EDUCATION AT THE ALDEN PLANETARIUM

An Interactive Qualifying Project Report

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Abstract

The purpose of this IQP is to analyze current techniques of public education employed at the Alden Planetarium of the Worcester EcoTarium. Commonly used programs from other planetariums were considered to improve the ease and quality of public education at the Alden Planetarium. Through this research, it was discovered that a large budget is helpful, but not necessary, to create a successful program.

Acknowledgements

We would like to take this opportunity to thank Professor Samson and Professor Jasperson for their guidance and patience throughout this process. Also, we would like to extend out gratitude towards the staff at the EcoTarium, especially Dr. Root and Dr. Frederick, for their time and assistance.

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Introduction

The Worcester EcoTarium is devoted to the education of the public about the surrounding environment. It states "*The mission of EcoTarium is to promote appreciation, increase knowledge and foster stewardship of our New England environment by stimulating learning about the world in which we live*[1]." It is designed to teach people to slow down and look around at the wonders of the natural world, and even some of the wonders of the man-made world. Many people simply accept natural phenomenon without knowing the underlying concepts. The value of the Worcester EcoTarium or any science center, as teachers of the public may sometimes be obscured, but it stands to reason that the value of scientific knowledge to the general population is dependant on the teachers who convey it.

The Worcester EcoTarium has an impressive selection of exhibits, from displays on aquatic life to African habitats to bald eagles. Included in the EcoTarium mission is the Alden Planetarium, which sits quietly in one corner of the three-story science museum. As the rest of the EcoTarium is committed to exploring and teaching about the more immediate environment, the Alden Planetarium attempts to bring a curious audience into the depths of space, where concepts of planetary motion, stellar activity, and even the Aurora Borealis can be taught with the assistance of technology.

The focus of this project is to assist the Alden Planetarium in its quest to educate. The discussion begins with a description of the methods and views currently being used

at the planetarium. It describes the goals, the technologies incorporated, and the methodology used to create valuable learning experiences for audiences of various ages.

In some cases, the methodology of the Alden Planetarium excels. The planetarium seems to successfully appeal to the younger audience with shows such as "Where in the Universe is Carmen Sandiego" and "The Secret of the Cardboard Rocket". While these programs are successful, other methods may be implemented to increase attendance. To gain experience and possibly come up with some creative ideas, our IQP members sifted through information obtained from other successful planetariums that could possibly be used to assist Dr. Ed Frederick, the director of the Alden Planetarium, in his mission. The planetarium has already implemented two ideas. The first is a low-budget way of creating the illusion of the Northern Lights. The other is a new design for the planetarium web page. By soliciting the advice of other planetariums and by observation, we have attempted to catalogue these ideas in the third part of this project.

There are many considerations to take into account when designing planetarium shows. The first and foremost is budget. Among other considerations are the roles of technology in education, the size of the audience, and the target audience itself. The final section of the IQP addresses some issues that may be present during the design and implementation of certain ideas.

The first is the idea of edutainment. Edutainment is a method of educating an audience on a particular topic, but is designed to hold the attention of an audience with entertaining techniques. Employed by many educational institutions, this strategy is not

[1] The Worcester EcoTarium Homepage. http://www.ecotarium.org/info/general/index.html

without controversy. A portion of this IQP has been devoted to understanding the concept of edutainment and its possible positive, as well as negative, implications. The argument over edutainment has many different faces. An intriguing aspect of edutainment is that it seems to be heavily debated in the world of art museums. Many art museums have been criticized on the grounds that their exhibits are designed to entertain and contain little, if any, educational value. Although the argument is prevalent in art museums, it was difficult to find any real equivalent controversy within the world of science museums. Another issue that has arisen is the effects of technology as an educational tool in science centers. Issues such as necessity and benefits as well as possible negative implications are addressed.

The Alden Planetarium

2.1 Description of the Alden Planetarium

The Alden Planetarium opened in 1971 and since then has been quenching the thirsty minds of those that yearn for knowledge of the universe. While initially it may seem out of place in a science center with a primary focus on the environment, the planetarium plays an important role in the EcoTarium's mission. Dr. Root, director of exhibits at the EcoTarium, feels as though the planetarium is not just a remnant of the former New England Science Center. According to her, the universe is as much a part of the environment as the land and the water, and what better way to educate people about it than through such a medium.

During March of 1999, tragedy struck when a fire destroyed the planetarium. It was reopened in November of the very same year, but with it came a very high cost. The new dome was $45,000, which included labor and materials. A large cost was involved with removing the smoke damaged acoustical material that was between the dome building and the dome skin because it was discovered to contain asbestos. Another large portion of the cost was also put into a complete rewiring of the electrical system and the installation of new carpeting and doors, which took several months.

While all of the work to rebuild the facility was done by outside companies, the staff of the EcoTarium took advantage of this opportunity to make improvements of their own. One such major improvement was to double the area of the console where the programs are controlled, because the addition of personal computers required a significantly larger amount of space than previous control methods. The computers are used to run the slide projectors for canned programs. These types of programs run off an open reel tape, which is a very old technology. According to Dr. Frederick, the director of the Alden Planetarium, "the next major improvement is to switch to a hard disk recorded professional digital production system."

The current budget for the Alden Planetarium does not allow for more modern educational technology. However, this facility is no stranger to technology. The programs may incorporate as many as 19 slide projectors, including six pans across the bottom front, seven montages across the top front, and 6 all-sky projectors, which cover the whole hemisphere seamlessly. The star machine is a Spitz, which was manufactured in Chadds Ford, PA, and uses a very bright $600 Xenon lamp mounted on gimbals so that it always aims up. The images produced by these various machines may be viewed on the planetarium's 40-foot dome from any one of the 103 available seats. It is also important to point out that the Alden Planetarium is extremely rare because it incorporates both a level and tilted dome where most planetariums only incorporate one type of dome. This allows for a greater viewing area than the standard domes.

All of this technology comes together as powerful mediums through which the planetarium conveys its information. While the star machine simulates the night sky for

the people of the city who rarely get to see it, the slide projectors provide images of celestial phenomenon that can only be seen with the highest-powered telescopes.

2.2 Current Goals

As it is with every educational system, certain goals must be established. These goals must be reasonable ones that can be accomplished within a specified time frame. When determining what goals should be sought after, the developer of the program must first determine the type of audience that he will be targeting. Will his audience be comprised of preschoolers, children in middle school, high school students, or adults? According to Dr. Root, director of the EcoTarium, young children have imaginations that are unspoiled; therefore simple tactics can be used to educate them. On the other hand, adults do not have the pure imagination of a child, and to express complicated ideas to them may take a more technological approach, which will later be discussed.

Once the target audience is determined, the developer must conclude what the majority of the audience members should walk away with in terms of newly found knowledge. This means the developer must decide the educational content as well as how much should be included. During this phase of creation it must be kept in mind that reasonable goals should be set in terms of what the average audience member can learn in around 45 minutes. For example, to expect an audience member to learn all there is

about each of the planets during a single show is preposterous. A more sensible idea would be to either choose a specific planet to focus on or a certain aspect that each of the planets might have in common.

Finally, after the audience has been targeted and the content has been selected, the next step is to choose a way to deliver the information. The Alden Planetarium is equipped with slide projectors, a video projector, a star machine, as well as computer-controlled outlets behind the screen that can be used for special effects. The developer of the program must think of a productive way to blend education with entertainment through the use of the tools he has to work with. Finding a healthy mix of the two concepts, however, is rather complicated. Without the right amount of entertainment, the focus of the audience might be lost. On the other hand, too much entertainment might take away from the educational aspect of the program, which has priority.

2.3 Current Programs

The Alden planetarium, like most planetariums, has a goal of teaching the public about the universe. This can be done in either of two ways, depending on the visitor's preference. One type of program to view would be a multimedia show. These shows incorporate music, live action, state-of-the-art computer animation, and 3-D effects. Another show used at the Alden Planetarium, called "Where in the Universe is Carmen

Sandiego," uses the popularity of the former PBS series, as well as the computer game by Broderbund. This show is geared towards a younger audience. The audience members act as detectives who are trying to find Carmen Sandiego who is hiding somewhere in the Solar System. To find her, the audience learns about each of the planets in the Solar System and determines where Carmen is by using facts about the planets to uncover clues. This type of presentation, known as a "canned program," is prerecorded and allows for very little audience interaction.

Some people learn best when they are able to communicate with their teacher. When the audience members are able to answer and ask questions, it allows for the educator to determine if the information intended to be conveyed is actually being understood. Thus, "canned programs" such as "Where in the Universe is Carmen Sandiego" are not always ideal. While that particular presentation does have some live interaction, it is much less than a show that is not prerecorded. This leads to the Alden Planetarium's other type of program, which is done live. Such shows offered include "Stories in the Stars" and "Are There ET's Out There?" Dr. Frederick, director of the Alden Planetarium, performs these presentations. According to him, his live shows are more beneficial to the audience since he can receive feedback, which will determine if he needs to spend more time on a particular topic during the presentation. Not all audiences have the same intelligence, and therefore having one specific program to be shown to all of them is unwise.

2.4 Current Techniques

A planetarium can be a very powerful tool with which to educate, but if there is no one there to educate, then it is useless. Therefore, methods of attracting the public are extremely important. During an interview with Dr. Frederick, the question of how he attains an audience was asked. He had two methods that he felt worked well. His first method involved the use of advertising. It is of utmost importance to let the public know that a service is being provided. The EcoTarium publicizes itself through advertisements in local newspapers.

The second of Dr. Frederick's methods relates in part to marketing. It involves giving the show a title that is catchy and will spark the curiosity of the average individual. "Where in the Universe is Carmen Sandiego" is a great example because, as mentioned earlier, its title builds off the popularity of the former television show and computer program. Placing "Where in the Universe is Carmen Sandiego" in a newspaper will receive more attention due to name recognition than one titled "The Various Rocks on Mars".

After listening to the two methods that Dr. Frederick already implements, another idea was suggested to him that would be a great way to reach a wider audience: a web page. The EcoTarium already had a web page; however, it was rather bland due to the lack of time that the staff had to deal with it. It was suggested to Dr. Frederick that just as the title of a program should be spruced up to get visitors interested, it would also be wise to enhance the current web page to grab the viewer's attention and spark appeal with what is on the page. A more formal analysis of the planetarium web page can be found in section 3.2.

The meeting with Dr. Frederick proved to be of great use in determining how a planetarium goes about attracting an audience. Creating fascinating presentation titles, advertising in local newspapers, and utilizing the Internet arouse interest. There is one more crucial facet of attracting an audience: understanding what the average person wants to learn about. While the methods of advertising are significant, there is no use in doing so if there is nothing attractive to publicize. The idea of a fancy title fits, but prior to the conception of a title must come the topic that the show will center around. In the following section, popular topics of interest for various planetariums will be discussed.

Techniques of Other Planetariums

3.1 Planetarium Programs

Deciding on a topic for a planetarium program can be quite difficult. First, a target audience and research the specific age group within that audience needs to be researched. Research on the Internet of various planetariums produced a rather large list of differing and catchy titles, but there were many of the same underlying themes. These common themes provide an idea of what is intriguing to the public. As an example, numerous planetariums provide presentations on navigation. The Albert Einstein Planetarium, at the National Air and Space Museum in Washington DC, provides a presentation on navigation entitled "And a Star to Steer Her By." This program aims to educate the average visitor "on the history of navigation from the standpoint of the tools we have used to find our way around."[2] Other planetariums chose to focus on the seasons, such as SciWorks in Winston-Salem, NC, with their program "Mystery of Missing Seasons."[3]

Other popular program ideas are those that are associated with certain times of the year, such as "Romancing the Stars," which is offered on Valentine's Day, or "Spooky

[2] http://www.nasm.edu/nasm/planetarium/Einstein.html
[3] http://www.sciworks.org/planetarium.htm

Nights,"[4] which is offered during the Halloween season. These programs blend together the mood of the seasonal event with interesting stories of the stars.

Lastly, extraterrestrial (ET) programs are used quite often. This type of show explores the possibility of other life in outer space, which is a topic that tends to interest many people. Numerous movies (Star Wars) and television programs (X-Files) have flooded our culture with intrigue on the subject matter. It is only natural that a planetarium would use the high interest level of this topic to draw a crowd and inform them of the realities of the situation. The Alden Planetarium currently offers a show dedicated to this topic entitled "Are There ET's Out There?" This program looks at the questions of whether or not there are ET's in this universe, and if so, could they be visiting us here on Earth?

Navigation, seasons, and extraterrestrials are all popular subject matters that most planetariums cover, but the manner in which they are covered varies. Planetariums with a higher budget may simulate a rocket ride through outer space complete with vibrating chairs, as does the Hayden Planetarium at the Rose Institute for Learning in New York. Other planetariums may simply display the stars and lecture about the topic of interest. The most important factor is that all the necessary information is present.

[4] http://www.mplanetarium.org/planet_home.html

3.2 Planetarium Web Pages

The unprecedented emergence and rapid expansion of the Internet has brought opportunity to every corner of the world. People are now able to communicate with ease over vast distances and entirely new marketing opportunities now exist for businesses. With the opportunities created by the Internet, a web page is certainly a good idea for any science center. Almost every major scientific institution boasts a web page. They range from extremely elaborate to very basic, yet they all share a common goal: to allow their institution to be known and advertised.

For a science center, a web page should be visually pleasing. Although there is a famous quote "Don't judge a book by its cover," this does not usually apply to web pages. A good-looking web page usually translates into a successful one. An immediate goal of the page should be to catch the viewer's eye and lure him to continue exploring the page. The web page for the Worcester EcoTarium (http://www.ecotarium.org) is a perfectly reasonable example of what a good web page should look like. The title page is shown in Fig. 3.2.1.

Fig. 3.2.1. EcoTarium Homepage

The page immediately displays a title graphic and then shows off a few pictures to catch the viewer's attention.[5] Nothing is crowded or confusing on the page, which gives the page an open and easy to read feel. Navigation through the site is also an important aspect of this page. Every page on the site contains a link bar that allows the reader to access any other part of the site. The reader should never reach a point where he can no longer get to a page that he has visited once before. The Rose Planetarium (http://www.amnh.org/rose/) is a questionable web page. It can be seen in Fig. 3.2.2.

[5] http://www.skyrme.com/guides/goodweb.htm

Fig 3.2.2. Rose Planetarium Homepage

It is obvious that there is a lot of effort and programming experience contained within the page, but the layout is somewhat cluttered. It is important that the eye is able to skim across the page with ease.[6] The page consists of a link bar at the top that allows the reader to navigate through the site for the American Museum of Natural History. The title of the site is immediately below and seems to cover a disproportionately large amount of space on the page. A smaller graphic and title may be more visually pleasing in this case. Most of the links are centered on the page and follow a common format with the exception of two links at the bottom. The two links at the bottom do not have a descriptive caption like the others, and are not aligned in the same manner, which makes the reader question their significance. Another problem with the title page may be more

of a matter of opinion. Many pages, such as the Worcester EcoTarium page, try not to convey too much information on the title page. The title page is analogous to the cover of a book and serves as an introduction to what is on the inside. The colors of the bottom frame do not appear to flow with the rest of the page. The small graphics that appear in a column on the right side of the page are actually animated gif's (Graphics Interchange Format). These pictures change their image very quickly. The aesthetic quality of this feature is highly a matter of opinion, but it does tend to distract the eye from the rest of the page, which is usually not a desirable result. The effect of stars trailing the mouse pointer (to the right of the page) is an interesting feature and should serve to create a somewhat eye-catching experience for the visitor. The stars can be seen in Fig. 3.2.2 in the blue background. If one continues to the rest of the page, he would probably find it very well developed. The graphics are visually pleasing and the navigation is straightforward and also visually pleasing. This is an example of a good web page with a questionable front page.

[6] http://www.colin.mackenzie.org/webdesign/layout.html

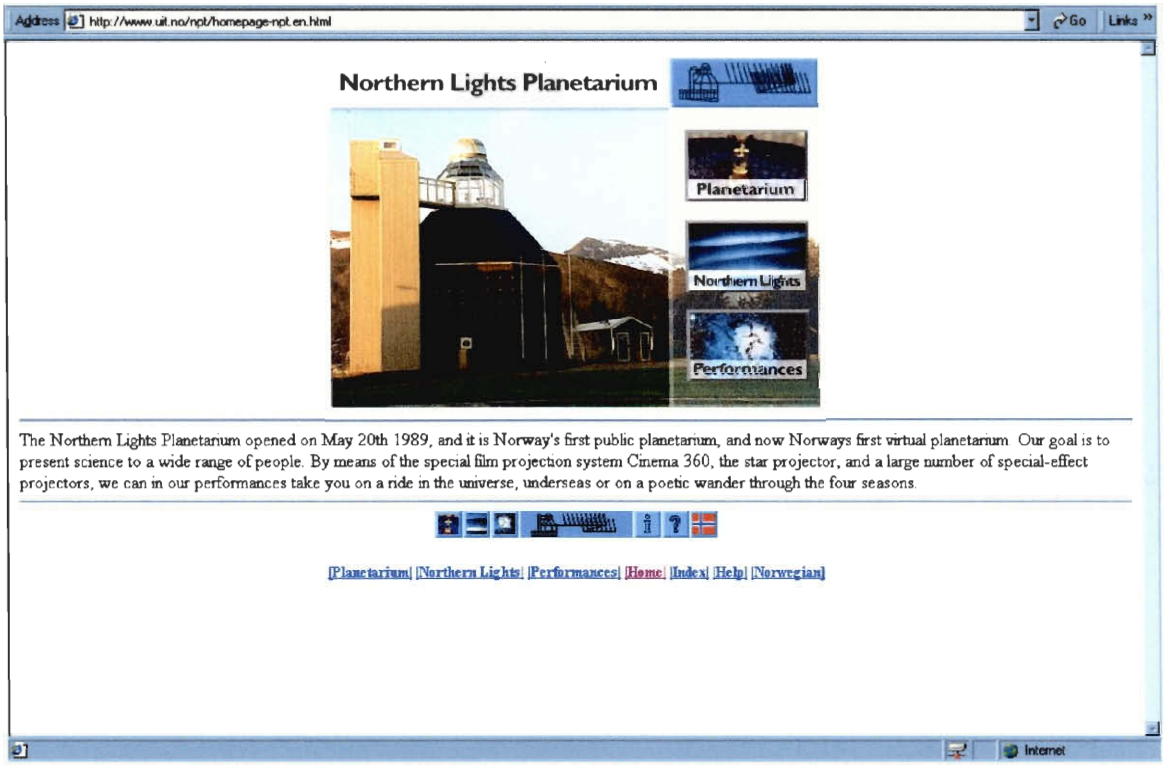

Fig 3.2.3. The Northern Lights Planetarium Homepage

The Northern Lights Planetarium (http://www.uit.no/npt/homepage-npt.en.html), seen in Fig 3.2.3 is an example of a decent cover page with the rest of the page being questionable. The front page is a simple title and picture of the planetarium. It is simple but visually pleasing. The rest of the page is very plain with a few graphics on a few pages.

The Adler Planetarium (http://www.adlerplanetarium.org/) is an overall interesting page. Unfortunately, the page has been redesigned. Although it is still an effective web page, it is impossible to illustrate how it used to be. It used to contain a title sequence (called a Flash Animation), which is very effective in catching the viewer's attention. The only two difficulties associated with this is load time with slow Internet

connections and the fact that some host computers will not have the software to run the animation. A possible remedy for the load time problem would be to just create a smaller animation or to display a link directly into the page. A link to enter the page would also help with the problem of browser inadequacy, but also a link to the flash homepage to download the plug in would be an option. As for the rest of the page, it is very well organized and very complex. This is a large project that was probably done professionally.

To design a page, the first question to be raised should be "What do I want to convey in this page." This is a critical question. The current EcoTarium page is a very good virtual representation of the EcoTarium. It gives an overall accurate feeling of the EcoTarium itself. Neat and clean and not too complicated. Its primary purpose is to inform the viewer as to the EcoTarium's functions, layout, events, and staff. One good point of the page is that it does not teach the reader about the topics listed on the page. The page is designed strictly to entice audiences to visit and learn about the topics at the EcoTarium itself.

Ideas for the Alden Planetarium

4.1 Creating a Memorable Experience

Science centers do not all have the same budget. As a result, not all science centers can incorporate the best technology due to financial restrictions. Programs performed at such centers do not have to be considered poor in quality. Technology can easily help a program enter a multimedia phase where the performance can be utterly amazing, but it is not necessarily needed.

In order to create a successful program, several factors need to be considered which the program should be based on. Interaction is an extremely important method that needs to be further analyzed. When a show is considered interactive, it includes a performer, or performers, who interact with the audience. The main goal of these performers is to create an entertaining/educational experience, meaning something that is retained by the audience after the show is over. In order for this to happen the performers in the program need to be skilled at acting in several categories and they have to show enthusiasm. Consider the audience the students, and the performers the teachers. The teachers have to get a point across that will interact with the class. The key is enthusiasm! The ideas perceived to make up enthusiasm include the following: voice animation, humor, body movement, suspense/surprise, possible role-playing, use of

props, and space utilization. The most important aspect of this topic is the performer needs to be considered a teacher.

When speaking in front of an audience, variety is needed.

> Paralanguage is a term for the conglomerate of vocal variations that accompany oral expression. Specifically, the elements of vocal pitch, speech rate, volume, and tonal quality are voice characteristics that are all capable of significant variation within any one individual.[7]

The aspects derived from the term enthusiasm are going to be discussed in great length. Often times it is the simple things that are overlooked, but this discussion will start from the beginning. The performer is now a teacher trying to get a point or points across to an audience whom are now the students. This type of situation closely resembles that of a classroom experience, where there have been proven methods written in texts that describe what makes a great teacher.

Performers who use a monotonous tone will create a boring experience that shows no enthusiasm whatsoever. However, when a performer constantly changes how he speaks, he will show a large amount of enthusiasm when putting on a show. This will keep the attention of the audience for the time needed to explain a topic of the show.

[7] Acting Lessons for Teachers, Robert T. Tauber and Cathy Sargent Mester. Pg. 42

Humor can be incorporated with how the performer speaks, but also with also how he moves his body in interaction with everything else that is going on at that time. Making an audience laugh is a great way to keep their attention, but at the same time create a memorable experience by letting the audience retain something within their memories after they leave the show. The bottom line of this topic is that an audience will learn more when they are having fun.

Body movement is a big concern in the 20th century, as it is looked at that an audience needs something visually stunning in order to pay attention.[8] Television has been a source of criticism over the past few generations, because people are having trouble paying attention unless it is visually stimulating. Creating eye contact, and facial expressions such as nods will all help in keeping the attention of the audience. Eye contact shows concern, or encouragement into understanding certain ideas. When an audience member's interest starts to waver, eye contact with the performer can maintain the audience member's attention. Eye contact and facial expressions are another way to create a sense of what the performer is feeling, or even possibly what the audience member should be feeling at that time. These feelings could range from suspense, fear, humor, questions, etc. Mentioned earlier, was how the performer can use vocal pitch to express something exciting. When this method is used with body movements, it can create a notion in the audience of what the performer really wants you to pay attention to and to remember. Large movements of the hands, and an exciting tone in the voice encourages a memorable experience, all of which is needed for a low budget show to be powerful and successful.

[8] Acting Lessons for Teachers, Robert T. Tauber and Cathy Sargent Mester. Pg. 118

As can be seen, the factors that make up enthusiasm are all starting to be linked together and can be played off each other. The four factors not explained yet are suspense/surprise, possible role-playing, use of props, and space utilization. Suspense and surprise should be easily understood to be a characteristic that makes up enthusiasm. When a show is being performed, suspense and surprise effects will keep an audience on the edge of their seats. When they are always expecting something more to happen, their attention is given to the performer of the show hoping to catch all of the next effect. People are intrigued when the mood is suspenseful, and the attention span of the audience is prolonged.

Two of the remaining three factors are very dependant of what type of show is being performed, and what type of audience is watching. When choosing to do a show that depends on role-playing, the objective would be to create a show that involves the audience, which creates a memorable experience to be enjoyed by all. This level of interaction is on a much more involved level than that of body motions, and voice animations. Body motions and voice animations are just the top layer of what a performer needs to know and do without thought in order to involve themselves with the audience. Role-playing however requires a deeper train of thought. Role-playing is the process of creating a story where the performer is playing some sort of character that is related to the show at hand. If the performer knows their audience well enough, and how to interact on an emotional level by using a story, this can then be one of the strongest ways to create a successful show. Once the audience is involved with a story, especially

one that they can relate too, then the experience for the audience is incredibly stimulating. Use of props and space utilization are smaller topics on the grand scheme of what is discussed, but together they help with the role-playing aspect. When using audience members as a prop for a role-playing situation, the level of entertainment can be enhanced. This might not be the most common situation for a Planetarium show, but it should be considered if there is a live demonstration that can pertain to these aspects described.

Everything mentioned should be given close consideration into an easy technique in creating any type of show or learning experience, for a planetarium or not. All planetarium performers that perform shows on a regular basis need to be skilled teachers, and cannot just pass off facts or perform a show without some knowledge of enthusiasm. This tends to be a large drawback into considering establishments that have a high budget and can create a visually stunning show without the hard work and skill required by a lower budget planetarium.

4.2 Cost Effective Technology

The Alden Planetarium excels with creative low cost program effects. One simple, but effective technique that is currently used at the planetarium pertains to producing the effect of a galaxy. Soap shavings on black velvet with an ultraviolet light positioned behind it works well to produce the effect. The light illuminates the soap,

which is shaped in the form of a spiral galaxy. Another method that is used at the Alden Planetarium is a series of colored light bulbs to produce different illuminations on the dome. The bulbs are lined up around the dome and alternate in color between red, blue, and green, which are controlled by a computer.

Another low cost technological effect is used to produce the illusion of the Aurora Borealis. For this effect, a simple backlit colored soda bottle mounted on a rotating platform can be used. This idea was given to the members of this IQP by the staff of the Rose Planetarium. Although this exact setup was not used at the Alden Planetarium, a similar design in which a child's doll provided a moving light source behind a fixed colored and textured canvas produced a similar result.

4.3 Redesigning the Alden Planetarium Web Page

The current page design for the Alden Planetarium is very simple. It did not display many graphics on its title page and there was no link bar or frame. The major problem with the design is its structure; the page is very large with very little aid in navigation. It is analogous to walking into a cave without a map or a rope that can be used as a guide to find the entrance again. In the page there are over 50 different html files, and the title page contains only a handful of links. The goal of the page seems to be different than the rest of the EcoTarium page as well. The Alden Planetarium page is

structured around teaching about the topics that the planetarium itself is designed to teach. The page should be more of an advertisement for the planetarium rather than a source of astronomical information. This however, is at the discretion of the planetarium coordinator and the project was to reorganize the page rather than rebuild it from scratch. Figure 4.3.1 illustrates the new design concept of the Alden page. The final stage of the title sequence is shown in Fig. 4.3.2.

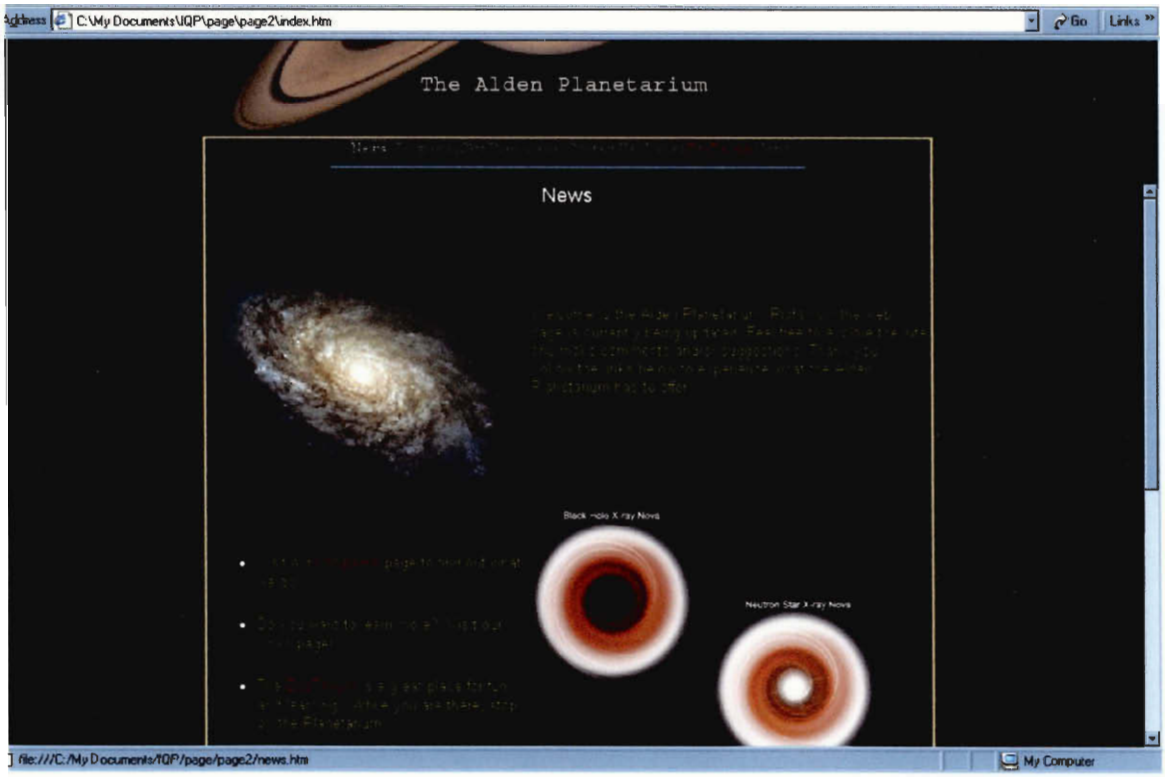

Fig 4.3.1. The New Alden Planetarium Page.

Fig 4.3.2. The New Alden Planetarium Title Page.

The beginning animation was an idea taken from the Adler Planetarium web page. The Adler Planetarium had the Earth and the Moon slowly coming near each other. The Alden Planetarium title animation will give the illusion of flying through space and stopping in front of Saturn. The viewer can then enter the site. The original idea of the site was to contain frames including a main index frame and a secondary index frame to allow ease of navigation. However, due to time constraints and the size of the page, this format was modified to contain one index frame for each subsection.

Issues Regarding Education

5.1 Education vs. Entertainment

The design and implementation of any new idea that is dubbed educational almost always creates some controversy. These ideas are based primarily on an educational tactic called edutainment. Edutainment has different meanings for different settings. Some believe that edutainment is the construction of a balance between education and entertainment. It is believed that this balance is delicate and, if not properly proportioned, could give rise to debate and criticism from outside parties. This debate is not unjustified; even the definition of edutainment is intrinsically controvertible. Edutainment is *a form of entertainment (as by games, films, or shows) that is designed to be educational.*[9] This definition claims that the object or idea that is designed as a form of edutainment is of an entertaining nature that had some educational message thrown into it. Another viewpoint that seems to be more dominant is the idea that a balance between education and entertainment is not what is important. Education and entertainment are not substitutes of each other; they are interwoven to produce an entertaining as well as educational experience. Controversy can still come into being over situations where the educational value is secondary to entertainment. This implies that the educator is attempting to produce something that is entertaining (for possible

[9] Merriam-Webster's Online Collegiate Dictionary

monetary reasons) and the educational quality is added as a secondary goal to give the attempt more of a good nature appeal.

5.2 The Art Museum Controversy

An interesting contemplation of edutainment can begin in the setting of the art museum. Harold Rosenberg is a well-known American art and literary critic. He has been known for his controversial writings and sharp criticism of art museums. Some of his harshest criticism has been directed towards the Metropolitan Museum of Art on the subject of the museums educational contribution to the general public. In his book, *Discovering the Present*, Rosenberg talks about the necessity of reverence to an art museum. He claims that an art museum must "[...] disseminate a sense of reverence in regard to the past [...]."[10] This is indeed the source of much of the edutainment controversy. Rosenberg also states:

> At the Metropolitan, reverence has been replaced by public relations. The current [c. 1970] policies of the Metropolitan are calculated to erase the distinction between a museum and an efficiently inventoried junkshop. [...] it approaches the past without reverence but with the hope

[10] Harold Rosenberg, *Discovering the Present* (Chicago: The University of Chicago Press, 1973) 135.

> that the objects which it accumulates will be esteemed in the future as deserving of reverence.[11]

Rosenberg claims that the Metropolitan has replaced that which is educational and is deserving of reverence with collections that contain no significant value in the hopes that they may become culturally or artistically important. It is a kind of ploy to upscale the significance and entertainment value of the museum. The reasons behind this may even be considered devious.

> Why do men and women collect? As well ask why they fall in love: the reasons are as irrational, the motives are as mixed, the original impulse as often discolored or betrayed.[12]

The possibility that the Metropolitan conformed to this type of gambling for an audience does not seem improbable. With this, it is certainly easy to see the significance behind the debate of education and entertainment.

This brings us to the differences between the science museum and the art museum. The conflict between education and education seems to be almost non-existent in the science museum, with the exception of the event of introducing a new technology into the science center. The reason for the rarity of this argument is fairly

[11] *Discovering the Present*, 136.
[12] Karl E. Meyer, *The Art Museum: Power, Money, Ethics* (Quote by Kenneth Clark) (New York: William Morrow and Company, Inc., 1979) 201.

straightforward. It is rooted in the subjective nature of art versus a more absolute nature of science.

> The nature of art has become uncertain. At least, it is ambiguous. No one can say with assurance what art is - or, more important, what is not a work of art.[13]

Specific instances of art cannot strictly be defined as educational or entertaining or a combination of either. Art has an edutainment value built into it on the day it was created. This value may be different for different people, but it is not subject to transformation. The levels of education and entertainment are permanently woven together to form the piece. The Alden Planetarium however, creates its "exhibit" by defining a set of educational goals and then working towards those goals with the use of entertaining techniques. The educational value and the entertainment value are dynamic and independent of each other in this case. There is no controversy because the educational content has been defined and confirmed by the scientific community; there is a global acceptance (in most cases) of the presented information. If the pre-selected educational topics are presented, no matter *how* they are presented, the goals will be realized.

[13] Harold Rosenberg, *The De-definition of Art*
(New York: Macmillan Publishing Co., Inc., 1972) 12.

5.3 Introducing New Technologies

As mentioned earlier, the controversy surrounding science centers is minimal, yet it does exist. The primary source for the argument is due to the introduction of new technologies. With the introduction of any technology, the potential of its use is usually vast. Education and entertainment are two common large-scale applications of new technology. The goals of a planetarium, or any science center, are to educate the public while creating a memorable, entertaining experience. Although there is more than one way to do this, technology is used extensively for this purpose. Most planetariums are built to house a star projector of some type. This is a technology that has been around since the early days of German engineering. The concept has not changed much, but the technology has improved tremendously. The Hayden Planetarium at the Rose Institute recently launched a massive and expensive endeavor to upgrade the technology that had previously been used in its shows. It now has the Zeiss Mark IX, which is considered one of the most advanced star projectors in the world.[14] There is no doubt that the Hayden Planetarium has successful, entertaining, and educational programs. Although most technology has the *potential* to be educational and the *potential* to be entertaining, it does not mean that those potentials are realized. During an interview with Dr. Root, the topic of the educational value of new technologies was discussed. Her response was that this controversy comes up every time a new technology is introduced. Television, and now the Internet are examples of technologies that had educational potential that were

[14] The Haden Planetarium Page at the American Museum of Natural History (http://www.amnh.org/rose/)

only partially realized. This argument is perfectly valid for general case scenarios. For small-scale situations such as introducing a projector into a planetarium, this argument is not well founded. The planetarium, ideally, should never lose sight of its primary objective, which is to educate. Any addition of technology to the planetarium should be decided based on how well this technology will be able to educate. If the planetarium has alternate motives, the argument can be applied.

Another example that creates debate can be seen with the Boston Museum of Science and their production of a laser light show in their planetarium. This performance is strictly for entertainment purposes only. However, the debate cannot be overemphasized due to the fact that the show has not been construed as educational. It should be clear to all audiences that it is pure entertainment and nothing more.

Conclusions

The Alden Planetarium is a great resource at the Worcester EcoTarium that has an opportunity to develop further at minimal cost. Several different techniques used by other planetariums were introduced that could assist the Alden planetarium in its mission to educate. The programs may also be used to attract larger audiences, which would generate more income for the planetarium.

The techniques introduced, include redesigning the web page, more entertaining ways to present educational material, and different programming formats which may include themes. Another strong technique is to design programs based on popular entertainment, such as television, movies, books, etc.

Technology is an important aspect when considering any type of programming. The introduction of a new technology sometimes gives rise to controversy with how it will be utilized. Most technologies are sold with the notion that they contain a strong educational standpoint, but rather end up being used for entertainment. However, the advantages brought about with technology tend to outweigh the negative implications.

In the absence of technology, there are many low budget techniques that can be used in order to create a successful program. Although technology is beneficial, it is not necessary for the success of a planetarium.

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