UCLA Sustainability Action Research

Sustainability within Arts and Architecture

Final Report

Holistic Review of Resource Acquisition and Waste Management Within UCLA's School of Arts and Architecture

Team Leads: Sam Trezona & Madeline Zhang
Team Members: Grace Choe, Alexandra Rosean, Gabrielle Biederman, Samantha Low
Stakeholder: Linda Holmes, Director of Operations and IT School of Arts and Architecture

Abstract

Current research on sustainability within arts and architecture programs is limited and merely points to how these programs can be a conduit for sustainability messages through installations, galleries, or architecture design without focusing on the sustainability of these conduits. Therefore, our project took an unprecedented step forward in UCLA sustainability by formulating baseline holistic research on arts and architecture sustainability that established areas of concern and provided recommendations for immediate change and future work.

The aim of our research project was to answer these central questions: **What is the UCLA School of Arts and Architecture buying? How is the School disposing of its waste? How can we make the items bought and the waste disposal more sustainable?** We have two main target populations: studios/labs and students. These populations encompassed students, faculty, and staff to holistically understand sustainability within the School of the Arts and Architecture.

During the past two quarters, this team has conducted interviews and tours with lab and studio managers, released and analyzed a student survey focused on reuse and waste culture and completed a rubric to quantify the sustainability metrics of vendors used by the School. Analysis of word of mouth, qualitative, and quantitative findings demonstrated a lack of participation in established UCLA sustainable policies and a failure from UCLA Sustainability to make these policies known and accessible. Furthermore, these findings demonstrated ineffective waste management and highlighted many violations of sustainable purchasing practices at a high student cost. Future work will need to be done on developing initiatives and plans to lower costs while increasing material reuse and sustainable purchases.

Meet the Team

Sam Trezona (he/they)
Team Co-lead
2nd year Ecology, Behavior, and
Evolution major, Environmental
Engineering minor

Madeline Zhang (she/her)
Team Co-lead
3rd year Climate Science major

Gabrielle Biederman (she/her)
Team Member
1st year Environmental Science major

Grace Choe (she/her)
Team Member
4th year Human Biology and
Society major

Samantha Low (she/her)
Team Member
3rd year Environmental Science
major

Alexandra Rosean (she/her)
Team Member
2nd year Economics and Art History
major

Sustainability Action Research - Arts and Architecture Team

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Introduction

Generally, when it comes to sustainability, research is often on how arts and architecture can facilitate a movement of sustainability, but not on how to make the creation of art or architecture sustainable. Due to this lack of peer-reviewed research on the sustainability of arts and architecture, our team is interested in determining how sustainable the arts and architecture education is at UCLA and how it can be improved. In order to answer our research questions, we would like to learn what the School of Arts and Architecture is buying and how the school is ultimately getting rid of these materials.

As an institution, UCLA has made commitments to purchasing sustainably. For example, UCLA is part of the Sustainable Purchasing Leadership Council (SPLC), a worldwide network of purchasers, suppliers, and experts unified under the mission of driving sustainable change through the market. Similarly, the UCLA Sustainability Plan updated in 2022 emphasizes that beyond engaging in environmentally purchasing policy (EPP), UCLA also has the additional responsibility to leverage its significant purchasing power and drive the market toward the production of more environmentally and socially responsible goods and services (UCLA Sustainability Plan 2022). UCLA's guidelines have expanded to include sustainability, and we aim to help the School fulfill these policies and goals, specifically on waste and sustainable procurement initiatives. As a state agency, University of California campuses are required by law to participate in EPP in adherence to executive order B-18-12 issued by former California governor Jerry Brown in 2012. EPP encourages state entities to use environmentally preferred products that have a lesser impact on human health and the environment when compared to competing goods or services, as long as the quality is uncompromised and it is cost-efficient (UCLA Business and Finance Solutions 2022). The University of California does have a Sustainable Practices Policy as well as general sustainability objectives embedded within its procurement guidelines.

Based on these institutional guidelines, the Sustainability Action Research (SAR) Arts and Architecture Team seeks to find an ethical and cost-effective approach to applying sustainability within the School of Arts and Architecture at UCLA to

benefit students, faculty, and staff alike. The team aims to holistically review materials for their impact during production, distribution, and disposal and how Arts and Architecture education can better organize and reduce unnecessary waste without compromising education and cost. Furthermore, the team plans to review UCLA's policy on purchasing materials and its sustainability goals. Our team hopes to develop a baseline understanding of areas of sustainable interest and possible options to implement sustainability within the School of the Arts and Architecture at UCLA.

Methodology

General Description of Methods and Incorporation of EDI

To begin, it is important to distinguish the scope of the research and provide a detailed description of the parameters that the project worked within. The School of the Arts and Architecture encompasses four academic departments including Architecture and Urban Design (AUD), Art, Design Media Arts (DMA), and World Arts and Cultures/Dance. Also included in this school is the Hammer and Fowler Museums at UCLA. There are approximately 650 undergraduate students and 300 graduate students within the School.

Because there is a wide range of programs and majors but a limited number of students, our team was advised to focus on areas of high impact including labs and studios, and students. There are a limited number of lab and studio spaces, and these are used by almost everyone in the School at some point. Therefore, targeting these spaces would encompass the most people possible and get an idea of general purchasing and waste management practices. Furthermore, to understand the outstanding costs of students, our team decided to distribute a survey. This section includes a description of the types of questions found in the survey and the process of how the survey was formulated. Targeting these two demographics within the School guaranteed that our research encompassed the most people within the School, which intrinsically incorporated equity, diversity, and inclusion (EDI) because it meant our project was inclusive and representative of the collective voice of an entire school full of diverse voices. Additionally, based on a literature review and preliminary research, it was made clear that the School was asked to lower its budgets over the next 5 years, so our approach focused on the economic aspect of sustainability to be equitable to all people within this School. However, in order to be realistic to the restrictions of the project timeline (2 quarters), the team primarily focused on the AUD and Art departments as they encompass most of the lab spaces.

In order to make our research more accessible, digestible, and understandable, it was also imperative for our team to use or create a new method to quantify

sustainability metrics when evaluating purchases made by the School. Detailed in this section is a description of how the rubric was created, changed, and used to evaluate vendors and items the School is using to purchase its materials. To incorporate EDI into this section of our project, it was imperative to include sections on transparency, equal opportunity companies, local businesses, and a comparative economical analysis of each vendor.

Informant Interviews and Tours

During the team's original stakeholder meetings, it was made clear to the team that there had been no research by the School of Arts and Architecture into resource acquisition and waste management. The labs and studios within the School have the most resource use and waste generation, as most students have to interact with many of these spaces throughout the duration of their degrees through required academic classes. It is important to mention that faculty are the ones designing these projects within the lab spaces, and sometimes lab or studio managers are also faculty. This created a dilemma for our team on which to target for this project, but it was settled to be the lab and studios since they were the most accessible and responsible for waste disposal. Since the team started with a broad scope that covered many departments, the interviews were also designed to help the team pinpoint areas of focus. Furthermore, during these interviews, the team was tasked to gain information about the main resources the labs and studios buy and where they buy resources from, which would further develop our list of vendors and material use. For a reference for all of the faculty and staff we reached out to for our project, please refer to Appendix A.

For our questions, there were three main areas of focus: purchasing practices, waste practices, and UCLA sustainability. The purchasing practices were focused on gaining key insights into what these people were purchasing and from whom in order to complete the resource audit. The waste practices questions were focused on gaining access to facilities and understanding baseline practices that are expected of most faculty and staff at UCLA. UCLA Sustainability questions were more focused on understanding the culture of the departments through a lens of sustainability. The questions were developed to understand if UCLA's Sustainability policies such as the Single-Use Plastics ban had been effectively communicated to the School and if there were already initiatives in place that our

stakeholder was not aware of that our team could capitalize on. In order to eliminate bias, the questions were kept fairly straightforward and succinct. For a template of questions, please refer to Appendix B.

Student Component

Student Survey

The goal of the student survey is to learn more about the UCLA School of Arts and Architecture's waste, sustainability, and purchasing cultures from the viewpoint of the students. UCLA undergraduates in the DMA, Art, and AUD departments of the School of Arts and Architecture are the survey's target audience. The survey wasn't restricted to students in these departments since it was expected that the survey would not have high respondent rates, however, the departmental curriculum calls for the purchase of visual art supplies, which is a measurable and tangible variable to monitor in these departments so the survey was mainly distributed through these departments. The survey included questions about costs as well as equity, diversity, and inclusion (EDI) to gain a nuanced understanding of the financial burden on students. Additionally, the interviewed lab managers expressed a strong interest in learning how much students were spending out-of-pocket for materials. Finally, the survey will be used to evaluate student interest in establishing a "Surplus Stop," a real area where UCLA, teachers, businesses, and students can contribute extra supplies for other students to use for projects.

During interviews with lab managers, questions were constructed based on the context and gaps in the information presented. As a result, the questions focused on the most commonly used and purchased items, the criteria most significant to students when purchasing, student waste behaviors, and students' perceptions of the School's sustainable culture. To eliminate bias, two SAR Arts and Architecture team members carefully wrote out questions, which were then distributed within the team for input before being reviewed by expert Dr. Carl Maida. The survey was distributed in a Google Form to lab managers and other department professionals on a compiled communications list (Appendix A). As an incentive for the participants, the SAR Arts and Architecture Team applied to and received The Green Initiative Fund (TGIF) for a raffle prize of a sustainably made portable charger valued at $120.

In an effort to publicize this study, flyers advertising the survey with a QR code were pasted around the UCLA campus, with the largest concentration in Broad Art Center and Perloff Buildings. The link to the survey was also published online on the SAR Instagram within a post as well as circulated through Instagram stories of the SAR Arts and Architecture team members. To increase survey traction, the SAR Arts and Architecture team members hosted engagement activities incentivized by goods and candy inside the common areas of the Broad Art Center and Perloff Hall, where most students within the School of Arts and Architecture attend class. In the engagement activities, SAR Arts and Architecture team members presented questions/statements about sustainability or students costs within three broad categories: Sustainability Opinions (ex: "How much do you know about UCLA's sustainability goals?"), Student Cost (ex: "Write down your number one class expense"), and Student Habits (ex: "Write down the item you throw away the most"). Students within the School of Arts and Architecture were then asked to engage via conversation, moving a pushpin, or answering on a sticky note to put on the board of questions/statements. Students were then encouraged to fill out the survey detailed in previous paragraphs.

Student Focus Groups

To facilitate the flow of information through in-depth conversations with students within the School of Arts and Architecture, participants of the student survey were selected to participate in focus group conversations via Zoom. After applying to and receiving funding from the TGIF fund, the SAR Arts and Architecture Team was able to compensate focus group participants $15 for 30 minutes of their time. In these focus groups, participants were asked to describe the life cycle of their projects from purchase to disposal, as well as to expand upon the sustainability culture, habits of their peers, and the greatest challenges the School faces in terms of sustainability. Focus groups were also used to assess student priorities and rationale when purchasing materials as well as general purchasing habits. The goal was to generate direct feedback from students within the Design Media Arts major, Art major, and Architecture major.

Vendors and Materials Rubric
(see Appendix F for sample methodology)

To provide numerical, digestible data for the final deliverable, it was necessary to develop a methodology in which sustainability could be quantified - particularly by-products and vendors. It became clear that a great necessity for the groundwork of the team's goals was to categorize, document, and localize the physical resources which were being used by the Arts and Architecture departments. To that end, a rubric quickly became the most feasible option for the project's crucial need to construct a foundation to work from. Not to mention, these specific academic departments have a uniquely fundamental necessity to purchase and utilize large quantities of physical products. Thus, the team created a rubric to examine and quantify the more intangible aspects of vendors and sustainability.

While originally the scoring system ranged from 0 being the least sustainable to 30 being the most, it evolved into a total out of 40 due to two significant updates: the addition of a procurement sustainability category and the alteration of the weighting scales. The rubric's early iterations maintained three categories, (environmental, ethical, and economic sustainability), but due to cross-examination with precedent, and similar rubrics, it was apparent that a category was necessary to acknowledge the cumulative supply chain of finalized products. As a result, the "procurement sustainability" section was added - scored from 0 to 4 (see Appendix F). Consequently, the weighting of the categories was readjusted to account for the increasing importance of ethicality with regard to the new section. As a result, the new weighting arrived at 12 points, or 30%, for each of the original categories, (environmental, ethical, and economic), and the procurement sustainability section accounted for the last 10% (see Appendix E). It should be noted that the three major 12-point sections have four sub-scores, 0 to 3 each, for more specific criteria, and the procurement section has two sub-scores, both 0-2. The resulting implications of these changes summarize a heightened sensitivity to the ethicality and sustainability of the raw resources and labor which produced vendor-specific products.

To illustrate the holistic process of research done for each vendor, specific examples and case studies can be drawn from each of the four sections. Beginning with environmental sustainability, this category was far broader than the others;

meaning, instead of being vendor specific, the scoring addressed the baseline product as a whole across vendors. For instance, Laguna Clay and Blick Plaster and Clay were scored together for this section, as to account for the fundamental sustainability of clay as a resource (see Appendix F). For this category specifically, information was, relatively, readily ascertainable - due to a wealth of source material on the environmental materiality of universal products like clay, lumber, and 3D acrylic filament. Analyses included questions about the compositional toxicity of the material and the degree of water used to create the product. Generally, through the use of digital resources and databases, this category's scoring was sourced without friction. As for the next category, ethicality, this category was largely the most qualitative aspect of the rubric. Subsections included analyses of workplace conditions and employee regard. The last of the three major weighted categories was the economic section, which provided the most conclusive quantifiable data. This amounts to price comparisons per specified quantities of the product, distance from distributors to UCLA, and quality controls of vendors. Altogether, such criteria were able to be scored with a great degree of confidence.

A case study that easily demonstrates this concept was the comparison of price levels for 3D filaments across each vendor; the standard acrylic filament is purchased in wound rounds of 330 meters, thus each vendor's price per meter could be compared and quantified (see Appendix E). Finally, the added section, procurement sustainability (0-4), was a measurement of the sustainability of product supply chains when compared to standard industry practice. The category diverges into two subsections, environmental and social procurement. The environmental procurement section is the vendor-specific analysis of environmental factors, as opposed to the general analysis per material as discussed earlier. This accounts for the holistic accumulation of environmental effects in each step of production: i.e. raw material acquisition, shipping, packaging, etc. Likewise, social procurement distinguishes the labor conditions of those collecting raw materials, handling products, conducting mechanical production, etc. A sample of this is the company Amazon, which was researched over several products due to its ubiquity within the departments, as it notoriously maintains an extensive supply chain from raw resources to finalized products. In the end, three categories of vendors were analyzed: official UCLA vendors sourced

from informational interviews and purchase invoices from the Arts and Architecture departments, unofficial sources which students opt for as disclosed in surveys, and sustainable alternatives which the team sourced and included. The sustainable alternatives allowed the team to provide the departments with suggestions of products that could be used instead of their, relatively, less sustainable current preferences.

Altogether, the rubric was an amalgamation of the team's informational, survey, and data research - providing a holistic and extensive analysis of products used in the Arts and Architecture programs. Furthermore, it offers a considerably widespread array of implications: it can be used for future SAR teams, by department leaders to analyze current and future vendors, and as an avenue to ease arts programs into increased sustainability.

Challenges

The team faced many challenges throughout the duration of this project, which many originated from having to navigate through uncharted territory in sustainability research. Generally, the challenges boil down to a lack of understanding of what sustainability is, slow communication, reluctance to be involved, conflicting notions of the best way to communicate sustainable policies, and finding information on vendors.

To begin, when navigating within the School throughout the last two quarters, there was a general lack of understanding of what the goal of our project would be. Often, when we asked about sustainability, responses would be in the form of questions like "What do you mean by sustainability?" Questions such as these highlight a major issue with sustainability communications as the general understanding of the three E's of sustainability (environment, economy, and equality) was lacking. There seemed to be a focus on sustainable initiatives as a hindrance to Arts and Architecture education and a hesitance to offer information about their resources because of this lack of understanding. For example, our team never received inventories from lab managers, and feedback on our survey included asking us to remove questions due to a lack of relevance. However, these questions were often imperative to our research and could not be removed.

There seemed to have been multiple sources for this lack of understanding. One, most importantly, is a general institutional problem of understaffing and underfunding. When these two occur simultaneously, especially with the arts and architecture, there becomes a focus on cost first and sustainability later. When confronted with changes that are more expensive, there is an intense aversion to sustainable recommendations. This aversion becomes more intense when there is a lack of compromise on these recommendations. It was found in conversations with department managers that, unless there was some help in buying more sustainable options, our team would be hard-pressed to make a change (specifics are discussed in more detail in the results section). In order to cope with this problem at the intersection between the two sectors of arts/architecture and sustainability, our team focused on communicating that recommendations are only truly sustainable if

they are holistic and cost-effective and that this would be a priority for our team. Once this language was adopted by our team, then our team was offered assistance in our research.

To further expand on this point, from discussions with our advisors and stakeholder there were many conflicting opinions on what the best avenues of communication or research would best influence people to participate in our research. It was made clear that there is a general lack of participation in surveys from students. Our team faced this issue firsthand, with students avoiding us at engagement tabling events and our emails to staff and faculty getting lost. To combat these challenges we attempted to make students, faculty, and staff feel represented and understood in our recommendations to hopefully increase to the success rate of the communication of our research. These conflicting opinions also caused confusion within our project scope as it was not clear what was expected of our team. A clear example of this is the later addition and implementation of a student survey because it was originally determined that a student survey would not be helpful and then this opinion was changed as the project progressed. Our team combatted these issues by involving many contacts from across the university to gain a better understanding of what has been effective in the past.

While many of the scores gathered in the departmental vendor sustainability rubric were easily quantifiable, i.e. price, shipping distance, toxicity, etc., others were far more difficult to ascertain: namely the "diversity and inclusion" and "work and trade conditions" subsections. Accounting for equity, diversity, and inclusion within the vendor's workplace amounted to analyzing the degree of explicit regard that vendors gave to diversity initiatives, equity programs, and inclusive acknowledgments (see Appendix H). For example, finding whether or not the vendor pursues initiatives to maintain a diverse range of employees from historically underprivileged communities. Of course, such research is difficult to garner, but utilizing mission statements, workplace reputations, social media presences, and news reports, allows a holistic collection of sociological data. For instance, Blick provides a mission statement and social media presence which explicitly acknowledge its dedication to diversity by providing art lesson plans catered to varying socioeconomic levels. In other cases, the ethicality subcategory "transparency" allowed the team to calibrate for any lacking information -

as it relays the openness of company practice with regard to these initiatives (see Appendix G). This calibration tool also corresponded to the "work and trade conditions" category, which analyzed the physical and mental conditions of employees, as well as compared salaries and compensation. Again, the most advantageous approach for the team was to conduct broad searches into the statements, press releases, reputations, and reports of the companies from outside sources. Likewise, harnessing precedent rubric score systems like the "EcoVadis" service, which UCLA sometimes uses to obtain information on its retailers, also allowed the team to utilize internal reports from vendors on their work conditions. Altogether, the team was able to circumvent informational challenges regarding work equity and social considerations by substantiating a broad approach.

Even with all of these challenges, our team was able to preserve and gain a large breadth of knowledge on the current state of sustainability within the School, and, often, these challenges enlighten points of future work by highlighting pitfalls of past UCLA Sustainability and the School of Arts and Architecture communication. For future projects within Arts and Architecture or those beginning in other Schools such as Engineering, begin by identifying key people within that community that would support sustainability the most by thoroughly looking through staff research and communicating this question clearly with your stakeholders. These people will give you the best idea of what the culture is like and any current initiatives you can bounce off of and would have been a better place for our project to begin with.

Results

Informant Interviews and Tours

To keep these results succinct and digestible, this section will discuss general themes and ideas that have been extrapolated from the interviews. Detailed and specific notes from the interviews can be found in Appendix C.

Resource Questions

From the majority of the 6 people interviewed, we were able to obtain a baseline of purchases and vendors. Though full purchasing lists were offered by some, they never were sent upon follow-up emails. The most common vendors include Anderson Plywood, Home Depot, B&H Photo, Laguna Clay, and Amazon. Our team was suggested to contact the Arts and Architecture department managers (refer to Appendix A) to gain detailed information about purchasing. After contacting these department managers, we were sent invoices for the 2022-2023 school year from the Art Department and a general list of vendors from the Architecture and Urban Design Department (AUD) supplemented with information from the informant interviews.

Waste Questions

Only two out of the six offered in-depth tours: Ceramics and Fabrication Lab. To see important images from our tours please refer to Appendix D. While Photography and Sculpture were open to one, tours never occurred because of scheduling or lack of response on follow-ups. All of the labs and studios had some recycling and reuse practices. These practices differed in quality and quantity based on resources used and time available to the people interviewed.

UCLA Sustainability

Some of the managers knew about certain policies and goals, but overall, the UCLA Sustainability Plan and how it pertained to these managers had not been communicated to them or they were not aware of it. Many had some goals for sustainability with the main ones being a call to action against foam core and better options for waste management.

Themes Across Questions

In reviewing the results of the interviews, we saw a number of general themes in these interviews:

1. **Budget restrictions with high staff and faculty turnover:** Many of these labs and studios mentioned their low budgets meaning that students often cover a considerable amount of the purchases made. This is accomplished by the lab or studio buying from the vendor and the students buying from the lab or studio. This is a cause for concern as it is possible students are spending a lot of money on resources. All of the managers were able to detail in some way how they reuse or recycle, however, they mostly were in the context of cost-effectiveness, not in terms of sustainability. Overall, sustainable practices seem to be a byproduct of low budgets and a need for reuse.

2. **Lack of communication:** Four out of six of the people interviewed were from the Art Department, and all bought similar materials from the same handful of vendors. There is major potential for consolidation of purchasing to minimize excess. The waste between departments is not shared. There is potential that an increase in communication between departments and managers within departments will decrease waste output. To better understand all aspects of this conversation, student survey results inform recommendations focused on waste consolidation and redistribution.

3. **Sustainable initiatives were shut down by the School:** For example, Philip Soderlind specifically proposed Falcon Core, which is a sustainable alternative to Foam Core (a resource in violation of UCLA's Single Plastics Policy), but was rejected by the AUD Department on grounds that Falcon Core was too expensive. Another example is that Ed Beller attempted to incorporate zero waste into the graduate art center, but no one from Facilities Management would pick up waste that needed to be recycled.

Student Survey and Focus Groups
(see Appendix E for tables)

The results of the student survey and focus groups shed light on the purchasing, waste, and sustainability cultures within the UCLA School of Arts and Architecture. The student survey received 26 total responses; however, based on conversations with faculty and lab managers within the School, survey response rates in the sub-population of arts and architecture students within UCLA have historically been low; 26 respondents approximately the number of students the SAR Arts and Architecture Team expected. Of the 26 respondents, 12 were Architecture students, 9 were Design Media Arts students, and 5 were Art students.

From the results of the survey, it was found that a student within the School of Arts and Architecture will spend an average of $294 out-of-pocket for course materials per quarter. Design Media Arts (DMA) students spent the least with an average of $177 per quarter, followed by Architecture students spending an average of $325 per quarter; Art students spent the most with an average of $430 per quarter. As students within the School of Arts and Architecture typically take 1-2 studio classes per quarter for 2-3 quarters per academic year, it is clear that the out-of-pocket costs for learning materials can easily range from approximately $400 at minimum to over $1000 per year.

When asked to rank their priorities in purchasing a project material, students ranked cost as first priority, delivery, and material quality equally for second/third, and sustainability as fourth. Likely due to the prioritization of cost, students who claimed they were willing to try out more sustainable materials also marked their unwillingness to do so if the cost was higher.
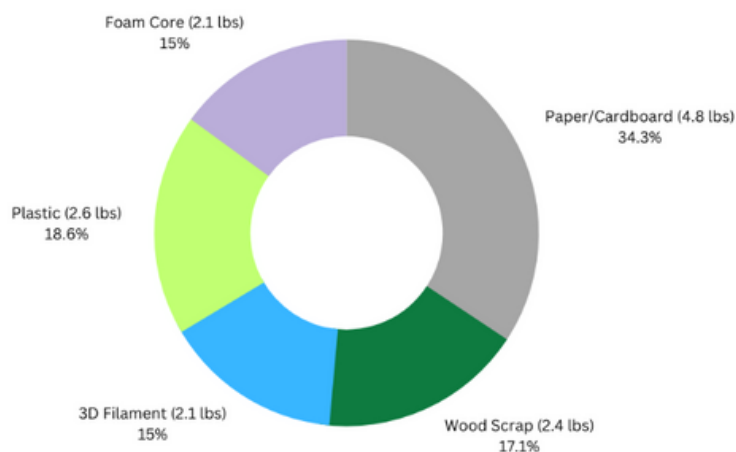
During the student survey, participants answered with the extent they agreed with statements regarding sustainability culture within the School of Arts and Architecture. A weighted average analysis of responses (strongly disagree = 1, disagree = 2, neutral = 3, agree = 4, strongly agree = 5) was applied to help characterize opinions and attitudes toward sustainability. Based on this weighted analysis, participants disagreed with the statement, "My department emphasizes proper recycling of materials used," and disagreed with the statement "I trust that

my waste is being sorted properly." Moreover, students believe that department curriculum does not encourage reuse, and strongly disagree with the notion that departments require reuse. Students had low faith that their peers regularly reuse, compose, or recycle their project materials and/or projects, but overwhelmingly agreed that they personally reuse materials/projects. Students averaged to neutral with awareness of proper reuse practice of their materials and to agree with proper disposal of materials used.
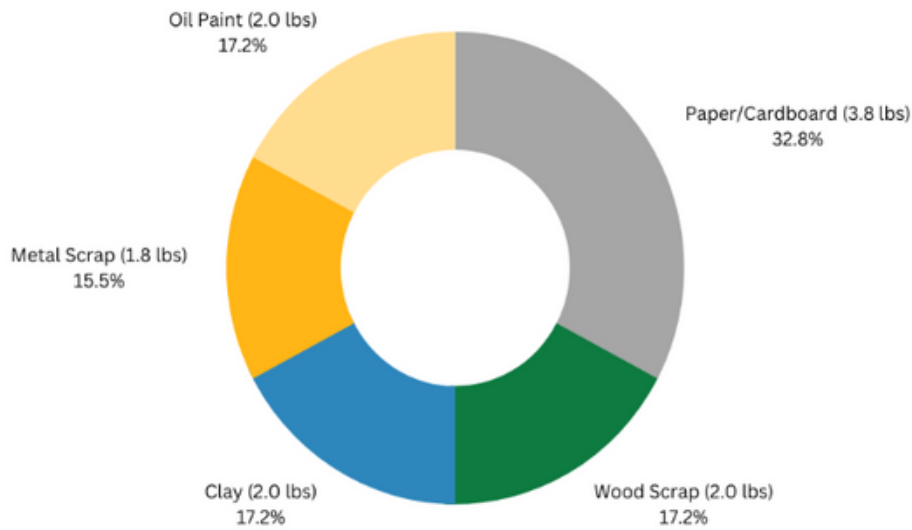
Overall, the data demonstrates that students have a moderately strong faith in their own reuse and recycling practices, but low faith in the external practices of peers and their department. Low faith in the external does not create a strong atmosphere interested in sustainability, and there appears to be a lack of social accountability with regard to sustainability within the School of Arts and Architecture. However, students also expressed a strong interest in learning more about proper disposal (96%), proper reuse practices (92%), and artists who regularly incorporate sustainable practices in their projects (92%). This suggests that students are interested in learning more about sustainability, but resources to do so are not easily accessible and thus their knowledge and faith in recycling and reuse reflects this. Additionally, during the focus groups, some participants voiced that while students in the School of Arts and Architecture may not go out of their way to research sustainability on their own, they will listen when it is talked about during instruction time.

Figure 1: Distribution of 5 Most Common Material Wastes Diposed Bi-weekly per Student by Average Pounds

A) Mean Architecture Student Total: 14.9 lbs

Foam Core (2.1 lbs) 15%
Paper/Cardboard (4.8 lbs) 34.3%
Plastic (2.6 lbs) 18.6%
3D Filament (2.1 lbs) 15%
Wood Scrap (2.4 lbs) 17.1%

B) Mean Art Student Total: 11.6 lbs

Oil Paint (2.0 lbs)
17.2%

Paper/Cardboard (3.8 lbs)
32.8%

Metal Scrap (1.8 lbs)
15.5%

Clay (2.0 lbs)
17.2%

Wood Scrap (2.0 lbs)
17.2%

C) Mean Design Media Arts Student Total: 15.0 lbs

Acrylic Paint (1.8 lbs)
12%

Paper/Cardboard (4.9 lbs)
32.7%

Plastic (3.4 lbs)
22.7%

3D Filament (1.8 lbs)
12%

Wood Scrap (3.1 lbs)
20.7%
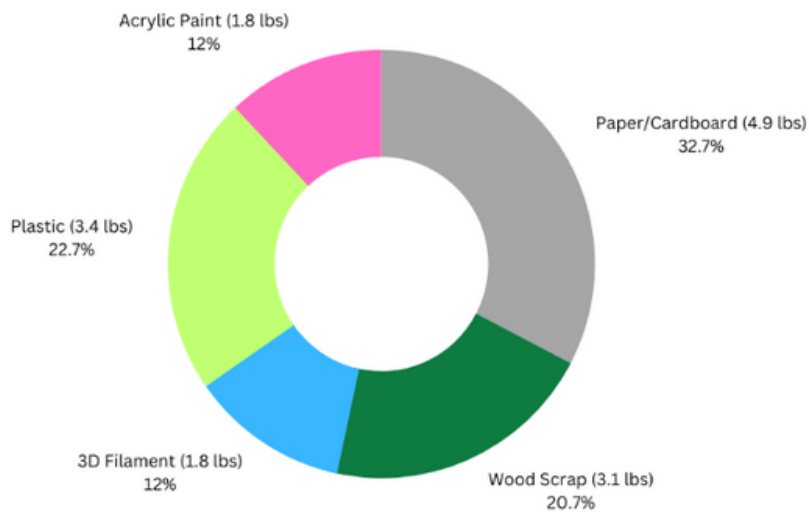
Figure 1 displays a donut-chart breakdown of the five most disposed of waste by average pounds disposed of per student every two weeks by the department. Across the Art, Architecture, and Design Media Arts departments, both wood scrap and paper/cardboard waste made up the largest share of course materials disposed of by weight (approximately 50%). In the free-response portion of the student survey, students shared concerns that peers were not being intentional with their printing.
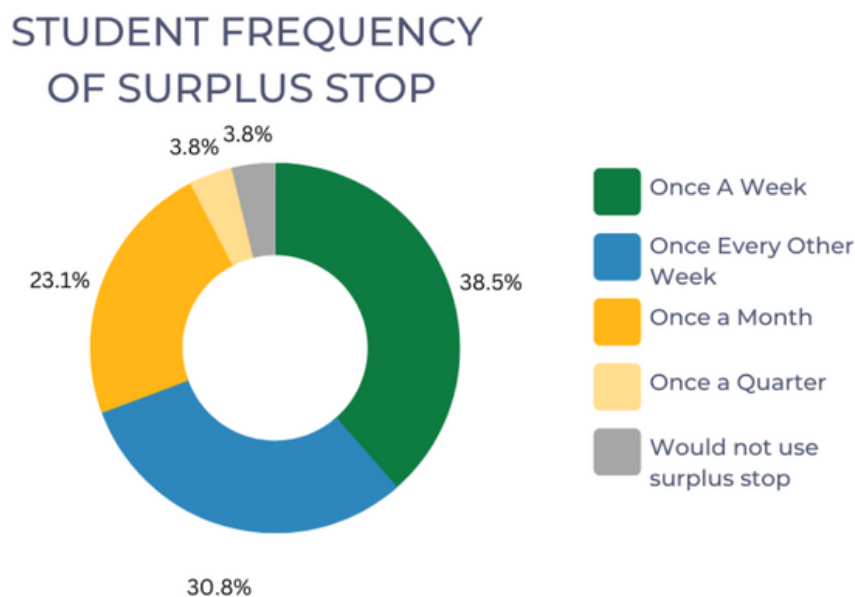
One respondent wrote:

"For many courses that need to print drawings, someone not only needs to inform the requirements of the drawing itself in advance but also remind students to pay attention to the direction of the printer. I found that the machine will use vertical printing by default and then students will cut off a large part of the blank paper and throw it away. In fact, as long as the setting is printing in landscape orientation it can save a lot of paper."

Since paper and cardboard make up a large share of waste, targeting printing practices and finding ways to reduce paper consumption can make all departments of the School of Arts and Architecture more sustainable. Further detailed results found in *Table 1* in Appendix E display the average waste disposed of per student bi-weekly at the School of Arts and Architecture by the department. As different departments require different materials for projects and courses, some departments dispose of large amounts of materials that other departments may rarely use. For instance, architecture and DMA students utilized foam core more than Art students, while Art and DMA students may utilize more paint. However, the data illustrates that there is a large overlap between many materials used and the School of Arts and Architecture departments could benefit from a School-wide surplus stop.

Lastly, the student survey showed great support for the implementation of a surplus stop. 25 out of 26 (96%) survey respondents indicated that they would use the surplus stop. Out of the total respondents, 38.5 % indicated they would use it once a week, 30.5% indicated they would use it once every other week, 23.1% indicated they would use it once a month, and 3.8% indicated they would use it once a quarter (*Figure 2*). In terms of maintaining a surplus stop, 48% of respondents marked that they were willing to volunteer; of these students, 58% indicated that they were willing to volunteer for 1 hour a week, 33% were willing to volunteer for 2 hours a week, and 9% were willing to volunteer four or more hours per week. However, of the 52% of respondents that were not willing to volunteer at the surplus stop, 30% were willing to contribute to running the surplus stop through a work-study program. This survey suggests that not only is there high interest for students in the School of Arts and Architecture for the implementation

of a surplus stop, but also a feasible amount of interest in providing the amount of labor required in maintaining a surplus stop.

Figure 2: Student Self-Predicted Surplus Stop Utilization Frequency

STUDENT FREQUENCY
OF SURPLUS STOP

3.8% 3.8%
3.8%
23.1%
38.5%
30.8%

- Once A Week
- Once Every Other Week
- Once a Month
- Once a Quarter
- Would not use surplus stop

Focus group participants expressed high enthusiasm to donate to the surplus stop. For instance, art majors are required to take a variety of classes outside their specialty as a general requirement. One focus group participant concentrated on the fine arts of oil painting and acrylic painting, but she was still required to take a photography class. After the photography class, she had a substantial amount of extra photo paper that she will likely never use again and would be happy to donate to another student. Focus group participants also expressed that the surplus stop would be most efficient with active involvement and/or endorsements from lab managers and professors. They indicated that if faculty actively encouraged students to check out the surplus stop for supplies at the beginning of the quarter and donate by bringing materials to class at the end of the quarter, the surplus stop could stay stocked and utilized to its full potential. *Table 2,* also found within Appendix E, illustrates additional course materials desired at the surplus stop from most desired to least desired.

Recommendations Following Survey and Focus Groups

From the data collected via the student survey and the focus groups, the SAR Arts and Architecture Team recommends the following. In regards to creating an atmosphere conducive to the social responsibilities of sustainability, implementing sustainability within the curriculum and having faculty emphasize reuse when possible within the course syllabus can be effective. Moreover, students strongly supported the creation of a surplus stop as well as expressed interest in both volunteering and work-study programs to maintain the resources. Lastly, strong faculty support to encourage the utilization of such as surplus stop as well as donations to the surplus stop would help reduce waste and cut costs within the School of Arts and Architecture.

Vendors and Materials Rubric

The results of our research can be divided into the vendors and materials currently used by the School of Arts and Architecture and the alternative vendors and materials found through our team's research. The School of Arts and Architecture currently buys clay products from Laguna Clay and Blick Art Materials, foam core from Uline and Blick Art Materials, wood products, like lumber and plywood, from Anderson Plywood and Bohnhoff Lumber, Painting and Sculpting Tools from U.S. Art Supplies, Kalour, Amazon Basics, Blick Art Materials, and Office Depot, and acrylic and plastic filament from Solter Plastics and Santa Monica Plastics. After holistically reviewing these vendors and products we found the current foam core, painting and sculpting supplies, and acrylic and plastic filament to be particularly unsustainable. The foam core as well as the acrylic and plastic filaments that are currently used by the School of Arts and Architecture violate UCLA's single-use plastic policy. In addition, a majority of the current painting and sculpting supplies violate this policy "somewhat"; "somewhat" refers to the fact that these plastic tools, while technically reusable, have a notably short lifespan and low durability when compared to alternative non-plastic supplies and tools.

Based on our rubric, the mean score of the current vendors used by the School of Arts and Architecture falls at 23.5. In comparison, the more sustainable vendors researched by our team had a mean score of 28.8. This score includes our suggestions of foam core alternatives from ConVerd Board and Falconboard, lumber

and plywood from Columbia Forest Products, painting and sculpting supplies from Natural Earth Paint and the designated sustainable section of Blick Art Materials, and acrylic and plastic filament from NonOilen and 3D Printlife Alga. This improved score also includes the current vendor of Laguna Clay due to the fact that this vendor was found to have an overall total score of 30. The current vendors compared to the vendors we suggested as replacements can be seen in the table included in Appendix I. Additionally, histograms detailing the general scores of the current vendors and the general scores of the more sustainable alternatives can be seen in Appendix J.

Foam core, in particular, shows the intricacies of this process. Traditional foam core as a product is not biodegradable, can leach harmful toxins, and its production contributes to the emission of greenhouse gasses. In the environmental analysis section, they scored lower than any other material mainly due to their inability to degrade over time. While the traditional foam cores scored a 4, the alternative foam cores scored a 7. Falconboard and ConVerd boards are both made from recycled and non-toxic paper materials. Overall, Uline's foam core scored a 20, Blick's foam core scored a 21, ConVerd board scored a 26, and Falconboard scored a 27. The reason alternative foam cores did not score higher was due to the fact that they are generally more expensive than traditional foam cores. Our team suggests that Arts and Architecture begin to slowly transition part of their foam core to FalconBoard or ConVerd until a better alternative is found or evaluate if another material can fill in the niche that traditional foam core is used for.

Recommendations for Implementation

To view the specific recommendations that this team made, please refer to Appendix I. However, the team would also like to recommend that this rubric be used across the entire School to evaluate products as well as vendors. Using the rubric will give the School a unique way to quantify sustainability metrics for vendors that do not exist anywhere else on this campus. Furthermore, the rubric acts as a way to make the conversation on products such as Foam Core more tangible and holistic. We recommend any vendors currently being used that were not evaluated by this team or any new vendors that may be added in the future are evaluated through this rubric to give a sense of where the vendor stands comparatively to future sustainability goals.

Furthermore, our team uncovered that the UC system has another system that can quantify sustainability metrics. This system is called EcoVadis. So far, approximately 26% of vendors used by the School have been evaluated through this system, which is a slightly disappointing mark. Please have the procurement office or someone within the School of Art and Architecture contact Liz Kennedy of ASUCLA (see Appendix A) to start the conversation on getting more vendors in the EcoVadis system. From what our team uncovered, it is as simple as having an EcoVadis representative request that a vendor fills out the EcoVadis survey to be graded on sustainability. Requesting a vendor to fill out EcoVadis is important because it puts pressure for change on the most important sustainability component which is outside vendors and can be used in negotiations on sustainable procurement.

Discussion

Deliverables

In order to communicate the research findings in a way that is quick, easy to understand, and distributable, our team will be creating an infographic report of our most relevant findings to distribute across the School. Furthermore, a blank copy of our rubric will be given to our stakeholders as well as how to use our rubric. Lastly, this report will be used as a deliverable since it contains all of our steps and fully details all of our findings.

The reason for including all of these variable deliverables is that the research provided in this report is a culmination of word of mouth, qualitative, and quantitative research that is not easily communicated in a single infographic. Therefore, we wanted the most important materials to be the most seen infographic and those that are interested will have more resources available. Hopefully, by including all of these supplemental informational reports and a blank rubric, people within the School of Arts and Architecture will be more inclined to implement our recommendations or become more interested in sustainability. By being extremely transparent about our findings, we hope that it sways more people from the School to be more welcoming to sustainability and more projects in the future. Additionally, this report will hopefully be used by future teams or projects as the basis for their research and provide insight into how to navigate the School.

Significance of Project on Sustainability

Since this project was the first to ever be involved in the School of Arts and Architecture, we were able to generate a lot of important baseline data for future projects and highlight key areas for improvement within not only the School of Arts and Architecture but within UCLA Sustainability messaging and communication. Firstly, Our team was the first to create, develop, and implement a rubric that quantified the sustainability metrics of vendors. During our meeting with Liz Kennedy (Appendix A), it was discussed that a rubric of this kind does not currently exist at UCLA. Secondly, our team was able to broaden and interconnect the conversation on

sustainability with the School between staff, students, and faculty, and between the School and UCLA Sustainability leaders to further develop important conversations about sustainability initiatives. Hopefully, our research enables more conversations to continue and a better understanding of both sides of the conversation. Having gained these opinions on both sides of the sustainability issues, there is a hope that more effective solutions for the problems identified in this research can be developed and implemented. Lastly, our team was able to provide the first data on estimated student costs and the general student opinion on sustainability within the School. The hope is that this sparks change in what is expected of students and pushes initiatives that are not only more sustainable but also reduce the overall cost of attendance.

Recommendations for Future Projects

Surplus Stop

Combining data from the student survey and informant interviews, there seems to be overwhelming support for a location for waste centralization and waste redistribution. Our team believes that this can be achieved within a loading dock of Broad Art Center or by being incorporated with the Perloff building space. For example, there is a large hallway on the basement floor of Perloff where donated materials are currently being stored until they can be moved. This hallway connects to a room designated for project pictures and project painting. While it is generally a challenge to implement shelving at UCLA because of the earthquake protocols, the implementation of shelves here could be a great place to start for a surplus stop. Either of these locations would be accessible to students and easy to control traffic in and out of the space. Using the Zero Waste Department's current Surplus Stop in Parking Structure 9 as a basis for a general structure of how to run a surplus stop seems to be an excellent place to start. Some expected challenges of this project would be gaining funding to build shelves or a fenced-in area to house this Surplus stop, slow acquisition of materials for reuse, and a slow rate of redistribution at the beginning of the surplus stop. We suggest that the School of Arts and Architecture, Zero Waste, and Facilities Management are brought together as stakeholders in a future SAR project to begin the first steps in this project. A great place to begin would be to do pop-up shops throughout next year to gain data on what students and lab managers would be interested in. A surplus stop would have the most impact as it

keeps waste out of the landfill and decreases student costs on materials. In order for a surplus stop to be implemented, there would need to be a cost-benefit analysis as well. The costs would include building the area for the stop, upkeep, paying students or staff to run the stop, and materials needed to organize the stop. The benefits could include decreasing student and School costs on materials and generated waste.

Budget Analysis + Elimination of Single-Use Plastics Violations

Something that was not within the scope of this project was an analysis of the budgets of the School of Arts and Architecture. Our team was given access to some of the invoices, but in order for a holistic cost analysis to be done, it will be necessary for another team of students to evaluate the budgets of all four departments. Looking at the budgets of these departments will provide clearer options for consolidating materials, provide a clearer picture of the economic status of the department in relation to its students, and can provide a road map of how to implement sustainable policies by making slight changes to purchases. The budget analysis would also provide a clearer idea of what amount of their budgets are going toward single-use plastics and provide pathways to eliminate these violations. For example, through a budget analysis, there might be a way to give a better plan for implementing new foam core initiatives. Some challenges that we anticipate running into are resistance from these departments to give access to these budgets and a lack of financial organization. We suggest starting by contacting department managers to see if this is even a feasible project they would be willing to participate in.

Appendix

Appendix A: Outreach Sheet

Name	Department	Position	Result of Contact
Linda Homes	School of Arts and Architecture	Director of Operations and IT Services	Stakeholder
Shoshi Watanabe	Art	Lab Supervisor - Ceramics	Informant Interview + Tour
Philip Soderlind	Architecture and Urban Design	Shop Supervisor (Perloff)	Informant Interview + Tour
Valerie Green	Art	Lab Supervisor - Photography	Informant Interview
Ed Beller	Art	Margo Leavin Graduate Art Studio Manager	Informant Interview
Eric Vrymoed	Art	Lab Supervisor - Sculpture	Informant Interview
Rayne Laborde	Architecture and Urban Design	cityLAB	Informant Interview
Nurit Katz	Sustainability	Chief Sustainability Officer	Information on Facilities Management
Bonny Bentzin	Sustainability	Deputy Chief Sustainability Officer	Information and guidance on Zero Waste - Brought on as an Advisor
Sofia Ratkovich	Sustainability	Zero Waste Consultant	Surplus Stop information and Facilities Management - Brought on as an Advisor
Christian Salazar	Art	Purchasing & Financial Coordinator	Purchasing Lists
Else Henry	Art	Department Manager	Purchasing Lists + Student Survey Review
Alberto Alquicira	Architecture and Urban Design	Department Manager	Purchasing Lists + Student Survey Review - Brought on as an Advisor
Liz Kennedy	ASUCLA	Director of Ethical Labor & Sustainability	Guidance on Rubric
Carl Madia	SAR	Faculty Advisor	Student Survey Questions, Focus Group Questions
Cully Nordby	SAR	Faculty Advisor	Student Survey Questions, Focus Group Questions
Rebeca Méndez	DMA	CounterForce Lab	Student Survey Distribution

Appendix B: Template of Questions for Informant Interviews

Purchasing Practices
- Do you have a purchasing list with the materials that you buy every quarter and are they willing to send it to us?
  - How far does this purchasing list go back?
  - Does the list include vendors and how much is bought from each?
    - If not, do you have a list of the top 5 vendors that you use?
    - How were the connections made with those vendors?
    - Do you have special discounts with those vendors?
  - How do you track what they need to buy?

Waste Practices
- Would you be available to give a tour of the facility?
  - If questioned, here was our prepared response: We are interested in the current waste policy and would like to see it in person to really get a scope of the behind-the-scenes waste and inventory.
  - If not, can we visit ourselves to get a better understanding? Can someone else give us the tour?
- Waste questions
  - What kinds of waste does the lab produce?
    - There are different types: chemical, biohazard, pathological, landfill
  - How do they organize the waste?
  - Are there current reuse practices?
  - Are there current recycling programs?
  - Where do you think the most room for improvement can be when it comes to waste?

UCLA Sustainability
- What are you expected to do in terms of sustainability?
  - Is it clear from the School that you have sustainability goals?
- Do you have any sustainability goals that you have identified that you need help with?
- What personal goals do you have for the lab?
  - This was purposely a general question as it would give insight into the current culture within the departments and, therefore, the School as a whole.

Appendix C: Informant Interviews Key Notes

Eric Vrymoed - Sculpture Lab Supervisor
- No inventory or direct purchasing list
  - Purchases go through accounting
    - Christain Salazar
    - Items/vendors restricted by accounting
  - Some items are donated/given
  - Main supply vendors and supplies
    - McMaster - hardware, misc supplies
    - Industrial Metal Supply - metal stock
    - Lowes, Home Depot, Anawaly - misc materials
    - Laguna Clay - plaster
    - Reynolds Advanced Materials - silicone, resins, alginate/mold making
    - Amazon - tools, misc material
    - Anderson Plywood - plywood/ lumber
- Waste management
  - Main waste products: plaster, wood
    - Used to have a wood pick-up, no longer available
    - Typically try to not have chemical waste
  - Facilities Management main control over waste
    - Currently, no streamlined system is in place
    - Ex. Latex needs to be dried before being thrown away
- Sustainability in the department
  - Currently no clear goal or emphasis on sustainability

Soshi Wantanabe - Ceramic Studio Supervisor
- Inventory of materials
  - Stated that he would send these materials (never received)
  - Material use rate hard to measure and predict
  - Items purchased through accounting
  - Main vendors
    - Laguna Clay
    - States that the card they use to buy materials restricts vendors to those approved by UCLA
- Waste Management
  - Mainly clay, paper, and plastic waste
  - Clay
    - Can be recycled unless fired
    - Uses lots of water
      - Requires reuse of water

Appendix C: Informant Interviews Key Notes (cont.)

- Sustainability
    - No acknowledgment of UCLA Sustainability policies
    - Lots of reuse projects
        - Meant to save money (increase plastic reuse to not spend money on plastic)
    - No guidance from the department or school on sustainable policies
    - Supports ideas of increased communication
- Miscellaneous
    - Doesn't want to compromise the learning process
        - Trial + Error methods
        - Inherently increases waste because of experimentation
    - Students purchase clay from the studio, their own materials, and aprons
        - Has a place to donate old materials, rarely used

Ed Beller - Margo Leavin Graduate Art Studio Manager
- Inventory of materials
    - Main vendors -
        - Home Depot
        - Anderson Plywood
        - Amazon
        - Office Depot
        - Aardvark Clay
        - B&H Photo and Video
    - Slow vendor approval process by UCLA
    - Purchasing through UCLA
- Waste management
    - Grad students take materials back and forth between studio and residences
    - Uses Culver City waste system (off-campus location)
    - Noted difficulty with UCLA Facilities Management
    - Some reuse practices in place with clay and paint thinner
- Sustainability
    - Affirmed that a surplus area would be beneficial
        - Used to reuse office supplies from a previous Surplus Stop
    - Accepts donations from local museums like Hammer Museum

Appendix C: Informant Interviews Key Notes (cont.)

Philip Soderlind - Architecture Shop Supervisor
- Inventory of materials
  - Kept list of materials and vendors
  - Example materials - foam core and MDF (from Anderson Plywood)
- Waste management
  - E-waste - picked up once a quarter
  - Epoxy resin - picked up once a quarter by UCLA Toxic Waste
  - Spray paint cans - picked up by UCLA Toxic Waste
  - Wood, foam core - not recyclable by the university
  - Wood dust - thrown out
  - Sometimes stores scraps to be reused
- Sustainability
  - Attempted to bring sustainable alternatives, but shut down due to price or durability
  - Ex. Falcon core or chipboard
  - Some unsustainable practices within architectural culture
  - Ex. have single-use (plastic/aluminum) for judges at review and constantly use foam core
  - Would like to see a surplus stop

Valerie Green - Photography Lab Area Supervisor
- Inventory of materials
  - Keeps track of a selection of items, that were not sent to our team
  - Purchasing 35 mm cameras, tripods, plexiglass
  - Main vendors -
    - Freestyle Photo
    - B&H Photo and Video
    - Amazon
    - Home Depot
    - Eco Pro Chemicals
- Waste management
  - Always produce some chemical waste in processing
  - Reuse practices in place - chemicals, used equipment
- Sustainability
  - Concerned about rising prices - wanted student survey results

Appendix C: Informant Interviews Key Notes (cont.)

Rayne Laborde - City Lab Associate Director
- Inventory of materials
  - Physical purchasing foam core - useful for prints for galleries and installations
  - Other purchases include food for events
- Waste management
  - Does not produce many materials - mainly performs research to develop models
- Sustainability
  - Belief that sustainability should be "common sense" within architecture
  - However, continues to use foam core despite its negative environmental consequences

Appendix D: Key Tour Photos

Photo 1: Excess Supplies in the
Ceramics Lab

Photo 2: Glazes for Ceramics,
Recycled

Photo 3: Trash Cans Separating Clay

Photo 4: Wood Excess Area in
Perloff

Photo 5: Trash Can of Wood in Perloff

Appendix E: Results of the Student Survey

Table 1: Average Waste Disposed per Student Bi-weekly at the School of Arts and Architecture by Department

Material	Average Bi-weekly Waste per Art Student (lbs)	Average Bi-weekly Waste per Architecture Student (lbs)	Average Bi-weekly Waste per DMA Student (lbs)
3D Filament	0.6	2.08	1.78
Acrylic Paint	1.4	0.50	1.78
Clay	2	0.00	1.33
Fabric	1.2	0.25	1.78
Foam Core	0	2.08	1.11
Food Waste	4.2	3.08	3.67
Glass	0	0.75	1.67
Metal Scrap	1.8	1.00	1.11
Oil Paint	2	0.50	0.78
Other	2.4	1.42	2.00
Paint Thinners / Solvents	0.6	0.25	1.11
Paper/cardboard	3.8	4.75	4.89
Plaster	0	0.75	1.33
Plastic	1.2	2.58	3.44
Rags	0	0.25	0.33
Rags w/ Solvent	0.6	0.00	0.67
Resins	0	0.50	1.11
Spray Paint	0	0.50	1.11
Wood Scrap	2	2.42	3.11

Appendix E: Results of the Student Survey (cont.)

Table 2: Interest in Surplus Stop Materials

Surplus Stop Material	Percentage of Survey Respondents Interested (%)
Paint Brushes	80.8
Scrap Wood	80.8
Cardboard/Paper	80.8
Ceramic Tools	76.9
Paint (acrylic)	76.9
Fabric	73.1
Paint (oil)	65.4
Glass	65.4
Clay (unfired)	61.5
Foam Core	57.7
Scrap Metal	57.7
3D Filament	57.7
Plaster	50
Paint (outdoor paint)	46.2
Paint (water color)	46.2
Resin	42.3
Clay (fired)	15.4
Wire, Dowels	3.8

Appendix F: Departmental Vendor Sustainability Analysis Rubric

SAR 2022-23 Arts and Architecture Team: Departmental Vendor Sustainability Analysis Rubric:

Appendix G: Using the Vendor Sustainability Analysis Rubric

Sample Analysis Methodology		
Environmental Analysis	**Score:**	**Laguna Clay**
Does product deplete natural resources? (0-3)	*2 - somewhat*	Clay mining by nature requires the extraction of raw clay - most typically from the sediment beds of waterways. However, this clay is not in an endangered or critically low status of availability.
Does vendor prevent product waste? (0-3)	*2 - mostly*	Clay is a relatively biodegradable material, particularly when compared to products that rely on single use plastic. Additionally, this clay can be reused and kept for extended periods of time.
Is the ecosystem impacted by this product? (0-3)	*2 - somewhat*	Some adverse effects occur. The stability of semi-aquatic ecosystems can be compromised during clay mining - as it may prematurely deteriorate the stability of native land.
Is the material or its components toxic? (0-3)	2 - rarely or little to none	The vendor's formulas contain no harshly toxic or irritating components i.e. it can be handled with bare hands and left unsupervised. However, a few chemicals inside are unfit for severe contact, i.e. it cannot be consumed and inhaled.

*scoring is processed relative to similar and alternative products - i.e. Clay is a more readily abundant resource than certain types of wood, thus it has a lesser degree of resource depletion; but also, this specific type of clay, (Laguna Clay), is more naturally formulated, with less toxins, than comparable vendors' clays.

# Appendix H: Footnotes for the Vendor Sustainability Analysis Rubric

Footnotes and Further Explanation:
(ss) - student source - vendors that were disclosed as student resources during student surveys
(as) - alternative source - vendors that were sourced by the 2022-23 SAR Arts and Architecture Team as sustainable alternatives to products already used within departments
* - diversity and inclusion metrics include explicit statements of dedication to diverse and inclusive workplace environments and having established programs for the inclusion of underrepresented identities and persons
** - price metrics also include educational discounts given by the vendor for students, teachers, schools, and universities
*** - environmental procurement metrics pertain to the supply chain which occured between the raw material resources and the final product, generally reflecting the transportation and acquisition processes in production
**** - social procurement metrics pertain to the supply chain which occured between the raw labor and the final product, generally reflecting the working conditions and ethicality of supplying actors
***** - somewhat in the sense that these plastic tools have a notably short durability and require relatively frequent replacements when compared to non-plastic tools

## Appendix I: Current Vendors Compared to Alternative Vendors

Material	Current Vendors	Higher-Scoring Alternative Vendors
Clay Plaster	Laguna Clay, Blick Art Materials	Laguna Clay
Foam Core	Uline, Blick Art Materials	ConVerd Board, Falconboard
Lumber	Bohnhoff Lumber	Columbia Forest Products
Plywood	Anderson Plywood	Columbia Forest Products
Painting and Sculpting Tools	U.S. Art Supplies, Kalour, Amazon Basics, Blick Art Materials, Office Depot	Natural Earth Paint, Blick Art Materials (sustainable section)
Acrylic and Plastic Filament	Solter Plastics, Santa Monica Plastics	NonOilen, 3D Printlife Alga

Appendix J: General Scoring Breakdown

Overall Scores of Current Vendors
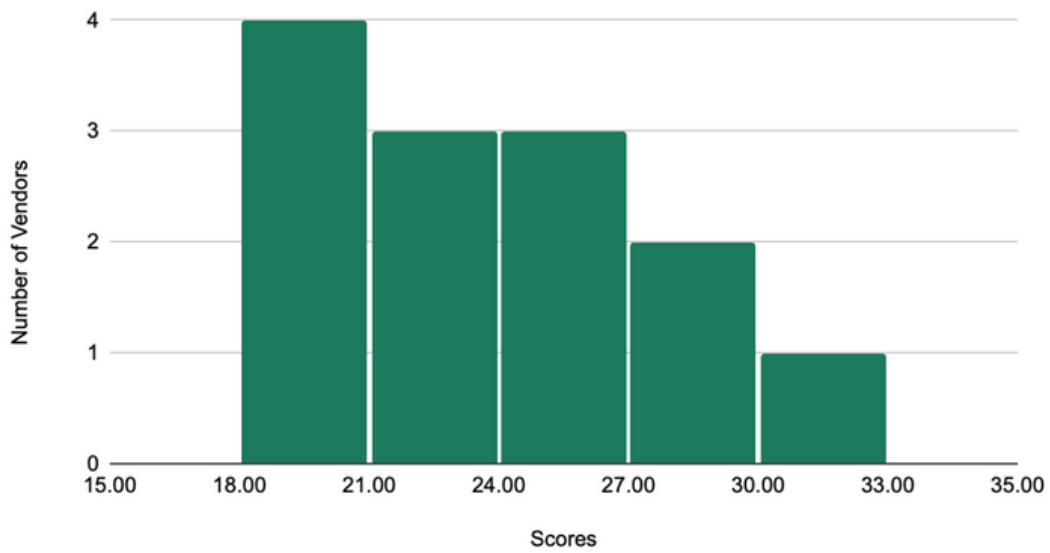
Overall Scores of Vendor Suggestions
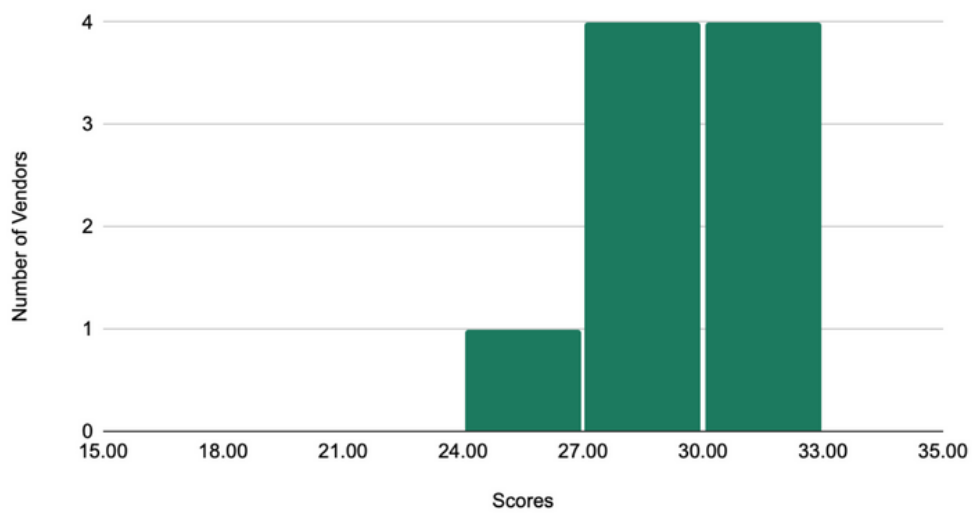
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