For example, the sleeping platforms would have had appeared dark even with multiple lamps lit inside the space. Many of the activities found inside a Thule Whalebone house would have required higher levels of illuminance by Western standards, because individuals must be able to resolve very fine detail or small objects. Light levels close to the source (*qulliq*

lamp) would have provided sufficient light for activities such as cooking (46.45cd), but not for sewing (92.9cd) (Woodson 1992). The inhabitants would certainly have been able to perform household tasks under much lower levels of light. Archaeological and ethnographic data proves that Inuit and their ancestors were extremely good at carving and sewing. There are many excellent precontact examples (Maxwell 1985). Many everyday Inuit objects like harpoons, knives, needle cases, and children's toys have incised lines arranged in geometric patterns (Mathiassen 1927; Maxwell 1985; McGhee 1978, 1984; Whitridge 1999, 2004). It seems reasonable that under these conditions of prolonged periods of darkness, the Thules would have compensated for the lower light levels, similar to individuals who are blind or deaf who often talk about a compensating effect, in which one or more of their remaining senses becomes more acute (Classen, et al. 1994).

The results of this study demonstrate that technologies like computer modeling and virtual reality can be used to obtain a more holistic understanding of how humans perceive and interact with the environments they inhabit. Using virtual worlds to reconstruct the sensory ecologies of past landscapes and built environments may afford researchers, teachers and students an opportunity to explore ideas and theories more fully. Ultimately, it is the means of displaying these results that makes the results of these research findings accessible to students and teachers.

### **The Virtual Museum Program**

With funding from the Virtual Museum Program in 2008, the researchers had the opportunity to create a virtual presence on the web to bring research on the Arctic life to the public (Glenbow Museum 2008). The mission was to create a site in which visitors would have the opportunity to learn about the environment surrounding Thule life. The site would focus on building materials, domestic architecture, hunting, sources of food and production of clothing. The website would also be devoted to the importance of bowhead whales to the Thule, including a section on how to catch a Bowhead whale and how to use the bones for building houses. There would also be sections on "myths" that link the whale to aspects of the "house", which some believe is a representative of "whales" in Thule society.

Once inside the houses, the attention centers on the organization and atmosphere of the interior space. Issues of light, heat, and privacy are explored in relation to the shape of the structure and the whale-oil lamp which was used to heat and light these houses. Once inside the space, the on-line visitor would learn about the tools and implements needed to exist in the arctic landscape. Organized by men's, women's and children's objects, animated gifs of laser scanned artifacts are presented including: ulus, needles, lamps, bow drills, knives and toys. Explanations are provided on how they were used for daily tasks. Other aspects of the website included a timeline and a section about how 3D imaging and computer modeling was used in the research.

The constructed website, though utilitarian and straight forward in its structure, was constrained by design specifications that barred the use of virtual worlds and on-line games. In the original proposal a series of virtual environments were suggested to explore the life in the arctic. For example, to introduce virtual visitors to the connection between light and space, a virtual walkthrough of the interior was proposed. With only a whale oil lamp to light the way, the contribution of light to a sense of community or privacy could be revealed. Navigating through the different areas of the interior, one would be introduced to virtual inhabitants who would demonstrate how to use various tools for cooking, cloth making and hunting. Similarly, it would have been possible to give the web visitor a set of virtual whalebones from which to construct a house. Once completed, a virtual test could be conducted to see if a design could have stood up against the elements of snow and wind. Unfortunately, design specifications that restrict the use of plug-ins and limit performance to computers built over a decade ago made it difficult to offer these kinds of exploratory environments as part of the web experience.

### **The Kiosk: Museum of Civilization**

A few years earlier, a kiosk installation was constructed at the Canadian Museum of Civilization, Ottawa (Levy 2003). As part of a special exhibition, “Journey to Kitgaaryuk” sponsored jointly by the Canadian Museum of Civilization and the Prince of Wales Northern Heritage Centre in Yellowknife, NWT an interactive world was developed for a standalone kiosk. The experience first provides a tour of the outside of the house. Once inside, the interior can be explored. Clicking on artifacts located on the sleeping platform of the house would activate a video which showed how the objects were used in daily life. For example, clicking on a stone ulu initiated a movie that showed a member of the Inuvait community creating a seal skin parka. Located at the centre of the gallery, visitors could interact with a virtual model of a sod house while being surrounded by actual artifacts from the region. Like many virtual worlds, one tracker ball provided control over the environment. Several audio headphones were attached to the single kiosk. Curiously, having the control of the environment in the hands of a single person did not present any serious barriers for small groups. One person would naturally gravitate towards navigating the world, while other participants would offer suggestions where to go next or would ask questions about the virtual world. Interestingly, young children were most adept at this kind of joint decision making (Levy, CMC 2003).

### **Virtual Reality: At a Larger Scale**

At the University of Calgary, students from classes in archaeology have the opportunity to view the whalebone house and other environments, including the skeleton of a baleen whale, an Inuit sod house, in an immersive environment in the I-Centre, CAVE. The I-Centre CAVE, designed by Barco Ltd, creates an immersive environment with walls that can be re-arranged to form a virtual reality theatre or CAVE. A CAVE is a room sized cube composed of four walls. In the I-Centre, the walls are right left, centre, and floor. Each screen is 8 ft high by 10 ft wide. With the VRPACK module of Virtools ([www.Virtools.com](http://www.Virtools.com)), virtual worlds can be viewed in stereo using active shutter glasses. Interactive sound and atmospheric lighting all contribute to totality of the experience (Addison 2000, Berndt 2000).



**Fig 5. A group of Archaeology Students in the CCIT CAVE, University of Calgary.**

For university, high school and primary students, the opportunity to view archaeological reconstructions and artifacts in an immersive environment provides an understanding of the complex geometry of these dwellings (figure 5). The ability to discover the connections between space, light and culture is an advantage of virtual exploration of the space at actual human scale. One issue in using the CAVE as a classroom experience is that interaction is generally limited to a single user. Without trackers and other input devices the experience is more like a 3D movie for most of the students. Though CAVE's are not common on most college campuses, the ability to construct multi screen immersive environments from standard workstations and inexpensive flat

panel displays will greatly expand their use in research and education. In a museum environment, the real challenge is creating experiences that will open opportunities for the user to interact with the virtual world (Champion 2003).

The experiences of Inuit Elders in the CAVE suggest new opportunities for working with members of Native communities (figure 6). In 2008, Inuit Elders from Arviat, Nunavut were flown to Calgary to examine artifacts held at the Glenbow Museums archives. Working with Dr. Dawson, this research was part of an ethnographic study examining the emotive, effectual responses that are triggered when indigenous persons interact with traditional objects that are meaningful. Specifically, Dawson was interested in exploring whether the meanings associated with traditional objects, such as harpoons, awls, and houses, are transferred to their digital copies. Inuit Elders Donald Uluadluak, Louis Angalik, and Mark Kalluak currently work for the Department of Education, Government of Nunavut, where they devote much of their time developing traditional knowledge curriculum materials for school-age Inuit children. After spending several days examining artifacts in the institutional setting of the Glenbow Museum, the Elders visited the iCORE C.A.V.E at the University of Calgary's Schlumberger iCenter, where they toured the 3D model of a Thule whalebone house. "All the stories I used to hear when I was young are coming back to me" remarked Mark Kalluak, as he navigated around the virtual dwelling. "It really makes me think about what it would have been like to live in my ancestors' home". Donald Uluadluak explained in Inuktitut that he felt like a magician. "No one has ever seen these buildings before. Now we are able to and it will help us understand who we are", he explained. The experience of being able to view the whalebone architecture of the dwelling in 3D also reminded Mark Kalluak of a traditional Inuit tale about a man who lived inside of a whale. "Maybe this legend comes from when we lived in these kinds of houses" he explained.

As the Elders shared their experiences in the iCore C.A.V.E with us, we began to realize their immersion in this virtual world of their ancestors had triggered an emotional response – one based on awe at what their Thule ancestors had been able to accomplish. The whalebone house had also served as a powerful mnemonic device, reminding the Elders of stories they had heard as children. The Elders' experience within this virtual environment was unguided – they simply explored the inside and outside areas of the dwelling. The comparatively sterile environment of the Glenbow museum's collection storage area had elicited little in the way of discussion among the Elders. In contrast, the comments they shared with us about their experiences in the C.A.V.E suggest that their encounters with the digital whalebone house and the traditional objects contained within were both emotive and effectual. The Elders seemed genuinely moved by their experiences. Their recollection of traditional stories indicates the power of virtual heritage environments to serve as mnemonic devices for evoking traditional memories and stories.

Our discussions with these Elders indicate that they recognized the experience as a simulation and not an authentic view of their past. Nonetheless, they appreciated the experience because it moved them closer to a point of contact with their own history and cultural identity. Placing museum objects in simulated traditional environments, such as dwellings and landscapes, also strips away the institutional settings where these items are commonly encountered, such as the Glenbow Museum.



**Figure 6 (From Left) Louis Angalik, Mark Kalluak, and Donald Uluadluak**

### **3D Virtual Reality Theatres**

In 2008, Dessault Systemes announced a competition for designing virtual world experiences for the Geode in Paris. A goal of this competition was the promotion of 3DVIA, an integrated development platform. 3DVIA (Virtools) provides tools for creating interactive worlds for display on PC's, Caves, and 3D theatres<sup>1</sup>. Ultimately, the virtual worlds resulting from this competition would be showcased in the Geode, the largest virtual reality theatre in the world. Re-Opening in 2008 after renovation, this spherical shaped theatre is located in the Parc de la Villette at the Cité des Sciences et de l'Inustrie in Paris (Figure 7). First constructed to show movies in IMAX format, it also has the capability of presenting 3D interactive worlds (Dessault Systemes, 2008).

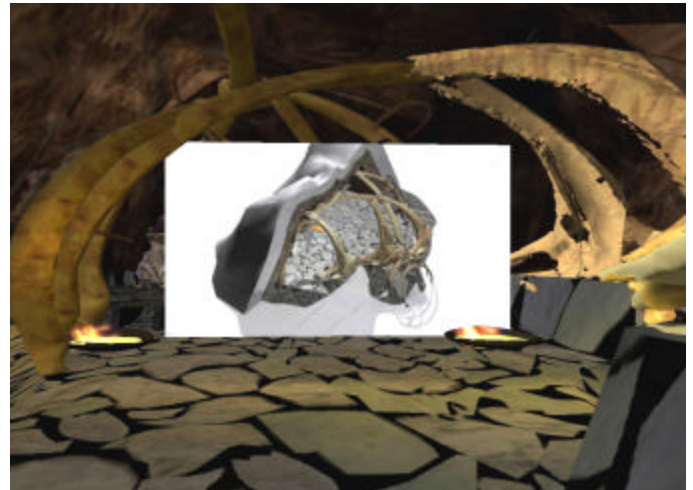


**Figure 7. La Geode, is the world's largest virtual reality centre.**

In this project it was possible for the authors to draw upon assets from worlds created over several years including 3D computer reconstructions of a Thule Inuit whalebone , house as well as a virtual Kayak simulation. In addition to these completed structures, learning objects created with long and short range scanners were also utilized in this project. These objects ranged in size from a small stone ulu, to the much larger skeleton of a North Atlantic Right whale.

Using a traditional story or myth as the underlying plot for a game is a common strategy among game developers. In this project, myths and stories collected by researchers visiting the far North, including Knud Rasmussen of the Danish Fifth Thule Expedition (1921-24), provided the background for the virtual experience focused on life in the arctic. One story in particular, “The Raven’s Story”, became the underlying plot line for the virtual world (Rasmussen 1921). Ultimately, a quest, a genre that is well understood by game makers, was used as the armature for “Exploring Arctic Cultures”.

In the Prologue, you are given your mission, to find your way home with the help of mythical creatures. To help guide your way home, whale oil lamps which appear suspended about the water light your journey. At the beginning of your quest you are introduced to the Raven, whose story will be retold during your journey (figure 8).



**Fig. 8 Image from the Interactive World “The Raven” Fig 9 Interior of the Thule Whalebone House**

For the Inuit, the connection between one’s life, nature and myth would have been reaffirmed by every day experiences (Whitridge 2004). To emphasize this connection, many of the mythical characters, represented by their likenesses in stone are found in natural state swimming, dancing or flying. The setting is also used to reinforce the sensation that you are in a mythical world. Here in the world of endless dusk, both night and day exist together. Huge icebergs mirrored by their reflection on the water, appear to be floating magically upon the sea, underscoring the connection between the mythical and physical world (Losh 2006).

At the end of your journey, you find yourself inside a traditional Inuit house (figure 11). Here objects, which have been created by laser scanning actual artifacts, can be found. Each object served as a mnemonic placeholder for accounts on everyday life (Sabo1980). In this space you find an ulu, harpoon, snowknife, adz, sewing needle and thimble. Accompanied by video and animations, objects are shown in context. For example, in one video, a pick, adz and snowknife are shown being used to create basic shelter (Figure 9). Though designed for a virtual theatre, the experience has been shown to 4<sup>th</sup> and 5<sup>th</sup> graders in the I-Centre facility. It was also made available over the Internet as a download that plays inside Internet Explorer or Mozilla Firefox.

### **Discussion and Summary**

Currently, plans are being developed for a website that will build on the researchers’ past experience with virtual worlds. In addition to databases of artifacts, virtual worlds and videos, plans are being made to pre-loaded content devoted to life in the North. It is hoped that this initial content will serve as the basis of community based repository. By allowing members of the community to add comments, personal stories videos and photos to the site, it will be possible to encourage the sharing of local history.

One goal of this project is to provide opportunities through a virtual space to share content using a repository structure that gives open access to contributors and users. Perhaps most important of all, the project is designed to support and embody the idea of constructivist learning in which learners construct knowledge for themselves. The idea is that as they learn they are building meaning both individually and in groups.

It is also hoped that this project will benefit the community. For example, by giving artisans and craft persons access to a virtual space to display their work, they will reach a much larger community. Though at the early stages of development, one possibility being explored is to use existing social media site like Facebook, Myspace, and Google Earth as a mechanism for disseminating content and encouraging members of Northern communities to participate in this discussion. Facebook is commonly used by many members of the Northern communities. Having this link into Facebook, the researcher hope to build upon current capacity established over the last few years to link into existing collections of family stories, images and video that will ultimately contribute to preservation of local history and traditional knowledge.

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