

Innovations in Development: Comedy-Drama for Climate Engagement

A. PROJECT RATIONAL

This three-year collaborative media and research Innovations in Development project creates both an national entertainment-education program addressing sustainability issues and studies the impact of that programming to determine whether entertainment-education is a strategy that can be transitioned into a STEM education tool for reaching broad audiences. The project proposes to create a pilot series of six 30-minute long comedy-drama television episodes (sitcoms) of young adult friends living in Los Angeles who experience climate change mitigation challenges through humorous everyday life experiences. Production of the series will be accompanied by rigorous formative and summative evaluation to ensure optimal use of the project for knowledge generation in media-based informal science education and science communication. This projects includes **collaboration** between several academic research partners, the entertainment media industry and a variety of non-profit partnerships.

This entertainment-education project is **knowledge building** for citizen/viewers by reframing perspectives of present impacts from climate change and teaching citizens constructive actions for mitigating climate change. It is **knowledge building** for the field of science communication by providing an example of an entertainment-education approach that transfers a successful model applied in the public health arena into a more general science communication tool. The **strategic impact** of this approach is that if entertainment-education can be repurposed from a health communication tool into an informal STEM education tool, it holds the potential to create a new genre of science engagement based television programming that blends light entertainment with in-depth discussion of science-intense topics. This project will also have immediate benefits by leveraging current climate change mitigation efforts, networking them together and teaching citizens tools for climate change mitigation. Developing a fan base for a show will be synonymous with making citizens active participants in national climate change mitigation efforts. The show will also serve as a role model for everyday dialog and conversation around climate change, and hence offers to change the culture around how we engage with each other about potentially controversial topics, broadening our ability to discuss these issues amongst society members with differing perspectives.

The ultimate goals for the project are to facilitate climate mitigation by:

1. *Increasing the dialog around climate change and facilitating societal discussion.* Americans are uncomfortable talking about climate change (Leiserowitz 2015). Hence, un-stigmatizing climate change as a topic will be advantageous in advancing other climate change mitigation outcomes as well as dialog about STEM-related issues in general.
2. *Increasing public participation in mitigation behaviors with non-profit partners.* Building on a broad coalition of educational partners, the project will provide tie-ins that facilitate public support of communal efforts to address challenges individuals might encounter when engaging in climate change mitigation behaviors.
3. *Providing a fictional interactive model of a city transitioning to sustainable practices* as a mechanism to drive behavior change, with STEM learning as a positive driver, which will also support citizens as they make changes.

Our technological knowledge is advancing more rapidly than the speed with which relevant information is being assimilated culturally (Miller 2010, Takahashi 2015), despite the fact that societal transformations based on this knowledge accumulation has been dramatic over the last fifty years (Miller 2004, NAS 1993, Krishna 2014). The accelerating pace of scientific development means that most Americans outside the scientific community will learn the majority of their science after they leave formal schooling (Miller 2010). However, despite efforts to improve scientific literacy and knowledge of environmental issues, literacy in these areas remain consistently low in the United States (Bord 2000, Miller 2004, Nisbet 2002, 2007, NSB 2016). While formal science education provides a solid base for the public understanding of science, it is insufficient for addressing rapid shifts in information acquisition due to emerging technologies and accelerated change of scientific knowledge (PEW 2015a). Jon Miller (2004) remarked that “the accelerating pace of scientific development will place increasing demands on informal science

educators - science writers, journalists, television and movie producers, and webmasters - and their institutions to keep Americans up to date about the new scientific research and technological developments after the end of formal schooling.” Since actionable knowledge is an important (albeit not sufficient) factor in explaining behavioral intentions, such as taking voluntary actions and supporting policies related to climate change (Bord 2000), developing new mechanisms for the public to encounter opportunities for engaging with such knowledge is critically important, especially with regards to climate change (Krishna 2014). Entertainment media that focus on evidence-based discourse around scientific topics might provide such a mechanism. The cultural integration of science in many interrelated media forms can build cultural and scientific capital in society. Citizens accumulate cultural capital through participation in science activities as well as activities involving art, music and literature (Kato-Nitta 2011). In other words: blending cultural experiences with ways to engage in scientific dialog might provide a powerful means to reach and touch audiences and “normalize” a topic or idea within the broader cultural context of our lives.

We will explore this idea through this **innovative** and unique project that supports the cultural integration of science, and creates mechanisms for maintaining an educated adult population. Sayre (2013) stated that “this is the time to be trying new, interdisciplinary methods addressing broad ecological shifts with a variety of stakeholders, to attempt real ecological stewardship.” Our project does exactly that. There is societal value to be gained from the cultural integration of science, and the inclusion of science in cultural products such as music, art and television; this television show is an example of one such cultural product.

Climate Change and Media

This media project will focus on climate change, and climate change mitigation efforts because, “the time window within which we can act to prevent the most severe impacts of climate change is closing; scientists across diverse disciplines have identified impacts that are already occurring and that will occur in the absence of action. In light of the urgency, studies on effective climate communication should be topping our field's research agenda” (Roser-Renouf 2015). The amount of future climate change will still largely be determined by choices society makes about emissions (Melillo 2014). Stronger mitigation efforts are needed to reduce the rate of climate change, and adaptation policies are needed to cope with the unavoidable climate impacts (Jackson 2015). Climate change mitigation behaviors that can easily be implemented in everyday life without major disruption or inconvenience are one possibility to keeping greenhouse gas emissions from rising further. They are the so-called “low hanging fruit”. One way to ensure that these behaviors are considered acceptable or as actions that fall within new societal norms for responsible behavior is to model them in the media, thus not only providing resources for citizens to succeed at mitigation efforts, but also setting new norms in that way (Clayton 2013).

California Challenges and Goals

Our story will be set in Los Angeles, California because it represents a model for a major urban center, with all of the challenges of managing energy, water, food, and waste in a sustainable way. As a setting LA is surprisingly representative for how people live today or in the relatively near future. By 2050, globally over six billion people are projected to live in large urban conurbations that resemble LA in some form (UN 2014). The city of Los Angeles has adopted a proactive sustainability plan, and is working towards improving its sustainability profile (Garcetti 2016). Part of the plan is to engage its citizenry and provide sufficient STEM knowledge and skills to support widespread sustainable practices. LA is not alone in this effort. California ranks second in the nation in total carbon dioxide emissions (US EIA 2013), yet has some of the most aggressive policies to reduce greenhouse gas emissions in the US (CEC AB118) (CEC SB1368) (CEPA 2016) (CEC AB844). As with LA, the state needs individual's support through mitigation (and adaptation) behaviors in everyday life, and to back politically relevant regulatory and technological efforts.

In our six pilot episodes, we will model reduction of greenhouse gas emissions via the use of “active transportation” (e.g., walking, biking, car-pooling and using public transportation). Active transportation reduces fossil fuel use, promotes community building, supports individual health, and is cost effective (Dora 2015, NRPA 2016). The city of LA is already actively promoting active transportation through its Mobility Plan 2035 and programs like CicLAvia. The shows will use humor and role models to (a)

introduce and discuss the STEM knowledge needed to understand why it is desirable to reduce CO₂ emissions and why active transportation can help with that, as well as (b) model a transition to active transit by providing virtual behavioral skills training, setting new norms, and facilitating city residence acquisition of active transit behaviors.

American Climate Change Beliefs

Although a majority of Americans already think that global warming is happening, making it unnecessary to convince them further, very few discuss it with friends and family (Leiserowitz 2015). While there is substantial general awareness about climate change among most segments of the US population and in other industrialized countries, important misunderstandings persist; climate change often is perceived by Americans as a distant, future threat with limited personal relevance (Brechin 2003, Lorezoni 2006, Maibach 2015, Reynolds 2010). In fact, only one in three Americans think that people in the United States will be harmed by climate change, and most Americans think that climate change is, if anything, a relatively distant threat (Leiserowitz 2015). While two-thirds of Americans are at least “a little interested” in hearing about global warming, the majority is also pessimistic about our ability to reduce global warming (Leiserowitz 2015). Yet, a majority of Americans think that if the world takes action to address global warming, it will help both the natural environment and future generations, and they think that the United States should make an effort to reduce global warming, even if this comes with economic costs (Leiserowitz 2015). Climate change is an emotionally charged subject, and peoples’ beliefs and experiences strongly shape perceptions of climate change (Leiserowitz 2015, Moser 2010). The best way to interact with public audiences about these issues not only communicate scientific ideas, but also address issues of ethics and public trust, is done through an engagement model, not a deficit model (Stilgoe 2009). Science communication as news or deficit is still the majority of communication (Priest 2009), and climate change efforts are no exception (An Inconvenient Truth, Climate of Doubt, Years of Living Dangerously).

In short, despite the polarized political discourse on climate change, most Americans now seem to accept the basic tenets and are even willing to support some form of action to address it; however, they struggle to grasp the dimension and timeliness of the threat and have difficulties seeing a personal role in addressing it. For many Americans, the question has shifted from “does it happen” to “what can or should I/we do to address it”? The proposed television show is an experiment in how we can answer the second question through entertainment-education.

Entertainment-education

Entertainment-education is a fully integrated national communication campaign that uses a television program as a piece of a larger communication strategy to build audience engagement around important topics of public concern. Entertainment-education narratives are part of intentional communication strategies, designed with both formative and summative research to deliver accurate information from reliable sources and model desired change through parasocial interaction, character identification, self-efficacy, and the mediation of interpersonal communication (Singhal 1999, 2004, 2013, Singhal & Wang 2013). Developed by Miguel Sabido, entertainment-education involves production methods for serial dramas grounded in theories of narrative persuasion and behavior change used for promoting pro-social messages (Singhal 2004). Between 1975 and 1982, Sabido produced seven telenovelas around public health messages that were commercial hits and that also led to higher enrollment in adult literacy classes, adoption of family planning methods, and gender equality. (Nairman 1993, Singhal 1999, 2013, Singhal & Wang 2013), and in the process created the so-called Sabido methodology for entertainment-education. This methodology begins with formative research to help build a framework describing positive, negative and transitional characters that accurately represent target populations. Scripts and transmedia stories are planned that demonstrate character perspectives through time as they relate to the subject matter. In this context, transmedia storytelling uses narrative elements creatively coordinated across different communication platforms to build a story world and enrich audience’s entertainment experience (Jenkins 2007). Communication platforms are all the various potential avenues through which an audience might experience the stories, from the televised shows themselves to physical and digital games around the stories and characters of the stories, additional online content provided on designated and linked websites, activities by community partners that are staged in connection to the TV shows, music and music events

connected to the show, toys and other show-related merchandise, discussion forums on popular social media sites, etc. Transmedia storytelling holds unique advantages for reaching and engaging audience from otherwise fragmented media markets to participate in the converging popular culture (Jenkins 2006, 2007). Each communication platform carries the story independently but the interwoven tapestry is designed to make for a richer whole, deepening the audience members' relationship with the characters, the plotlines, and the issues (Davidson 2010).

Fictional narratives are created that aim at engaging cognitively, emotionally, and socially, helping to effect attitudinal and behavioral change among individuals and communities (Bandura 2004, Green 2002, 2012, Kincaid 2002). Fictional narratives use implicit persuasion approaches that reduce counter-arguing and psychological resistance (Eveland 2013, Moyer-Gusé 2008). Sabido's original work has proliferated, over the past thirty years, to thousands of global entertainment-education projects, becoming an influential health promotion strategy (Green 2012, Kincaid 2002, Moyer-Gusé 2008, Singhal & Wang 2013).

Sustainability themed entertainment-education projects have already been implemented successfully with a broad range of international audiences (Heong 2008, Reineremann 2014, Singhal 2000). While entertainment-education as a field is robust internationally, it is rarely developed for American audiences in part due to the high cost of production in the US media saturated market (Sherry 2002). Entertainment-education is particularly effective at producing cultural shifts. It is therefore well suited as a mechanism to shape and support personal dialog and engagement with the topic of climate change in the US, helping to move conversations around climate change science, climate change mitigation, and climate change adaptation from a stigmatized and socially avoided topic to one that groups of people can embrace as legitimate aspect of their group identity. Narrative fiction is ideal for engaging with audiences over long periods of time because it maintains audience engagement and reduces messaging fatigue. Entertainment-education as a strategy is likely to be effective at shifting the direction of climate science communication in the United States from a debate over whether or not there is climate change, to a discussion about how best to address solutions for climate change mitigation.

Transmedia

Part of this television serial will be to model positive, long term climate change mitigation behaviors based on climate science and related STEM content, to provide STEM knowledge and support about effects of climate change, and to support social change at the individual and community levels. Our ultimate goal is to reach millions of Americans, and to inform, educate, motivate, and inspire or sustain positive behavioral and systemic changes around climate change and related socio-ecological issues.

Brazilian telenovelas establish precedents for audience participation and script modification for creative societal discussion through television media. These programs include social marketing inserted into narrative programming, similar to conventional product placement, but with pro-social messages instead of commercial products, and definitive endings that permit narrative closure. "Brazilian telenovelas are created in a cyclical, continuous manner with ongoing external, diverse inputs from organizations, the government, and the audience. Brazilian writers, producers and directors write and shoot episodes for a telenovela only a few weeks before they are broadcast. This process allows for last-minute changes, reflects new social trends, and includes current political events. The storyline and SM [social merchandizing] consistently evolve due to community input primarily through audience ratings and focus group interviews" (Pastina 2004). Brazilian telenovelas provide an example of responsive, open-genre media and demonstrate an ideal communication mechanism for facilitating a real societal dialog connected to civic engagement towards social and personnel improvement.

In American culture, it has become commonplace to engage with our media through transmedia elements (Davidson 2010). There is already a blurred line between fiction and reality as they relate to science (Cole 2015, Nisbet 2015, Reid 2011). Through a combination of transmedia elements, special effects, and stories that are a mix of fiction and reality, it is difficult for audiences to distinguish between fiction and reality with regards to science issues. Scientists are already engaging with the public using new media technologies (PEW 2015b). In fact, there has been a shift in American scientific media consumption towards television and the internet (Cacciatore 2012, NSB 2016, PEW 2015b, Yi-Fan Su 2015). Using television supported by transmedia elements to engage with audiences meets cultural expectations, and supports audience engagement.

The transmedia extensions in this project will provide STEM and climate change information in an entertaining format in which the audience engages, making the information interesting, relevant, easy to connect with, and tie directly into their own lives. They will form connections to the lead characters, develop trusts in them and in extensions learn more about the issues from what they then consider reliable sources, take action to improve their own decision making in dealing with the issues addressed, and become advocates for positive behavior and social responsibility. The website and transmedia extensions will serve as a launch pad and a hub for our audience to talk openly about climate change and participate in lively discussions around the issues. Our audience will be given the opportunity to connect with each other about climate change issues in the United States today, and to participate in mitigation efforts locally and nationally.

Initial indication for the effectiveness of transmedia entertainment in the US

East Los High (ELH) is an example of the effectiveness of transmedia entertainment. It is the first mainstream entertainment-education project in the United States with transmedia elements and non-profit organizations supporting doable outcomes. ELH is a modern adaptation of the Sabido production method tailored for the young Latino audience in the digital age (Wang 2016), emphasizing that realistic characters in familiar settings resonate with audience members, especially critical and media savvy young entertainment consumers (Guttman 2008). Creative writers incorporated learning from formative research with local teens, and insights from problem-solving approaches to identify “what works” for Latino audiences and to shape characters and dialogues. ELH succeeded in fostering an extensive web of collaborative partnerships (Wang 2016). Summative evaluation demonstrates that ELH was highly effective in reaching its targeted audiences at the local, national, and even global levels. For example in Season One, the education content focuses on reproductive health issues and evaluation demonstrates that resulting outcomes conclude that 40-50% of the participants learned the correct use of condoms that they did not know before and close to a third learned something new about birth control and emergency contraception. The program, based entirely on digital platforms, attracted its primary target audience, as well as viewers of diverse age, race/ethnicity, geographic location, and socioeconomic status. ELH engendered strong levels of audience engagement, attracting hundreds of thousands of people to the program’s website, to experience various transmedia storytelling elements, and establishing a steady stream of 40+% returning visitors, thereby cultivating a fan base for continuous education. ELH has been consistently rated as a top show on Hulu, drawing 1 million unique visitors each month to its Hulu Latino page (Castro 2013, Wise 2015). Such fandom is key to popularizing and sustaining societal interventions. For example, as a result of engaging with ELH, 40-50% of young viewers who responded to summative surveys had learned new information about the correct use of condoms, and close to a third learned something new about birth control and emergency contraception. More importantly, a great majority of the survey respondents were now willing to get tested for HIV and other sexually-transmitted diseases, and reported becoming aware of services for pregnant teens and would recommend them if needed.

Viewers’ strong desire for more programs like ELH validates the large-scale appeal of digital transmedia storytelling (Wang 2016). ELH demonstrates that digital entertainment education transmedia storytelling can be an effective strategy for achieving positive behavioral outcomes with American audiences.

Results of Prior NSF Support

Dr. Martin Storksdieck (OSU) is PI/Co-PI on several NSF and NASA funded projects, including a recently completed project at the National Academy of Sciences, to develop Communicating Chemistry in Informal Settings (AISL #1238273; 9/12-8/16; \$979,667). The project’s Intellectual Merit is to develop a framework for effective chemistry communication, outreach, and education that will synthesize lessons learned from practice along with social-science research about chemistry learning and teaching in informal and formal settings. For Broader Impact, the project aims at providing chemists and informal educators with practical strategies for engaging specific audiences and educational goals. Two reports resulted from the project: the first (National Academies of Sciences, Engineering, and Medicine (2016). *Effective Chemistry Communication in Informal Environments*. Washington, DC: The National Academies Press. doi: 10.17226/21790.) addresses the Intellectual Merit, and the second (National Academies of Sciences, Engineering, and Medicine (2016). *Communicating Chemistry: A Framework for*

Sharing Science: A Practical Evidence-Based Guide. Washington, DC: The National Academies Press. doi: 10.17226/23444.) addresses the Broader Impacts of the project.

Co-Evolution of Upstream Human Behavior and Downstream Ecosystem Services in a Changing Climate (CNH-1114934) (\$1,499,997, 8/1/2011 to 8/31/2015) (PI: J. Martin Senior personnel: E.C. Nisbet) This research project uses the Maumee River watershed and western Lake Erie as a model ecosystem to quantify the co-evolution between upstream human behavior and downstream ecosystem services. The investigators model how public attitudes co-evolve with downstream ecosystem conditions and shape policies impacting agricultural management practices.

B. PROJECT DESIGN

Project Objectives

The overarching goal of this project is to advance the field of informal science learning by creating and testing the outcomes of an entertainment-education project focused on STEM topics. We are hoping to learn whether entertainment-education methods can be used to broaden audiences for engagement with STEM topics.

Key Objectives, Corresponding Deliverables and Desired Outcomes

Objective 1: Develop a national entertainment-education program relating to climate change and sustainability.

Deliverable 1: Formative research to inform the design of an entertainment-education sitcom based on a transmedia design, associated with a national strategy for creating cross-media audience impact.

Deliverable 2: Six pilot episodes of a television show (each 30 min in duration). The television show will be a narrative comedy-drama (sitcom) addressing active and public transportation options in urban environments targeted towards young adults who are underserved in STEM engagement.

Deliverable 3: A website hub for fan engagement with transmedia elements. The website will be similar to the East Los High website components but with content matching the national programming goals established in the formative research. The website will serve as a base for fan engagement and for researchers to monitor the discussions that are generated by fan participation with climate change topics. Additional social media platforms will carry the information as well.

Deliverable 4: A network of non-profit partners facilitating climate mitigation behaviors with shared data. These partnerships connect exciting sustainability projects to the show to improve participation in existing programs. They also serve the research by informing us about what kinds of participation the show generates and how long it lasts for.

Desired outcome for the viewing audience:

The primary audience for the project is ethnically and culturally diverse adults in the highly desired age range of 18-49 who, in the segmentation studies of the Six Americas done by the Yale Program on Climate Change Communication (Roser-Renouf et al. 2016), represent the 4 middle groups Concerned (28%), Cautious (27%), Disengaged (7%), Doubtful (11%). As a result of watching episodes of the show and engaging in activities through the transmedia elements, we expect (dose dependent) that individuals

- Strengthen or solidify their existing knowledge and beliefs of climate change (stay within or move up from an existing category); this aspect can be measured using various items of the survey instrument used to establish the audience segmentation of the Six America's study.
- Develop familiarity and comfort discussing climate change science or climate change mitigation and adaptation activities within their social environment; this aspect can be measured using self report statements, but also observed in social media environments related to the show and its transmedia elements.
- Develop a stronger disposition and intention towards, and self-efficacy for pro-environmental behaviors that might support climate mitigation or adaptation. This aspect is represented by increased positive attitudes towards carbon-neutral or low-carbon emitting forms of transportation.
- Become net promoters of such activities in their social environment (self report and observed in social media environments), and

- Perceive a new norm for what should customarily be considered acceptable and appropriate ways to act within ones personal sphere of influence when considering the overarching science of climate change (self-report and observed in social media environments).

These outcomes will be achieved by an engaging media campaign that connects viewers to climate change and sustainability ideas and services they might encounter in their everyday lives.

Objective 2: Study the effects of the entertainment-education program

Deliverable 5: Formative and summative research describing the results of the project.

Desired outcome: A clear understanding of how American audiences reacted to the entertainment-education content with regards to climate change perceptions, and a insights for the ISE (Informal STEM Education) and edutainment community on whether entertainment-education is an effective strategy for broadening audiences for engagement with STEM topics in general, and environmental topics such as climate change and sustainability in particular.

STEM Content Areas

The project will touch broadly on climate change science and the science of sustainability, including scientific perspectives on climate mitigation and, to a lesser degree adaptation. Climate mitigation will focus on issues related to carbon dioxide emissions from transportation, featuring not only practical aspects of low emission forms of transportation such as walking, biking, using public transportation or car pooling and car sharing, but will also delve into some background issues related to smart and integrated traffic systems embedded into urban planning that minimizes the need for transportation.

Reaching the Target Audience

Our strategies for reaching broad audiences include national (digital) distribution of a television show, where the marketing and advertising materials make no reference to climate change, and match the tone of similar comedy programming. Major network digital distribution through Netflix, Hulu or Amazon is preferable. As is customary in the production/distribution cycle of entertainment media, full commitment to product distribution depends on reasonable assurances for production funding. Given dramatically lower digital (streaming) distribution cost than those for aired shows, and given the non-competitive nature (streamed programming does not compete for airtime), distribution of the show is virtually guaranteed once funding for the show is secured. Producers are negotiating with Participant Media, a media group that assists pro-sustainability shows find network homes, to broker the relation with a national distributor. Independently, producers will continue in their negotiations with distributors while the project is under review at NSF.

Seed support of our community partners will allow for building “hype” amongst potential audiences with tangential interests in topics discussed by the show. For example, Pedal Love already has a broad network of media outlets that are eager to support pro-bicycling projects that we can use as informal advertisement for the show. Branding, merchandising and the transmedia components of the show will further support audience building.

The entertainment industry defines audience by key demographic, and we will be focusing on the coveted 18-49 age range, which includes American citizens who care about community and welfare, but not necessarily science topics or climate change. Demographically, our audience will be varied, and partially determined by the formative research collected at the beginning of this project. Since a goal of this project is to increase public engagement in climate change related issues, target audiences include the voting public, and consumer base for the United States. As described above, we will focus on US resident adults who fall under the Six America segments Concerned, Cautious, Disengaged, and Doubtful (Roser-Renouf et al. 2015, 2016). This television show will focus on the Concerned, the Cautious, and the Disengaged, together comprising 62% of Americans, and might reach out to the 11% of the US adult public who comprise the Doubtful. We assume that the group labeled the Alarmed (12%) will comprise a considerable portion of the potential audience, and might benefit as well from engaging in the show and the related transmedia elements. However, we do not expect that this group has much room to grow from the experience provided by the shows.

Reaching the Concerned and Cautious segments requires channels with broad mass audiences. Low involvement strategies are effective in these channels, as they demonstrate efficacy across audiences (Roser-Renouf et al. 2015). This project is **innovative** because it is the only fiction entertainment project proposing STEM education and climate change mitigation behaviors.

The estimated number of individuals that might be served is 4 million viewers. This varies depending on which distributor buys the content and how much money we collect, since production quality is tied to the quality of viewership we can attract. Other popular TV comedies attract viewerships of: Blackish (4.1 million), Brooklyn nine nine (6.17 million), Mindy Project (3.71 million), Parks and Recreation (6.0 million viewers), Grey's Anatomy (8.22 million) total viewers. We will use a comedy television show to attract a broader adult audience comprised of viewers not interested in science as a topic, but instead attracted to the show as entertainment. The degree to which this audience is also interested in STEM topic will be established through summative research.

Story

Since the topics of this show are complex, we will employ a **division of topics by season**, for example: transportation, energy, water, food, and waste. We will start with active transportation in the first season (the content of the six pilot episodes for which we seek funding), because we can positively reinforce how active transportation provides an alternative to fossil fuel based transportation in Los Angeles and show how it facilitates the development of stronger communities.

We will build two versions of the City of Los Angeles. The story will begin by accurately representing Los Angeles as it is, with regards to sustainability topics. Our second Los Angeles, set into the not-too-distant future, is a sustainable Los Angeles, as it might develop if climate change mitigation strategies were fully applied. We will transition from present Los Angeles to its hypothetical sustainable future through character development, and engagement with audience feedback, representing real discussions, ideas, frustrations and successes of the Los Angeles city residents.

Plot lines will include use of classic physical comedy and humor to model solutions. In season one these will be bicycling, walking, and public transit. Most of the screen time will be devoted to actionable behaviors, such as transporting cargo, and learning safe urban bike routes.

The **concepts** presented in the six pilot episodes are: the **process** of climate change and evidence of how it is already affecting US communities, including urban solutions for active and public transit. The climate change components will not be overt. This is implicit learning. We will add additional, more overt information about climate change through the transmedia extras, tied to the television show by the website and distributed on their own through YouTube, with characters and branding matching the show. **Associated skills** conveyed to the target audience include: how to use bike lanes, use bike locks, etc., that are all essential skills for riding in a city. These will be subtly conveyed to the target audience through the story and reinforced through technical skills extras in the transmedia components.

Representation of Global Warming's Six Americas (Roser-Renouf et al. 2016) will be reflected in character design. Assuming a ten-person cast, there will be one Alarmed character, three Concerned characters, three Cautious characters, and one character each representing the Disengaged, the Doubtful and the Dismissive. Character design will be reflective of Los Angeles population demographics, accurately representing the racial minorities. There is an aspect of environmental social justice that applies to health impacts of climate change in Los Angeles, these will be represented as accurately as possible.

Fear, and humor play integral roles in audience engagement with climate change. Representations of climate change need to be grounded in present realities, neither separated by time and space, nor exaggerated (Sakellari 2015). Fear does not appear to motivate long-term behavioral changes towards pro-environmental behaviors (Sakellari 2015). Due to the catastrophic possible outcomes of climate change, mental health impacts, like anxiety (Melillo 2014) paired with fearful framing of the issues, reduce enthusiasm for media content about climate change as well as reducing participation in climate change mitigation activities (Doherty 2011, Clayton 2013), and anxiety impairs climate change mitigation behaviors (Doherty 2011, Morley Rolls 2013). Comedy, especially positive humor, is successfully used to soften scary topics (Samson 2012). Making the scope of the problem smaller and the solutions more doable is likely to provoke interest and engagement in daunting tasks, such as climate change mitigation behaviors (Doherty 2011).

One of the founding tenants of the entertainment-education is that the narrative content needs to be culturally representative of the target audience; for Americans, at the moment, this means comedy (Ryan 2016). Comedy helps make climate change approachable, reducing fear and anxiety (Bore 2014). Television is a primary source for American audiences for climate change information and is influential in shaping national perceptions of the related issues (Boykoff 2008, 2015). Television comedy in particular is a tool for broadening audiences for climate change topics (Brewer 2015). While there are a few contemporary examples of comedy in science communication (Pinto 2015, Riesch 2015), there is room for further experimentation, especially using comedy within narrative fiction, not stand-up comedy, for the purposes of science engagement. For all of these reasons, our entertainment-education about climate change will be framed as a comedy.

Making a show about climate change that is funny and engaging, which models specifically how to do climate change mitigation behaviors, will increase perceptions of self-efficacy of climate change mitigation behaviors, and increase the perception that we can reduce our carbon dioxide emissions and reduce the overall harm caused by climate change. Intrinsic reinforcement, such as perceived choice, competence, and community will be used as rewards, rather than external rewards, such as money (Clayton 2013). “Some behaviors are avoided because people believe, rightly or wrongly, that they do not know how to perform them. In these cases, behavioral skills training is more important than encouragement. People may need to hear how to reduce their carbon emissions, for example, rather than just being exhorted to do it. Information about behaviors may also increase perceptions of self-efficacy (competence at achieving a desired outcome), which have been shown to be strongly related to pro-environmental behavior”(Clayton 2013).

This project creatively explores how fiction, comedy and narrative drama can be used to engage stakeholders in STEM and sustainability topics. It will transform science communication practices by expanding entertainment-education to encompass a much broader set of topics and audiences. Using comedy through narrative drama is original to this project, and is a new method for non-triggering climate change communication that will motivate people into action instead of scaring them into inaction. This project creates a new, more relevant, interactive way for society to discuss developing technologies and future environmental challenges.

C. COMMUNICATION PLAN

Results of the project will be distributed to four audiences:

- (1) *Media producers* with interest in using entertainment-education as a mechanism for addressing other aspects of societal concern. We will host in-person events in Los Angeles to discuss the results of the project with representatives from the media and entertainment industry, and host videotaped versions of these events online. We will work closely with the National Academies of Science, Engineering and Medicine’s Science and Entertainment Exchange and USC’s Hollywood, Health & Society to reach key stakeholders in the industry. To support this form of outreach, the core team will produce an attractive brochure that summarizes the results of the project.
- (2) *Informal science educators and science communicators* will be reached through project information shared on informal.science.org and Trelis, the collaboration site of the American Association for the Advancement of Science (AAAS). We will conduct discussion sessions on both platforms, deposit relevant documents (formative and summative evaluation reports, progress report, project descriptions, links to shows and transmedia elements), and use the information functions of both sides to inform relevant communities about project progress.
- (3) *Researches in climate and sustainability science communication* will be informed through conference presentations (e.g., NAAEE’s annual research seminar, NARST environmental education and informal learning strands, NSF AISL PI meeting), and peer-reviewed journal articles in *Science Communication*, *Public Understanding of Science*, *Journal of Environmental Education* or *Environmental Education Research*.
- (4) In addition, we will share knowledge advanced by this project through collaborations with the Yale Project on Climate Change Communication, and the CLEAN Network.

D. PROJECT EVALUATION

Formative Evaluation

Empirical formative research will shape the contents of the entertainment-education materials. Dr. Suruchi Sood will conduct this research to ensure that key elements of the sitcom and of the transmedia elements resonate with target audiences. She will use standard procedures (focus groups, interviews, repeated at least twice during story development to verify potential improvement) to test various show characters in their role as representatives of archetypes. In addition to typical characteristics that can link individual characters to various audience members (e.g., gender, sexual orientation, age, ethnic or racial background, personality types), Sood will test for the appropriateness of characters to represent the various groups of Six Americas. Sood will test script storylines to make sure they are appealing, humorous, and clearly communicate target ideas to the viewers. Any discrepancies will be modified before content production to ensure that the quality of the final media programming benefits from the results of formative testing. Formative evaluation will also include elements of front-end studies to identify transmedia elements most conducive to appeal to likely audiences and to more deeply understand how these additional opportunities for audience engagement can be integrated into the basic design of the study. Before and during story development, Sood will be an integrated partner in the creation of the scripts. As part of the formative evaluation Sood will also conduct a critical literature review, focused on the needs of story development for the project, of existing literature on current understanding of the impact of climate change, attitudes and norms around climate mitigations and population level responses to climate change strategies.

Summative Evaluation

[The supplement provides a more detailed summary of conceptual framework, evaluation activities, goals, and methods beyond what is outlined below.]

Summative evaluation will address whether audience outcomes around learning, dispositions and behaviors have been achieved, and for what segment of the viewership. Major guiding research questions, derived from a theoretical framework further explored in the detailed summative evaluation plan (see supplement) are:

Research Question 1: How do audiences' entertainment and information-seeking motivations influence selective attention, recall, and processing of show content with corresponding consequences for audience learning?

Research Question 2: Does science entertainment-education narrow knowledge gaps about climate change across differing levels of educational attainment, prior knowledge, or cultural relevancy?

Research Question 3a: Is show content an effective means to diminish the negative impact of strongly held ideological "perceptual screens" among those who are disengaged, doubtful, or cautious about climate change that inhibit audiences from learning information that challenge inaccurate pre-existing beliefs?

Research Question 3b: Is show content an effective means to reinforce belief and attitudes about climate that result in greater mobilization and increased levels of pro-environment behaviors among audience segments already concerned or alarmed about climate change?

Research Question 4: Does viewing show content increase engagement with other sources of informal learning about climate change, and increase viewers' willingness and ability to communicate about climate change in their personal social environment?

The summative evaluation and research program (SERP) will be managed by Dr. Erik C Nisbet, an expert in science communication, learning, and media who will be contracted as independent evaluator of the project. The overarching goals of the SERP fall into two mutually-reinforcing categories of evaluation and basic research; the work will primarily be conducted during years two and three of the project. The SERP will primarily be experimentally evaluating how online viewership of project content influences audience learning, attitudes, and behavior about climate change across different audience segments, thereby acknowledging the transmedia aspect of the project. SERP will be testing social-psychological

models of how narrative mechanisms (e.g. transportation, identification), audience motivations (information, entertainment), and audience predispositions (prior knowledge, values/ideology, cultural relevance) influence informal learning about science, whereby learning includes dispositions, attitudes, knowledge, skills or behaviors.

The SERP will be based on integrating three sets of quantitative data: 1) secondary data indicators on audience impact (e.g., ratings, web views and hits, viewer profiles, online experience statistics, social media users), 2) a national online study conducted in year two that experimentally evaluates how audience motivations for consuming project content impacts learning and behavioral outcomes, and 3) in year three a second, larger national online experimental evaluation of project content's impact on audience learning and behavioral outcomes that focuses on how outcome vary by educational attainment, prior knowledge, Global Warming Six America's audience segmentation, gender, and cultural relevance to underserved minority groups (African-American and Latino). This study will also assess the durability of content effects over time. Combined, these three sets of data will provide an overall impact profile of the project.

Scientific knowledge about the processes by which entertainment-education (E-E) influences audience learning, attitudes, and behaviors still remains underdeveloped. The four primary basic research goals woven into the evaluative activities of the SERP aim to close this gap and are informed by the conceptual framework outlined in the enclosed supplement. Briefly put, they are:

- Generally explicate the communicative, cognitive, and affective pathways by which science E-E may enhance informal learning processes and outcomes compared to other science media.
- Test whether science E-E is an effective means to diminish the negative impact of strongly held ideological and value-based pre-existing beliefs that inhibit audiences from learning about science topics that may challenge their pre-existing inaccurate- beliefs.
- Understand how audience motivations for consuming media content influence learning from science E-E, and how motivation interacts with other factors that may impact audience outcomes.
- Test whether science E-E, compared to other forms of media and informal learning approaches, is better suited to increase audience learning about science without incurring knowledge gaps that are generally due to differences in educational attainment, prior knowledge, or cultural relevancy.

The SERP takes a rigorous social science approach that employs quantitative social science methods. The two online summative evaluation studies combine high internal validity through experimental methods and random assignment with high external validity by employing a heterogeneous pool of nearly 6,000 adult participants that are exposed to content online, analogous to a transmedia environment. An important component of the SERP is its focus on examining how underserved groups such as African-Americans, Latinos, women, and the less-educated may best learn from science edutainment. This focus includes oversampling African-Americans and Latinos within the two national online experiments, ensuring sufficient gender parity in all data collection, and quota sampling to include a representative portion of non-college educated adult participants in the online studies.

Intellectual Merit of the Summative Research: This work will be the first of its kind to investigate at a large scale the narrative impact of science entertainment-education (E-E) on a wide range of audiences. The evaluation, therefore, has significant intellectual merit beyond informing and evaluating content and storytelling approaches for this project. There currently is a significant gap in basic social science research on how E-E narratives directly and indirectly influence learning outcomes for controversial science topic like climate change, and how stories and characters that audiences can connect with emotionally shape the way that audience predispositions and motivations play into their willingness and openness to engage with controversial topics. The evaluation is specifically designed to close this gap in basic research through the programmatic activities outlined above. We will share the results widely with for researchers and practitioners through conference presentations, peer-reviewed journal articles, and online distribution of evaluation reports via informal.science.org.

E. PROJECT MANAGEMENT

Project Leadership

Laura Azevedo (PI), is Executive Director of the Filmmakers Collaborative, the fiscal sponsor for both the television pilot episodes and the research that accompanies them. She will serve as Principal Investigator for the project. Laura has over twenty years experience as a production manager and supervising producer, with credits on national series such as NOVA, American Experience and FETCH! with Ruff Ruffman. She manages all strategic planning for the Collaborative, and is interested in implementing further networking and educational opportunities for the independent media-making community.

Emily Coren (Co-PI), Executive Producer/Science Communicator has spent her career producing interactive, multi-platform, digital audience engagement media with science and technology subjects for science-uninterested public audiences. She will lead the creative team in producing the television show and coordinate the creative and research goals of the project. She will serve as Co-PI on the project.

Martin Storksdieck (Team Lead), Director of the Center for Research on Lifelong STEM Learning at Oregon State University and Professor, College of Education and School of Public Policy, will oversee the research and evaluation components for the show, advising both the overall structure of the projects and ensuring that the evaluation components answer both, constructive research questions for informal STEM education and design decisions during production, post-production and post-launch. Storksdieck will also serve as key advisor on informal learning aspects of the production.

Project Team Members

Erik Nisbet, Associate Professor, School of Communication at Ohio State University, will serve two functions on the project: He will advise the team on Science Communication, Communication in Society, and Strategic Communication Principles. And he will serve as the independent summative evaluator and research partner, building and implementing a research plan so that this project collects and analyses data that will examine whether or not entertainment-education is a useful tool for the STEM community.

Suruchi Sood, Associate Professor at the Dornsife School of Public Health at Drexel University, is advising in the strategic development of entertainment-education content, she will oversee the formative research for the show including pre-testing and entertainment development.

Robert Diaz LeRoy, Line Producer, writer/director/producer with 23 years of experience in Hollywood, producing a wide range of entertainment content in both a wide range of genres and budgets.

Summer Marsh, Co-producer, specialist in Film Production and Digital Media, she has spent the last 10 years working in Hollywood on various television and movie sets mastering all aspects of film production with an emphasis in camera work. She will staff the crew and oversee physical production of the television show to make sure that the production matches entertainment industry standards.

Maya Zuckerman at Transmedia SF will oversee transmedia site construction. Transmedia SF is a professional media technology agency and studio that provides strategy, planning, execution and education services that enable their clients to effectively reach customers on all of their devices – anytime, everywhere. Their focus is on developing the core story, matching that story to the needs of the intended audience, and to delivering that story via all of the devices and platforms that target audiences use and access on a regular basis.

Advisory Board

Entertainment Industry Supervisor:

Geoff Harris, former Vice President at NBC for 14 years as well as the Head of Story Department. He will be a script editor, and will advise the show creators so that the tone and story arcs conform to entertainment industry standards.

Science Communication Advisers:

Bruce Lewenstein, Professor of Science Communication at Cornell University and Department Chair, advising on science communication theory. Providing oversight for the project overall, helping to ensure that it benefits the science communication community with 1-2 annual conference calls.

Susanna Hornig Priest, Editor, Science Communication: Linking Theory and Practice. Previously, she was a tenured faculty member at Texas A&M University, the University of South Carolina, and the University of Nevada, as well as visiting scholar positions at George Mason University and the University of Washington. She will be providing oversight for the project overall, providing a broad perspective on the science communication field and helping to ensure that it benefits the science communication community.

Entertainment-education Advisers:

Bill Ryerson, President of Population Media Center, international leaders in developing entertainment-education. He has two decades of experience using the Sabido methodology of behavior change communications. He will oversee that this project conforms to established best practices for entertainment-education programming.

Arvind Singhal, Professor of Communication and Director of the Social Justice Initiative in the Department of Communication at the University of Texas at El Paso. He will provide strategic development of entertainment-education content by providing oversight for the project overall, helping to ensure that it conforms to best practices in entertainment-education with 1-2 annual conference calls.

Jeremy Kagan, Professor at the USC Cinematic Arts, and is an internationally recognized director/writer/producer with ten feature film credits including the box-office hit *Heroes*, advising on specific scene design to ensure that the educational parts of the programming (including transmedia video extras) are both entertaining and clearly communicate their intended messages, by reading over scripts and offering constructive criticism.

Climate Change Communication Advisers:

Edward Maibach, Professor of Communication at George Mason University and Director of the Center for Climate Change Communication at GMU, advising on communication about climate change in the US with 1-2 annual conference calls, and answering specific questions as necessary.

Frank Niépold, Climate Education Coordinator at NOAA's Climate Program Office, advising on climate change in general for the US with 1-2 annual conference calls, and answering specific questions as necessary.

Max Boykoff, Associate Professor in the Center for Science and Technology Policy, which is part of the Cooperative Institute for Research in Environmental Sciences at the University of Colorado-Boulder. He will advise on creative climate communication, creating and testing examples of comedy for climate change communication with 1-2 annual conference calls, and answering specific questions as necessary. Also, possibly using his project *Inside the Greenhouse* as a resource for developing comedy content as it becomes useful to story or joke development.

Marc Gold, Associate Vice Chancellor for Environment and Sustainability, Coastal Center Director, and Adjunct Professor Institute of the Environment and Sustainability at UCLA, advising on sustainability issues for Los Angeles with 1-2 annual conference calls, and answering specific questions as necessary.

Stephanie Pincetl, Director and Professor-in-Residence California Center for Sustainable Communities at UCLA, advising on sustainability issues for Los Angeles with 1-2 annual conference calls, and answering specific questions as necessary.

Ruth Greenspan Bell, Public Policy Scholar at the Woodrow Wilson International Center for Scholars, Research Associate, Center for Decision Sciences, Columbia Business School and Visiting Scholar at the Environmental Law Institute. She will advise the project on climate change policy issues as they relate to program content with 1-2 annual conference calls, and answering specific questions as necessary.

Transmedia Design Adviser:

Helen (Hua) Wang, Department of Communication, Assistant Professor at SUNY Buffalo, will offer guidance on the design of the evaluation plan and design and assessment of the transmedia hub connected with the show.

Institutional partners

Population Media Center (PMC) is the international leader in producing entertainment-education content. PMC is a nonprofit, international nongovernmental organization, which strives to improve the health and well-being of people around the world addressing a variety of issues. PMC has over 15 years of field experience in behavior change communications with projects around the world. PMC staff will advise the project on best practices for entertainment-education and train script writers in the Sabido methodology. PMC worked with Wise Entertainment developing two hit television series – ‘Último Año’ for MTV Latin America, aired in 18 countries, and ‘East Los High,’ a Hulu exclusive serial for the US, now in its fourth season. East Los High received 3 Daytime Emmy Award nominations in the category of “Outstanding New Approaches to Drama Series.” (Emmy Awards 2015). For this project PMC will provide technical expertise and advising on story creation using the Sabido methodology applied to driving climate change mitigation behaviors through entertainment.

The Science & Entertainment Exchange, a program of the National Academy of Sciences, and **Hollywood, Health & Society**, a program at the USC Annenberg Norman Lear Center, both provide science advisers and accurate scientific information to interested filmmakers. However, it is important to note that neither organization produces content nor has any final say in how the content they contribute is used, both organizations are participating in this project.

Supporting ‘Take Action’ Non-profit Partners include:

- League of American Bicyclists
- People for Bikes
- Transportation Alternatives
- Los Angeles County Bicycle Coalition
- Los Angeles Community Garden Council
- Climate Resolve
- Sustainable Streets
- Pedal Love
- San Francisco Bicycle Coalition
- Green for All
- Bike Pittsburgh
- Bike Coalition Philadelphia
- Washington Area Bicycle Association
- Cascade Bicycle Club
- Bicycle Transportation Alliance
- Bike Austin

Project Management Plan

Project leaders (PI, Co-PI and other leadership personnel) will be responsible for oversight of their respective subject areas. As project coordinator Emily Coren will arrange periodic meetings to ensure that all aspects of the project are fully integrated with each other. Periodic checkins with an advisory board will provide additional external insight into improving the project design, such as script advice, transmedia design, and finished content prior to airing. Bruce Lewenstein, Susanna Hornig Priest, and Erik Nisbet will provide guidance on the ISE goals and design of the project from the perspective of science communication, science engagement and informal science learning. Television programming will be shaped by the guidance of Bill Ryerson and his staff at PMC so that the entertainment-education content follows best practices for engaging narrative storytelling, and will be further advised by both Arvind Singhal and Jeremy Kagan. Climate change communication professionals that will shape the messaging and story accuracy include: Edward Maibach, Frank Niepold, Max Bookoff and Ruth Greenspan Bell for national climate communication. Marc Gold, Stephanie Pincetl will advise specifically for sustainability issues related to Los Angeles locations. Scripts will be overseen by Geoff Harris, the former head of Story Department at NBC to ensure that stories and scripts match entertainment industry expectations. Helen Wang will advise on the research components tied to transmedia content. Suruchi Sood will conduct formative evaluation that informs script and character development as part of an iterative process between the creative team, advisors and the empirical evidence that emerges from the evaluation. Coren and Storksdiack will ensure that the various strands of input from advisors with different expertise will be incorporated in a timely manner into script development, through regular and ad-hoc production meetings that translate advice and findings into concrete changes to production. While all advisers may be called upon to read scripts and provide input to improve the quality and scientific

accuracy and salience of the content and the effectiveness of the story-telling, ultimately the creative team has final say in all scripts (Coren, Marsh, LeRoy and writers to be hired at the time of funding).

Once the story development process is complete we will begin physical production of the television show and its associated transmedia elements. At the conclusion of the show programming, summative evaluation will be conducted to measure the project outcomes and advise future seasons of content production.

Coren will also oversee transmedia element development with community partners (see list above) to ensure input into story development and the creation of concrete associated community-based activities that can accompany the show itself.

Work Plan (3 years)

Year 1

1. *Project kick-off* (month 1): Project team comes together. Review of goals. Refine work plan. Intersect formative testing timeline with character and story development (1 months).
2. *Story Development* (months 2-12) includes: initial formative research, writer training in Sabido Methodology by PMC staff, and presentations to writers on formative research results (1 week), writing the story bible and scripts (4 weeks), story testing and revisions, advisory board provides input into script drafts, script and bible rewrites, and transmedia design.

Year 2:

3. *Physical Production* (months 13-17) includes: pre-production (3 weeks), shooting scenes (6 weeks), post production (12 weeks), and transmedia site construction in conjunction with 'Take Action' non-profit partners.
4. *Distribution* (18-36 months) includes: transmedia site going live, media partners informed of the show launch, publicity begins, non-profit partnerships start activities that correspond to the story content, content airs nationally.
5. *Summative project evaluation* (18-30 months). Data collection during the airing of the show, etc.

Year 3

6. *Dissemination of results* (25-36 months) includes: Formative and summative evaluation reports on designated project website, informalscience.org, and Trellis. Outreach brochures. Conference presentations submitted (note: additional funding for attendance at conferences is not requested. We assume that these are already covered otherwise). Peer-reviewed journal article preparation.

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NSF Panel Review Summary

We applied as a Innovations in Development: Comedy-Drama for Climate Engagement for a grant in the 2016-1017 funding cycle to the NSF Advancing Informal STEM Learning (AISL) program which seeks to advance new approaches to and evidence-based understanding of the design and development of STEM learning opportunities for the public in informal environments. This year, the AISL program received 425 full proposals totaling over \$456,858,006 in requests, of which approximately 10% of the submitted proposals will receive support. While our proposal was declined for support this year, given the current political climate, this project is even more important. This project creates a constructive space for creating public discourse about climate change in the US.

Positive Feedback from the review panel included:

- This project takes a new implicit approach to science education.
- The entertainment-education model holds promise as a way to broaden audience reach for important issues such as climate change.
- There are a large number of advisors and collaborating organizations with diverse expertise related to the project participating.
- The proposal shows substantial planning effort. It is a well-developed and fully-fledged plan, well researched and includes a strong formative and summative evaluation plan with several strong avenues for communicating the research results.

Questions and Concerns about the project:

Q: Does this program teach climate science?

A: Yes, it will provide viewers connections to credible (and where possible humorous or branded versions of the content) through the transmedia components. What the content looks like will be advised by the initial research. This could possibly include content such as MinuteEarth, Energy 101 by the Department of Energy, or the National Climate Assessment.

Q: Focusing on individual level changes is not effective in producing society level climate change mitigation strategies. Specifically, the active transportation topic focuses on personal behavior, but may be better addressed as an public infrastructure problem.

A: Correct, and we will be addressing those sets of constraints through narrative programming later in the series. This content is intended to run for several seasons and build up to complex social infrastructure issues. Entertainment-education is a tool to build depth into an issue by maintaining audience interest for a longer period of time. By introducing the subject material at a personal level first helps make the content relatable to viewers, build emotional attachment to the characters and sets the stage for the rest of the discussion. Through the transmedia elements and organizational partnerships, we will identify and begin to improve the infrastructure issues associated with the content.

Q: This treatment does not seem very appealing to me, will it reach, maintain and influence a large national audience?

A: Yes. The entertainment-education program will be created based on the results of the initial evaluation to define and hold the interest of its target audience. The attached treatment is not meant to convey finished programming, only to provide an example of how climate change mitigation activities could possible be interwoven into a narrative show. The show will be focused on character relationships, growth and development. A few plot lines will convey information about climate change mitigation, but that is only a piece of the programming. Content will be tested with a panel and rewritten to make sure that it does appeal to the target audiences.

Q: Isn't 18-45 too broad an age range? Can't you narrow the target audience to something more specific?

A: Yes, the target audience will be refined during the initial research phase of the project. Entertainment-education is a little different than traditional media production in that instead of starting with a script, we start with a commissioned body of research to help advise the story content. After scripts have been written based on this research, they are then evaluated through focus groups and interviews, input from our advisory board is incorporated, and scripts are revised before they go into physical production.

Q: Even the best expository screenwriters have difficulty writing explanatory exposition. How will this project make sure that the content is engaging?

A: Our team includes Jeremy Kagan and Geoff Harris to ensure that the explanatory exposition is engaging and matches entertainment industry styles. Jeremy Kagan, a professor and television producer at the University of Southern California, specializes in integrating accurate information into narrative dialog. It is one of his roles as a project advisor to advise the writers on engaging narrative screenwriting. Geoff Harris, former Vice President at NBC for 14 years as well as the Head of Story Department, is advising the show content to help screenwriters match the tone of the show to commercial entertainment industry standards.

Q: This content does not seem to address climate change denial, won't that make it ineffective?

A: No, using the Global Warming's Six Americas model from the Yale Program on Climate Change Communication, the Dismissive audiences (which include climate deniers) are only 9% of the American audiences. This program is intended to appeal to the 60% of the population comprised of the Concerned, Cautious and Disengaged.

Q: Can an entertainment-education program attract, maintain and influence a wide national audience?

A: Yes, there is a large body of research evaluating international entertainment-education content. There is sufficient supportive evidence that a national entertainment-education campaign dealing with sustainability topics could constructively facilitate public discourse about climate change and broaden participation in mitigation activities.

Q: How is a full 30-minute show constructed around climate change mitigation strategies, especially when the topic is not overt by design?

A: The narrative format retains audience interest, creating content that is cumulative through time as the story develops. Information about climate change is only one of the show's parallel story lines. Additional climate change information is introduced through various interactive transmedia elements.

Q: How is the example of East Los High analogous to the proposed show? The target audience for climate change is smaller. The topics of sex and relationships addressed in East Los High have substantially higher intrinsic interest.

A: Entertainment-education is designed as an entertainment format. Our show will include plot lines of relationships, sexuality and character growth.

Q: The PI and project leadership have not demonstrated experience managing or writing a project of this scale.

A: The existing partnerships in this project represent leadership from several different fields in both academia and media production. For example, Filmmakers Collaborative has 30 years supporting collaborative media projects, and Robert LeRoy is a writer/director/producer with 23 years of experience in Hollywood, producing a wide range of entertainment content in both a wide range of genres and budgets. In addition, our team is actively seeking more experienced production partners.

Q: How will the show be distributed?

A: Good question. We are seeking a partnership with a national distributor. The content can be tailored to match the desired content of any interested distributor, hence the broad initial target audience which gets focused during the development stage of the project.

Q: The Brazilian telenovela style of iterative content seems exciting, but it isn't how current US television production works.

A: This interactive media format will be especially exciting to American viewers, who are already accustomed to a high level of fan engagement. Since this style of iterative content has been used successfully in other countries, we think this new approach will make it *pop* to give it an edge over other competing shows. This project uses a lively interactive format to keep the public discussion of climate change alive in contemporary American culture.