Bridging the Gap Between Knowledge and Behavior: Understanding What Factor Promotes Water Conservation

A Thesis
presented to
the Faculty of the Communication Department
at Southern Utah University

In partial fulfillment
Of the Requirement for the Degree
Master of Arts in Professional Communication

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May 2015

We certify that we have read this thesis and that, in our opinion, it is satisfactory in scope and quality as a thesis for the degree of Master of Communication.

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Abstract

A community's survival, both economical and physical, is dependent on its water supply. Planning sustainable living for this natural resource is key for a community's existence. Sustainable living is only achievable from an informed public (Staveloz, 2013). Attitude plays a large role in whether or not a behavior is performed, but other elements come into play such as perceived ability to perform that action (Sofoulis & Williams, 2008). Using the Theory of Planned Behavior (TPB), the intention to adopt a specific behavior is influenced by attitude towards that action, including social normative and perceived behavior control. The objective of this paper is to uncover the attitude of water Washington County residents in Southern Utah have and what independent variables affect their behaviors to conservation water. Studying these variables of attitude, social normative, collective and self-efficacy and their effect on behavioral intention will help to develop a strategic communication message to influence a change in behavior for an achievable result in water savings. When utilities understand the behaviors of its customers as it pertains to water conservation and the variables that affect those behaviors, the gap from knowledge to action will be bridged and the achievement of a sustainable water resource can be reached through a comprehensive water management plan (Morrison J, 2013). As this study has found, incorporating in strategic messages specific actions for self-efficacy will bring long term water savings (Richter, 2013). This study can help water utilities identify components of strategic messages to promote an achievable and sustained behavior change in water efficiency.

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Introduction

Water is life. It is essential for the ecological health of the earth and the physical well-being of humans. With something as critical to sustainment of life, water is the only resource with no alternative. There are alternatives to energy and scientists have even discovered a way to clone sheep, but water cannot be duplicated. Water covers 70 percent of the earth's surface yet only one percent of this natural resource available for human consumption (James, 2013). Of the fresh water, only one percent is accessible as a community's water resource (Devi et al., 2009). Water scarcity to some degree is experienced in most cities in the world (Richter, 2013). Even though water is a renewal natural resource it is challenging to manage because of the difficulty to forecast when it will come, where it will come, and how much will be received.

There are two aspects to water resource management, the supply side and the demand side. The first focuses on developing new water sources, planning for system reliability and building infrastructure to disperse the resource. The latter deals with managing water use by reducing peak water demand and reducing overall total water use. By promoting conservation, a water utility company can delay when a new water projects is needed or the need to increase system capacity to meet peak water demand (American Water Works Association, 2010). Financial and environmental benefits can be found by the utility company when delaying new projects. This cost savings may be substantial (Woltemade & Kuellhart, 2012). Some economic savings can be realized through developing a water conservation policy and implementing conservation programs. Reducing water demand may be a strategy in mitigating drought issues short term as utilities try to cultivate a conservation ethic to maintain the reduction in water use long term (Polebitski & Palmer, 2013). The water savings may be initiated by use of regulation and rate increases (Vickers, 2001). These strategies, however, are hard to sell to the customer

and the elected officials that have to ratify these changes. Utilities try to seek a better alternative, a voluntary reduction. This is a better approach in advocating voluntary behavior change and can achieve a long-term water savings when combined with other water demand approaches (Fielding, Spinks, Russell, McCrea, Stewart, & Gardner, 2013). Water utilities can use conservation as a virtual water resource which can manage system capacity in meeting peak water demand and delay new water projects.

The purpose of this study is to identify what factors affect Southern Utah Washington County residents' behavioral intention in conserving water. Using the Theory of Planned Behavior, five variables were identified to understand the gap between knowledge and behavior of water use. First, it is necessary to understand residents' views about water. This is the starting point in any behavioral change. Second, the research looked at the behavioral intentions of water use and how the independent variables affected this behavior. Third, the assessment looked at residents' perceptions on how they view their ability to conserve water. Fourth, the study measured residents' views on how well they believed the community could conserve water as a group effort. Fifth, the study gaged what residents felt was socially accepted in the community towards conserving water. This will provide an informative starting point to understand how to construct messages which will align behavioral intent to conserving water. Using the insights from this study, utilities may develop a strategic communication plan to bring together water-efficient technology with conservation measures and aligned with water-efficient behavior for an achievable, long-term result in water use reduction. This study will be valuable to utilities in staging their water conservation policies, programs, regulations and water rates. A better understanding of how these independent variables affect water conserving will bring greater results in water reduction through strategic messaging which focuses on self-efficacy in the

framework of TPB. Awareness does not always lead to action. As a result, this study uses TPB to understand the correlation between knowledge and the variables that significantly influence action. Identifying perceived behavioral control or self-efficacy as the most significant effect on behavior and understanding how efficacy is formed; components for a strategic communication plan can be identified to influence this variable to achieve the performance of water conserving behaviors.

Literature Review

Social Theories Used For Water Conservation

Since conserving water is an environmental behavior, the research looked at two social theories: Theory of Reasoned Action (TRA) and Theory of Planned behavior (TPB). In TRA, a person's attitude and what the person perceives as a social norm influenced whether or not a behavior is performed. TPB adds another component to TRA in predicting behavior. It is that a person's perceived ability to perform that behavior is a major contributor of whether or not that behavior is adopted. TPB provides a framework exploring self and collective efficacy as predictors of whether or not that behavior will be adopted. Theory of Planned Behavior was one in particular that was used frequently and found success in cultivating the necessary water conserving behavior in study participants.

Water conservation is identified as an environmental behavior because it is a community resource, shared by all (Hughes, 2012). The research for this project was designed using the social model theory of TPB. In TRA, Fishbein and Ajzen (1975) argued that intention to behave was influenced by attitude towards that belief. How the person perceives that behavior to be accepted or rejected as the social norm can influence whether or not a behavior is performed (Fishbein & Ajzen, 1975). TPB also includes that social predictors plays a large role in whether or not the behavior was performed; but in addition, the person's perceived ability to perform that behavior determined whether or not that behavior was adopted (Sofoulis & Williams, 2008). Applying this to the behavior of water conservation, even a knowledge and understanding about the need to use water efficiently does not generate that responsible behavior, it takes self-efficacy to get the behavior adopted (Middlestadt et al., 2001). Since water is a community resource,

collective efficacy was also looked at to understand how this played into adoption of water conserving behaviors.

As of Spring 2014, according to the U.S. Drought Monitor, over half of the states are experiencing some degree of a drought condition (The National Drought Mitigation Center, 2014). Therefore, reducing water use through regulations, pricing, water conservation policies and programs to reduce water demand will be crucial for all water utilities. Even adopting regulations to reduce water demand will require cooperation through behavior change. The addition of water conservation incentives and programs can put new water efficient technology in the hands of the water utility's customer, but without behavior change, these measures, regulations and technology will not be enough.

Environmental Attitudes

While water efficient technology has and will continue to advance, the problem water utilities are finding is changing the way consumers think about water and how they use it (Landers, 2012). Looking at consumers' attitudes and cultivating change in their behavior will help propel the water savings further (American Water Works Association, 2010). Middlestadt (2001) found the impact of behavior intention parallels human cognition. Therefore, he recommends improving behavioral change with specific actions to direct that behavior change.

This study specifically targeted Washington County, Utah. In the past, this county has been fortunate in having adequate water resources (Utah State Division of Water Resources, 1998). The county is located in an arid climate which receives on average only eight inches of rain a year in its heavier populated area (Western Regional Climate Center, 2013). Good management of its water resources in the past has allowed the county to grow and flourish with minimal water problems. Stresses on its water resources and challenges in planning for an

adequate water supply have emerged with population growth, prolonged periods of drought and climate change (Corum, 2013). A comprehensive approach to water management of increasing water supply and decreasing water demand is essential in meeting a community's water needs (James, 2013). Without a comprehensive approach to water management, a community's water supply will be vulnerable.

In the demand component of this comprehensive water management plan, policies and water conservation measures can help mitigate management issues. Therefore, water conservation or demand management has become an essential component in managing water resources of a community. Water conservation can aid in bringing sustainability to a community's water resources. This makes it essential to understand what factors contribute to the behavior of water efficiency (Dolnicar, Hurlimann, & Grun, 2012). Looking at consumers' attitudes and cultivating change in their behavior will help propel the water savings further (American Water Works Association, 2010). Resident's perception about water will affect their motivation in conserving it (Sofoulis & Williams, 2008). The value that is placed on this commodity will also influence the behavior of its use (Fielding, et. al, 2013). However, awareness and positive attitudes in water conservation does not necessarily lead to behavioral changes. Still looking at residents' attitudes allow for understanding of a foundation to motivating behavioral intention.

Behavioral Intent

Even though water efficiency technology has made great strides, the everyday use of water is difficult to change. Through technology reduction in water used to flush a toilet has gone from seven gallons of water to successfully flush a toilet now at 1.28 gallons per flush (EPA WaterSense, 2014). High-efficiency showerheads have reduced water consumption from

over 5 gallons per minute to 2 gallons per minute (EPA WaterSense, 2014). One of the most notable advancements in water efficiency is the Smart Water Applied Technology (SWAT) sprinkler system controllers. These controllers will apply water to landscapes only when the plant's needs require it (EPA WaterSense, 2014). By collecting data from weather or soil moisture sensors, these devices monitor when water needs to be applied to the landscape. Still, even though implementing water-efficient devices should find water savings, sometimes reduction in water use is not realized (Suero et al., 2012). Perhaps, installing water saving fixtures may be a justification of the consumer to use water excessively elsewhere (Campbell et al., 2004). In addition to the water conservation incentives, regulation or policies; behavior changes are essential. The everyday use of water becomes difficult to change because the behaviors are rote and sometimes resistant to change (Barr & Gilg, 2007). Understanding the factors that bring behaviors to conserve water will assist water providers in promoting that behavior (Dolnicar et al., 2012). Sara Hughes, Voluntary Environmental Programs in the Public Sector, made the point that even if regulation becomes necessary, if there is not "performance standards and rigorous monitoring" the regulation will not be credible and will not work (Hughes, 2012). This validates the need to motivate behavior change to resolve environmental issues and looking for alternatives to labor intensive enforcement of regulations (Lapinski et al., 2007). Water efficient behavior will be necessary regardless of the water conserving measures used.

As installation of new technology may not find water savings, nor will information alone bring behavior change. The consumer may have behavioral intention to implement change, yet variables enter into the decision process and can negate the behavior change intention (Barr & Gilg, 2007). Specific examples of what actions are needed of the consumer will increase a

successful behavior change (Middlestadt et al., 2001). Even with policy changes or implementation of incentives, some cooperation of the consumer is required. So the need for specific water efficient behavior is crucial in finding water savings.

Individual and Collective Efficacy

Self-efficacy is the personal belief of their ability to reach a certain goal or achievement. Bandura has contributed much to understanding the workings of self-efficacy. TPB identifies self-efficacy as perceived behavioral control. He taught self-efficacy can be formed from four sources:

1. Self-efficacy is realized if the actual performance, task, accomplishment is completed and practiced by self.
2. Self-efficacy can be reached by watching someone perform the task, such as vicariously participating in the task through observation.
3. Self-efficacy can be influenced by a well-respected person persuading performance of the task.
4. If minimal stress is felt by performing the task, then the task creates self-efficacy for the individual (Bandura, 2001).

Collective efficacy is the belief that the community or group the individual is associated with can work together to reach the community goal (Lam, 2006). Behaviors that affect the collective, or the community, are more difficult to change than those behaviors that affect the individual personally (Lapinski, et al., 2007). When benefit of new behaviors are seen more immediate and experienced personally, motivation to adopt and continue the new behavior is easier to preserve (Lam, 2006). Some consumers will conserve water because they feel a sense of duty to the preservation of the earth, but these individuals are in the minority. Most folks are less

likely to change to a more environmentally sustainable behavior. They must feel the community's goal can be reached with everyone's efforts and that everyone in the community is equally sacrificing in addition to their own shortages. When the benefit is not realized personally, but the gain of that behavior is achieved for the common good, the change in that behavior becomes less predictable and difficult to maintain (Hurd, 2010). So this brings understanding to why resolving individual issues, such as health, the individual benefit is observed readily and motivation to continue the behavior is acquired (Corral-Verdugo & Frias-Armenta, 2006). This awareness leaves finding and maintaining behavior changes which benefit society difficult to achieve. For instance, the State of California recently evaluated its voluntary environmental programs and found mixed results in the effectiveness of the programs (Hughes, 2012). As individuals, people are more apt to change if they can see the result of their changed behavior (Dolnicar et al., 2012). However, for a common goods commodity, like water, the result of using it efficiently is not so readily seen as beneficial. Therefore, to achieve a behavior change for the sustainability of a natural resource, the individual must feel confident in the community's ability of change. They must feel that their sacrifice is met along with the community's sacrifice and together the goal can be achieved (Corral-Verdugo & Frias-Armenta, 2006). Providing ways to build individual confidence in water conserving actions will bring self-efficacy. Showing the community working together to save water will bring collective efficacy.

Social Normative

When a specific environmental behavior is the target, consumers need to see this behavior as the social normative (Lapinski et al., 2007). As this relates to water conservation, this means consumers need to perceive those significant to them, such as their neighbors or other respected individuals in the community are conserving water. As a result, they will be influenced

by this social norm to change their behavior (Lapinski et al., 2007). There are several subcategories of social normative to consider when using social norm. A subjective norm is those behaviors that are influenced by peers (Fielding et al., 2013). It is understood that individuals will adopt water efficient behavior when it is perceived others in the community are participating and the behavior is valued (Corral-Verdugo & Frias-Armenta, 2006). Evaluating the social norm in a community will help in understanding what water conserving behavior is acceptable in the community.

The objective of this research is to identify southern Utah's Washington County residents' attitudes about water, understand how the independent variables affect their behavioral intention to conserve water. Studying these independent variables of attitude, social normative, collective and self-efficacy for behavior intention will help to discover what factors play a role in influencing behavior to develop a strategic communication message to influence a change in behavior for an achievable result in water savings. As utilities understand the behaviors of its customers as it pertains to water conservation and the factors that affect those behaviors, the gap from knowledge to action will be bridged and the achievement of a sustainable water resource will be reached (Morrison J, 2013). This study can be valuable not only to Washington County but to other utilities in identifying the factor that plays a role in influencing behavior and use this discovery to develop a framework needed to develop an effective message for an achievable and sustained behavior change in water efficiency.

Research Questions

The goal of this study is to identify which factors best predict behavioral intention in water conservation and investigate how these factors play out in developing a strategic communication plan. This discovery about residents can construct a bridge with messages and

intervention strategies to influence behavior and find an achievable, long-term result in water savings. This will be valuable to water managers of utilities in promoting water conservation policies, selecting programs and incentives as well as establishing regulations to find long-term water savings.

Research was pulled from various studies, specifically looking for studies on environmental behavior change involving natural resources and using TPB. Most studies took a look at people's attitudes; yet those studies found focusing on changes in attitude was not enough to motivate a change in their behavior. In TPB, attitude and what was perceive as a social norm influenced whether or not that behavior is performed. Self and collective efficacy is also a factor in behavior change. Studies concluded knowledge alone did not drive action. Assessment of people's attitude is necessary to evaluate where their motivation resides and the context in which they see water. Studies also recognized influencing individuals to act towards solving an environmental issue was entirely different than when influencing their behavior toward a personal problem. Therefore, this study looked at what is the attitude residents have about water, the importance they see it plays in their lives. Other variables measured included social norm, personal and collective efficacy and how these variables influenced behavioral intention. When understanding what factor plays a role in influencing behavior, this can then be used to develop messages for implementing water conservation policies, measures, water rates and regulations. This information can be integrated into a strategic communication plan for an achievable and sustained behavior change in water efficiency.

H_1: An optimistic attitude about water conservation will positively affect behavioral intention to conserve water.

In building awareness about water efficiency, a message will need to be developed that will build interest, educate and motivate change. It adds to TRA's that attitude and social norm motivates behavior premise and brings in perceived ability to perform that action predicts whether or not that behavior is achieved. Research found success in cultivating the necessary water conserving behavior in study participants through using social norm. Research included how to package the message into concise information that can be grasped and used readily. Subjective norm is when an individual's behavior is influenced by peer pressure whether these behaviors are adopted or not (Fielding et al., 2013). Individuals will adopt water efficient behavior when it is perceived other residents in the community are participating in these actions and are seen as favorable among the group (Corral-Verdugo & Frias-Armenta, 2006). So, it is anticipated messages will need to incorporate this. In this research it is predicted:

H_2: A belief that social normative uses water efficiently will positively affect behavior to conserve water.

Self-efficacy has also been found to influence whether or not conservation becomes an adopted behavior. Studies revealed that unless the individual had specific details on how to change behavior, the behavior was not adopted. This study will identify how self-efficacy affects behavioral intentions to bring a long-term reduction in water use. Behaviors that affect the collective, or the community, are more difficult to change than those behaviors that affect the individual personally (Lapinski et al., 2007). They must feel the community's goal can be reached with everyone's efforts and that everyone in the community is equally sacrificing in addition to their own deprivation. It will also be important that residents believe that with their efforts, the community as a whole, can be successful in reaching the goal. Yet with this awareness, it leaves finding and maintaining behavior changes that benefit society difficult to

achieve. Therefore, to achieve a behavior change for the sustainability of a natural resource, the individual must feel confident in the community's ability of behavior change. They must feel that their sacrifice is met along with the community's deficiency and together the goal can be achieved (Corral-Verdugo & Frias-Armenta, 2006). Therefore it is anticipated:

H_3: Self-efficacy about water conservation behaviors will positively affect behavioral intent to conserve water.

H_4: Collective efficacy about water conservation will positively affect behavioral intent to conserve water.

It is understood that people will adopt water efficient behavior when it is perceived others in the community are participating in the same collective goal (Corral-Verdugo & Frias-Armenta, 2006). As a result, they will be influenced by this social norm to change their behavior (Lapinski et al., 2007). It will be advantageous to determine what role each factor plays in the behavioral intention of conserving water. This will be critical when developing a strategic communication plan. This study seeks to answer the following research questions:

RQ1: Which factor best predicts behavioral intention?

Answering this research question will lead us to the second research question by identifying the predictors that influence behavioral intention to answer the following:

RQ2: What role does each factor play in making strategic communication?

Method

The study involved both a quantitative and qualitative research design. Study One seeks to identify how each variable affects behavioral intention. Study Two seeks to identify what role each factor plays in developing a strategic communication. The independent variables measured

will involve attitudes about water conservation, collective and self-efficacy and social normative and how they affect the behavior intentions of water conservation.

Study One - Quantitative Research

Procedure. The quantitative research component of this study involved a survey of residents in Washington County, Utah. The focus was made to homeowners who have the ability to control their water use. A count of the number of homes in Washington County, Utah provided guidance on the number of responses needed to obtain a suitable confidence interval. The county assessor's office provided the number of 39,107 households in the county. Using this number, a sample size of 380 households is needed to bring a confidence interval of five at a 95 percent confidence level. Over 5,000 email invitations were sent out. The following agencies forwarded the survey information through their email database: Washington County Water Conservancy District, City of St. George Water and Energy Department, Utah State University Extension, Southern Utah Home Builders, various Facebook posts of local residents and an article with an online local newspaper extended the invitation. This invitation directed participants to a web address where the survey was managed. The web survey provided a consent form before access to the survey was given. The participant clicking next provided their acceptance of their willingness to contribute to the survey. The survey was administered through www.qualtrics.com. The survey was open from March 16 to April 16, 2015

Respondents. A sample size of 445 Washington County residents responded to this survey. The average respondents' age was 57 (*SD* = 14.3) with the mode being 72. The lowest age was 29 and the highest age of 91. Just over 6 percent of the responses declined to answer this question (*n* = 418). Approximately 51 percent of the respondents were female and 2 percent declined to provide this information (*n* = 435). Participants' annual income levels reported at 30

percent between $25,001 and $50,000 with another 30 percent between $50,001 and $75,000. The greatest percentage of 35 percent of the respondents reported an income over $75,001 and 5 percent earned less than $25,000. There was 8 percent declining to indicate their annual income (*n* = 410). Most responses were from homeowners with 89 percent indicating they owned their home. There were 11 percent participants indicating they rented with 18 percent of the responses declining to answer (*n* = 364).

Measures. There are five measures researched for this study. Here listed are the four independent and dependent variables.

Attitudes on water. Questions assessed participants' attitude towards the natural resource of water. The survey established their answer general questions regarding air quality, water and energy and their stewardship of these resources. The survey focused on assessing the local residents understanding of water, the value they put on it, and the way they used it coupled with their attitude on conserving it. This was assessed with the question, "In general, I think conserving water is…". This was measured by using a matrix table using a bipolar variation where participants' attitude was measured using two extremes (i.e., bad - good, negative - positive, useless - useful, unimportant - important). Overall attitudes on water was 4.85 (*SD* = .47). There is a significant relationship between attitude and behavioral intention. Reliability of this measure was high (Cronbach's alpha = .87).

Behavioral intention. The survey measured participants' willingness to engage in different types of water efficient behaviors and how this was influenced by the other variables. Measurement was taken with four questions, "I would be willing to use plants that need less water", "I would be willing to turn off the tap when soaping up", "I would be willing to use a shower rather than a bath", "I would be willing to wait until there is a full load for washing

clothes". The questions revolved around participants' willingness to engage in or adopt water conserving behaviors. This was measured using a 5-point Likert scale (i.e., strongly disagree-1, disagree, neutral, agree, strongly agree-5). The overall scale mean of the behavioral intentions dependent variable was 4.1 (*SD* = .70).

Collective efficacy. Participants were surveyed what their perception of the community's water conserving behavior. If they saw water conservation as being prevalant among the community (Lapinski et al., 2007). The poll included if they felt the community as a whole used water efficiently or if there was a lot of waste. Also questions included if they perceived their community was capable of water efficient behaviors. The measurement included four questions, "Laws are useless in making people conserve water", "Many people in my city or county would take action to save water", and "with resident's cooperation and governmental actions, our county will be able to conserve water". These questions were measured using a 5-point Likert scale (i.e., strongly disagree-1, disagree, neutral, agree, strongly agree-5). One question varied from this scale. When asked, "How likely do you think your neighbors try to conserve water" the 5-point Likert scale options (i.e., not at all-1, rarely, sometimes, often and very much-5). The overall scale mean of the collective efficacy variable was 3.3 (*SD* = .47). There is not a significant relationship between collective efficacy and behavioral intention (Cronbach's alpha = .87).

Self-efficacy. In addition to collective efficacy, a self-efficacy was measured to see if participants felt capable of completing water efficient tasks (Kim et al., 2012). Then assessed on how they perceived their ability to perform those tasks played a role in their willingness to engage in water efficient behavior. This variable was measured using a 5-point Likert scale (i.e., strongly disagree-1, disagree, neutral, agree, strongly agree-5). This variable also had four

questions, “I will take steps to participate in reducing my water use to help the community’s water supply even if it causes me daily inconveniences”, I can participate in water efficient behaviors if I really wanted to”, “I think about water conservation often”, and “I am knowledgeable about water conservation”. The overall scale mean of the self-efficacy independent variable was 4.0 (*SD* = .61). There is a significant relationship between self-efficacy and behavioral intention. Reliability of this measure was high (Cronbach’s alpha = .87).

Social Normative. The survey measured how the participant perceived the social norm was toward water conserving behavior. Then participants were gaged whether they felt these behaviors were difficult to perform or expected to perform from family members, friends and/or from the community. This variable was measured using ghta 5-point Likert scale (i.e., strongly disagree-1, disagree, neutral, agree, strongly agree-5). There were four questions to measure this variable. They were, “Clearly most people are taking action to conserve water”, “Most residents approve of people who try to conserve water”, “Most people who are important to me think I should conserve water”, and “Information provided through my community makes it clear what water conserving behaviors people approve of”. The overall scale mean of the social normative variable was 3.1 (*SD* = .62). There is a significant relationship between social normative and behavioral intention. Reliability of this measure was high (Cronbach’s alpha = .87).

Study Two Qualitative Research

The qualitative section of this study conducted a focus group. This group assessed the role the variables play in behavioral intentions and considered the components needed to develop a strategic communication campaign to engage water conserving behavior. A focus group was held in the county. Recruiting for the focus groups was done through a self-selection process. Washington County Utah State University Extension office sent out two emails a week apart to

recruit participants for the focus group. This process only brought four participants. Selection of three other participants was made by direct invitation of residents in Washington County. The findings discovered from the focus group are the following. This process resulted in seven people participating. The focus group met for approximately one and a half hours. The participants signed a consent form to participate and the group started with a discussion on questions about the measured variables in quantitative study. The group ended with constructing their water conservation message. The group was asked approximately ten questions to generate discussion and discovery. The focus group helped to identify a strategy of what would be appealing, motivating and an engaging for a campaign advocating water efficient use. The focus group measured what information appealed to the public to educate on water conservation. In addition, a question would collect information on a call to action message that would make a real difference in saving water. And finally, the focus group would be directed to give information on what approach they prefer to receive information.

This focus group helped to understand how much self-efficacy will play into adopting behaviors of using water efficiently. The focus group will also assess how participants felt about the collective efficacy. So, the study looked at if individuals feel the community's ability to save water collectively influences their decision to choose water conserving behavior. The results of the focus groups served as a beginning of what role these independent variable play in behavioral intent to conserve water and aid in creating a successful strategic message campaign. This research provided information of what variables influence behavior adoption and identifies ways to influence them to promote water conservation and a communication strategy to find long-term of water savings.

Results

The following findings are the results of the two studies.

Study One

The first four hypotheses seek to find correlations between each independent variable (i.e., attitude, social norm, self-efficacy, and collective efficacy) and dependent variable (i.e., behavioral intention). To test these, a series of Pearson Correlation was performed (see Table 1).

Table 1

Descriptive statistics: Means, standard deviations, reliabilities, and correlations

	Mean	SD	1	2	3	4
1. Behavioral Intention	4.15	.71	-			
2. Attitude	4.85	.47	.31**	-		
3. Social normative	3.09	.62	.10*	.22**	-	
4. Self-efficacy	4.04	.61	.50*	.41**	.20**	-
5. Collective efficacy	3.33	.48	.06	.13**	.53**	.11*

** are significant at the $p < .001$ level (two-tailed).
* are significant at the $p < .01$ level (two-tailed).

The first hypothesis stated an optimistic attitude about water conservation would positively affect behavioral intention to conserve water. The Pearson Correlation measured a positive relationship between an optimistic attitude about water conservation and behavioral intent to conserve water, r (451) = .31, $p < .001$ (see Table 1). Therefore, the first hypothesis was supported. The analysis revealed that 31 percent of the total variability in the model for behavioral intention is predicted by a positive attitude towards water conservation.

The second hypothesis supposed behavioral intent would be predicted positively by a belief that social normative uses water efficiently. There is a significant positive relationship between the beliefs of social normative uses water efficiently and behavioral intention to conserving water, r (438) = .103, $p < .05$ (See Table 3 and 4). These results indicate the second hypothesis was supported, but minimal. The analysis revealed that only 10 percent of the total

variability in the model for behavioral intention is predicted by the perceived social normative of water conservation.

Hypothesis three declared self-efficacy about water conservation will positively affect behavioral intent to conserve water. There is a significant positive relationship between behavioral intent to conserve water and self-efficacy about water conservation, r (438) = .50, p < .001 (see Table 1). The results of this third hypothesis were supported. This analysis revealed that 50 percent of the total variability in the model for behavioral intention is predicted by self-efficacy of water conservation.

The fourth hypothesis maintained collective efficacy about water conservation will positively affect behavioral intent to conserve water. There is no unique variance to predict a relationship between the two variables of collective efficacy and behavioral intention. There was not a significant relationship between behavioral intention and collective efficacy about water conservation, r (445) = .48, p = .165 (see Table 1). Therefore, the fourth hypothesis was not supported. The analysis revealed that only 6 percent of the total variability in the model for behavioral intention is predictable by collective efficacy of water conservation.

The firsts research question (RQ1) sought to determine which factor(s) of the independent variables best predicts behavioral intention. Running an analysis using SPSS multiple regression was used to see the effect of all independent variables on the dependent variable. The following results were discovered.

Table 2

Stepwise regression analysis for behavioral intention

Model	R	Adjusted R Square	Beta	t	*P*
Self-efficacy	.501	.249	.446	9.91	.000
Attitude	.266	.262	.134	2.97	.003

Using a multiple regression statistical analysis, the following results were found for the single variable self-efficacy: $R^2 = .25$. Taken alone, the predictor of self-efficacy towards water conservation, this variable accounts for 50 percent of the variance in behavioral intention (see Table 2).

The model summary then identified self-efficacy and attitude with the results of: $R^2 = .27$; the predictors of these two variables account for 52 percent of the variance in predicting the behavioral intention of water conserving behavior. The overall regression model was significant, F (4, 433) = 39.22, $p < .001$, $R^2 = .27$ (see Table 2).

In the multiple regression analysis, independent variables Self-efficacy and attitude were looked at the independent variable separately. Finding a strong beta of .501 for self-efficacy, the coefficient table found there was a unique variance significant in the predictor of behavioral intention ($p < .001$) (see Table 2).

When pairing self-efficacy and positive attitude, the model revealed the beta for self-efficacy to be .446 and attitude .134 ($p = .003$).

The findings of Study 1 show H1 and H2 were supported. H4 was not supported. H3 was rejected. The results of the statistical analysis show the significance strong in the variables of Self-efficacy ($p < .001$) and attitude ($p < .05$). Not significant in the unique amount of variance to behavioral intention to water conservation were the predictors Collective efficacy at ($p = .831$). Social Norm at ($p = .786$) (see Table 15).

Study Two

The qualitative portion of the research discovered some perspectives that have not been considered before. The focus group was brought together and presented several questions to assess the same variables measured in the quantitative study to see if the findings held true.

Setting the mood, the participants were asked to picture life with a severe water shortage. Then the group drew a picture of what they saw. A discussion followed reviewing the illustrations of each participant. The topic began with a participant talking about Indians leaving the area when droughts occurred or died. Then the group covered how our homes should be all water efficient including removing grass strips and incorporating desert landscape. A participant spoke about how they have gone through water shortages and it has given them an understanding of how precious water is to them. The conversation ended with an illustration of a car explaining if water was not available here, they were going to leave to find water.

Why Conserve

Next the group talked about why they conserve. Participants brought out the importance of working together. Someone thought raising the price of water would be essential to promote conservation. In addition, it was brought out that there is a conflict of interest when some planned developments have a minimum requirement of lawn. The observation was brought out that this does not promote conservation. The conclusion was that ordinances need to change. A member pointed out this water is the cheapest we will have and any new water will cost more to develop and rates will go “sky high”. The group thought good stewardship of water is developed from education in the home. In addition, education of appropriate irrigation and water use should be taught in the community.

Top concern for water resources

The group was asked to rank why they are concerned about the community’s water resources. The majority ranked “future generations” as number one. Another participant selected “health” as their top concern for the town’s water resources. This brought a lengthy discussion as one participant didn’t see the connection between water and health.

Who conserves

The group felt that the majority of the community failed at conserving water. The highest percentage expressed was 30 percent of the community conserved water. They felt the community was lacking in information on the “how-to” use water efficiently. The group did feel most of the residents understood water was essential to the community and without it the community would die. One participant felt the community would come together and work through water scarcity. Most of the group felt water was too cheap. Until rates are raised, people will not conserve. The majority of the group was against regulation to enforce water conservation and eliminate water waste. One participant expressed regulation has such a negative effect. It is better to incentivize people to use water efficiently than to hammer them with regulation and fines. Most of the participants had heard information on water conservation in the media, especially with the drought in California. One participant complained there was not any information provided. A participant thought it necessary to get the point across that water conservation is about me, not about what my neighbor is doing, but what “I” can do to save water.

Importance of Water

Continuing on, the group was asked how important water is to this community. Everyone saw its importance. The conversation moved to talking about a drought. One participant had reservations about the community pulling together to use water efficiently when in needed. Someone expressed the need for rates to increase in order for the community to understand the importance of water to this community. When talking about drought and water scarcity, one participant didn’t feel any threat, but the rest of the group understood its vulnerability.

Call to action

The discussion ended with seeing if they had heard anything about water conservation in the community lately. Most expressed they have seen information about water conservation and drought in the news media (e.g. radio, newspaper, etc.). So, the group was asked a to participate in a final activity. The assignment was to draw or write a call to action. If they had the assignment to create an ad that would motivate and change people to use water efficiently what would it be (see Appendix A).

Discussion

The research wanted to find out which factor of the independent variables best predicts behavior intention. After reviewing the results, discussion about each variable will give the results some understanding. Here each variable is analyzed and evaluated.

Positive Attitude About Water Conservation

In the quantitative study, the finding confirmed an optimistic attitude toward water conservation positively affects behavioral intention to use water efficiently. In the multiple regression analysis, using the option “Stepwise”, independent variables self-efficacy and attitude were looked at against the dependent variable, behavioral intention, separately. Finding a strong beta of .501 for self-efficacy in the first stepwise, the coefficient table found there was a unique variance significant in the predictor of behavioral intention. When pairing self-efficacy and positive attitude, the findings in the model found the beta for self-efficacy strong at .446 with some influence from a positive attitude of water conservation.

When talking about drought and water scarcity in the qualitative research, one participant didn’t feel any threat. She expressed water has always be there and it will always be there, even in a drought — somehow water will be available. It appears people who have never had to

experience water scarcity have no concept of the possibility of being without water. The price of water came up in the discussion with one participant exclaiming water was too cheap. Referring to water rates, she said, “Until rates are raised, people will not conserve.” Indicating rates will influence the value people have on water. In conclusion, both studies found attitude also played a significant role in predicting behavioral intentions in using water efficiently.

Social Normative

A social normative toward conserving water found some correlation with behavioral intent to conserve water. This variable had a correlation of 10 percent of the variance which fell behind the correlation attitude had at .30 and self-efficacy at .50. However, it did show some significance in predicting behavioral intention of using water efficiently.

In the focus group, the findings were discovered to be the same. Seeing social normative as a predictor in behavioral intention to save water, but not very significant. All participants vocalized their ability to use water efficiently and agreed they were conservation minded. However, they found the community lacking in the ability of how to conserve. One participant claimed to “know all the tricks” and complained that friends leave the “water running the whole time.”

Self-efficacy

In the analysis, the predictor of self-efficacy towards water conservation, this variable accounts for 50 percent of the variance in behavioral intention. The analysis then looked at two variables self-efficacy and attitude as predictors of behavioral intention. These two variables accounted for 52 percent of the variance in predicting the behavioral intention of water conserving behavior.

In the multiple regression analysis, using the option “Stepwise”, independent variables self-efficacy and attitude were looked at against the dependent variable separately. Finding a strong beta of .501 for self-efficacy in the first stepwise, the coefficient table found there was a unique variance significant in the predictor of behavioral intention. When pairing self-efficacy and positive attitude, the findings in the model found the beta for self-efficacy strong at .446 with some influence from positive attitude of water conservation.

From the qualitative findings, it was interesting to note that all participants expressed good ideas of how they conserve water. All vocalized their ability to use water efficiently and agreed they were conservation minded. One participant claimed to “know all the tricks” and complained that friends leave the “water running the whole time.”

Collective Efficacy

The survey showed collective efficacy provided no significant influence to behavioral intention. When the research looked at self-efficacy about water conservation, there was a significant relationship between these two variables. What was surprising is the lack of correlation between collective efficacy and behavioral intent. There is no unique variance to predict a relationship between the two variables of collective efficacy and behavioral intention.

In the focus group, overall participants felt the community could work together in a crisis to solve water shortage issues. From the conversation this was because there was a lack of information on how to conserve. The group was against regulation in enforcing water conservation behavior. It was suggested utilities need to be positive in encouraging people to use water efficiently. Therefore, it appeared the focus group was not influenced by the ability or lack of ability for the community to conserve water. The group was conserving water; they knew and understood how. Therefore the findings in both studies were consistent with this variable.

The findings of Study 1 show H1 and H3 were significantly supported. H2 provided some support. H4 was rejected. When comparing all the variables against the dependent variable the results of the statistical analysis show the significance strong in the variables of Self-efficacy ($p < .001$) and attitude ($p = .003$). Two independent predictors, collective efficacy and social norm, showed no significance in the unique amount of variance to behavioral intention indicating collective efficacy at ($p = .831$) and social norm at ($p = .786$) (see Table 15).

Information and message

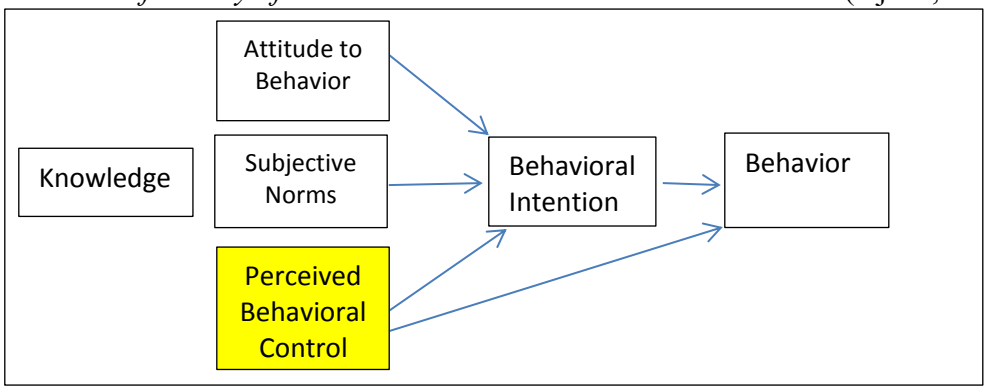
This portion of the discussion is geared to only the focus group. The survey did not poll in how they received information on water conservation. Most of the focus group participants had heard information on water conservation in the media, especially with the drought in California being prevalent in the media. One member of the group was noted as not hearing or seeing anything on water conservation in past month. The focus group brought out a possibility that perhaps water managers haven't considered. A participant in the focus group expressed the perception that water will always be "there", it has always be there and even in a drought, somehow "they" will get water to us. Perhaps there is a disconnect present with the vulnerability of a water supply. With most areas of the nation experiencing drought, still many communities have not experienced the devastation of a community without water. So water managers should consider this lack of reference point in water being vulnerable. The recommendation from a participant was to focus the message on the individual being the solution to water conservation. This comment suggested taking the focus from what the neighbor is doing or not doing in water conservation, but places the focus on what each individual can do to save water. The final activity with the focus group was to have each draw or write a call to action in conserving water (see Appendix A).

Key Components of a Strategic Communication Plan Identified

The results of study one identified self-efficacy with a strong correlation in influencing behavioral intention of water efficient use. Therefore, understanding what influences self-efficacy can assist in constructing messages to find encourage water conserving behavior. Albert Bandura contributed extensively to understanding the forming of self-efficacy. As identified in the model of Theory of Planned Behavior, perceived behavior control or self-efficacy influences whether or not the behavior is adopted (see diagram 1).

Diagram 1

Ajzen's outline of Theory of Planned Behavior Theoretical Framework (Ajzen, 1991).



As outlined in this diagram, and indicated in the first study, perceived behavior control or self-efficacy plays a role in behavioral intention and behavior adoption. Using this information, a framework for messaging can be developed to change behavior and find an outcome of water savings through residents conserving water. While forming self-efficacy has been used widely in the health industry, the framework can be applied to environmental behavior as well; especially when self-efficacy plays such a significant role in the behavioral intent. Water conservation messages paired with "theory-based behavioral interventions will only strengthen the possibility of long-term adoption of the beneficial behavior" (Hatchett, Hallam, & Ford, 2012). As this research has indicated self-efficacy as a significant predictor, forming the self-efficacy of

residents' water conserving behavior will be important in a strategic communication plan. It is suggested each message should be constructed on features of the situation such as the perceived difficulty of the behavior or the perceived certainty of its benefit (Strecher, DeVellis, Becker, & Rosenstock, 1986). When providing information in messages, Bandura identifies self-efficacy develops from four sources: performance accomplishments; vicarious observation; verbal persuasion and physiological state. Performance accomplishments provide the most influences since it is derived from a personal experience (Strecher, et al., 1986). Research indicated performance accomplishments are the most influential since it strengthens ability in self-efficacy. When applying this to the behavior of water conservation, even a knowledge and understanding about the need to use water efficiently does not generate that responsible behavior, it takes experience, observation, persuasion or non-stressors to get the behavior adopted (Bandura, 2001).

Conclusion

The results of study one identified self-efficacy with a strong correlation to the behavioral intention of water conserving behavior. Therefore, understanding what influences self-efficiacy can assist in constructing messages to find encourage water conserving behavior.

Albert Bandura contributed extensively to understanding the forming of self-efficacy. Using the framework of TPB and the information of forming self-efficacy by Bandura, a framework for messaging can be developed to change behavior and find an outcome of water savings through residents conserving water. Water conservation messages paired with "theory-based behavioral interventions will only strengthen the possibility of long-term adoption of the beneficial behavior" (Hatchett, et al., 2012). This study has indicated self-efficacy paired with attitude are both strong and important determinants in predicting behavioral intention. It will be important when promoting water conserving behaviors to communicate the behavior specifics of the situation such as the perceived difficulty of the behavior or the perceived certainty of its benefit. When providing information in messages, Bandura identifies that self-efficacy develops from four sources: performance accomplishments; vicarious observation; verbal persuasion and physiological state. Performance accomplishments provide the most influence since it is derived from a personal experience (Strecher, et al., 1986). The findings of this research indicated self-efficacy the most influential in behavioral intentions of efficient use of water. When applying this to the behavior of water conservation, even a knowledge and understanding about the need to use water efficiently does not generate that responsible behavior, it takes experience, observation, persuasion or non-stressors to get the behavior adopted (Bandura, 2001). It will be important to incorporate this formation of self- efficacy in a strategic communication plan. This framework will promote water conservation and find long-term water savings.

This research has benefited from the framework of TPB by understanding how to influence behavioral intent using perceived behavioral control or self-efficacy. The research looked at how the local resident's water conserving behavioral intent is affected by their attitude, self and collective efficacy and social norm. Of these four independent variables studied, self-efficacy showed the most significant predictor in behavioral intention with attitude showing a slight effect. This study has brought in Bandura's formation of self-efficacy to understand crucial components in a strategic communication plan. Using the findings of this study can provide a starting point for developing components in a strategic communication plan. Findings from this research can help construct a framework utilizing the factors identified in this study that will influence behavior. This framework can assist in developing messages for an achievable and sustained behavior change in water efficiency.

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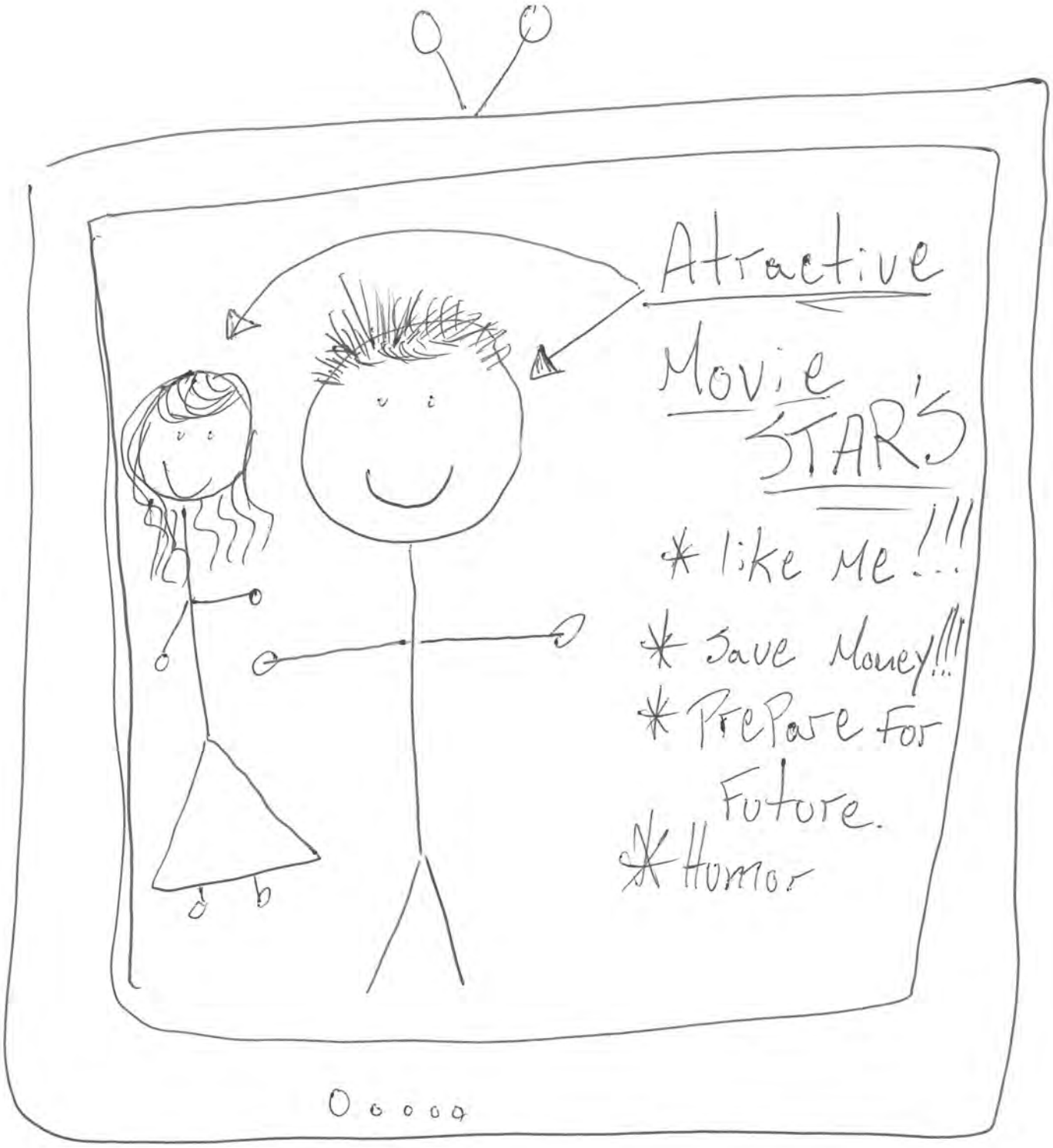
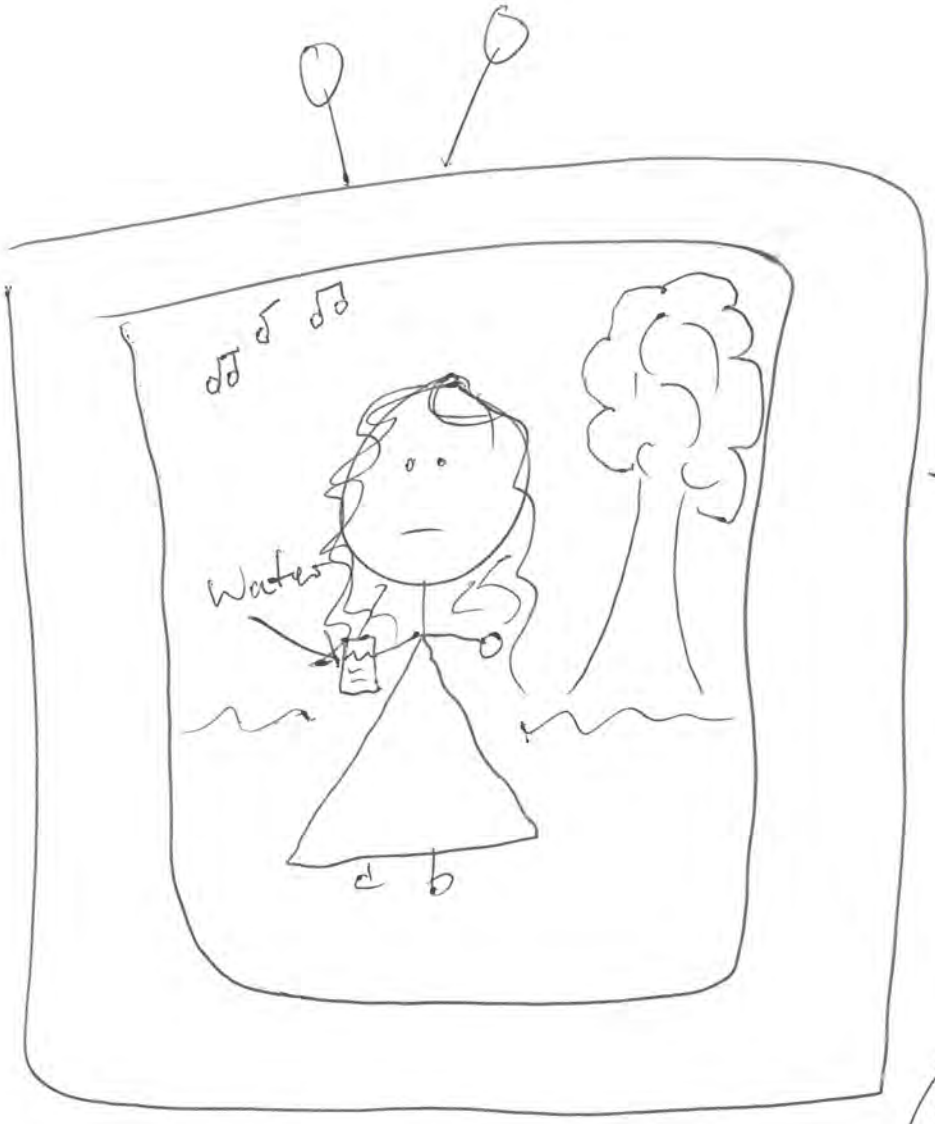
Appendix A

Focus Group: A Call To Action


Atractive
Movie
STAR'S
* like me!!!
* Save Money!!!
* Prepare for Future.
* Humor

or

2A



"In the Arms of an Angle"
-Sarah McLaughlin

ZB

22

DRINK Beer!!

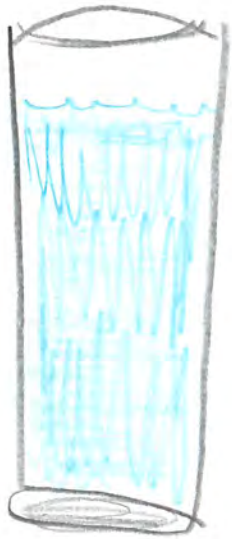
We are out of Water!!

EVERY DROP COUNTS

HOW MANY DO YOU USE?

- DAY -
- WEEK -
- MONTH -

(92)



Now your glass is full

SOON your glass is empty

Conserve Now for tomorrow!

(go to www.save water now.org to see how you can help :) This is facetious)

Home Depot ad

Lets do something

changing Lawn from not conserving

to a water conscious lawn

Zoom back eagle eye

lawn picture showing future generati

Its our responsibility to provide for the

future generations.

Add bells? → 30 30 30 !

Using water wisely is my responsibility. It's simple & it works -- to ~~the community~~

~~to water wise landscape and~~

water~~ing~~ by the numbers, i.e.

March - Water 1 day/week

April - May - Water twice a week

Jun, Jul & Aug - Water three times a week

Sep, Oct - Water twice a week

Nov. water once a week

We must all do our part.

22

Monthly water Bill

April 1 to April 30

12 K gallon used

Indoor
Household size 4 x 55gpd x 30 days

6,600 indoor water

tier 1 rate

Outdoor Water

8,000 sq feet landscape area

Et 3.2 inches water

Tier 2 rate

over used water

Tier 3 rate

(22)

Budget met	83.00
Overage	62.00
Total	145.00

Learn how to reduce your overage / unsustainable water usage by contacting _____ with city conservation or _____ with county water conservation you could save $62.00

Your overage / unsustainable water usage will go toward conservation measures, & developing additional water resources