



**ART on ART  
Final Report  
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Anjana Amirapu  
Alex Caryotakis  
Jennifer Truong  
Daniel Noakes  
Trevor McDonald

*Cully Nordby  
Academic Director of IoES*



**UCLA**  
Institute of the Environment and Sustainability

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## **I. Executive Summary**

The Education for Sustainable Living Program is “a statewide program that is centered on the education and promotion of sustainability” (ESLP ART website). The Action Research Teams are a two-quarter long part of this program and are comprised of teams of students who work with campus stakeholders to research ways to enhance sustainability in their areas of focus. Throughout its seven-year history, ART has helped shape the path the entire campus must take to reach its goals in sustainability. However, with data from 45 teams over seven years, it is difficult to summarize the effects of ART on campus sustainability and on those students, stakeholders, and staff that were involved in the program. To address these issues, faculty advisors Cully Nordby, Carl Maida, and Nurit Katz created the ART on ART team to evaluate ESLP ART, document the program’s accomplishments so far, and take note of any possible improvements for the program.

During winter quarter, we had to build our plans from scratch since our team was new. The first thing our team did was to read the final reports from all past ART teams and conduct literature review of all the teams. In each final report, we took note of the methodologies, metrics, and potential savings and compiled all of the data into a spreadsheet. Once we created the spreadsheet, we discovered that while some of the teams recorded quantitative data within their metrics, many of the teams only had qualitative data. These data were often times in the form of an educational survey on students’ sustainability knowledge and habits. After reading each report, we became interested in delving deeper into the lasting impact of certain teams based on the sustainability topics we were interested in. Thus, we created timelines for “mini-projects” that measured more specific impacts of certain teams. Lastly, in order to get input from

the stakeholders around campus who proposed the projects, we sent them a survey about their professional and personal experiences from participating in the program.

In spring quarter, we put all our planning from winter quarter into action. First, we sent out the stakeholder survey. Our stakeholder, Cully Nordby, also sent out a survey we designed to ART alumni to get input on how ART impacted their lives. We conducted in-person interviews (sometimes videotaped) with some of the stakeholders who have worked with ART for many years for more personal input. Meanwhile, each team member carried out their mini-project following their particular teams. They first took the recommendations from each team, then did an observation study of the sites where the teams worked, and finally took note if any work the teams did was still present. At the Earth Day Fair, we hosted a game where participants matched the pictures we took for our mini-projects to three sustainability categories (energy, water, waste). We also provided a suggestion box for people to give suggestions on what issues ART should look into next. Next, we created macro-analyses for six ART categories to see the program's overall impact on sustainability issues around campus. For our final projects, we compiled a video project of the stakeholder interviews and a campus map of all the areas the ART program has touched at UCLA.

## **II. Significance/Background**

Our team was the first team in the sense that we were the first team to look at the ART program in its entirety instead of a certain sustainability issue on campus. In the past, our stakeholder, Cully Nordby, had been praising the success of the ART program but had no concrete documentation to back her statement, which is where our work comes in.

Another reason for the creation of our team was to conduct a meta-analysis on the ART program as a whole. Prospective, current, and past stakeholders were interested in seeing how ART has helped the campus reach its goals outlined in the Climate Action Plan.

Finally, to focus on the future of ART, we wanted to see if recommendations suggested by past ART teams were carried out and are still noticeable today. That way, we could suggest improvements for the ART program so that it continues to help campus sustainability.

### **III. Objectives/Goals**

One goal of our team is to summarize the ART program's impacts on campus sustainability and how it personally impacts students, faculty, and stakeholders alike. The summary of the program will help give a sense of why the ART program is important in both shaping campus sustainability and providing meaningful learning experiences for students and stakeholders alike.

Another goal of our team is to collect quantitative data from what ART has done in the past. This data could be used as substantial evidence for showing how ART has made an impact on the campus.

A third goal we have is to gather qualitative information on the value of the program through interviews, surveys, video footage, and visual media. We will then later present this information in various aggregates that illustrates ART's successes, impacts, and potential areas of improvement. From there, everyone involved in ART can receive input from many perspectives on how to make ART as successful as possible.

## **IV. Methodologies**

### Initial Conditions

Our initial condition was essentially a blank slate. There had been no ART on ART team before us. Our stakeholder, Cully Nordby, provided some initial guidelines in that she wanted quantitative metrics to summarize the program as a whole. For that reason, we started our literature review and data analysis. Later on, our team also came up with a video project and stakeholder interviews as part of our research when Cully encouraged us to examine the personal impacts of the program. It was thus a combination of student and stakeholder efforts that brought us to the methodologies outlined below.

### Timeline

#### **Winter Quarter**

- **Weeks 1-5: Literature Review.** Organized the final report analyses according to an outline Anjana created. Every member had around 7-8 final reports to read. We organized information from our analysis into an Excel spreadsheet. We created the categories energy, water, waste, sustainable foods, economic savings, and education to divide up the information in the final reports.
- **Week 5:** Started work on a survey that would capture stakeholder opinions of the ESLP ART program. Alex designed the survey. Alex and Anjana reviewed it with Cully and the team. It was ready to be sent out by the end of the quarter. Anjana also started to design an alumni survey.
- **Week 7 and 8:** Alex and Anjana created an informal methodology (“mini-projects”) to research whether or not recommendations from specific teams were implemented or

continued. The mini-projects consisted of visual documentation or stakeholder interviews. Each team member had to pick one team to follow up on.

### **Spring Quarter**

- **Week 1:** Sent out stakeholder survey. Each member had a group of stakeholders to send this survey out to.
- **Week 2:** Each member created a plan for their mini-project to be approved by Alex and Anjana.
- **Week 3:** Team members started to gather information and visuals for mini-projects.
- **Week 3-Week 8:** Select stakeholders were interviewed to better understand whether ART recommendations were continued. Some of these stakeholders were interviewed by Anjana for a video about the program's personal impacts on stakeholders, students, and faculty.
- **Week 4:** Alex, Trevor, and Anjana met ESLP ART's founder, Edward Murphy, to discuss motivations for creating the program and to get any recommendations for the program in the next years.
- **Week 5-6:** Anjana created a map of all the ESLP ART team locations on campus. Alex and Anjana presented for the Sustainability Committee's last meeting on May 8th. Team members finish mini-projects.
- **Week 7-9:** Team started macro-analysis. This analysis grouped all the data collected into the following categories: energy, waste, sustainable food systems, water, hospital, and green buildings. Alex also finished the alumni survey started by Anjana in the Winter. The survey was distributed during week 9.
- **Week 8-10:** Team cleaned up ART at a Glance spreadsheet, started final report, prepared

for final presentation.

## **Quantitative Methods**

### *Literature Review*

Anjana Amirapu created an outline format to help our team members uniformly evaluate past ESLP ART team final reports. This rubric can be found in Appendix X. We also have included the way we split the readings in Appendix I. Essentially, we wanted our team members to be critical of each team's methodologies, research results and metrics on environmental and monetary savings, discussion, and recommendations. We used our literature review results to create the broad categories we wanted to break down the analysis of the program.

From this literature review, we created a spreadsheet to keep track of all the teams, their metrics, and stakeholders to make our subsequent projects and analyses easier to conduct. A modified version of this spreadsheet, named "ESLP ART at a Glance," was created with the intention that future ART teams utilize it as a valuable resource. This is available on Appendix II. The major results are described in our Results section in much greater detail.

### *Macro-analysis*

After our team decided against our initial metrics compilation strategy of adding up metrics from each report (since hard metrics were not easily found), we turned to a more general approach. With the help of our stakeholder, we decided to split up all the teams into six categories: energy, waste, water, sustainable food systems, hospital, and green buildings. We would then combine metrics for each of those categories. The outline for our macro-analyses was as follows: pull out hard metrics (such as gallons or kWh), potential metrics (such as potential savings from lighting retrofits), outreach numbers (from surveys or tabling fairs), and knowledge gathered (for those teams that conducted research which didn't result in any of the above



metrics) for each category. We also recorded the areas of campus addressed by each category and wrote a summary of the overall goals of the teams under each category.

The macro-analyses were a good way to organize metrics from the 45 teams into digestible chunks. They also simplified the process of writing our final report, since the results were already compiled into six distinct categories. Finally, the macro-analysis categories are a good first information source for those interested in the effect of the ART program. Through each macro-analysis category, one can take a quick glance and understand what the program is about and what it has achieved.

### Qualitative Methods

#### *Mini-Projects*

Each team member was responsible for evaluating whether or not specific ART team changes and recommendations were implemented or had sustainable outcomes. These evaluations were meant to be surface-level investigations and also meant to have a visual component when possible. The results of the mini-projects have been incorporated in the results/discussion section.

Anjana chose to follow whether or not any produce or meat vendor recommendations from the Sustainable Food Systems 2013 team were being used by Sproul Dining Hall. She was also interested in whether or not UCLA's purchasing efficiency, the percent of total food purchases that are sustainable divided by the per plate cost, has increased from 2.28, the value found by the 2012 Sustainable Food Systems team to be the lowest in the UC system. She interviewed Aliana Lungo-Shapiro and found that one of the produce vendor recommendations, Greener Fields Together, was being utilized by Sproul Dining. However, UCLA Dining did not act on the meat vendors because its procurement process is much longer. Finally, UCLA Dining

had not recalculated their purchasing efficiency rate since 2012, something that Aliana had expressed that a potential team could redo.

Alex's mini-project examined the legacy of energy and water teams that worked in on-campus housing. Two teams, the 2013 Water Action Plan team and the 2011 Hill Energy Metering Project Team, put up water and energy conservation signage in housing. Alex walked through dorm buildings searching for traces of previous ART teams' signage. Although none were found, an interview with housing sustainability director Aliana Lungo-Shapiro revealed that to establish energy and water conservation signage requires approval from the Office of Residential Life as well as funding. As a result, such signage is still in the works. However, a video the 2011 HEMP team created on thermostat usage is still distributed to students, and it seems these two teams' research has led to a discussion in UCLA Housing about installing permanent conservation signage.

Jennifer Truong wanted to know if the native and drought tolerant plants planted by the Native and Drought Tolerant Vegetation 2010 Team on Hilgard were still present. She took pictures of the area, counted numbers of plants and their species, and she looked for other drought tolerant plants on campus. She found that agave and blue fescue were dominant in this area and that they were in other areas on campus in Bombshelter. These were two recommendations that were achieved.

Daniel Noakes wanted to know if the shower aerators that ZBT had installed, per the 2010 Green the Greeks' Team, were still present and if their projected \$5,000 a year savings were actualized. He interviewed a current ZBT resident to see if the shower aerators were still there. The resident confirmed that they were, but added that the brothers in the house did not use the fixtures often because of the comparatively low water pressure.

Trevor McDonald examined the changes made over three years and three teams in John Wooden Center. These changes were: low-flow showerheads installed in the John Wooden locker rooms, recycling systems installed by the 2010 JWC team, and the vegetation changes made by the 2011 team. He took pictures of the changes that he found. He unfortunately could not get an interview with Rich Mylin due to his inavailability in the latter half of the quarter.

### *Stakeholder Survey*

Equally important to gathering quantitative data on the impacts of the ART teams was gathering data on the personal impacts of the program. We did this through surveys of both ART stakeholders and ART alumni. Our surveys sought to discover how the ART program changed the opinions of students and stakeholders with regards to sustainability, UCLA, and their own agency. We chose SurveyMonkey to create, distribute, and analyze our survey.

The stakeholder survey took longer to develop than the alumni survey. We had difficulty formatting it in a way that would accurately capture the opinions and recollections of the 46 stakeholders without taking a large amount of time. We decided to create four different stakeholder surveys: one for stakeholders who participated once, one for stakeholders who participated multiple times, one for Nurit Katz, and one for Robert Gilbert. We did this because many ART stakeholders have had two teams, six stakeholders have had three or more teams, and the latter two stakeholders, Nurit Katz and Robert Gilbert, have been involved in seven and eleven teams, respectively.

We eventually settled on a multiple page survey format, in which each page corresponds to a different team and year. We designed survey questions that would result in hard data (obtained from yes/no questions or rating scales) and soft data (in the form of “fill in the blank” questions). The questions can be split into three categories: those that gathered information on

the origin of the team, those that asked for the accomplishments of the team, and those that asked for the influence ARTists have had on stakeholder opinion of students, UCLA, and the ESLP ART program as a whole. The origin questions asked who initiated the project topic (student, stakeholder, or collaboration) and what areas of sustainability the team addressed. The accomplishment questions asked the stakeholder to determine whether or not the team was successful (yes/no) and comment on why or why not the team was successful. Another accomplishment question asked whether or not the team's recommendations were implemented (yes/no). Lastly, the stakeholder influence questions ask the survey-taker to rate the degree to which ART has impacted them personally and to add any future recommendations for the ART program.

The survey was distributed via email. Within the email body our team added hyperlinks to the final reports for each team the stakeholder worked with. This allowed the stakeholders to refresh their memories before filling out the survey. The survey was sent out in the last weeks of winter quarter. Our team sent out reminders two and four weeks after the initial distribution. Our stakeholder, Cully Nordby, sent out a final reminder during 8<sup>th</sup> week. In the end, we collected 24 responses out of 45 stakeholders.

### *Alumni Survey*

The alumni survey was a much simpler design than the stakeholder survey. It consisted of 12 questions on 2 pages. The questions sought to answer what area of sustainability students were interested in when they first joined ESLP, how ART changed their views on sustainability, how ART impacted their success in class work or careers, and how ART changed their sense of personal agency in effecting change at UCLA. We used rating scales, check box questions, and fill in the blank question designs for the alumni survey.

The alumni survey was sent out at the end of spring quarter. Our stakeholder sent out the emails for the alumni survey to maintain the privacy of alumni. We have collected 23 responses thus far. Cully Nordby intends to analyze the survey further.

### *Interviews*

Our team used stakeholder interviews as a method to follow up on the actions and recommendations of past ART teams as well as to find out stakeholder opinions of the ESLP ART program. Some interviews were part of a larger mini-project, such as that with Aliana Lungo-Shapiro about ART impacts on UCLA housing, while others were with key figures in the program who could provide overall insight, such as Edward Murphy, Nurit Katz, and Ichiro Nishimura.

One of the ESLP faculty advisors, Carl Maida, urged our team to interview Edward Murphy. We arranged an interview with Eddy in the beginning of Spring quarter to learn about why he founded the program, what his vision for the program was back then, what lessons he learned from ESLP ART, and what he sees as the future of the program.

Nurit Katz was an important stakeholder for us to interview because of her extensive involvement with the program (11 teams) and her position as Chief Sustainability Officer at UCLA. Our team thought that Nurit would have valuable information as to how the ART program impacts sustainability at UCLA and why ART is important.

We interviewed Ichiro Nishimura since he was one of the first stakeholders in the program and also one of the most receptive to the idea of bringing sustainability concepts into his department. His feedback was vital to understanding how changes made by ART can last.

Our team also interviewed Pete Angelis of Housing and Hospitality Services to get perspective on ESLP ART from a Vice Chancellor.

The remaining interviews sought specific information from stakeholders about the impact of certain ART teams. We asked Aliana Lungo-Shapiro about the effects of the 2013 Water Action Plan team, which researched drought tolerant landscaping on the hill, the 2011 Hill Energy Metering Project team, which installed signage to encourage energy conservation, and the 2012 and 2013 Sustainable Food Systems teams, which researched sustainable vendors for UCLA dining. We also talked to Todd Lynch of Capital Programs, a stakeholder for many green buildings teams, about his experience working with students. We interviewed Jon Smithers from facilities about the potential retrofit of Engineering IV researched by the 2012 Energy Team. Transcripts for interviews with Aliana Lungo-Shapiro, Ichiro Nishimura, Todd Lynch, and Jonathan Smithers can be found in Appendix 3. The rest of the interview results can be found in our videos.

### **V/VI: Results/Discussion**

We have divided our results into two categories: Macroanalysis of ART's Impact on Campus Sustainability and ART's Personal and Professional Impacts on Stakeholders and Students. Initially, Cully wanted to organize our analysis according to a schematic known as the three pillars of sustainability: environment, economy, and social equity. We all soon realized that while all the teams' projects had an environmental focus, they did not neatly fit into the three pillars schematic. We first divided the teams that had the most obvious environment focus into the following sub-environmental sections: water conservation, energy conservation, and waste management. Of the remaining teams, we divided them into their subject area focuses, such as sustainable food systems and green buildings. Given that these two subject areas are much more fluid than the three pillars categories, we believed that treating them as their own areas of

analysis was best. We analyzed hospital sustainability as its own category because of the long history of teams working with hospital and because hospital operations are distinct from other operations at UCLA. Finally, we recognize that only two ART teams had a social equity component, Responsible Investment and Fair Trade, which we addressed in our last area. For our macroanalysis, the majority of our information came from our literature review, mini-project follow-ups, and interviews with stakeholders. For our professional and personal impacts, much our data came from the stakeholder survey results and interviews with stakeholders.

Here are summary tables of the metrics we have collected and outlined in the paragraphs below.

Total Metrics (See Appendix for Specific Breakdown)		
	Realized	Potential
<b>Energy</b>	674,063 kWh	88,000 kWh/year
<b>Water</b>	5,690,000 gallons	3,888,000 gallons/year
<b>Waste</b>	1000 lbs	400,000 lbs/year
<b>Economic</b>	\$100,791	\$59,000/year
<b>Outreach</b>	3847 survey responses	N/A

ART Overview (As of 2013)	
<b>Students</b>	204 (30% participate >1 time)
<b>Stakeholders</b>	46 (13 repeat, 33 single)
<b>Credit Hours</b>	39,000
<b>Teams</b>	47

### Macroanalysis of Environmental Impact

#### Water Conservation

The overall goal for these teams was to reduce water usage around campus in order to meet requirements of UCLA’s Water Action Plan, requiring a 20% reduction in water use by 2020. These teams addressed areas such as John Wooden Center, Zeta Beta Tau housing, the

Intramural Field, The Hill and Powell Library. A total of 8 ESLP ART Teams over the past 8 years have worked under the heading of water usage reduction. There were three primary approaches these teams took in attempting to achieve this water reduction: implementing water conservation devices, introducing native and drought-tolerant landscaping or artificial turf, and educating the UCLA community on ways to reduce individual and everyday water waste through signage and surveys.

Teams typically installed water conservation appliances in order to reduce water usage. In 2010, the John Wooden Sustainability team replaced 2.5 gallon per minute showerheads for 1.5 gallon per minute versions, which save about 1.4 million gallons of water per year and result in financial savings of \$15,000 per year. The Green the Greeks Team of 2012 installed house sink aerators and low flow showerheads in the Zeta Beta Tau house, resulting in savings of 5,236 gallons per year and about \$1,400 per year. In addition, many teams recommended projects for potential savings. The Water Action Plan of 2013 team found that if 8 second metered sinks were installed and operated for 5 years, \$4,000 and 618,000 gallons of water per year could be saved. The Green the Greeks team of 2012 estimated that 3.24 million gallons of water could be saved by installing low flow showerheads and sink aerators in all Greek houses. In total, if all actual and potential implementations were made, a total of over 5.25 million gallons of water could be saved per year. According to the EPA, this is equivalent to the usage of approximately 300 households on an annual basis.

Another approach to water usage reduction that ART teams took was the implementation of less water-intensive landscaping practices. The Native/Drought Tolerant Vegetation Team of 2010 enacted the installation of native and drought tolerant plants along with the required drip lines of 0.6 gallons per hour. These plants only required to be watered once a month rather than



twice a week. This action effectively reduced the number of watering cycles to one eighth of the previous frequency. Another area where the campus could reduce water usage immensely is through replacing large grass areas with artificial turf. The Artificial Turf Team of 2009 surveyed 293 students in order to gauge the preferences of turf over grass. The team found that students on average did not have a strong dislike for artificial turf. The Water Action Plan of 2013 gathered 130 student responses to determine preferences for xeriscaping and artificial turf as well. This team also calculated that switching Canyon Point on the Hill to artificial turf would save 22,000 gallons per year. Additionally, other potential metrics were calculated. The 2009 team suggested that the installation of artificial turf on the intramural field saving an estimated 1.17 million gallons of water per year which is equivalent to \$55,000 per year. The project of installing artificial turf is in the works.

In an attempt to reduce water usage through behavioral change, ART teams made the following efforts to educate students. In order to change water usage habits, the Green Living Project: Water Team of 2009 observed 942 students habits regarding water usage. They analyzed water usage during showering periods and flush data to determine low flow and peak flow hours. Furthermore, the John Wooden Team of 2011 saved an additional 25,000 gallons of UCLA's water annually through the "Tanks for Towels" campaign which incentivized students to bring their own towels to the gym in order to reduce water and energy use. However, these savings claimed by the "Tanks for Towels" are somewhat misleading. Since the towels must be washed somewhere there are no actual savings in water or in energy as a result of this campaign.

ESLP ART water teams have done a fantastic job at looking at micro and macro solutions in order to reduce our water usage on and off campus as well as outreach. As you can gather, our

water teams have done a great deal to decrease water usage through superior appliances and altered landscaping in addition to improved education on a more individual level.

### Energy

The overall goal for the Energy teams was to achieve energy savings through lighting retrofits and energy efficiency education. Teams gathered important data to determine a baseline of student energy use both on and off-campus. Energy teams have addressed Ackerman Union, Engineering IV building, John Wooden Center, off-campus housing and on-campus housing. There have been a total of 10 teams that have worked on saving energy around the UCLA campus. The two primary approaches to energy savings that we observed were implementing efficient electrical fixtures and enacting behavioral change.

The implementation of energy efficient fixtures was enacted through the following teams. The JWC of 2012 team found that with their installation of motion sensors the JWC could assume a reduction in lighting use from 24 hours to 16 hours per day. This would amount to savings of about \$6,000 per year or 66,000 kWh/year. The 2010 John Wooden team installed 78 lower wattage bulbs on Collins Court resulting in savings of approximately 87,000 kWh/year and \$13,228 annually. Other potential savings were calculated by the Energy team which found that \$4,200 savings per year and 47,000 kWh per year savings could be assumed through retrofits of the Engineering IV building by installing energy efficient lamps and removing unnecessary lighting elsewhere. Overall, the implementation of energy efficient fixtures has resulted in the reduction of approximately 200,000 kWh and \$23,500 per year. 200,000 kWh/year corresponds to approximately 20 households.

A complementary approach was to encourage energy conservation through behavioral change methods. More specifically the John Wooden Sustainability Team of 2010 initiated the

“Tanks for Towels” campaign, which involved students and faculty bringing their own towel to the gym in exchange for a free tank top. This saved about 2,500 kilowatts per hour for the JWC. The following year, The Hill Energy Metering Project (HEMP) Team of 2011 estimated that 42,207 kWh could be saved through signage that encouraged energy saving behavior and discovered that students in rooms with energy consumption displays reduced their energy usage by 30%. In addition the Energy teams received nearly 2,000 survey responses about various energy- reduction projects and initiatives on campus.

As a whole, ESLP ART energy teams have made great steps towards reducing the energy consumption of the UCLA campus. Teams focused on the installation of more energy efficient fixtures along with attempts to improve individual energy conservation through educational efforts.

### Waste Management

The overall goal for Waste teams is to study the waste streams of UCLA, reduce the amount of waste, and divert that waste to recycling, compost, or other waste streams in order to meet the campus goal of Zero Waste by 2020. Many projects measured the initial conditions to determine a baseline to track their project’s success against. These teams addressed Lu Valle Commons, Ackerman Union, Pauley Pavilion, John Wooden Center and the Hill. Over the years, 15 ART teams have worked under the heading of waste reduction.

For example, the Tobacco Free Campus team of 2013 calculated that there was a shift from 600 median cigarette waste to 160 median cigarette waste after the no-smoking ban was established on campus. In 2012, the Compost team collected about 1,100 pounds of food waste. Additionally, in 2011 the Recycling Team held a competition that decreased total waste in Bunche by 65% and decreased single stream recycling to 48%. In order to address paper towel

waste, the 2011 ASUCLA team installed 6 hand dryers to reduce paper towel waste in bathrooms. Lastly, other initiatives from the 2010 Green Orientation team made an effort to distribute reusable water bottles in order to reduce plastic bottle waste. Along with these projects, many waste teams conducted waste audits to determine the amount of compostable, recyclable and landfill waste in various locations. As a result of the waste audits, a variety of recycling bins were placed accordingly in locations such as Weyburn Terrace, and Weintraub Lab.

These teams have made great strides in developing and implementing strategies to inspire waste-savings on and off campus. Through their waste audits they have collected valuable data in identifying areas of campus that could benefit from improvements in their waste handling practices.

### **Subject Area Focuses**

#### **Green Buildings**

The overall goal for these teams was to improve campus awareness of LEED and green building practices through research and development of an effective communication strategy to reach students and visitors alike. These projects have addressed or inspired LEED certification in De Neve, Court of Sciences Student Center, Covell, Canyon Point and Bradley International Hall. The 2012 and 2014 teams have been catalysts to gaining LEED certification, inspiring other buildings to seek out credits for certification and significantly improving the awareness of green building practices at UCLA. For example, at the 2014 Earth Day Fair, the Green Buildings team was able to obtain over 80 survey responses. The 2014 team has also gained access to the Energy Star Portfolio Tool, which has allowed them to gather data to create a baseline for various buildings. This information has present value and future value in that it will set the foundations for data collection so that future teams can more easily create LEED credit proposals. The LEED

Certification and Green Buildings teams have been outstanding in regards to institutionalizing the comprehensive approach that LEED brings to sustainability. These teams will continue to educate and spread awareness through student surveys, LEED certified panels, and future team research.

### Hospital Sustainability

The goal of the Hospital Sustainability Teams was to improve sustainability measures at the Ronald Reagan Medical Center. The primary focuses of these teams were waste diversion and improved education. The 2013 Hospital Sustainability Team's primary action was altering signage on trash bins to increase the amount of waste that is composted by the Ronald Reagan Medical Center. As for education, the Hospital Sustainability teams have held interviews with doctors and hospital staff members, surveyed nurses, and held an Earth Day Fair in conjunction with the hospital. There is now a Sustainability Task Force in place at the Ronald Reagan Medical Center that may have been influenced by ART. This task force has now taken over where ART left off in the efforts to making the Ronald Reagan Medical Center a more sustainable facility.

### Sustainable Food Systems

Teams in this area have worked exclusively with On-the-Hill Dining and focused on reducing waste and increasing the amount of local and sustainable options students encountered. The 2008 Waste Watchers measured the amount of food wasted in De Neve during dinner time and found that on average, students wasted 0.2 lbs of food, or the equivalent to two slices of bread. Their findings were documented by UCLA Media and the Daily Bruin and were responsible for the "Go Trayless" signage found in dining today. The 2012 SFS team researched UCLA's current status in terms of sustainable and local food products. They found that UCLA

had the lowest amount of the sustainable purchases in dairy and meat and that it had the lowest purchasing efficiency. Anjana's interview with Aliana noted that these numbers have not been recalculated. The 2013 SFS Team recommended 5 produce vendors and around 15 meat vendors. Aliana noted that one of the five produce vendors, Greener Fields Together, was currently being used by Sproul Dining and the vendor was featured in the Daily Bruin in an Earth Day feature.

### Social Equity

Finally, the 2011 Fair Trade Team and the 2012 Responsible Investment Team were the two teams that dealt with issues of social equity. Fair Trade coffee is being offered by Ackerman Union, yet Cully would have liked to see organic coffee as the primary option available on campus, a task ASUCLA has been reluctant to do. The Responsible Investment Team had a stakeholder who was difficult to get in touch with. Our Director Cully Nordby would like to see more social equity teams.

## **ESLP ART's Professional and Personal Impacts on Stakeholders and Students**

### Stakeholder Survey

The results of the stakeholder survey were very encouraging. To start with the origin questions, we found that the initiation of project topics is mostly stakeholder driven (44% of teams), followed by a result of a collaboration between students and stakeholders (41%) and then by students themselves (16%). In terms of what areas of sustainability the teams changed for the stakeholder's department, the most popular answers were educational outreach, energy savings, water savings, and waste diversion. For the accomplishment questions, we found that 93% of stakeholders named their team's project as successful. Elements that characterized successful teams were student effort (40% answered yes), communication between stakeholders and students (30%), initial departmental need for an ART team (10%) and a clear project objective

(10%). Elements of an unsuccessful project, although an unsuccessful project was rare as seen above, were not driven by students. Reasons that stakeholders named were difficulty finding time to manage the project (30%), lack of scope definition (20%) and lack of communication (20%). No stakeholders named lack of student effort as a reason for an unsuccessful project. Lastly, the influence questions also yielded positive results. The stakeholders were asked to rate the following statements on a scale of 1 (disagree strongly) to 5 (agree strongly).

*Working with the ART team positively impacted the way I view: the impact of students at UCLA, sustainability at UCLA, interactions between students and faculty at UCLA, and my work experience at UCLA.* The ratings of the four statements were, 4.1, 4.1, 4.1, and 4.0, respectively.

As interpreted by our team, the results from the stakeholder survey serve as a mandate for the ART program to continue for years to come. Stakeholders seem to love the program for the opportunity to incite change in their department and to work closely with students. In fact, 88% of stakeholders surveyed said they would like to be stakeholder again in the future. Being a stakeholder for the ART program is certainly in high demand.

### Alumni Survey

Here is a snapshot of the results of the alumni survey thus far.

89% of alumni answered that they accomplished what they set out to do for their ESLP ART project. The four most popular choices of aspects of ESLP ART that enhanced the educational experience of alumni were team dynamics, interactions with stakeholders, project management skills, and the ability to design an independent project. The average ratings for the following question:

*On a scale from 1 (strongly disagree) to 5 (strongly agree), rate the following statements, The ESLP ART program had a positive impact on my success in: academic coursework, jobs or*

*internships, and graduate or professional school* were 3.75, 3.93, and 3.9, respectively. Lastly, the average rating for the rating scale question of whether or not participating in ESLP ART had a positive impact on the way alumni view their ability to effect change in the world was 4.13.

These preliminary results are encouraging, and our team has found that alumni have a positive memory of ART. Further analysis of this alumni survey could be a future project, either for another ART on ART team or the advisors and directors of the program itself.

### Interviews

Our interview with Edward Murphy gave us the important concept to look towards the future of the program. Eddy explained that the seven-year-old program needs to reevaluate itself in order to have success in the next seven years. He also introduced us to the idea of creating a rubric to provide a guideline for the qualities that make up a successful research team.

Our interview with Ichiro Nishimura provided good overall information about the ESLP ART program. Professor Nishimura emphasized that for sustainable change to last, there must be an institutional memory of the changes. For example, the team that worked in Nishimura's Weintraub Lab in 2008 instituted white paper recycling for the first time. Though the white paper recycling bins are still there, Professor Nishimura remarked that students in his lab do not use them correctly. He explained that lab workers must be regularly educated on how to recycle properly for the changes made by the ART teams to last. This is too much work for the lab directors, but it hints at a possible topic for future ART teams: sustainable education.

Pete Angelis believed ESLP's greatest strength is that students can research other students' behaviors, learn from their peers, and retain important lessons on sustainability for the rest of their life. Given that 11,000 students live on the hill, Mr. Angelis believes that ART teams produce valuable data that can impact a high number of students.

Anjana's interview with Jonathan Smithers provided an impressive metric about the 2012



Energy Team. The retrofit that the team recommended was indeed completed in November 2013, resulting in energy savings of 148,394 kWh/year, which was beyond initial estimates.

## **VII: Recommendations**

Our first recommendation is for the ART directors to encourage ART teams to continue where other related teams left off. In general, we found that more was accomplished when ART teams built on each other, such as the Hospital Sustainability and John Wooden teams. To facilitate this, we suggest the following becomes a requirement of each team: each ART team reads all the final reports that relate to its topic before planning the quarter's research. This will situate team members in the timeline of changes by ESLP ART. They also must be able to demonstrate how their team has contributed to their area's growth.

We also recommend that team leaders meet with stakeholders early on in the quarter to discuss the overall scope of their project. This may minimize the time it often takes teams to scale down from a larger idea to a smaller, more manageable one.

Next, we recommend the creation of a rubric that would give an idea of how a successful research team operates. This would give team members and leaders a framework to relate to and to base their two quarter's research off of. Perhaps a future ART on ART team could work with Cully Nordby, Carl Maida, and Edward Murphy to develop such a rubric.

Lastly, we recommend that a future ART team is created for the purpose of sustainable education and signage. Standardizing and installing sustainability signage around campus would have a great effect on the energy-usage, water-usage, and recycling behavior of the campus community. Also, as Ichiro Nishimura pointed out, for sustainable changes to last there must be an institutional memory of why the changes were made. An educational team could work

towards keeping sustainable changes in the minds of the UCLA community. We believe these two research topics could provide a year or two year's worth of work, at the least.

If the ESLP ART program decides to have another ART on ART team, we believe that this team should look into the continued impact in the following areas: ASUCLA, social equity, and education. We also believe that the next ART on ART team can implement the rubric instead of the directors.

## **Conclusion**

Water, Energy, Waste, Sustainable Foods, LEED Assessment, and Hospital Sustainability are a few of the general categories that the Education for Sustainable Living Programs Action Research Teams have addressed in their projects. All of these projects seek to address the three pillars of sustainability: environment, economy, and social equity. In order to create a successful and sustainable solution, all pillars must be addressed. To achieve true sustainability the world must be perceived as an interconnected system. ESLP ART has achieved this by working in all areas of UCLA, physical and conceptual, to improve sustainability as a whole. Although ESLP ART projects works at the regional level, its participants go on to influence behaviors, create knowledge, and lead the movement to disseminate sustainable practices and knowledge.

## **Appendix I.**

### Literature Review Guidelines

- Summarize the Summary
- Team Objectives/Goals
- Research Methodologies
- Data
- List Recommendations
- Mention what the team did well on
- Mention what the team could improve on
- What are areas to investigate continued impacts\

## **Appendix II.**

“ART at a Glance” Excel sheet is too large to be hosted here. Please visit at this link:

[https://docs.google.com/spreadsheet/ccc?key=0Am-bTExjR46RdDVLSGtiblIDYTAyZEJ2OWhFTkJvcGc&usp=drive\\_web#gid=0](https://docs.google.com/spreadsheet/ccc?key=0Am-bTExjR46RdDVLSGtiblIDYTAyZEJ2OWhFTkJvcGc&usp=drive_web#gid=0)

## **Appendix III.**

### **1. Alex’s Interview with Aliana Lungo-Shapiro**

**Water Action Plan (2013): conducted research on campus plumbing fixture changeovers and residential landscaping changeovers.**

**Did this ART team’s work influence the changeover to artificial turf in some areas of the Hill? (outside Holly, for example).**

*All existing artificial turf installations were complete prior to the 2013 ART. However, it is my understanding that there are a few small installations of artificial turf that might have been influenced by the ART.*

**What has happened to the mirror clings the 2013 team put up to remind residents to save water? Did the team’s initiatives lead to more water conservation signage on the hill?**

*I needed to get approval from Housekeeping and the Office of Residential Life to get those made and distributed. I’m still working on these and would like to see these implemented in the next year. Funding is likely a necessity.*

**Hill Energy Metering Project (2011): Put up reminder stickers next to thermostats and light switches in Rieber Vista to encourage energy conservation. Created a “how-to” video on thermostat usage.**

**Are there currently any resources about thermostat usage that students on the hill can access?**

*What specifically do you mean by “thermostat usage”? The rooms are not metered by end use, so we cannot track electricity use resulting from A/C demand.*

**Is there currently any energy conservation signage inside rooms on the hill?**

*No, unfortunately not at the moment. This requires another conversation with Housekeeping to develop something that they approve of. I am unsure if there was signage in the rooms during the ART project.*

**If so, did the 2012 ART team influence the existence of either energy conservation signage or video content on the hill?**

*I am unaware of additional influence, but the videos continue to be shared with all residents.*

## **2. Anjana’s Interview with Aliana Lungo-Shapiro**

### **Produce Vendors**

*Pursued one of the recommendations—already pursuing before the ART—team helped confirm decision of dining staff to continue pursuing the vendors. They were known as Greener Fields Together, a subsidiary of Family Tree.*

*Vendor that could provide details on the source of produce the vendor had education and outreach and a newsletter and local sourcing --- greener field is the education outreach and family tree.*

*First Team exceeded expectations with limited guidance. Aliana said that she did not have a clear goal, but the team was able to help her with this area.*

*Enjoyed experience with first team and second team --- amenable with changes*

*Worked with some organizations --food buying programs and negotiations that were unforeseen factors about buying food--important to continue evaluating. The Buyers did not act on the 2013 Teams' beef recommendations because the process is much more lengthy. The buyers have not solidified a relationship with them as of yet. She foresees that future teams could investigate meat and poultry information more to better persuade food purchasers.*

### **Sustainability Efficiency Metrics for 2012 SFS Team**

*No one in dining has recalculated the sustainable efficiency purchasing metrics.*

*Food and beverage director for the metrics on sustainability efficiency purchasing.*

### **3. Anjana's Interview with Todd Lynch**

*The program in its longevity of 8 years is more influential than individual quarters because it has been integral to changing campus culture with regards to sustainability. The students have been important to driving conversations that would have taken a lot longer to occur on their own. For instance, in your (Anjana's) past team, that was a team with a very abstract goal, understanding what students want from spaces on campus. Your team put together a survey about students' opinions and a video. The new labs in Powell on the 2nd floor were designed in mind with some of your collected information.*

### **4. Jonathan Smithers (email correspondence)**

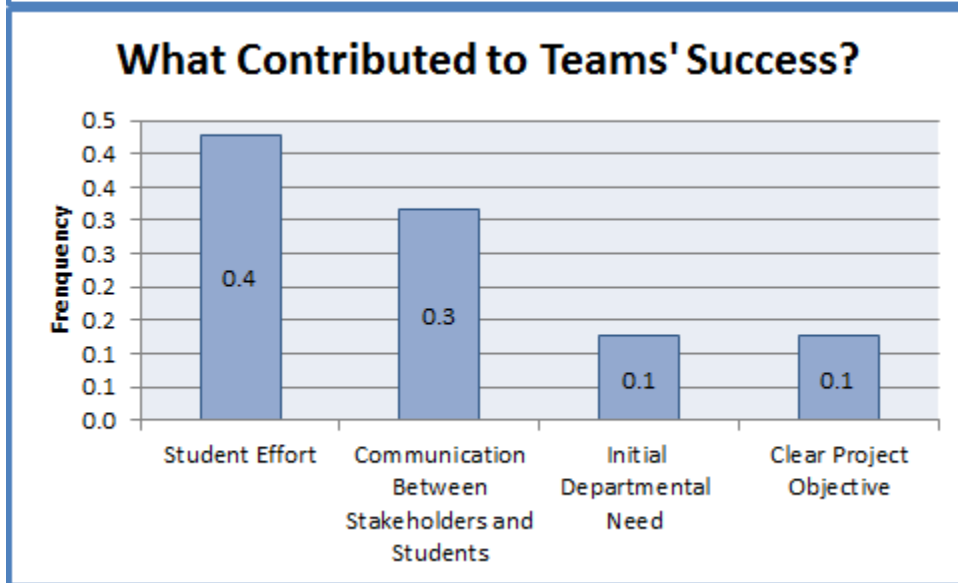
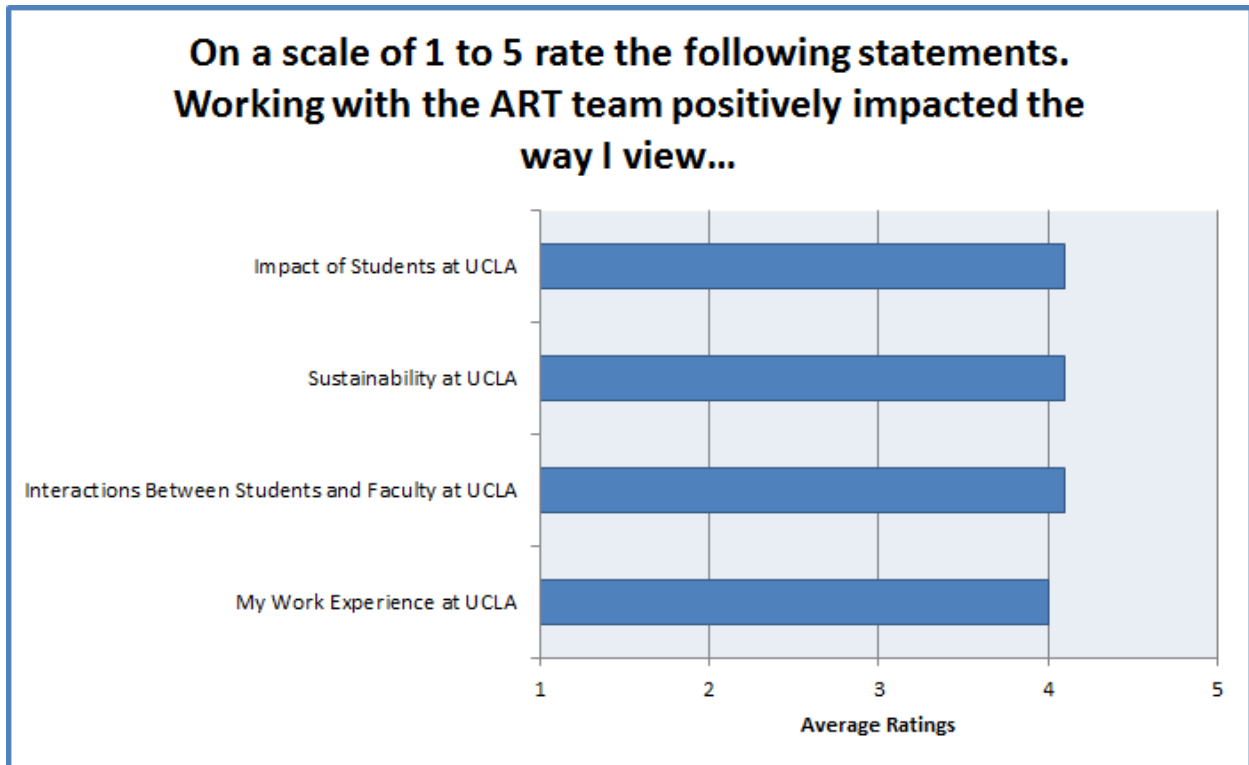
Anjana,

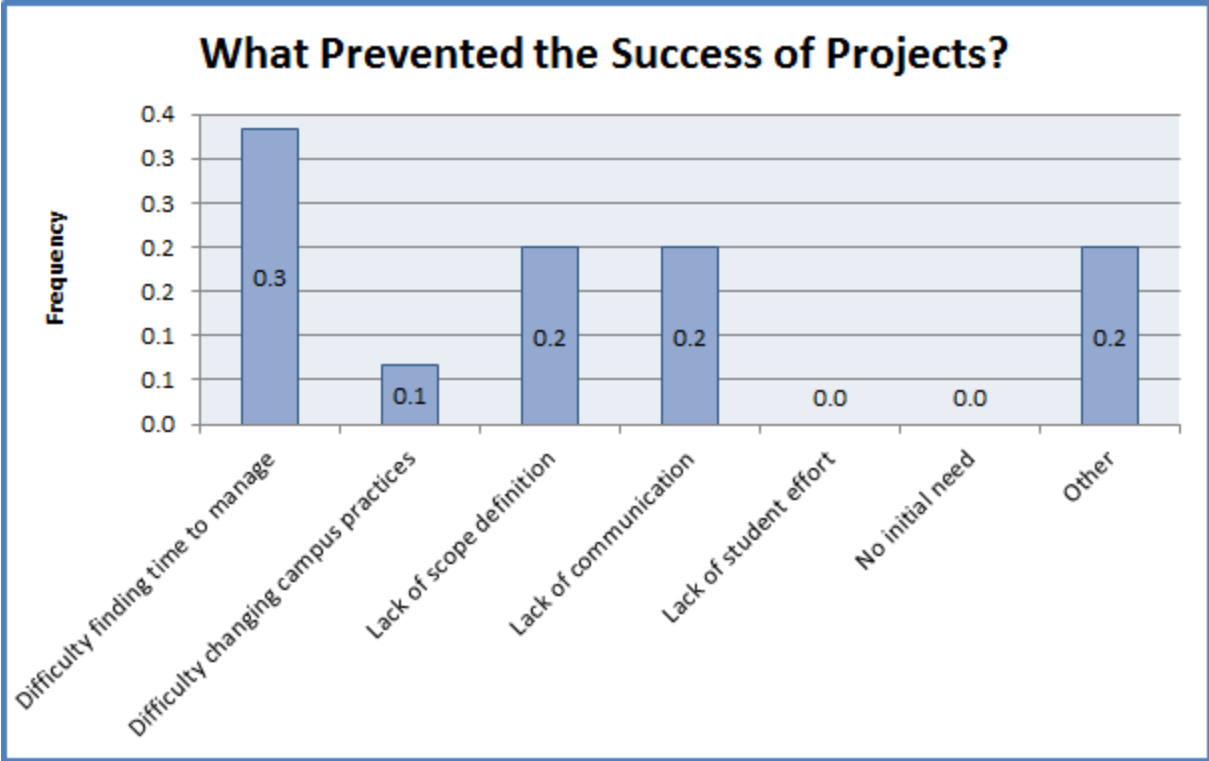
*I hope you are doing well. The project recommended by the team was not completed until November 2013, as the work was combined with other lighting efficiency measures. Although a bit delayed in implementation, the results were better than expected: We removed a total of 605 lamps @ 28 Watts each, amounting to energy savings of 148,394 kWh/year, energy cost savings of \$14,840/year, and corresponding CO<sub>2</sub> emissions reduction of 38 metric-tonnes/year.*

*Let me know if I can help with anything else.*

*Regards, Jon*

**Appendix IV. Stakeholder Survey Results**  
24 respondents





<b>Are You Interested in being a Stakeholder in the Future?</b>	
<b>Yes</b>	<b>88%</b>
<b>No</b>	<b>12%</b>

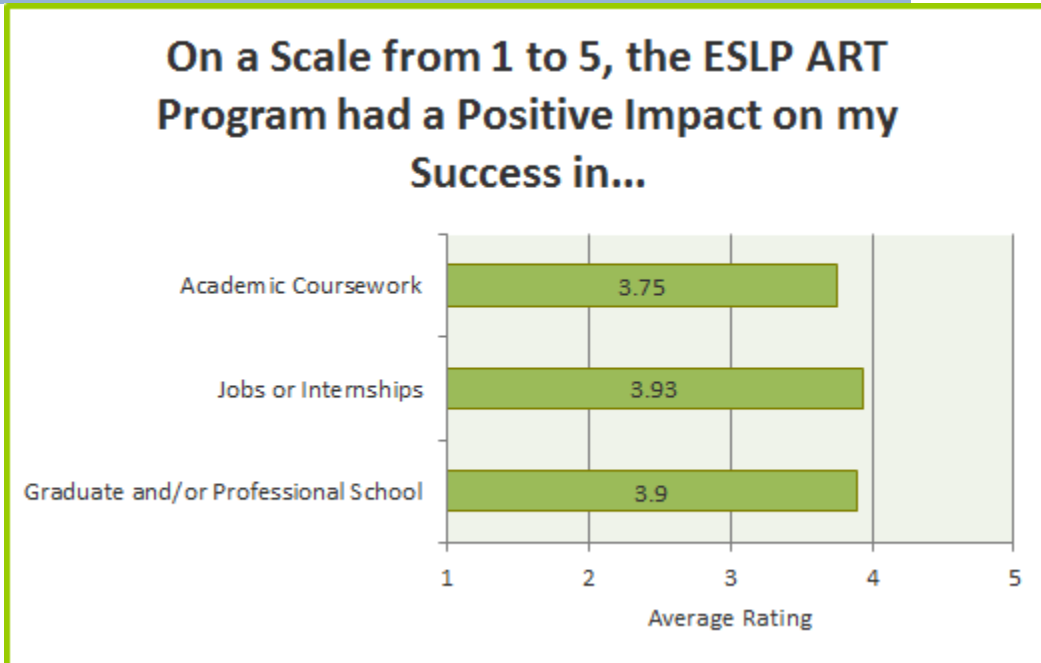
**Appendix V. Alumni Survey Results**

24 Respondents-- ongoing.

*On a scale from 1 (strongly disagree) to 5 (strongly agree) rate the following statement:*

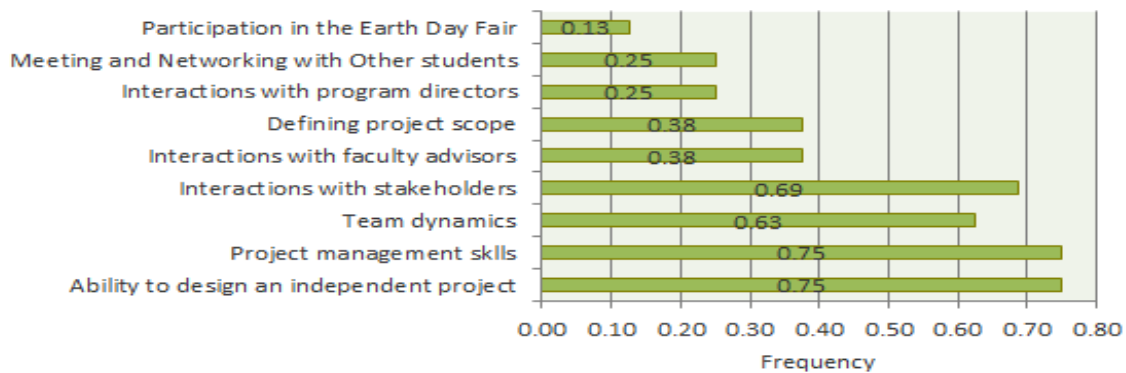
**Participating in ESLP ART had a positive impact on the way I view my ability to effect change in the world.**

**Average Rating: 4.13**





## Please Select Four Aspects of the ESLP ART Program that most enhanced your educational experience at UCLA



### Appendix VI. Pictures from Mini Projects and Weintraub Lab

2008 Weintraub Lab-- Paper Recycle with Blue Gloves wrongly added



2009 Native and Drought Tolerant Vegetation- -Blue Fescue and Agave-- Jennifer Truong



2010 John Wooden Center-- Low Flow Showerheads



2010 John Wooden-- Drought Tolerant Landscaping



Appendix VII. Map of ESLP ART teams from 2008 to 2014.

# Education for Sustainable Living Program Action Research Teams 2008-2014



Compiled by the ART on ART Team 2014 Leader Anjana Amirapu

### Appendix VIII: Metrics Tables

Total Metrics (See Appendix for Specific Breakdown)		
	Realized	Potential
Energy	674,063 kWh	88,000 kWh/year
Water	5,690,000 gallons	3,888,000 gallons/year
Waste	1000 lbs	400,000 lbs/year
Economic	\$100,791	\$59,000/year
Outreach	3847 survey responses	N/A

ART Overview (As of 2013)	
Students	204 (30% participate >1 time)
Stakeholders	46 (13 repeat, 33 single)
Credit Hours	39,000
Teams	47

### Appendix IX. Spreadsheet and Interview Video

Link to Metrics Spreadsheet:

<https://docs.google.com/file/d/0B2-bTEjR46RWXZmM3BHUEtKVms/edit>

Link to Introductory Video of Stakeholders and Student Interviews

<https://docs.google.com/file/d/0B77dsD8dQ46wdWhNdlhRVU0tVkU/edit>

### Appendix X. Potential Rubric for Team Evaluations

<https://www.iusb.edu/weave/docs/Rubric%20for%20Evaluating%20Program%20Assessment%20Plans%20and%20Reports.pdf>