

# Higher Education Combating Climate Change through Social Media

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## Abstract

Greta Thunberg, *TIME* magazine's 2019 Person of the Year, challenged world leaders to do more to combat climate change by greatly reducing carbon emissions to ensure a better quality of life for future generations, instead of ignoring this issue for the past 30 years (Chow, 2019). The purpose of this qualitative case study is to explore if institutions of higher education in the United States are helping to combat climate change through green technology use and social media. Results from the study show that about 100% of the universities in this study use one or more forms of green technology, which shows that higher education in the United States is taking climate change seriously. About 90.9% of employees as well as students use one or more forms of green technology at home, which shows that a green culture is gaining momentum in higher education in the United States. Also, about 63.6% of universities used social media campaigns to promote environmental sustainment, which shows that institutions of higher education could include more social media into their green initiatives. Lastly, 68.2% of universities do not collaborate with their communities to increase the use of green technologies in their homes, transportation, industries, and commercial centers. This shows that the green culture of many universities does not extend to their localities, so their ability to combat climate change and global warming is still limited.

**Keywords:** Climate Change, Energy Use, Global Warming, Green Technology, Social Media, Sustainability

## 1. INTRODUCTION: CLIMATE CHANGE & GLOBAL WARMING

In this section, climate change, global warming, green infrastructure, and green technology will be clearly defined. The causes of both climate change and global warming will be addressed. Lastly, evidence of both climate change and global warming as a threat will be presented.

Climate change is abnormal weather patterns that affect the physical, chemical, and biological quality of the earth for a period of time (Malhotra, Melville, & Watson, 2013). Global warming is the gradual increase of the world's temperature, which is negatively affecting the world's atmosphere, plants, creatures, as well as oceans and is changing the world's climate permanently

(Gholami, Watson, Hasan, Molla, & Bjørn-Andersen, 2016). It is the gradual increase of the earth's temperature that gives rise to global warming, which then leads to the devastating climate change. To prevent climate change, we have to reduce carbon dioxide that is responsible for global warming by increasing our use of both green infrastructures and green technologies.

Green infrastructure is the economical and efficient management of the systems that protect, restore, and replicate the natural cycles of water, heat, and vegetation, thereby reducing the waste of natural resources and the unnecessary release of carbon dioxide from human activities into the earth's atmosphere (Morelli, 2013). Green technology is a product or service made with the purpose of alleviating the

negative effects of carbon dioxide produced from human activities into the earth's atmosphere (Yang, Sun, Zhang, & Wang, 2016). Green infrastructure, unlike the carbon infrastructure that depends on hydrocarbon products (crude oil, fuel, diesel, natural gas, gasoline, petrochemicals, and coal), is a system that uses natural energy to generate the power we need for electricity, transport, industry, homes, and agriculture, which could be solar (sun or heat), hydro (water), wind, and vegetation (biogas). Green technology refers to items or services that now depend on these green infrastructures to reduce human emissions of carbon dioxide that cause the global warming that leads to climate change.

Global warming, which leads to severe climate change, has become a threat to life on earth because humans are constantly producing high levels of carbon emission daily from electricity use, various transportation modes, as well as continued industrialization (Aimiwu, 2018). The quest for urbanization, along with the desire for energy from hydrocarbons has produced the following greenhouse gas percentages in the USA: transportation, 29%, electricity, 28%, industry, 22%, commercial centers and homes, 12%, and agriculture, 9%, while the United States is responsible for 15% of global carbon dioxide production (EPA, 2019). About 70% of carbon emissions in the United States is the result of driving vehicles, electricity use, and other energy use in both homes and shops. If Institutions of higher education (IHEs) can encourage employees, staff, and students to use more green technology and maintain a green-friendly lifestyle as a way of life, this could greatly reduce our carbon emissions through how we use our electricity supply, how we drive, and which appliances we buy.

Now that the problems of climate change and global warming have been addressed, the literature review of social media, green technology, and green lifestyle will be discussed to understand how the issue of climate change and global warming can be rectified by both public and private IHEs. A research question will be explored through four interview questions and a relationship model will be presented for the study. The data for the present study took the form of a qualitative interview from social media users from 16 different universities. Then, the results of the study, discussion, limitations, and conclusion will be addressed.

## 2. LITERATURE REVIEW: SOCIAL MEDIA

Social media (SM) are platforms and applications that are used to exchange information in order to keep users engaged and interactive while affecting both their behaviors and decisions (Aimiwu, 2019). Examples of popular SM include Facebook, YouTube, Twitter, Instagram, WhatsApp, and Skype. Many of these SM are used to share information with the aid of videos, images, and texts. Facebook, WhatsApp, and Skype also have a phone service for talking, as well as hosting group meetings, and conferences.

SM is used by firms to influence customers about their brands, affect their purchasing decisions, and control their behavior through peer-to-peer interactions (Aimiwu 2019, 2017) and other means. This means that SM will be a good tool to create awareness regarding both climate change and global warming, as well as to gain following for the use of various green technologies to combat these issues. IHEs informing employees, students, and locals about their green technology use could influence them to use green technology personally and help in the fight against both climate change and global warming.

From past research, Current events, the latest news, comedy, live videos, as well as cause with solution posts were the top-10 posts on Facebook (Patel, 2018). Instagram top-20 most-liked posts included images of sports or movie stars, public figures with their associates, as well as women with children (Joyce, 2020). On Twitter, the top-10 tweets were videos or images of children and animals as well as text about a public figure (Lacy, 2018). It seems women and children, celebrities and animals, as well as live videos of current events are the most popular on SM, especially on Twitter, Instagram, and Facebook.

Despite the dearth of research on SM, there is a gap in SM research. There is limited research on how IHEs (both public and private) are using it to share their green culture with faculty, staff and students as well as how they are collaborating with their locality to sustain their environment.

### Social Media and Green technology

There is not enough research to show what green technologies many IHEs are using and how they use SM to inform their faculty, staff, students, and locality about it. This paper tries to bridge that gap by explaining the benefits of some green technologies and how social media can be used by IHEs to create awareness about how IHEs use these green technologies.

In order to reduce global warming to defeat the threats of climate change, IHEs need to encourage employees, students, and people within their localities to use more green technologies in order to reduce their carbon emissions. Some of these green technologies could be used to save, conserve, restore, and replicate systems of water, heat, and vegetation without the need to produce more carbon energy emissions into the earth's atmosphere. Green roofs can give above 40% value in managing storm water versus traditional roofs, thereby helping to reduce energy cost, improve air quality, and provide up to 45% annual energy savings (Aimiuwu, 2017). IHEs can use Facebook for instance to share their use of green roofs in their buildings and inform employees, students, and locals about the benefits of using green roofs on their homes, farms, industries, and business centers. This use of SM would be an example of a solution strategy.

Many localities today are now into solar energy. Solar energy is used to make thermoelectric generators, which are good for heating, and thermoelectric refrigerators, which are good for cooling, to reduce both cost and carbon dioxide production (Zhang, Sun, Xu, & Zhu, 2014). Researches have been promoting both solar and wind energy to be the best renewable sources of energy for the future, but Photovoltaic is quite more of an attractive solar producer of electricity, and by 2050, solar energy could be able to produce about 11% of electricity used worldwide (Moosavian, Rahim, Selvaraj, & Solangi, 2013). Higher education can encourage professors in the physical sciences to share information on their class' WhatsApp or Skype messages to promote the use of Photovoltaic based solar electricity as a deterrent to depending solely on traditional electricity from hydrocarbons that is greatly enhancing global warming, which is speeding up climate change drastically.

### **Social Media and Green Lifestyle**

There is not enough research to show how universities are motivated to embrace a green friendly lifestyle in order to combat both climate change and global warming. This paper attempts to bridge that gap by explaining how a green friendly lifestyle can be beneficial to the university, people living within the locality, and the environment.

One way IHEs can succeed in the quest to combat climate change is to connect with government officials, energy and telecommunication leaders, employees, and students through social media.

The IHEs goal is to share the benefits of green infrastructure and green technology to individuals on SM so that even the basics of green technology can be used in private cars, homes, offices, and even on farms. The earth will be protected from climate change if IHEs could spread both education and awareness of green lifestyle to employees, students, and community residents through SM so that we collectively work to reduce carbon emissions on a daily basis in order to sustain the earth.

"Sustainability" refers to achieving societal goals within commercialized goals while optimizing environmental, social, and economic balance simultaneously (Malhotra et al., 2013). For humans to sustain the earth from climate change, there must be economic benefits for the government, firms and people; social benefit for the communities and family; and environmental benefits for the earth and its atmosphere. Benefits to government and firms could be the purchase of their green products and services while benefits to people and communities could be more green jobs within their localities and discounts for using green products and services. IHEs can use their sororities and current Homecoming Queen to make a YouTube video for their Instagram about both green jobs and green technologies in the area as well as where they are located or where they can be purchased.

Some insurance firms offer good discounts for hybrid cars, limited driving time, and pay-at-the pump drivers to reduce driving time as well as to reduce fuel use (Aimiuwu, 2017). People get discounts on their home and health insurance for using green technology or living a green lifestyle (Aimiuwu, 2017). IHEs should promote these insurance benefits to their employees, students, and locals on their Facebook, Twitter, Instagram, and other SM platforms, as well as via email to show individuals that there are benefits to a green-friendly lifestyle. They can also team up with insurance firms to ensure that both their students and employees are getting annual discounts for increased use of green technology. They can also invite firms to conferences as speakers to talks about their green policies and green technologies they offer to employees and students.

Green firms do attract investors and media attention (Dhaliwal, Li, Tsang, & Yang, 2011) as well as tax benefits and breaks (Bohas & Poussing, 2016). Firms are usually committed to green initiatives based on cost savings benefits, their improved corporate image, and links to their core values (Bohas & Poussing, 2016). IHEs can

use their Facebook, Twitter, Instagram, and emails to share with their employees, students, and locals the benefits they are getting from investors; media attention; tax benefits; cost savings; and improved corporate image that is linked to their core values as a way to motivate the industries, farms, and commercial centers around them to jump on the green technology bandwagon to help combat climate change.

### Research Question

The research question of the study is: How are IHEs in the United States combating climate change through green technology use and social media? Four interview questions were used in this study to explore if IHEs is doing enough to combat climate change and if IHEs are spreading their green culture to their employees, students, and locality through SM. In this study, school is a university. The four interview questions to explore the research question are:

- 1) What energy and water saving technologies or green technologies does your school use?
- 2) How does your school's green culture motivate you to use various green technologies at home?
- 3) How does your school use social media to promote green technology use within the school?
- 4) How does your school use social media to promote local green technology conferences?

### 3. RELATIONSHIP MODEL

The model used in this study is based on the Health Belief Model (Champion & Skinner, 2008), which is shown in Figure 1 (see Appendix). This model illustrates how IHEs are motivated to help combat climate change, the benefits of doing so, barriers they may face, and their confidence to take appropriate action. The model is divided into two sections, which are Individual Belief and Action. Under the Individual Belief section, we have four constructs, which are perceived threat, perceived benefits, perceived barrier, and self-efficacy.

**Perceived Threat:** Deals with the fear of falling sick and the consequences of the sickness that can even lead to death. This relates to threats about why IHEs need to help sustain the environment.

**Perceived Benefits:** Are the positive reactions and behavior changes done in order to reduce the risk or eliminate the perceived threat. The study has to address the benefits of IHEs going towards green technology use or embracing a green lifestyle.

**Perceived Barriers:** Deals with the cost of the reaction and time it takes to implement the reaction. It is also the inconvenience and discomfort of the new reaction. The barriers that prevent IHEs from going green will be discussed.

**Self-Efficacy:** This is the confidence to act because a person understands the goals of the actions and belief in its positive outcomes. How IHEs promote their green initiatives to those in their locality to understand and believe in environmental sustainment is essential.

The Action section has just one construct, which is the cues to action, which affects human behavior or action towards the beliefs.

**Cues to Action:** These are the strategies to act as well as the awareness and motivation to have the desired behavior in order to reduce or eliminate the perceived threat. This relates to the strategies IHEs use to make members of their locality aware of environmental sustainment.

## 4. METHODOLOGY

71 connections were invited from the author's network on Facebook, LinkedIn, email, and by phone to participate in this study, but only 26 responded, and 22 of them were interviewed because the other four were unavailable. There were seven participants from the phone, six from Facebook, five from LinkedIn, and the rest from e-mail contacts. The participants came from 16 different universities within the United States. 10 were students, 7 staff members, and five faculty members.

Seven professors were invited to pilot review the four interview questions as experts, but only 4 helped to review and modify the 4 questions through LinkedIn and email. The interview was conducted for between 4-12 minutes within 5 days by phone and the participants verified their responses by email, LinkedIn, Facebook, or text messaging. Saturation was reached for all 4 research questions.

Interview protocol digital footage, digital transcriptions, and NVivo 12 Plus qualitative software were tools employed in this study. Digital audiotape and observation sheets were

used to maintain credibility. Interview protocol for the four open-ended questions was used to ensure transferability. The methodology of the study is explained in detail to achieve dependability. All participants verified their transcribed responses through the member checking process. The qualitative software NVivo 12 Plus was used for both the coding and segmentation of the responses for analysis.

## 5. RESULTS

In this study, 10 or more participants out of 22 or above 45% of similar responses in each question were accepted as saturated. The "Word Frequency Query" of NVivo was used to explore the top key themes within each of the responses and the "Text Search Query" of NVivo was used to explore the number of participants that used those top key themes. The "Query Word Tree" from the text search result was used to get the verbatim transcription for each key theme. Below are the key findings from this study:

- 1) What energy and water saving technologies or green technologies does your school use?

About 100% of participants (10 students, 7 staff members, and 5 faculty members) said that their university used at least one form of green technology. As shown in Table 1 in the Appendix, about 70% of the participants said their universities were using light and water technologies to conserve energy. These technologies range from motion sensor or activated lights to special windows in buildings that let in more light so that the lights inside did not have to come on until absolutely necessary. Less than 50% of the participants said that their universities used toilets and sinks that dispensed water automatically with the aid of motion and activity sensors. This means that many universities are taking necessary steps to combat climate change by using both green technologies for electric and water use.

- 2) How did your school's green culture motivate you to use various green technologies at home?

About 90.9% of the participants said that they used at least one form of green technology and were influenced by the universities' use of green technology for electricity and water. This could mean that people carry the personality and attitudes of their environment through education,

awareness, and use. As shown in Table 2 in the Appendix, almost 60% of the participants use green technology in their car. Some had electric and hybrid cars, while others had Eco settings, Eco boost, and Eco features in them. About half of the participants used green technologies in their homes. Many had dishwashers, washing machines, dryers, light bulbs, and thermostats that were energy saving to reduce both gas use and heat production. Others also used green technology for water and heat control in their water heaters, dishwashers, washing machines, toilets, sinks, and showers that was Eco-friendly or had energy savings features.

- 3) How does your school use social media to promote green technology use within the school?

About 63.6% of participants said that their university used electronic campaigns, such as emails and SM to promote green and energy conservation initiatives. Other non-electronic campaigns included flyers, school clubs, and recycling activities that promoted green activities manually or verbally as expected or normally. In Table 3 in the appendix, about half of the participants said that they got messages from the universities' SM, such as Facebook, Twitter, and Instagram, about buildings being renovated for green technology and conservation, while others received emails from the school about energy saving tips and turning off all electrical power supplies before going home at the end of term or semester. Some participants talked about using Blackboard to submit their assignments to reduce the energy cost of printing paper and the paper.

- 4) How does your school use social media to promote local green technology conferences?

About 68.2% of participants said that they have not seen or heard their universities collaborate with the city or local community to have green or environmental conservation campaigns or conferences to address energy-saving issues. In Table 4 in the Appendix, only 31.8% of participants said that their universities collaborated with their localities or brought speakers to encourage their school or community to conserve energy and the environment. There is a lot of work that needs to be done by IHEs when it comes to collaborating with the locality

through conferences and speaking engagements through SM.

If IHEs would extend their green SM campaigns to their localities through community engagement, they could also be successful in taking their green culture of energy conservation into the cars, homes, industries, commercial centers, and farms in their localities to reduce carbon emission. Any reduction of our carbon emission by a small percentage goes a long way in saving our planet for future generations.

## 6. DISCUSSION

Based on findings from this pilot study, IHEs in the United States are doing enough in the use of green technology and green services to combat climate change and are also doing well in spreading their green culture to their employees and students. Unfortunately, more work is needed in the use of electronic campaigns to promote their green initiatives to both their employees and students to show the benefits of their green culture. Also, more SM collaborative initiatives with their locality are necessary to spread their green culture to homes, offices, industries, commercial centers, and farms in their communities in order to maintain a green lifestyle in their localities, as shown in Figure 2.

The Social Media Sustainability Belief model of Figure 2 in the appendix has five constructs, which are perceived threat, perceived benefits, perceived barriers, cues to action, and self-efficacy. Each of the constructs explains how IHEs are responding to climate change based on the study, considering the benefits, setbacks, and actions taken by IHEs in the study.

**Perceived Threat:** These are the perceived fears and consequences of both global warming and climate change which could lead to shortage of food and good drinking water, extreme heat that leads to the discomfort from extreme living conditions, as well as sicknesses and shortened lifespans that could even lead to death. It shows that IHEs take the threat of climate change and global warming seriously.

**Perceived Benefits:** These are the reactions to mitigate the perceived threat. These actions include the need to use more green technologies (solar, wind, vegetation, and water technologies), planting more trees and saving more vegetation lands, as well as reducing the need of hydrocarbons to power human modern lifestyles. Staffs and students of the universities show that

they are benefiting from green technology use in the study.

**Perceived Barriers:** These are the fears to make a person question the perceived benefits and even doubt the credibility of the perceived threat in order not to change their behavior. This includes the cost, availability, adequacies, and installation of various green technologies and then wondering if the change of behavior is worth the time, cost, energy, and inconvenience of the change. The study shows that the time and cost of making SM videos or posts may have led to a decline in SM use in their green initiatives.

**Cues to Action:** These are what eliminates the fears of the perceived barriers and enhances the appreciation for the perceived benefits in order to mitigate the perceived threat. This includes adequate and frequent information from SM to educate people and keep them aware of the benefits of green technologies, where to find them, their affordable costs, and how to install them. There is a lot of action on the part of the universities, staffs, and students in their use of green technologies.

**Self-Efficacy:** This is basically the confidence to act based on the effective cues of action. It includes the belief in green technology use regardless of the reality of perceived threat, as well as knowing needed green technologies, where to purchase them at affordable prices, and how to install them. This ultimately affects human behavior towards a green friendlier lifestyle and towards sustaining the environment. The study shows that universities need to extend their green initiatives to their locality in order to be more effective in combating climate change and global warming.

Ultimately, the goal of these green collaboration between the universities, green business, and the locality through SM is to create more green jobs for both the locals and the students after they graduate from the university while combating climate change together.

## 7. LIMITATIONS

A qualitative single case study was used to explore if selected IHEs are helping to combat climate change by using green technology and extending their green culture to their students, employees, and locality through SM, instead of a quantitative survey research. The sample size used in the study could have been larger but time constraints made this goal especially challenging. Triangulation could have been done to investigate

if these 16 different universities actually had a strategic green campaign on their SM. Also, triangulation could have been used to see if the universities in question actually hosted conferences and invited guest speakers to talk about energy and environmental conservation on their SM. This study relied on the participants to provide their green cultural experiences with their universities through their opened-ended responses.

## 8. CONCLUSION

In summary, IHEs in the United States could play a big role in reducing carbon emission through their use of green technologies and by influencing both their employees and students to do the same. Unfortunately, not all IHEs are employing green SM campaigns. This includes inviting speakers and stakeholders from green companies, and organizing green conferences through SM to spread their green culture throughout their locality.

SM campaigns are essential in spreading awareness of the green technologies IHEs are using and the numerous benefits they are getting as a result of their green initiatives. Some of these benefits could be tax breaks, corporate discounts, media attention, and more attractive investors. Other benefits include discounted premiums in the health, auto, and life insurance realms--to keep employees, students, locals, and families informed about the IHE's efforts to combat climate change through SM-based awareness of their green-friendly philosophy.

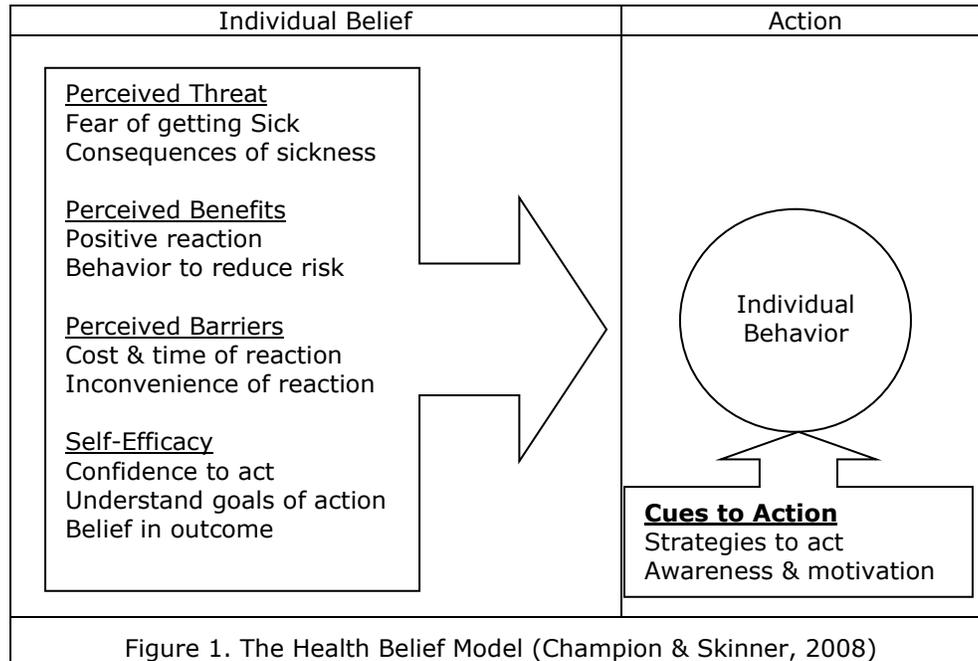
Lastly, IHEs can organize conferences and invite speakers from green organizations and businesses to talk about specific energy-saving tips and technologies for homes, offices, commercial centers, industries, and farms in their localities. SM could be used to promote both the conferences and the speakers. The goal is not just to encourage the adoption of a green lifestyle within the locality, but to also increase the market share in green technologies, in order to reduce the cost of green services, and to create more green jobs.

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## APPENDIX



Key Theme	Percent	Transcribed Verbatim
Lights	68.2%	Automatic lights, automated lights, lights are motion activated, lights turn on & off, lights with sensors, lights are motion activated, lights from outside
Water	45.5%	Refill water, save water, low water flush, automatic water systems, water motion sensors, water fountains, water stations, water turns on, water faucets
Sinks	45.5%	Bathroom sinks, automatic sinks, sinks had automatic sensors, sinks that turn on, sinks that comes on, sinks that work, sinks are automatic, sinks are sensor

Table 1. Response to how school saves energy

Key Theme	Percent	Transcribed Verbatim
Car	59.1%	Smallest car, car for less gas, Eco features in my car, car has Eco boost, car has Eco settings, car is electric, car set to auto lighting, car operated manually
Water	54.6%	Electric water heater, to control water, has water saving feature, not to let water run-off, water through sensors, water saving toilets, water and electricity
Use	50.0%	Control use of, Eco smart to use, control water use, less gas use, reduce gas use, decrease our energy use, use less water, use smallest car, use to decrease
Energy	45.5%	Save energy, is energy savings, light bulbs are energy, washer & dryer with energy, washing machine and dishwasher have energy, decrease energy we set thermostat

Table 2. Response to how participant are motivated

Key Theme	Percent	Transcribed Verbatim
Energy	45.5%	Building for energy, talk about energy, conserve energy, reduce cost of energy, printing cost and energy, to promote energy, energy saving tips, energy efficiency

Table 3. Response to schools' electronic campaigns

Key Theme	Percent	Transcribed Verbatim
Energy	31.8%	Talk about energy, conserve energy, renewable energy, clean energy, environment & energy, address energy issues, energy and water, energy savings

Table 4. Response to schools' collaboration campaigns

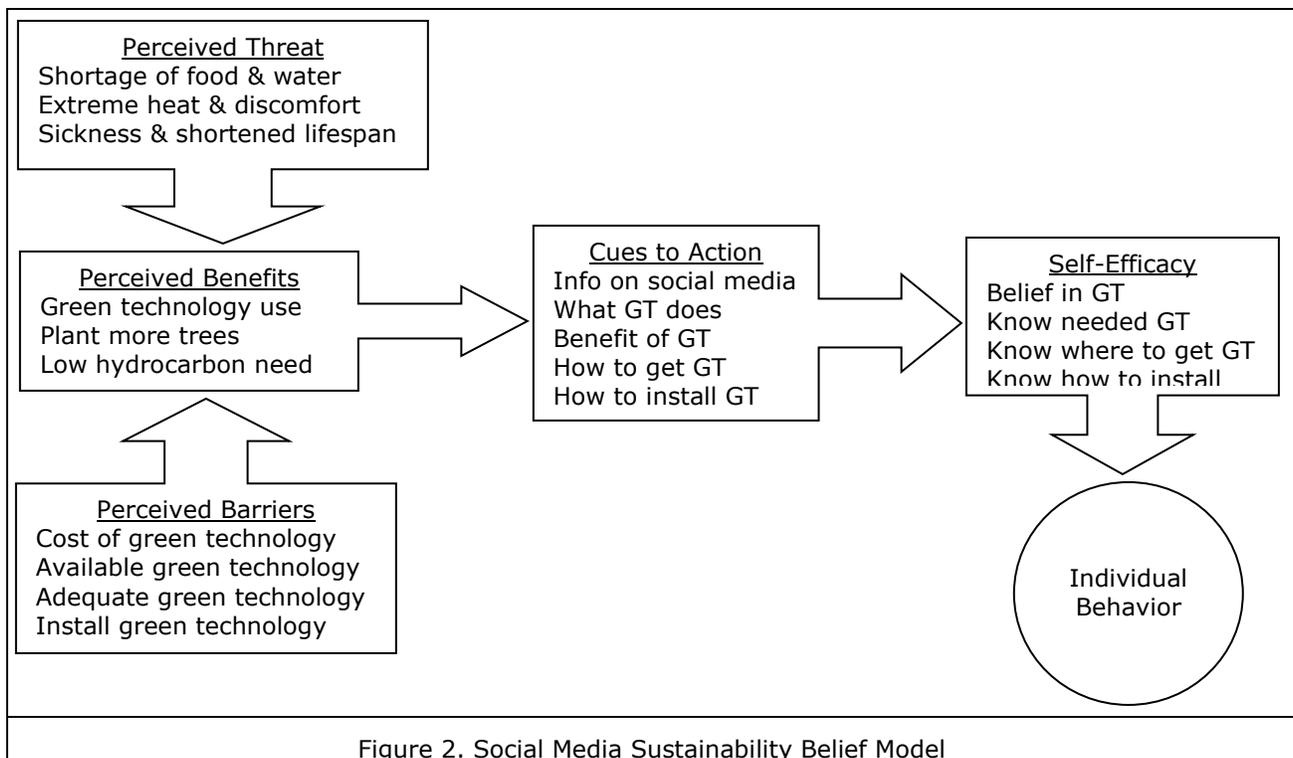


Figure 2. Social Media Sustainability Belief Model