

Water in the Desert Service Learning Project

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### **Literature Reviews & Project Goals**

In the documentary, it explained how water creates and gives life. We use water every day, which is being taken for granted. We have a US crisis, but mainly in the Southwest due to the extreme temperatures or climate change. The tropical dryness is expanding north to the Colorado River that is at its lowest in years. Thirty million people depend on it in the Southwest. It is a distressed river with potential catastrophic problems. Users of the water include Southwest California, Phoenix, AZ, Las Vegas, NV, Palm Springs, CA, Tucson, AZ and Albuquerque, NM. This is not the first time that the Colorado River had this problem. It happened 800 years ago, when tens of thousands of Indians abandoned the area. Today the river is two degrees warmer. All this combined is causing health implications and poor water conditions, which is very contaminated (Thebaut, 2008).

1.2 billion people do not have water. By 2015, they estimate 3 billion people will not have water. The lack of water is affecting the quality of life. Manifest Destiny told pioneers to inhabit the land. We have a very complex water system and as a result, states are starting to fight for water and one commentator said that there is a great big fight that will be coming (Thebaut, 2008).

In 1922, they had the Colorado River Compact that divided through the states but the data was based on old water levels. Las Vegas gets 90% of its water from the Colorado River and is now looking for ways to conserve and reuse water. California gets water from the Colorado River Aqua duct, which was designed to serve 20 million people but is currently serving 37 million people. The prospective future demands are anticipating serving about 60 million people. Water and energy usage is related. If we save energy, we can save water. California is the number one user in the SOUTHWEST. We may have created an unsustainable environment.

The population strains the underground reservoirs. We do not know how much water there is left in the reservoirs. Mining water will never be replaced. Palm Springs is serving 400,000 people and the reservoirs have been depleted to the point that the ground level has dropped one foot. Phoenix has 4 million people. The area users that are closest to the origin of the Colorado River have the first rights, who rely on aquifers and individual wells. In New Mexico the Rio Grande Water is threatened, therefore, Albuquerque is planning to export water from the river. The Native Americans are living in third world conditions. They use about 10 gallons per day per person where the rest of the nation is using 160 gallons per person per day. The quality of water their using is unclean, causing health problems and yellow teeth. The Landmark Winters Doctrine promised to give water to reservations. The Indians are saying they do not want paper water they want wet water. A one billion dollar Navajo Project is in the process of starting (Thebaut, 2008).

Washington needs to create policies for the future for land, water, energy, and air. We need a leader not a dictator for this task. SOUTHWEST states have signed a National Water Policy for a new water supply, which affects the city, state, and reservations. These seven states need to become self-sufficient by taking advantage of watersheds, recycled water, and rain runoff. Another solution is “showers to flowers” for recycled water. Desalinization is very expensive, requires of lot of energy, and creates a problem of how to dispose salt brine. One solution recommended is to use solar energy, which is plentiful in the Southwest. This planet is sick. Things that there are experimentation on are low water plants, green construction materials, and much more. We have to prepare for a catastrophic event by making small changes in our daily habits and make people understand proper conservation methods. All is not lost if we make changes and we all invest we have a historical opportunity to make a difference (Thebaut, 2008).

### **Why Reduce Bottled Water Consumption Literature Review**

Reduced bottled water consumption is an enormous target behavior at CNM Campus. Most importantly because the bottle is composed of petroleum oil. Many bottles that a person believes are getting recycled are actually not recycled at all due to the composition of the bottle. When I watched a video for a different class in a previous semester, I learned that plastics never go away. Prior to this, I was under the impression that they were biodegradable. I also was not aware that plastics could be a contributing factor to respiratory problems, the health of an individual's brain, and a person's behavior. Nor did I realize that plastic manufacturing is such a profitable business that when a few people have attempted to stand up to change environmental conditions so that laws are made to make our environment a sustainable one. Some large productive businesses fight the environmental changes because they do not want to lose the substantial profit. When one bottle of water is created,  $\frac{1}{4}$  liter of oil plus 2 liters of water is utilized to make just the bottle, and then manufacturers have to fill it with another liter of water. The FDA exempts bottled water from the standard regulations in regards to the chemical composition of the bottle. Among the chemicals made from the composition of the bottle in combination with the water that it is filled with are the following potential bacteria and chemicals coliform bacteria, heterotrophic plate count (HPC) Bacteria, *Pseudomonas aeruginosa* bacteria, arsenic, nitrate, trihalomethanes and phthalate (DEHP) (CNM, 2013).

Coliform Bacteria is an extensive classification of germs utilized to indicate possible signs of fecal contagion that are often innocuous alone. The catastrophic varieties of this kind of bacteria can be formed by microorganisms composed of fecal substances or *E. coli* bacteria that may create poisons within a person's body that can cause them to vomit, have diarrhea, or cause severe diseases in kids, seniors, or other susceptible populations. *Pseudomonas aeruginosa*

bacteria has been known to have similar affects as in the Coliform Bacteria and is not regulated by the FDA (CNM, 2013).

HPC bacteria experiments have proven that there is an indication in regards to public health between the manufacturing process of the bottle as well as the water source. Arsenic is a known human carcinogen that can contribute to problems with the skin, nervous, reproductive or developmental systems in human bodies (CNM, 2013).

Nitrates, DEHP, and trihalomethanes, which is related to the chemicals in chloroform and has devastating health risk affects for everyone from the potential to cause “blue baby syndrome” (Postman, 2016), caused by intervention of the blood’s capacity to carry oxygen, other genetic deficiencies, miscarriages, endocrine organism disruptions, and many different forms of devastating types of cancers. DEHP is also not regulated by the FDA.

That’s not all, it is also using up our natural resources that could be utilized to regenerate and produce a more sustainable life for all of us. In the articles and documentaries, which I viewed it, indicated that it is affecting all of our life forms by the toxic effects. Because tap water has to be tested so often, it is actually much less toxic than many of the bottled water brands. Were you aware that 22% of the bottled water available for purchase and to merchandise for consumption, contains a minimum of one toxin in the compositional materials used to make the bottled water that every consumer drinks?

The Colorado River Delta is now the endless mudflat that was once the mouth of the Colorado River. It once covered an area the size of Rhode Island nearly 2 million acres from Arizona to the Sea of Cortez. The mouth of the water of the Colorado River is just about all dried up because it took just 80 years, one lifetime for upstream dams to stop the river that now supplies California with much of their water supply. If we were, just given

1% of the rivers flow, we would be able to reconnect the Mexicali or Las Vegas, NV and the deltas would have the ability to generate new plant life, spawn more fish for fisherman, trees for birds, and other wildlife animals (Cousteau & Smith, 2015).

If we all just took one-step towards making the most of our resources and were willing to work together in a consolidated effort we could make a huge difference. The world would be more beautiful, scenic and sustainable for everyone. All it takes is one change and one decision at a time moment by moment, to be inspired to take action and be willing to stand up to make the world a better place to live in.

### **Probable Barriers & Benefits of Reduced Bottled Water Consumption**

Some of the barriers include the resistance to change from corporations such as Nestlé's that have lobbyists working to stop National Parks from going bottled water free. They have invested well over 10,000 dollars to prevent this from happening. From a student's perspective, students tend to be overwhelmed and have busy lifestyles, they do not always take time or they forget their bottle of water at home. In addition, many people just are not aware of the devastating effects caused by the usage of bottled water exhausting resources such as water and petroleum oil (DeRusha, 2016c).

“The International Bottled Water Association (IBWA) is the bottled water industry's trade association and a mouthpiece for Nestlé in Congress.” (DeRusha, 2016, September) Multiple times it has pushed legislators to present linguistic into the “House Interior and Environment Appropriations bill” (DeRusha, 2016a) that would result in the illegalization for parks to apply aid in order to become free of water bottles. It has been disclosed that they are primarily promoting the usage of bottled water to safeguard the revenues their industry at the cost of our parks and the environmental consequences that is derived by the plastics. When a

person sees what it does to an ocean, the consequences can be even more severe because it effects our clean water supply. Trash is blown in from the ecosphere primarily plastics which drifts all over the place in a whirl. This gigantic assortment of debris is well known as the “Great Pacific Garbage Patch.” (DeRusha, 2016b) This is an enormous hazard injuring and even killing oceanic life and the healthiness of humans. Plastic is not biodegradable. Therefore, it never disintegrates it keeps stacking up in landfills, bottleneaking rivers and streams, and accumulating in places like the Pacific Ocean. It has been discovered that over “15 trillion pieces of plastic are floating in the world’s oceans.” (DeRusha, 2016b) The majority of the plastic began as garbage on land. In addition, ocean life like zooplankton is weighs less than the fragments of plastic with a proportion of 36:1.

The benefits are that places like the Colorado River could be rejoined with places like the Mexicali. We could regenerate our water supply by freeing up some of the water in the damns, deltas would generate plant life, fish would spawn, forests, and wildlife could inhabit and replenish some of our natural resources. The environment would become sustainable rather than creating chaos within our environment by draining the resources and causing overwhelming consequences.

The results of the CNM’s Water in the Desert Project Survey indicated that the majority of students spend most of their time on the Westside Campus. Eighty-two percent of those surveyed already bring their own reusable water bottle to the campus most of the time. Less than half of the students used the hydration stations. Only one person in the survey indicated that they occasionally purchase bottled water on campus. Thirty-six percent of the students are not utilizing the hydration stations on campus. The barriers in using the hydration stations ranged anywhere from keeping bottled water in their car, the location was not convenient for them,

never considered using one, the taste. One survey was even more descriptive in their comments and mentions that there is an odd taste when they have not changed the filter. However, overall the sample population was not large enough to do an accurate survey. Furthermore, I do not feel that it was a good representation of the student body because until I took an environmental science class I was clueless in regards to the information about bottled water as well as how plastic bottles are made. It is crucial to make data accessible and easily available if the goal is to have a sustainable and healthier environment.

### **Development of Outreach Tool Summary & URL**

In designing the evidence-based outreach tool, I learned that it is important to appeal to all facets of the group that will help to change their lifestyle benefits because of their passionate desire to make the environment sustainable in the future. It is a critical element to ask the right questions in the survey so that a person can explore some of the potential barriers, and incorporate benefits as well as strategies to help change habits. These steps can create a successful online tool. It is important to understand the populations motivation such as social norms, social diffusion, communication, prompts, visuals which appeal to their senses, ideas that make an impact, and whether the issue is important to them or they just aren't thinking about future resources. It's also important to encourage them with what can be accomplished by working as a team that cares about our environment because a group effort can accomplish much more than just one person at a time.

The items that I would like to change in the online tool would be to double check grammar and spelling as well as possibly try to achieve a better picture and sound quality if possible given the technical issues of our cell phones created by downloading information to the computer.

### **Analyzing the Collected Data**

The aspect of the outreach tool designed that is working well is the content used in the online tool.

The aspects of the outreach tool designed that are not working well and should be improved are the quality of the picture or text content and lighting used in the video. There was also a comment that was made that there should be more time allotted in order to read all the content in the video. In addition, it was also mentioned that it would be more visually appealing if the video was in mp4 format and not recorded with a camera.

### **Psychological Principles Used to Improve Online Outreach Tool**

There are several psychological principles that were used to develop and improve the outreach tool. Among them is working to ensure that the person designing the tool is speaking the communities language so that the outreach tool will appeal to their senses. Utilizing the auditory perspective an energetic musical piece was selected to adhere to that particular sense for an individual that is motivated through an auditory viewpoint. There is also an auditory digital perspective, which is where the charts come in that illustrates the way that a plastic bottle of water is composed. By making the outreach tool visually appealing a designer appeals to individuals that are motivated by having the ability to see the results when individual's work together to reach a common goal as well as demonstrating what has been keeping our resources from being sustainable. In addition, by incorporating the true and false questions, the individuals that are more interactive tend to get more involved and in some instances are inspired to take an active role in the environment or project.

The optimal distinctiveness theory that proposes individuals are continually juggling to balance common goals while maintaining their individuality was also incorporated in the

outreach tool. The prospect theory was utilized by providing a basis that will benefit people through awareness of the effects that to diminish the effects by working together to solve the problem.

Additionally, some of the six principles of influence were also used in the outreach tool. The psychological principles used within the outreach tool that incorporate the principles of influence consist of scarcity, social proof, consistency and commitment, likeability and authority.

Scarcity was demonstrated using the dams and the effect that it had on the Colorado River. Social proof was illustrated through the idea that by working together 1% of the dam could be released so that fish would be able to spawn. It was also encouraged through suggestions of bringing reusable water bottles and using the hydration stations. Consistency and commitment were emphasized by encouraging viewers to act now by making a decision to help the environment and conserve water resources. Likeability was illustrated throughout the process by appealing to the population of individuals, who attend or work at CNM. Authority was utilized by the quote that was used in the presentation from Cousteau's expedition documentary in regards to the Colorado River.

The outreach tool was improved by making the presentation longer to compensate for individual reading times. The audio quality was changed to an mp4 quality and picture quality was improved by creating a video directly from the PowerPoint presentation. The video was uploaded to YouTube instead of making the video through the camera. There were also some corrections made for consistency throughout the video as well as a making a spelling correction.

The link to the outreach tool is <https://youtu.be/hwIOT4nES20>.

### **Summary of Reflections**

Upon reflection and review of the survey and from analyzing the collected data, I learned that 30% of the participants that randomly agreed to participate in the survey were surprised that bottled water could be more toxic than tap water and learned about the effects plastic has on the landfills. An additional 10% of those participants were also stunned that the dams had such a negative impact on the Colorado River. Thirty percent of the participants also felt that the tool helped to reinforce their beliefs in regards to using tap or filtered water. Thirty percent of the participants indicated that there wasn't enough access to reusable bottles on campus and that they were too expensive for them to purchase at stores or on campus. Ten percent of those participants indicated that they did not like the taste of regular tap water. In fact, the survey revealed that 80% of the participants would keep bringing their own reusable bottles of water, start bringing reusable bottles of water, or use the water fountain. Twenty percent of the participants specified that convenience was more important to them than the toxicity of bottled water, 20% of those participants specified that they would continue using bottled water.

Upon reflection and review of the strategic development utilized within this project, I learned that if this campaign is to be successful it is a critical element to reinforce the desired target behavior by using prompts. It is vital to address potential barriers before they are mentioned by survey participants through online tools that includes, for example, research that is available. In fact, it is imperative to educate people on facts that involve living in a sustainable environment and the real cost of convenience. While there are some participants that are motivated to help, convenience ends up winning out in 20% of the cases due to their schedules and lifestyle. The majority of participants, which in this case is 80% of the students, faculty, and

staff that randomly participated in this study verified that the online tool either reinforced their beliefs or made them aware of the ultimate price of convenience. These participants strive to achieve success in living a healthy lifestyle and a sustainable environment. However, 30% of the participants did indicate that the cost and accessibility of the reusable water bottles when they forgot their own at home made a significant difference in their decision. This survey, however, only represents a small sample population of students, faculty, and staff within the current CNM population.

The confidence level in this evaluation of the online outreach tool is significantly greater than it was when I first introduced it to a small group of participants. After receiving feedback through the survey in regards to the information, visual, and audio quality illustrated on the online tool is at 90%. The reason that it is only at 90% is that I preferred the audio that was in the first video that I feel demonstrated the mood of the video better than the current video. However, the audio track was the best that I could find for the extended length of the video that was approved by YouTube. The timing is also dependent upon the capability and rate of speed in which the outreach tool is read. In addition, there always seems to be room for improvement in any literary or art project. Limits are placed only by the creativity of the individual that created the original project. As times change and more information is learned and captured through journals, literature, and the availability of approved audio tracks visual projects will be enhanced with time and knowledge.

### **Reporting**

I am giving my permission for the online outreach tool to be posted on the CNM website, which I have renamed as *Sustaining Water for Desert Communities*. The video is described as an

interactive video that provides information on bottled water vs. tap as well as information to inspire individuals to work together to create a sustainable environment.

## References

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