4-15-2019

The Effects of QR Code Prompts Posted to a Solar Charging Bench on Website Visibility

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Lee Honors College Thesis

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Abstract

This study will investigate the effects of graphic prompts with integrated quick response (QR) codes posted to a solar charging bench. The hypothesis is that posted prompts and the bench itself will increase website traffic and visibility of sustainable actions at Western Michigan University. Website traffic will be monitored using Google Analytics software which will allow for tracking of website visits specifically from scanning the QR code. Thus, data from bench installation and from bench installation with prompts will be compared with baseline data from before installation of the bench and before installation graphic prompts. Data that supports the hypothesis, increased website traffic, will lend additional backing to other research on the use of graphic prompts and QR codes to increase behavior and interaction with online entities as well as usage of the solar charging bench by participants. Future research with collection of participant demographics could be conducted in order to analyze which groups out of a more general population may be influenced more by prompts, QR codes, and usage of the bench. This has large implications relating to the advancement of sustainability at Western Michigan University and the increased visibility of sustainable actions being taken by the university.

The Effects of QR Code Prompts Posted to a Solar Charging Bench on Website Sustainability

On December 12th, 2015, the majority of nations across the world created a document recognizing the immense need to cultivate a sustainable future. This document, known as the *Paris Agreement*, was created at the *United Nations Climate Change Conference* and comprises goals and charges for each signatory nation to reach regarding the reduction of their individual impacts on the environment. One of the main goals is to keep the global temperature from rising more than two degrees Celsius this century by reducing greenhouse gas emissions. According to the *United Nations Climate Change Convention* website, much of the agreement is comprised of ways to reach the goals and charges set forth by outlining the impacts of climate change and a financial pathway towards reducing greenhouse gas emissions. To date, 184 of 197 *United Nations* countries have signed the agreement while the United States has withdrawn their ratification. The *Paris Agreement* is an excellent example of the majority of nations around the world recognizing the impact humans are leaving on the environment and how harmful it has become. A global effort to reduce greenhouse gas emissions is a necessary step towards a sustainable future.

The current United States government administration withdrew their ratification of the *Paris Agreement* with a formal announcement of the withdrawal from United States president on June 1st, 2017. With many harsh criticisms of the withdrawal, *ScienceDirect,* a news source with highly factual, science-based, and middle ground reporting (Van Zandt, 2016), notes that there are many sources of speculation as to why the United States withdrew from the climate agreement, but one of the most import aspects to focus on in the situation is the impact the withdrawal could have on the environment. One main concern, is a lack of research funding coming from the United States (Zhang, Dai, Lai, & Wang, 2017).

The United States is perhaps one of the most well-equipped countries in which imperative scientific research can be done. The country is wealthy and has a multitude of research-focused government agencies which, due to the climate agreement withdrawal, will not be focusing on the reductions of greenhouse gas emissions as outlined in the *Paris Agreement.* While this limits the ability of the United States to actively reduce climate change, it also has a harmful impact on smaller countries ratified to the agreement. Smaller, poorer countries may not have the financial and governmental resources to conduct their own research on climate change, and will rely on research done by other countries. Without the United States' research, these smaller countries efforts to fit in accordance to the agreement could suffer. One reaction to the government's inability to provide relevant research, is to look to research universities in the United States, as discussed by Atkinson and Blanpied (2008). The United States has some of the best research universities in the world and they are able to contribute published empirical research to the field of environmental sustainability. Additionally, many university entities have entered into university-wide agreements to work toward reducing their harmful impacts on the environment. Two ways colleges have started to implement sustainability institution-wide are the *Talloires Declaration* and *STARS.*

The Association of University Leaders for a Sustainable Future (ULSF) published the *Talloires Declaration* in October 1990 after Tufts University president, Jean Mayer, brought twenty-two university presidents together in Talloires, France to brainstorm about the state of the world. According to the *Brief History of the Talloires Declaration* page on the ULSF website, they, together, created a list of charges that institutions must take on in order to foster a sustainable future (ULSF 2015). As of July 1st, 2018, 504 institutions in 59 countries have signed. The declaration is a ten-point action plan on how universities will pledge to promote a sustainable future. Those ten point are: “(a) Increase awareness of environmentally sustainable development, (b) create an institutional culture of sustainability, (c) educate for environmental responsible citizenship, (d) foster environmental literacy for all, (e) practice institutional ecology, (f) involve all stakeholders, (g) collaborate for interdisciplinary approaches, (h) enhance capacity of primary and secondary schools, (i) broaden service and outreach nationally and internationally, and (j) maintain the movement. Institutions, once signed to the declaration, are charged with its implementation” (*Talloires Declaration, 1990)*. The ULSF provides information on how different universities have implemented the points of the declaration.

In similar fashion to the ULSF’s *Talloires Declaration (1990)*, the *Association for the Advancement of Sustainability in Higher Education* (AASHE), is an organization with a mission “to inspire and catalyze higher education to lead the global sustainability transformation” (AASHE, 2005, p. 1). The association launched in Portland, Oregon in 2005 with two staff members, and since then have taken great strides towards the education and implementation of sustainable practices in higher education. One of their main programs is *Sustainability Tracking, Assessment & Rating System* (STARS). AASHE describes this assessment as “a transparent, self-reporting framework for colleges and universities to measure their sustainability performance” (AASHE, 2005, p.3). Universities are invited to complete the assessment and then receive one of five ratings: Reporter, Bronze, Silver, Gold, and Platinum. Each rating level is broken down into four additional categories of sustainable interventions: Academics, Engagement, Operation, and Planning and Administration. An institution receives a score based on points it earns by working towards credits in the four main categories (AASHE, 2019). Credits are given to universities using the following considerations:

- "Extent to which the achievement of the credit ensures that people acquire the knowledge, skills and dispositions to meet sustainability challenge;
- To what extent does the achievement of the credit contribute to (a) human and ecological health and mitigate negative environmental impacts; (b) secure livelihoods, a sustainable economy and other positive financial impacts, and (c) social justice, equity, diversity, cooperation, democracy, and other positive social impacts and;
- To what extent are the positive impacts associated with achievement of the credit not captured in other STARS credits?" (AASHE, 2019, p.2).

This rating is public information universities can use it to track their progress as they try to move further towards a higher level of sustainability. They are also able to compare their performance against other institutions who have completed the assessment. This assessment goes hand in hand with the *Talloires Declaration* in that it is a guide for universities to implement the charges they are given once signed on to the declaration.

The general public wants to see a greater reliance on solar energy (Burger, 2012). It is one of the most widely accepted and least worried about forms of renewable energy currently being used. Several hundred individuals in the Rutgers University community were interviewed following the Fukushima nuclear accident in 2011 in which radiation from nuclear power generators was released and a large oil spill ensued. Participants were asked to rate their worry about seven different types of energy sources [nuclear, chemical, coal, hydro, solar, wind, and gas] across six different categories [exposure from everyday occurrences, transportation, exposure from plant, exposure from food or water, worker exposure, and exposure to wildlife]. Subjects were also asked to rate individual risk factors related specifically to each category where solar energy's was "harmful UV radiation exposure to wildlife" as well as subject rating on not wanting future development of each energy source. Results showed that solar and wind energy were the least worried about energy sources. Solar was the second lowest category in the "percentage that do not want future development" section with hydro power slightly lower. The public wants solar energy and trusts solar energy. While it can be difficult to implement new trial-type interventions focused on sustainability at the business and even governmental level, colleges can be a great alternative setting. They are institutions of higher learning and foster setting of community engagement and communication while often putting an emphasis on the 'cutting edge' of new research.

One example of this is illustrated by Petersen, Shunturov, Platt, and Weinberger (2007) outlining an intervention in which college dormitory residents reduced their electricity consumption by implementing feedback and incentives. This study separated groups into "high-resolution" immediate web-based feedback and "low-resolution" feedback delivered once per week based on the overall dorm's ability to reduce electricity use. The purpose of this study was to show that education on a sustainability issue, in this case electricity consumption, while combined with feedback would cause participants to engage in behaviors that would reach the end-goal. This study is a great example of how sustainable interventions can start and thrive at the higher-education level. However, one limitation is that specific behavior was not monitored. Researchers were unsure of what specific behaviors residents were engaging in in order to reduce their electricity consumption, just that their wide array of behaviors was causing them to achieve the terminal goal of the study.

Another university-level study focused on individual sorting behavior. Binder (2012) conducted a study out of Western Michigan University, where it was found, during a waste audit, that almost one third of landfill waste from a university building was material that could have been recycled. If proper sorting behavior could be established, there was potential for a reduction on recyclable materials ending up in the landfill. Binder introduced a multi-faceted intervention consisting of three separate components: (a) “aesthetically pleasing” waste receptacles with three differently-shaped openings for each type of waste: landfill, paper/cardboard recycling, and glass/plastic/metal recycling, (b) the creation and implementation of new signage on trash receptacles outlining in text what could be placed in each section of the bins mounted above the respective openings, and (c) placement of trash receptacles in central locations throughout the building (Binder 2012, p. 11-12). The results lent support to the conclusion that centrally-located trash receptacles with appropriate signage and removal of trash receptacles from classrooms led to an increased amount of correct sorting behavior (Binder, 2012, pp. 38). Binder also analyzed social validity measures noting that participants who took part in an optional survey found that the new recycling/waste disposal method made it easier to correctly sort recycling and trash and the new bins were well-liked.

While both of the previous studies, Petersen et al. (2007) and Binder (2012), are excellent examples of university-level sustainability interventions, they still may encompass barriers to campus sustainability as identified by Horhota, Asman, Stratton, and Halfacre (2014) in an analysis of the behavioral barriers to many studies on campus sustainability. Four main behavioral barriers in college setting were identified: “(a) lack of engagement; (b) communication issues; (c) lack of proper campus infrastructure; and (d) financial concerns” (Horhota et al., 2014, p.346). From the previously discussed studies, the first two barriers, lack of engagement and communication issues, can be explicitly seen. In the Petersen et al. (2007) study looking at electricity consumption, one main limitation was the inability to measure specific and individual behaviors. Researchers did not communicate with residents about their specific behaviors that led to the reduction of electricity consumption and as a result, a lack of engagement may have been overlooked. Some residents may not have engaged in any behaviors to reduce electricity consumption while others in the same building could have been ‘pulling the weight’ and engaging in more extreme behaviors. Binder (2012) focused on increasing proper recycling behavior where there may have been a lack of engagement by some participants. Again, there was no way to study individual behavior. Two ways to curb a lack of engagement and communication issues in campus sustainability interventions is to increase the saliency of the interventions and to pair that with free-choice learning experiences.

Many opportunities for people to learn about sustainability come from formal education where it is usually a requirement to do readings and complete coursework on sustainability issues. One little-explored alternative to formal education of sustainability is free-choice learning. This involves education outside of formal education programs where individuals choose on their own accord to seek out the relevant information. It is noted that informal education, or free-choice learning, is generally aimed at subjects much broader than those in formal education.

Ballantyne and Packer (2005) explain that free-choice learning can play to the advantage of sustainability where desired learning outcomes are often broad such as inspiring curiosity about the subject and evoking emotions in hopes of leading to environmentally sustainable practices (p. 281-282). The article is a review of where the field was at with literature, in 2005, with regards to the use of free-choice learning to increase sustainable behavior and attitudes. One way to encourage free-choice learning is through issue exhibitions. This involves experiences, usually set up in public places such as museums, which encourage individuals to interact with tangible objects related to a social issue (p. 287). With the implementation of exhibits, learners are often able to increase their awareness of the issue through interaction. In many cases described in the article, exhibits are used to challenge the perspectives of learners and require them to think critically. The current study will take a step back from this, where the goal is to spark interest through interaction, but the principal of the exhibit still applies. Additionally, in order to increase interaction with these sort of exhibitions, it is important to increase their saliency.

O'Neill, Blanck, and Joyner (1980) focused on how to increase stimulus control, or saliency, of objects in order to achieve a higher level of interaction with those objects. This study aimed to increase proper disposal of litter into trash receptacles at a large university football stadium. O'Neill et al. (1980) states that while reinforcement can reduce littering, it is impractical and difficult to provide reinforcement in natural setting where there are cost problems and also logistical problems with distribution of reinforcers. Thus, the idea to increase stimulus control over trash receptacles was implemented. Some of the regular trash receptacles, 55-gallon orange drums, were modified to include a door with the word "PUSH" written on it and when done so, a makeshift plywood hat, modeled after hats commonly worn to the stadium, with built in electronics would be lifted along with the underside of the door which said "THANKS" being exposed. Except for one out of the four monitored football games, the weight in litter deposited into the trash receptacles was near double for the modified receptacles when compared to the original receptacles. The more salient, and novel, receptacles had increased stimulus control and led to an increase in proper litter disposal.

Several studies have been conducted using graphic prompts to increase consumer learning and engagement. Lai, Chang, Li, Fan, and Wu (2013) used QR codes to increase mobile learning. As mentioned previously by Ballantyne & Packer (2005), learning taking place outside of the classroom had qualities that can go above and beyond traditional education. Whereas Ballantyne & Packer (2005) focus on the free-choice aspect, Lai et al. (2013) focus on an outdoor environment as a way to provide contextual experiences. They use smartphones, which have the ability to read QR codes and have wireless internet access, as a way to access learning experiences in outdoor environments. While students were still under instruction, it was in an environment related to their content. Students were put in contact with learning content as a result of scanning QR codes in outdoor locations. In implementation, students were taken on exploration activities and used their smartphones to scan the QR codes to gain access to information such as information about plants found in the outdoor area. This type of learning, while still formally instructed, did provide students access to a tangible learning experience and ease of access to information on mobile devices.

One positive aspect of QR codes are that they are very low-effort. With very little instruction, users can understand how to use QR codes in order to access information more quickly than looking it up manually. Gao, Liu, and Paas (2016) examined the effort of QR code use versus manual selection. This study focused on using QR codes versus manual selection when students were required to pick out specific types of plants. For the manual selection phase, students had to search for pictures of specific plants and for the QR code phase, students could scan QR codes attached to specific plants. It was found that when there were a high number of plants to choose from, the lower-effort QR codes were more preferred to the manual selection technique. This lends support to the construction of the current study, which uses QR codes to implement and prompt learning in a low-effort manor.

The current study aims to address each of the behavioral barriers to sustainability as outlined by Horhota et al. (2014) by increasing saliency of sustainable interventions and implementing the use of QR code graphic prompts. This will involve the placement of a solar charging bench in the outdoor area on the campus of a large Midwestern university and using QR code graphic prompts posted to the bench to increase website traffic. The behavioral barriers to be addressed are “(a) lack of engagement; (b) communication issues; (c) lack of proper campus infrastructure; and (d) financial concerns” (Horhota et al., 2014, p.346). Lack of engagement will be diminished with the placement of the bench itself. This is a large, flashy, and salient new structure being added to a very busy part of campus and it has opportunities for interaction. Students will be able to sit and study under the solar panel canopy and have their electronic devices charging from the energy gathered by the solar panels. Communication issues will be taken care of with the info-graphic prompt which will have an embedded QR code for users to scan and gain access more information on why the bench is there and how it is sustainable. The current lack of proper campus infrastructure will be taken care of by installation of the bench itself and due to this study being funded by a grant and research being conducted as part of a project, this will be cost-free to the university. Additionally, specific behavior will be measured through the use of unique URL data collection and a plug-load monitoring system. The current study aims to create a low-effort, salient, and free-choice learning experience in a contextual outdoor environment. This will be done by use of a large solar work station with info-graphic prompt QR codes to allow users to access learning experiences.

Method

Participants and Setting

Participants will be any users of the Sunbolt Campus XL solar charging bench. All of those who scan the QR code and get directed to the website will be participants. There will be no exclusionary criteria. The study will be completed at the installation site of the Campus XL, Miller Plaza near Brown Hall (Appendix B) on Western Michigan University campus. The participants will scan the QR codes when prompted by graphic prompts attached to hardware and the plug load monitoring system within the bench itself, will record number of chargers clicked in, amount of solar energy harvested, and amount of solar energy output to devices.

Apparatus and Materials

Solar charging bench. This research will be conducted using a Sunbolt Campus XL solar charging bench which is a branded solar charging bench (*Figure 1)* as well as a graphic prompt specifically designed for the study (*Figure 2*). The solar charging bench will be placed in Miller Plaza due to its high volume of foot traffic. The close proximity to a large parking garage, a large community auditorium situated on campus, and central location to many academic buildings are the cause of foot traffic. The bench features two 4’6" W" x 1’2 ½” L bench seats on either side of a 4’6” W x 3’6” L table top. There is an ASTM A-500 Grade B structural steel vertical tube in the middle of the tabletop with a thickness of 3/16” that supports a tilted solar canopy with 8’3 ½” clearance on the high side and a 6’11 ¾” clearance on the low side. The overall table footprint of the bench measures 4’6” W x 7’0” L and the bench weighs 1,450 lbs. Overall. The structure is powder coated steel with wooden table and bench tops. The bench has a wind speed rating of 90mph self-ballasted meaning no surface attachment is required. The solar charging system features a 1kW DC capacity array, four 120V electrical plugs, and eight USB charging ports. The battery charged by the solar array is 225 amp-hour and the charge is controlled by Morningstar TS-MPPT-45 (maximum power point tracking). The daily energy production of the bench can reach 3,800Wh. There is a twenty-five year warranty on solar panel output.

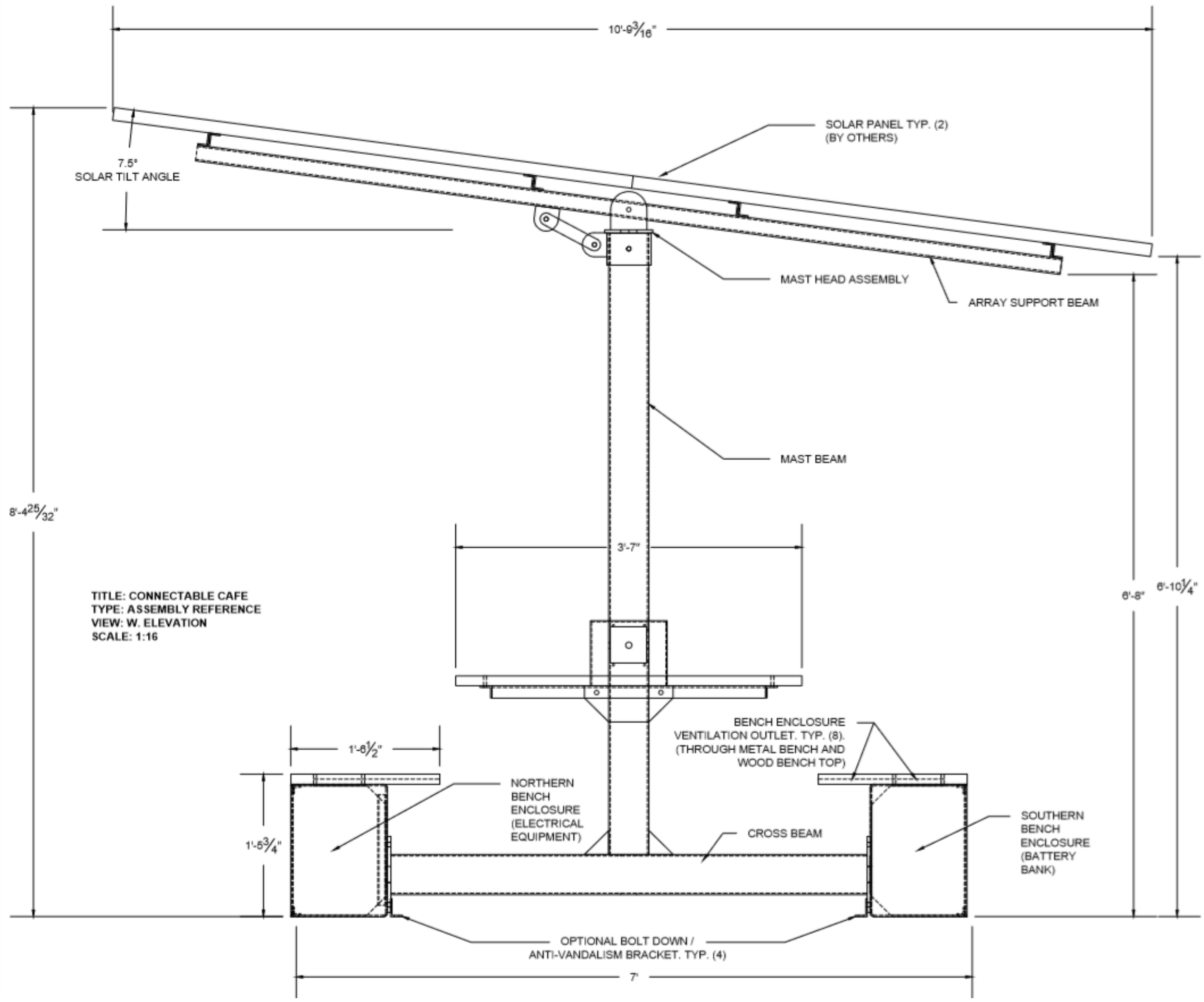

Figure 1. Campus XL measurement drawing depicting all exterior dimensions. Reprinted from the Sunbolt *Installation and Operating Instructions* (p. 21), by Sunbolt. (2018), Campus XL 2018 installation and operating instructions.

QR code prompt and website. The current study will implement use of quick response (QR) codes embedded into a 4” x 6” graphic prompt *(Figure 2)* posted to the solar charging bench that participants may use to be directed to the website of interest; in this case, the Western Michigan University Office For Sustainability website. The QR code was generated by the experimenters through *qr-code-generator.com*. When a participant opens the camera feature on their smartphone and has the QR code in the camera's view, they will be prompted to visit the website.

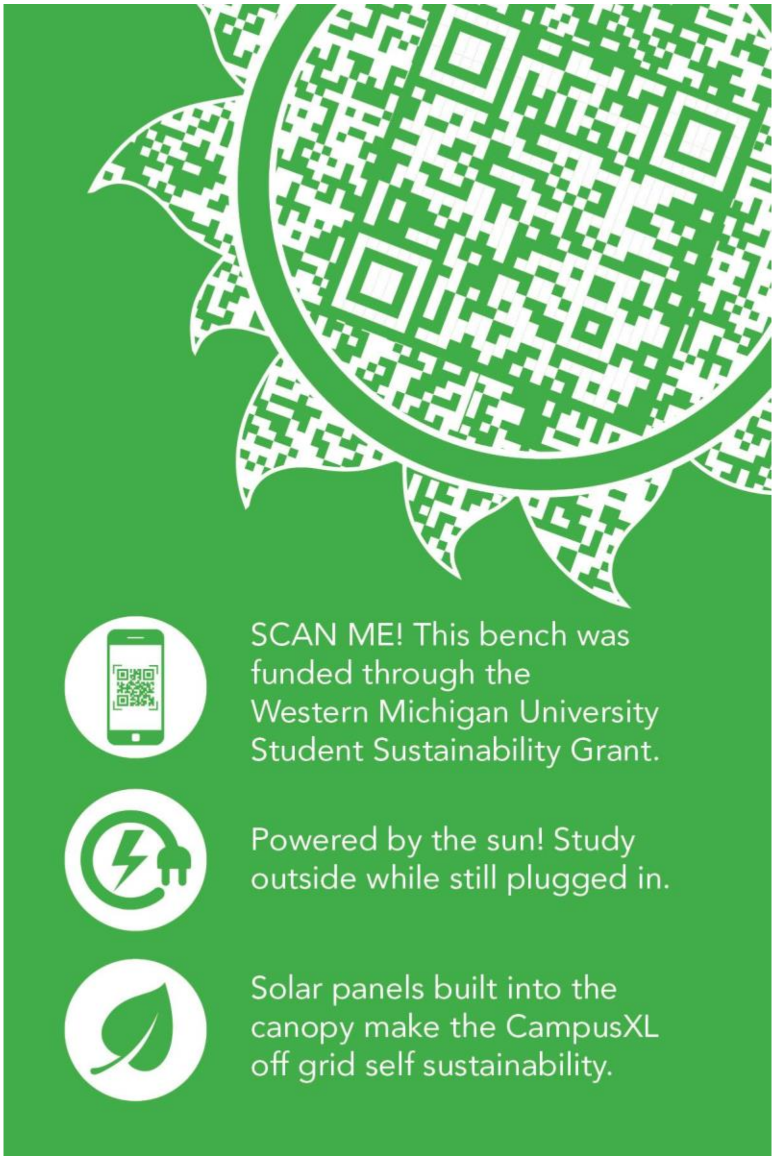

Figure 2. Graphic Prompt: 4.0" x 6.0" as it will appear on the Campus XL Bench. Developed for the current study by Brin Hamilton Photography and Design, (2019, February 11), Campus XL Info-Graphic [Digital image], Retrieved February 11, 2019.

Dependent Variable

A change in website traffic will be monitored from two different sources; from general website hits during baseline and during intervention, general website hits and hits generated by the QR code prompt which will have a unique signature.

Independent Variable

The intervention will be the installation of the Campus XL Solar Work Station and implementation of graphic prompts, see *Figure 2*, posted directly above the outlets on the center column of the bench, see *Figure 1*. The prompts will feature text telling users to learn more by scanning the QR codes featured on them which will direct them by way of unique URL to the Western Michigan University sustainability website. The QR codes generated online and posted on the bench will link participants to the Western Michigan University Sustainability website using a unique URL created using *Google Analytics* (Trevellyan, 2017) allowing for monitoring of website hits generated specifically from the graphic prompts on the bench.

Experimental Design and Procedures

This study will be run using an AB design. There are limitations with using an AB design, however, in the case of the current study, it will be necessary and some of the confounding variables will be removed. In AB designs, there is no opportunity for reversal, which is used to show that the intervention is the variable that is changing results. In the current study, a complete reversal would not be possible. Due to the size of the Campus XL and the one-time effort to install it as a permanent fixture on Western Michigan University Campus, there would be no way to remove it completely and then reinstall it. The graphic prompts can be removed, however, it is not necessary. The QR codes will be the only way to access the website on the prompts. That is, there will be no link displayed. Due to this, scans on the QR codes will generate their own unique URL allowing researchers to monitor which website hits come from the graphic prompts and which did not. The future research section will examine possible extensions of the study in relation to changing the graphic prompts. For the purposes of the current study, though, examination of just the implementation of the graphic prompts and bench are what will be analyzed.

Baseline. Baseline data will be collected by monitoring Western Michigan University sustainability website traffic before the implementation of the graphic prompts in the form of how many users, unique and repeat, visit the website on an average weekly basis. Baseline data will be collected for three weeks.

Installation of bench and QR prompt. The Campus XL will be installed on the steps of Brown Hall in Miller Plaza on Western Michigan University Campus (*Figure 3*) in fall 2019. The Campus XL will be shipped, by Sunbolt, its manufacturer, from Pennsylvania to Western Michigan University, and from there, facilities will complete installation using the installation guide provided by the company. Miller Plaza is an ideal location for the solar bench. There is a high amount of foot traffic from Miller Auditorium, Brown Hall, Dalton Hall, Sprau Tower, the Frostic School of Art, and the large parking garage for students, faculty, and visitors. This area will provide high visibility for the bench and show students the efforts Western Michigan University is making to be a sustainably responsible school. A solar bench in Miller Plaza would also bring a modern aspect of sustainability to an area of campus that may be lacking due to many older buildings. Intervention data will be collected for three weeks.

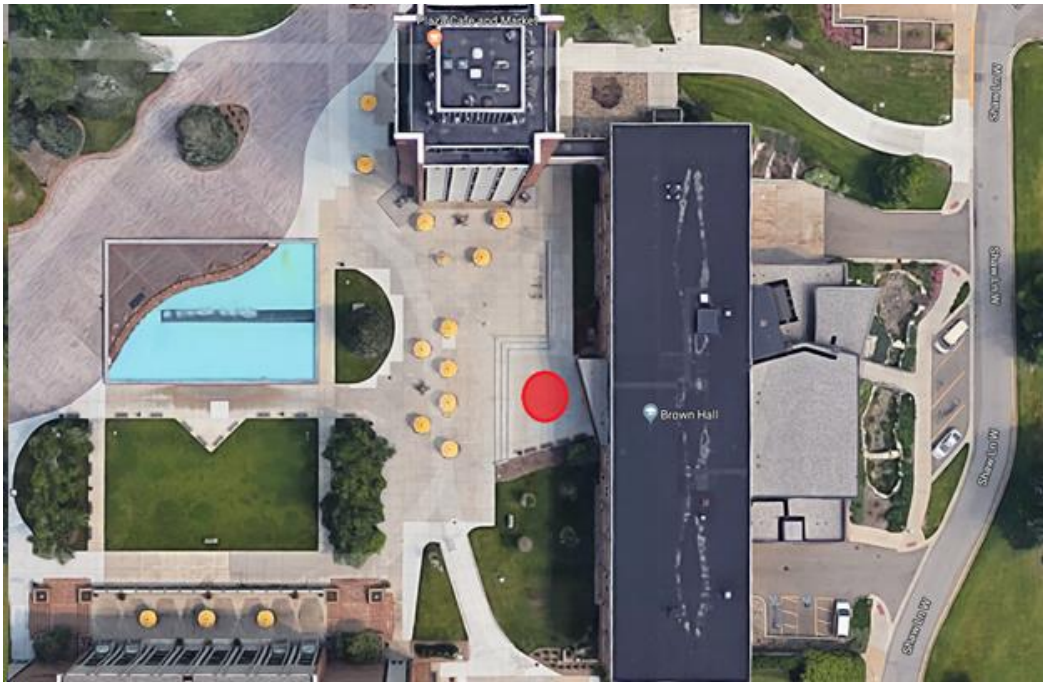

Figure 3.. Bench Location: Red area indicated on image is the approximate location of the Campus XL bench on Western Michigan University Campus. Adapted from Google, (n.d.), *Western Michigan University,* Retrieved from https://www.google.com/maps/@42.2798848,-85.6154256,106m/data=!3m1!1e3

Maintenance. Maintenance to the solar bench would include keeping the solar panels clear from snow and debris as well as diagnosing potential electrical problems. Western Michigan University landscaping takes care of the outside area around Miller Plaza, where the bench will be located, and would potentially be responsible for those tasks. The company who manufactures the bench, *Sunbolt,* can be contacted about electrical issues with the panels as they do include a twenty five year warranty on solar panel output. For the graphic prompts, student research assistants will be able to take care of anything having to do with placement or damage to the prompt.

Potential Results/Discussion

Potential Results

It is expected that with implementation of the info-graphic prompts, website usage will increase. Due to the QR code embedded in the prompts having a unique URL, a change from baseline to intervention will be analyzed using any usage of the unique URL and also a general increase in website traffic. The data to be analyzed will be a weekly amount of website visits specifically from scanning the QR code located on the Campus XL as well as a daily amount of all website visits.

Implications

If the results of the current study are as expected, from the aspect of the Campus XL having an acceptable amount of usage by those on Western Michigan University Campus, the university may take further action. The university has recently started construction on a new dormitory "neighborhood" and has multiple non-solar benches all around campus. After a meeting with the head of space management for the university, the possibility of more solar charging benches both in the new neighborhood and in replacement of current non-solar benches is very strong with positive usage of the Campus XL. The installation of more benches had implications within itself, such as the possibility to work bench power intake into the university mainframe and use benches to help power university buildings.

The current proposed placement of the bench also helps to spread the visibility of sustainability throughout campus. Currently, the sustainable interventions around the university are concentrated or difficult to see/interact with. For example, the newly-renovated building that has little-known solar panels and rooftop gardens is in one part of campus. This building is a talking point for sustainability on campus tour for prospective students. There is no way to interact with sustainable aspects of this building as with the solar farm on a satellite campus that is only visible from a highway. The placement of the Campus XL in a different part of campus, with high foot traffic and much older buildings, will help to spread sustainability throughout campus and also function as a way for students to directly interact with clean energy by charging their devices using energy powered by the sun. Students will also be more involved and informed about sustainability both from simple usage of the bench and interacting with the sustainability website by way of the info-graphic prompt.

In addition to visibility and interaction with sustainability, there is potential for students to be directly involved with sustainable research as a result of the installation of the bench and info-graphic prompts. Using a class titled *Behavioral Approaches to Sustainability,* students would be able to monitor energy intake, output, amount of plug-ins to the bench, and amount of website hits generated by the QR code graphic prompt. This would allow students to have a more involved interaction with sustainability and understand the implications of sustainable research and interventions. In addition to research on the current study by students, future research could eventually be conducted.

Future Research

The results of this study have potential for continued research. For example, there is the potential to collect demographic information. Scanning the QR code could still lead to the Western Michigan University sustainability website, but a small pop-up quiz about demographic information could be presented before access to the website. This would allow researchers to better their understanding of what types of people were scanning the QR code as well as a brief view of their current knowledge about solar power. Additionally, weekly visual feedback on energy saved by using the charging bench could increase usage, as it did in a 2007 study conducted by Petersen et al. which examined electricity and water use reduction in college dormitories by implementation of visual feedback. If the results do not turn out as expected, that is, participants are not scanning the QR code, changes to the graphic prompt could be made. This could be in the form of larger text, brighter colors, different placement of the prompt, or an incentive for scanning the QR code such as the chance to be entered in a giveaway.

Conclusion

The results of this study will have large implications on the visibility of sustainable practices at Western Michigan University. They will provide an outlook on how something as salient as the solar bench, when paired with prompts, contributes to student education on and engagement with on-campus sustainability. A furthered study that could gather demographic and baseline knowledge on sustainable practices would be yet another step towards making Western Michigan University one of the most sustainable college campuses. Furthermore, installation of this single bench, and positive study results, will open the door to installation of more benches thus keeping with Western Michigan University‘s goal of continuing to strive for a sustainable atmosphere.

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