A Case Study of a Collaborative, Action-Oriented Environmental Education Program at the University Level

Jacey Chinn, Alicia Kwan, Magdalene Lo, Sarina Morales, Yiwei Zhou
Advisor: Professor Magali Delmas
Program: UCLA IoES Practicum 2019-2020

Table of Contents

Acknowledgements

The team would like to thank everyone who has supported us during our Practicum project. We would like to recognize and thank our amazing advisor, Professor Magali Delmas. We would not have been able to do this without her guidance and support. To Noah Garrison, for making the Practicum to what it is now and still making it an amazing experience despite the current circumstances. To our clients at IoES, particularly Noah Garrison, Cully Nordby, and Peter Kareiva, who guided and supported us throughout the entire project. To Scott Gruber and Royce Dieckmann for their contributions to our project. To the alumni and client who participated in our surveys and interviews. And to so many others that supported us throughout the course of this project.

Abstract

Interdisciplinary, action-oriented learning is an emerging approach for training students to solve real-world problems, which is especially applicable in the environmental education field. However, such an approach has not yet been systematically evaluated at the university level. This study investigates the process and outcomes of an undergraduate-level, action-oriented environmental project: the Practicum program at UCLA's Institute of the Environment and Sustainability (UCLA IoES). The assessment was conducted through the administration of two surveys, one of the IoES alumni and one of the past clients of the program, requesting their view of the program so our team could compare the Practicum's goals to the Practicum's effectiveness. The results of these surveys were used to determine any trends in experience from each group to find what the Practicum is doing well and what it can improve upon. With the main findings, we have made recommendations for the improvement of the Practicum and IoES curriculum.

Executive Summary

At the university level, a leading program in environmental education is the Practicum Program of the Institute of the Environment and Sustainability (IoES), which is a year-long capstone project for all senior Environmental Science students at UCLA. The Practicum, created in 2008, is a collaborative, action-oriented, and interdisciplinary education strategy. Over the course of a year, students engage in a group research project, aided by a faculty advisor, to provide environmental solutions or data to an outside organization or client. It aims to

provide students with training and experience in multidisciplinary environmental problem-solving, to help them prepare for meaningful professional or academic careers in the future.

Anecdotal evidence indicates that the Practicum has achieved substantial overall success. However, the Practicum's effectiveness and long-term impact has not been formally and thoroughly evaluated since its inception. The lack of information about the program hinders efforts to expand areas of strength or address potential weaknesses. To fill this gap, this project investigates the Practicum's effectiveness through both alumni's and clients' perceptions via surveys.

Our approach guided by five research questions: 1) What is the alumni and client's overall satisfaction with the program? 2) What is the experience like for the student specifically during the process? 3) How prepared are students for the Practicum? 4) What skills do students gain from the Practicum? 5) Finally, how useful are deliverables for clients? These questions were developed to evaluate what success would mean from the Practicum's goal of preparing students for the workforce.

The research team wrote and administered two surveys to alumni and clients via Qualtrics. They were first sent on April 28 and 27, 2002, respectively. After follow-up emails and social media posts asking for survey participation, by the end of May, there were 308 alumni who began the survey and 222 who completed over 90% of the survey (72.1%). 40 clients began their survey, and 33 of them completed over 90% of the survey (82.5%). With the responses, the research team conducted analyses with Qualtrics's visualization (graph-making) capabilities and by manual coding/sorting of answers to free-response questions.

By the results of this assessment, strengths observed of the program include satisfaction with the overall experience for students, with an average rating of 5.9/7 and clients with an average rating of 6.06/7. Another strength of the program was the experience for students regarding their team and their advisor. On average, alumni felt that their suggestions were taken seriously by teammates and advisors (4.63 and 4.47/5 respectively) Alumni also felt, on average, that they received enough support from their advisor, with a rating of 4.26/5. Weaknesses of the program include the preparation of students for the Practicum with only 29.05% of alumni answering that they felt prepared for their project. We also observed weaknesses in specific skills students demonstrated according to the clients, specifically report writing, with the lowest average rating at 3.48 out of 5.

Based on this analysis, we propose a few recommendations including restructuring the Fall Quarter course to include a team members' role workshop and team-building activities. Furthermore, we recommend revising the timeline of the fall quarter course and covering more specific topics for each team as well as emphasizing training on project management. We also suggest providing students with training in professional writing and communication. To further improve on communication, we also suggest requiring more frequent client check-ins. Finally, we recommend having a greater emphasis and providing more resources on career preparation within IoES outside of the Practicum.

Introduction

Environmental Education (EE) is a growing field with increasing importance. EE is thought to be vital in preserving and improving the health of the world and its biodiversity (UNESCO, 1978). It is defined by the Tbilisi Declaration as: “A learning process that increases people’s knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action” (UNESCO, 1978). EE also varies in nature since it can range from a one-day outdoor learning activity to a year-long course or project. Despite these differences, EE generally has the goal of educating with the ultimate goal of influencing behavior.

An example of university-level EE that combines learning with hands-on experience is the IoES Practicum Program. Senior Environmental Science students engage in a year-long group research project related to the environment and sustainability. These projects facilitate student learning in practical research and professional skills that hopefully translate to post-undergraduate endeavors in many disciplines and fields. In the IoES Practicum, student groups under the guidance of a faculty member are paired with clients to develop a solutions-based research project. The Practicum offers students the opportunity to learn requisite professional skills, including teamwork, leadership, organization, communication, and time and data management. Although this program has been conducted for over 10 years and is believed to be an effective model for environmental education, there has yet to be empirical evidence to support these claims. Our research therefore gathers this empirical and anecdotal evidence through a formal evaluation of both alumni and clients. This report will assess the effectiveness of the Practicum to help improve the program and environmental education as a whole.

This report is organized as follows. First, this report includes a Literature Review that includes methodologies for program evaluation, survey design, and existing research on the impact of environmental education programs and action-oriented education programs. Then, the Background provides context on UCLA’s Environmental Science undergraduate program and its senior Practicum Program. Next, the report outlines this study’s survey and analysis methodologies. The Results section is divided by our five major research questions: What were alumni and client opinions on “Overall satisfaction with the experience,” “Experience of the process,” “Preparation for the Practicum,” “Skills acquired for the workforce,” and “Usefulness of deliverables”? The paper concludes by providing recommendations to the Practicum to improve team member relations, optimize the timeline of the Practicum, and effectively prepare students for their Practicum research and future jobs.

Literature Review

Educational Program Evaluation Methods

Generally, there are three types of evaluation methods: qualitative methods, quantitative methods, and mixed methods. Qualitative methods collect data in forms of narrative responses such as surveys, interviews, or observation; quantitative methods collect data in discrete categories such as numbers, counts, or multiple-choice responses. Mixed methods include both qualitative and quantitative. Methodologies could enrich the evaluation design such as repeated measures (collecting the same data elements at multiple time points), longitudinal data (collecting data over an extended period of time), sampling (random sampling or purposeful sampling), and case-studies which examine a particular person or group in depth. (U.S. Department of Education, 2014)

There are nine evaluation tools: assessments and tests, surveys and questionnaires, interviews, focus groups, existing data, observations, portfolios, case studies, and rubrics. In this project, we use surveys and interviews the most. Surveys can be designed close-ended or open-ended. Close-ended surveys provide choices with each choice scaled for further analysis and open-ended questions are scored by a rubric. Interviews and focus groups are more detailed but costly. Compared to surveys, interviews provide opportunities to directly ask the interviewees with chances to clarify their responses and move the topic deeper. Interviewees will be sampled in small size from the population. It is necessary to obtain permission from interviewees if researchers would digitally record the interview (U.S. Department of Education, 2014).

There are different methodologies to analyze quantitative data and qualitative data. Researchers use statistical calculations such as mean, percentage, or t-test to analyze quantitative data. On the other hand, researchers use two methodologies to analyze qualitative data. First, researchers could build a rubric and score the data. The data scored becomes quantitative and then it can be analyzed by statistical calculation. Second, researchers could build a protocol. The protocol shows the process of identifying themes, organizing data, coding data, and finally making conclusions (U.S. Department of Education, 2014).

Methods of Assessing Environmental Education and Their Results

In order to discuss impacts, it is important to note some general characteristics and practices of environmental education (EE) programs that have generated positive results. Stern, Powell, and Hill (2014) wrote a literature review on research studies published between 1999 and 2010 regarding environmental education outcomes. In their studies, they found the characteristics that seemed to have the most influence on the program's degree of success was "experiential education, dosage, and investigation." Collaborative, action-based experiences in EE programs proved to be essential (Beringer & Adomβent, 2014). Not only was it important for

students to collaborate with each other, but also to collaborate with the community (Beringer & Adomβent, 2014). Moreover, it was important for students to engage in real-world, present-day issues. Additionally, programs need to recognize individuals and their ability to transform themselves and the world around them so they learn not just about the environment but for the environment (Robertson, 2016). These findings were also consistent with two case studies conducted in university-level programs in Germany and Canada (Robertson, 2016). They emphasized the fact that EE programs need to be more integrative and less isolated (Robertson, 2016). Furthermore, both of these programs, which were deemed as successful examples of EE programs, lasted over a course of 3 years, indicating that the duration of the program does affect impact and success (Robertson, 2016). Oftentimes, sustainability initiatives on campus only reach those in relevant majors or fields, when truly successful EE programs should create learning opportunities for the entire campus and expand even into the community (Robertson, 2016). The key determinants of a successful program vary and are difficult to pinpoint, but there are still a few key aspects of EE programs, like those discussed above, that generally make them more effective.

Although there is debate on the most effective aspects of EE programs, difficulty remains in forming effective methods to evaluate these programs. EE programs want to evaluate knowledge, attitude, behaviors, and skills, but there are not many evaluation tools that measure all four dimensions (Ballantyne, Packer, and Everett, 2005). Most methods of evaluation are done via surveys, interviews, and focus groups which produce varying findings on the impacts of EE programs. Many surveys incorporate a Likert scale (Fong et al.,2018; Kudryavtsev et al., 2012; Ballantyne et al., 2005). Additionally, most measurement tools must be tested and refined several times before it is officially sent to participants. (Ballantyne et al., 2005; Fong et al., 2018; Kudryavtsev et al., 2012). This is largely due to the fact that through participant interaction with questions, researchers can refine questions so that they are not too broad and will not be misunderstood. Although Ballantyne's study (2005) was conducted with young students, the findings that observational studies for examining engagement, paired with structural interviews, were the most effective methods provides some insight into our own evaluation. Additionally, based on an evaluation of 86 evaluated programs, most evaluations contained pre- and post-program aspects (Stern et al., 2014). However, a few of these studies felt that their "measurements were not sensitive enough" to be able to detect differences in pre-and-post-evaluations (Stern et al., 2014).

It is also important to recognize that most of these evaluations are short-term, often done soon after the culmination of the program and therefore research regarding long term impacts is limited (Liddicoat & Krasny, 2012). Other studies generated a similar consensus that there is little evidence that supports EE programs influencing behavioral change since most programs are evaluated in the short-term (Gralton, Sinclair & Purnell, 2004; Bergman, 2014).

On the other hand, performing long-term research provides its own sets of challenges. Researchers have attempted to address the longevity of studies by asking participants on memories—specifically significant life events that affect their attitude and behavior toward the environment (Liddicoat & Krasny, 2012). In their study, they found that time spent outdoors and repeated exposure had a significant impact on those who were environmentally active. This

further supports the idea that successful environmental programs should focus on experience and maintain aspects of being outdoors and not just in a classroom lecture setting.

Impacts of Interdisciplinary and Action-Oriented University Education

In evaluating the potential impacts of an interdisciplinary education on college students, it is important to distinguish the difference between interdisciplinary studies and discipline-based majors/studies, or studies focused on a single subject. In their seminal educational manual, Klein and Newell (1997) define interdisciplinary studies as “a process of answering a question, solving a problem, or addressing a topic that is too broad or complex to be dealt with adequately by a single discipline or profession.” Advocates of interdisciplinary studies claim these programs foster skills such as critical thinking, problem solving, and need for cognition, which is a student’s willingness “to engage in and enjoy effortful cognitive activity” (Cacioppo, Petty, Feinstein, & Jarvis, 1996). Interdisciplinary programs vary greatly in structure and institutional support, with strong programs displaying qualities like an intentionally broad yet interconnected list of required courses and a culminating senior capstone. (Lattuca, Knight, & Seifert, 2017). Opponents of interdisciplinary studies might cite a flexible degree plan as unfocused or incompatible with standardized evaluation. However, under the traditional paradigm which has historically characterized single discipline-based studies, degrees are awarded simply after a required minimum number of credit hours are achieved (Barr & Tagg, 1995). If the new learning paradigm, compatible with interdisciplinary degree plans, holistically assesses demonstrated knowledge and skill to earn a degree, then this new framework is more effective at evaluating the productivity of the student and the program.

Closely related to and often incorporated within interdisciplinary studies are action-based studies, which aim to provide students with real-world experiences applying the theoretical knowledge they gained in the classroom setting. This type of education is especially important in the field of environmental science, where the answers to the most difficult questions are often found in the natural world through thorough experimentation. Partially owing to the somewhat-recent public awareness of the alarming rate of global environmental degradation, undergraduate environmental studies programs across the United States are turning their focus towards making eager students into leaders, stewards, and informed citizens capable of considering a diversity of perspectives in their formulation of appropriate and responsible calls to action (McClaren & Hammond, 2005, p.193).

It is important to note that although the impacts of interdisciplinary and action-based learning are generally regarded as beneficial to a student’s educational experience, these models are dynamic and thus rely on continual reassessment of revisable learning outcomes. The program in question, UCLA’s Institute of the Environment and Sustainability, combines both of these styles of the curriculum to best prepare students to tackle the world’s most pressing environmental issues. For the first three years of the program, students are immersed in interdisciplinary education, allowed to take classes in subjects ranging from organic chemistry and evolutionary biology to environmental law, public policy, and scientific journalism. During

their senior year, students take the Practicum class which incorporates the action-based project model to apply their previous three years of learning. IoES's Senior Practicum is a young program with room for structural improvement upon closer evaluation of its strengths and shortcomings. The Practicum program's interdisciplinary application of geographic information systems (GIS) technology and measurable real-world impacts are both steps in the right direction, towards giving students the tools to solve any problem in a rapidly changing world.

Survey and Question Design

Our methodology for collecting data consists of [DM6] surveys and interviews. To gain the most accurate and viable data, survey and interview questions must be clear, unbiased, and well-designed. Clear questions with understandable wording help protect against confused and inaccurate answers, as well as minimize respondents' frustration with the survey (Vannette, 2018). Questions should also be unbiased, not leaning toward a particular answer, and the same applies to one's tone when conducting an interview. Respondent bias can also manifest itself in many ways, such as in taking shortcuts when providing answers or not finishing or responding to a survey at all (Krosnick, 2018a, pp. 98; Choi and Pak, 2005). In all cases, it is the researcher's responsibility to minimize the likelihood of these biases, by keeping in mind the length and ease of survey completion (Krosnick, 2018a, pp. 98). Surveys and interviews are a type of conversation, so they should flow with logic to the type, order, and number of questions (Vannette, 2018, pp. 333). Questions should also be carefully edited and tested before being used. Editing not only corrects grammar and typos, but it also allows time for correcting biases and ensuring that questions actually address the research focus (Vannette, 2018, pp. 335). Questions design requires all of the aforementioned considerations, and many more. Being mindful of these considerations will hopefully guide our research and produce accurate and reliable information.

Background

The Program

The first alumni of the Environmental Science major of the Institute of Environmental Science graduated in 2008. Operating for 12 years, the Environmental Science major has undergone significant improvements to keep up with the ever-changing environmental, technological, and socio-political landscapes (Student Handbook, 2019). In 2018, the department changed its core curriculum to better meet the needs of students. This change was largely informed by the feedback received from the bi-annual IoES alumni survey in addition to an 8-year departmental review. The alumni survey revealed strengths and weaknesses of the undergraduate program that IoES faculty used to inform their decisions to modify the curriculum.

IoES aims to phase out the older curriculum because the newer curriculum provides students with these benefits:

1. Specific required courses in GIS, environmental policy, and advanced statistics, data management, and programming. These courses teach students skills that are extremely marketable for careers in environmental science.

2. Suggesting one required course per year of advancement to ensure that most, if not all, other students in that class are environmental science majors of the same year/cohort. This facilitates a better cohort familiarity and camaraderie.

3. A simpler degree plan with consolidated categories, allowing students to take a wider array of classes each quarter and ultimately graduate in under 4 years.

These modifications are visible when comparing the 4-year degree plan of a student who graduated in 2019 to a student graduating this year, 2020. Students this year were given the option of following the older degree plan or the new plan, depending on when they joined major, as many environmental science students started their freshman year in 2016 following the old degree path.

The Environmental Science undergraduate program offers its students an interdisciplinary, action-oriented, and intellectually rigorous 4-year path to earning their bachelor's degree. The first three years of coursework provide the academic framework for the culminating experience of all Environmental Science students, the year-long Senior Practicum. The goal of the Practicum is to teach students skills useful in research and general professional environments that aren't generally taught in a lecture. The IoES Practicum was largely inspired by the capstone project of the Bren School's Environmental Science Master's program at UC Santa Barbara (T. Longcore, personal communication, February 4, 2020). Its primary pedagogical goal was to motivate students to produce something that will live beyond the classroom. [DM7] It was designed with the aim to provide students with a research experience where they could develop a question to solve a real-world problem, a methodology, and a data management plan (T. Longcore, personal communication, February 4, 2020).

The Practicum

The Senior Practicum is a 3-quarter course (1 academic school year) that begins fall quarter of a student's senior year. This fall quarter is a preparatory 10-week long course, which focuses on client presentations of the projects, GIS labs, and lectures given by the Practicum director that prepare students for the Practicum and the workforce. At the beginning of the quarter, each client of the Practicum introduces their company/organization and presents their research question(s) to the senior Practicum class. Concurrently, students learn how to use ArcGIS, an advanced GIS software. Halfway through the quarter students send in their top 4 project preferences to the Practicum director and explain why they are interested in each project. The director forms each Practicum group based on these preferences, aiming to assign

students to one of their top 3 choices, if possible. Practicum groups meet about 7 weeks into the quarter and are assigned to write a paragraph summarizing their project to start their team webpage on the IoES website. Then, students write a literature review based on a question pertinent to their project, assigned by and turned into the director of the Practicum.

In the second quarter of the Practicum, teams are introduced to their faculty advisor and schedule meetings to start working on the project proposal. The proposal serves as a work plan that clients and the Practicum director can reference and revise if necessary. The faculty advisor takes on the teaching role from this point on in the Practicum. Each project requires different types of support from the faculty advisor, but the faculty advisor, in general, helps guide the team through the research process and gain the necessary skills to be successful. They also serve as the link between the student group and the client for all projects. Then, once the proposal has been approved, the team begins collecting data. This may involve field research, further review of the literature, survey design, or another research method depending on the project's specific questions and needs.

Finally, in the third quarter of the Practicum, groups analyze their data, compose their final deliverables, and present their findings to clients, faculty, and their peers. Final deliverables include a final report and the final presentation, but may also include alternate presentations of their findings, such as a completed model or map if the project involved data modeling and/or GIS. The client must clearly communicate their expectations of the final deliverables to the faculty advisor and student group and the students must create a quality final deliverable that is useful to the client to complete an impactful Practicum project.

Methods

As early as the writing of the proposal of this Practicum project by IoES, it was determined that we would use survey questionnaires as the main research methodology. With the broad goal of improving the Practicum, we narrowed our focus to assessing the experiences of former and current clients and IoES alumni. Due to the limited timeframe and necessary narrowing of the project, we did not assess the experiences of faculty advisors or employers of IoES alumni, nor were we able to compare the Practicum to other senior capstone projects at UCLA or other universities. Concentrating on alumni and clients, we developed questions that would address outcomes and successes of the Practicum, from which we could provide recommendations for improving the program. The research became a case study of the IoES Practicum, focusing on five main questions: 1) What was the overall satisfaction and experience of the Practicum for alumni and clients, 2) What was the experience of the Practicum process for alumni and clients, 3) How well were alumni prepared for the Practicum when they were students, 4) From the perspective of the alumni and clients, what skills were acquired by the alumni for the workforce, and 5) How useful were project deliverables for clients.

The surveys were administered through the online survey service Qualtrics. Survey design lasted from January 19 to April 23, 2020, over three months, and focused on writing questions for two surveys, one each for clients and alumni, that answered the research

questions. Research for writing these questions included meeting with Practicum Director Noah Garrison and Associate Director of IoES Cully Nordby to understand the questions and goals of our client, IoES, and to receive suggestions for questions. In early February, the team also interviewed former Practicum Director, Travis Longcore, to gain insight into the goals of the Practicum when it was first created, thoughts on positive and negative outcomes of the Practicum, and any changes to the program he would have made. In late February, the team conducted in-person and video call interviews with four former clients to gain clarity on the clients' perspectives on a successful project, usefulness of deliverables, and overall thoughts and opinions on the Practicum and areas of improvement. In early to mid-April, a preliminary version of the alumni survey was sent to 14 alumni and 1 IoES graduate student, 11 of whom took the survey and responded with feedback. A preliminary survey was also sent to 7 previous clients, of whom 5 took the survey and provided feedback. Throughout the survey-writing process, preliminary and revised versions of the surveys were sent to the UCLA Institutional Review Board (IRB). The final IRB approval of the surveys was given on April 2. Final revisions to the survey questions were made based on input from Dr. Noah Garrison and IoES Director Peter Kareiva, and the final texts of the surveys can be found in Appendix C.

The alumni survey was sent through the newsletter service Mailchimp by IoES web designer and developer Scott Gruber. Follow-up emails with messages written by the team were sent out afterwards to the recipients who did not open the previous email. Emails were sent on 4/28 (698 recipients, 299 unique opens (42.8%), 62 unique link clicks (8.9%), link in this email was broken), 4/28 (696 recipients, 269 unique opens (38.6%), 79 unique link clicks (11.4%), link corrected), 4/30 (437 recipients, 80 unique opens (18.3%), 18 unique link clicks (4.1%)), 5/6 (632 recipients, 288 unique opens (45.6%), 67 unique link clicks (10.6%)), and 5/12 (354 recipients, 75 unique opens (21.2%), 21 unique link clicks (5.9%)). Follow-up posts were also written and shared on alumni social media groups. Of 308 alumni who began the survey, 222 completed over 90% of it (82.5%).

The client survey was sent via individual email to client contacts by Garrison, the first email being sent 4/27, however, with a broken link. An email was sent on the same day, 4/27, with a corrected link. 10 survey responses were received 4/27-4/29. Follow-up emails were also sent by Garrison on 4/30 and 5/1, and 19 responses were received 4/30-5/4. Between 5/5 and 5/7, follow-up emails were sent by Garrison and the research team, and on 5/7 reminders were sent to the IoES alumni association and on alumni Facebook pages. 11 responses were received 5/5-5/14. However, not all survey responses were completed surveys; 7 responses out of 40 total (17.5%) had completed less than 90% of the survey.

Analysis of survey results was performed on Qualtrics and via manual coding of free response questions. All quantitative questions and scale questions (e.g., dissatisfied to satisfied) were analyzed in Qualtrics with their data visualization features, producing graphs. Due to time constraints, statistical analyses for significance were not conducted. Graphs correlating data from different questions (breakouts) were also produced (e.g., alumni satisfaction with Practicum vs. project methodology). Free response questions were coded manually according to the topics mentioned in the answers. Responses were tallied by the number of times a topic appeared, and many responses mentioned multiple topics and therefore were counted multiple times. Percentages were calculated as (number of responses mentioning

the topic)/(total number of responses to the question)×100. Because of the double- or multiple-counting of responses, percentages do not sum to 100.

Results

Demographics/Sample

Alumni

In the following data for gender, age, and field of work/study, respondents included were those who completed the survey up to Q26 out of 30 total questions. The total population for this portion of analysis is 215 alumni.

Gender

The gender profile (Figure A1) of the respondents was 142 female students (66.05%), 63 male students (29.30%), 4 (1.86%) students who identified as “Other,” while 6 (2.79%) students preferred not to say. Compared to UCLA demographics for freshmen in 2018, respondents skewed slightly more female (60% female and 40% male) (UCLA Academic Planning and Budget, n.d.).

Ethnicity

The ethnic profile (Figure A2) of the respondents was 120 White students (47.43%), 88 Asian students (34.78%), 28 Hispanic or Latino students (11.07%), 8 students who identified as “Other” (3.16%), 7 students who indicated “Prefer not to say”, 1 Black or African American student (0.40%), 1 Native Hawaiian or Pacific Islander student (0.40%), and 0 students who identified as “American Indian or Alaska Native.” Respondents skewed more white and less Hispanic and Latino and less Black than UCLA freshmen in 2018. The demographics for their class were 26% White, 30% Asian, 20% Hispanic, 4% African American, and <1% Native Hawaiian or Pacific Islander (UCLA Academic Planning and Budget, n.d.).

Age

The age profile (Figure A3) of the respondents was 1 student at the age of 21 (0.48%), 17 students at the age of 22 (8.17%), 29 students at the age of 23 (13.94%), 27 students at the age of 24 (12.98%), 34 students at the age of 25 (16.35%), 40 students at the age of 26 (19.23%), 29 students at the age of 28 (13.84%), 12 students at the age of 29 (5.77%), 8 students at the age of 30 (3.85%), 4 students at the age of 31 (1.92%), 5 students at the age of 32 (2.40%), 1 student at the age of 33 (0.48%), 1 student at the age of 34 (0.48%). Due to a technical error, the choice of age 27 was absent from the survey, and 2 students indicated their age of 27 in the fill box below.

Field of Work

Responses to the question asking what type of organization alumni currently work in (Figure C2) indicate that 75 alumni work in for-profit companies (34.88%), 57 alumni work in the public sector (26.51%), 38 alumni are graduate students in universities (17.67%), 26 alumni work in non-profit organizations (12.09%), 4 alumni are self-employed (1.86%), and 15 (6.98%) alumni chose “Other.”

Client

Types of Organizations

Responses to the question asking the organization’s type (Figure A4) indicate that 22 clients work for non-profit organizations (61.11%), 7 clients work for for-profit companies (19.44%), and 7 clients work for the public sector (19.44%).

Year Projects Conducted

Responses to the question asking the project-conducted year (Figure A5) show that 11 clients conducted projects in 2019-2020 (19.30%), 11 clients conducted projects in 2018-2019 (19.30%), 10 clients conducted projects in 2017-2018 (17.54%), 10 clients conducted projects in 2016-2017 (17.54%), 3 clients conducted projects in 2015-2016 (5.26%), and 4 clients conducted projects in 2014-2015 (7.02%).

Data and Findings

Due to survey dropoff and non-completion, the total number of responses per question is not constant throughout the survey. Earlier questions in the survey have more responses, and the analyses, totals, and graphs reflect the total number of responses given for that question. Respondents who did not complete the survey were not removed from the data pool.

1. Overall satisfaction and experience of clients and alumni

Alumni, on average, described themselves as satisfied with the Practicum experience, 5.9 average out of a 1-7 scale, from “Extremely Dissatisfied” to “Extremely Satisfied.” 90.81% of responses ranged from “Somewhat Satisfied” to “Extremely Satisfied,” and the remaining 9.19% ranged from “Dissatisfied” to “Neither Dissatisfied nor Satisfied” (Figure 1.1). Clients rated their satisfaction at a 6.06 average in the same 1-7 scale. 87.88% of responses ranged from “Somewhat Satisfied” to “Extremely Satisfied,” and the remaining 12.12% were “Neither Dissatisfied nor Satisfied” (Figure 1.2).

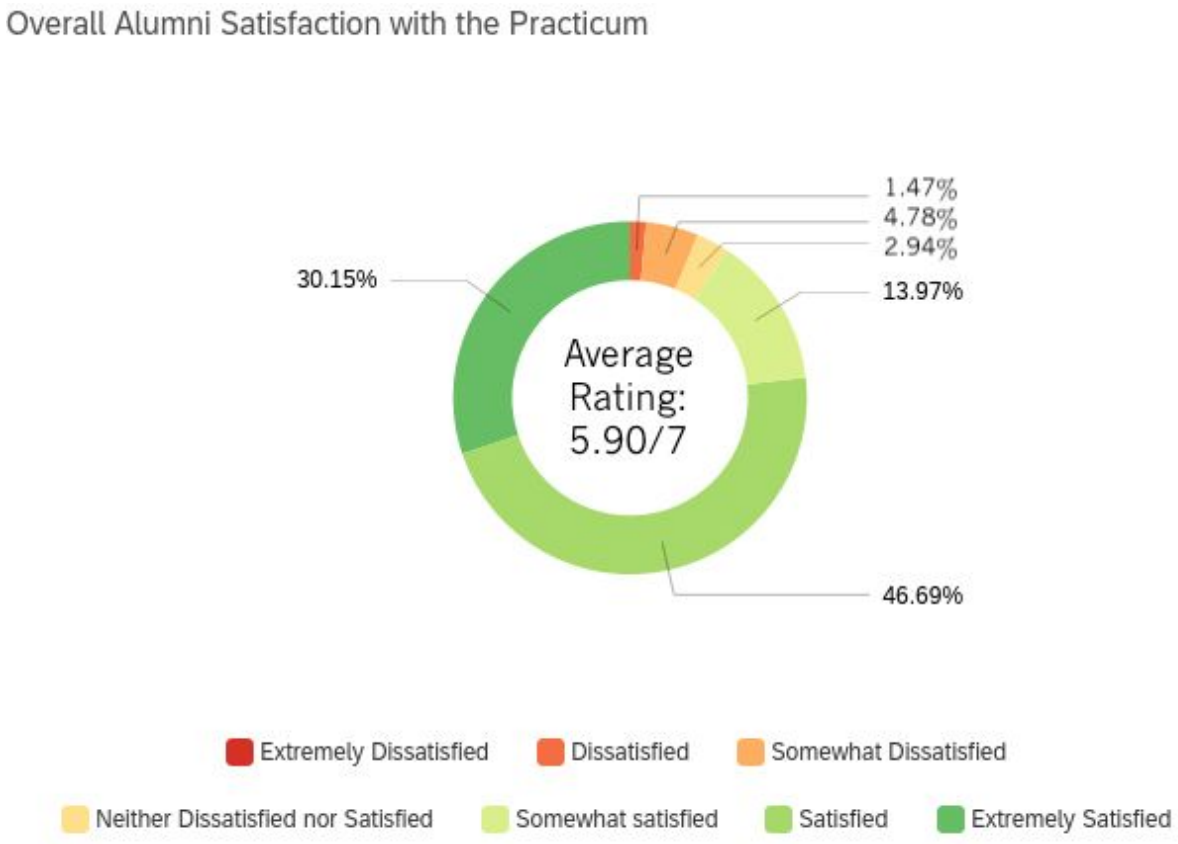

Figure 1.1: Alumni Survey, Question 2. How Satisfied were you with your overall Practicum experience? Alumni ranked their experience on a 0-5 scale, with 0 corresponding to “Extremely Dissatisfied” and 5 corresponding to “Extremely Satisfied”. 76.8% of alumni, 209 respondents out of a total of 272, indicated that they were either satisfied or extremely satisfied with the overall Practicum experience. This suggests that the Practicum is generally viewed as a positive experience for alumni.

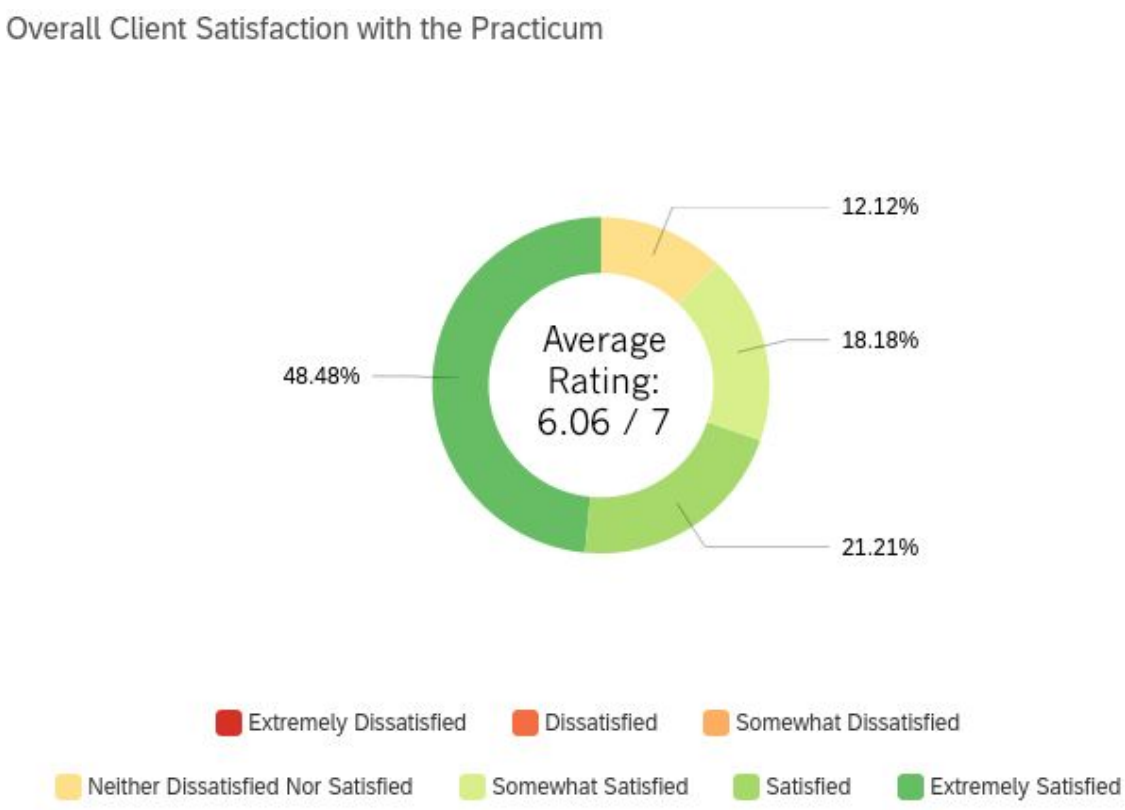

Figure 1.2: Client Survey, Question 6. How satisfied were you with the Practicum project? Clients ranked their experience on a 0-5 scale, with 0 corresponding to “Extremely Dissatisfied” and 5 corresponding to “Extremely Satisfied”. 69.69% of clients, 23 out of a total of 34 respondents, indicated that they were either satisfied or extremely satisfied with the Practicum. This suggests that the Practicum is generally viewed as a positive experience for clients.

When asked what they liked most about the Practicum, alumni commented most frequently on the program providing real-life experience of research, teamwork, interaction with professionals, and problem-solving (99 times in 232 responses, Table 1.1). The three next most-frequent responses captured the major components of the Practicum: working in a team, with a client, and with faculty. The responses that followed in frequency were related to the skills and process of the Practicum: using and acquiring research skills, having skills and materials to bring to a job, interview, graduate school, or resumé, having independence over a project, learning GIS, and making a difference in the world. The remaining categories were remarked upon fewer times but still provide insight to what alumni appreciated: learning about new careers and fields, making lasting friendships, networking, project management, enjoying their particular research project, and working with the community.

In contrast, when alumni were asked what they liked least about the Practicum, their answers were more varied than when responding to what they liked most. The largest category, with 56 responses out of 223, was “Other,” which included aspects that appeared three or fewer times, and the second-largest contained only 43 responses. Many of the aspects that alumni appreciated most (working in a team, with an advisor, with a client) were also strongly disliked (43, 22, and 20 responses, respectively). 29 responses also noted

issues alumni had with the size of teams, how clients were chosen, and how their projects were assigned to them. Alumni also noted that they wished they had started their projects sooner (19 responses) and that their Fall quarter class was not helpful or could have focused on more helpful topics (Table A2). In terms of what they liked least, alumni also expressed that they didn't feel like they made a difference, didn't have direction in their project, couldn't follow up on the results of their work, and that the Practicum was not structured enough. Topics expressed fewer than 3 times were grouped in "Other" (Table 1.2).

Summary of alumni responses to "What did you like most about the Practicum? Why?"

Categories	Number of responses	Percent of responses	Examples	
Real-life experience/applied learning	99	42.7%	What I liked the most about the Practicum was being able to get hands-on and collaborative experience performing research on a topic that I was interested in. I was able to take away numerous skills such as creating a research plan, operating instrumentation for measuring parameters, analyzing data, and working with others to develop a conclusion that progresses knowledge in a field of research.	I liked that we were treated like adults: tasked with addressing a real world issue, with real world stakeholders, and asked to create something of value, not simply take a test to show knowledge.
Working in a team	49	21.1%	I liked being in a group with students from the major that I had never interacted with before, even in classes. It was great to see a mix of students from different disciplines who could bring something new to the table.	working as a team on a project we were all passionate about. we grew really close and I always looked forward to meeting even though it was a lot of hard work
Working with a client	40	17.3%	The industry experience and relationship with our client was the best benefit by far. I was able to apply what I learned to my work post-graduation because of how relevant the topic was to my industry of interest.	Working with real agencies/companies. It was the most practical experience I' had so far.
Working with advisor/faculty	32	13.8%	My favorite part was establishing relationships with my teammates and our advisor. My team was lucky enough to be advised by a top notch environmental engineer.	It was free-form, and we were allowed to collaborate with different departments/researchers on campus. It did a lot to foster camaraderie and cohesion within the major. I'm still in contact with a lot of people I got to know through my Practicum experience.

Using/learning research skills	29	12.5%	I had the opportunity to learn how to approach a problem with multiple scientific methods and use it to inform policy decisions.	It taught me practical skills that I otherwise wouldn't have learned, such as how to use GIS, how to utilize MS Word, tips for managing references, tips for good writing, etc. These gave me skills that I was able to apply immediately to my first job and that I still use today in graduate school.
Having skills and materials for resumés, interviews, jobs, and graduate school	22	9.5%	My Practicum topic was very relevant to my minor as well as my honors thesis- I worked closely with faculty advisors I knew well, and it built on experience I already had. In addition, while challenging, the GIS lab provided a useful skillset that was helpful to have on my resume when I graduated.	It allowed me to develop transferable soft skills that are applicable to the work environmental. Allowed me to collaborate with others, have healthy disagreements, and a tangible product that was able to be utilized as work experience upon graduation.
Independence in project	18	17.8%	Scoping out and building a project from the ground up. I liked this most because there aren't many opportunities in traditional coursework that offer similar hands-on learning experiences.	I loved the open endedness of the problem. It was a good introduction to actionable research - here is a question, how do we try answering it?
Learning GIS	13	5.6%	Though it was so poorly structured, the GIS portion of the Practicum was the most useful. It's a good skill to have - there are lots of entry level GIS jobs available for fresh grads	Learning GIS during Fall Quarter. Heads up, incorporating python or some sort of spatial analysis like clustering, interpolation, etc. would be helpful since a lot of env. sci. jobs are increasingly expecting some knowledge of GIS. Use of QGIS, not just a student ESRI license would also be useful, so students can practice more than a year out from fall quarter.
Making a difference	13	5.6%	I liked that I was able to work with an outside client and that the research we did would actually help answer questions they had.	Spending time in the housing projects' community garden that was once a vacant lot/dump gave me a sense of hope that positive change is possible.
Exposure to careers/fields	12	5.2%	I loved that I had the opportunity to participate in a project that was outside of my concentration. It was this project that made me realize that I wanted to go into wildlife conservation.	The best part was seeing our studies in action. As you are going through your classes you do get a glimpse of what an environmental career can look like, but with the Practicum, you get to see truly how diverse your career can look like. You can work in the entertainment field, non-profits, the government, private businesses, and so many more.

Making lasting friendships with peers	9	3.9%	Finally getting to work with peers in my degree and bonding. It was definitely challenging work and pushed us to be better teammates but it was also really nice to get to know other students from the program more personally. I think community is very important in the environmental and sustainability field because it is easy to get burnt out trying to make positive change and working on climate and justice issues.	Because of the many different options and paths built into the Environmental Science degree and the small size of the major at the time, many of us didn't really have a chance to interact until the Practicum. The Practicum helped to build the relationships that I've kept since graduating.
Opportunity to network	8	3.4%	I especially liked the opportunity to be able to work with a real company/agency and work on a topic that was relevant to environmental issues in Los Angeles/the world. The Practicum also led to more opportunities to network for careers after graduation.	Direct contact and discussions with the client and faculty advisor because it offered great exposure to business dynamics and provided excellent networking opportunities.
Learning about/carrying out project management skills	8	3.4%	I liked working with my team the most because we worked really well as a group. I also enjoyed learning project management skills that I've used on many projects since then.	Taught me real world skills in terms of 1) Project Management 2) Deliverable Production 3) Stakeholder Engagement
Performing research in Practicum project	7	3.0%	I liked the group project I was put in. It was my first choice out of all the projects and allowed me to finally experience research at UCLA which was the main reason I was interested in the environmental science major, for the research Practicum.	Getting to do this exact project! And evaluate something I was a part of, like a real researcher would.
Working in the community	7	3.0%	I enjoyed working on a project that supported the community. The hands on, practical experience gave me the confidence to pursue other hands on projects during my time in grad school. It also pushed me outside of my comfort zone. This is where the most learning happens. Not just about the material, but also about yourself.	The opportunity to work on a project with a real-world application was refreshing as a student, as the majority of assignments require you to go through the motions but often do not have any larger benefit to the community or otherwise. I honestly do not think I'd be the quality of scientist I am today if it weren't for the Practicum (plus Travis Longcore was the program director at the time - he was wonderful!).
Other	45	19.4%	I enjoyed applying my skills to the real world. It helped me get over my imposter syndrome because for the first time I felt like I actually did know what I was doing.	First real and practical research project with peer reviewed publication

Table 1.1: Alumni Survey, Question 3. Summary of responses to the free-response question posed to alumni, "What did you like most about the Practicum? Why?" Topics mentioned three or more times were grouped into a category, resulting in 14 categories, including "Other." Responses including multiple topics are counted in multiple categories. Percent of responses were calculated by dividing the number of responses in a category by the total number of responses to the question, 232. Percentages, therefore, do not sum to 100% because individual responses were counted multiple times. Table of all categorized responses can be found in the Appendix (Table A1).

Summary of alumni responses to "What did you like least about the Practicum? Why?"

Categories	Number of responses	Percent of responses	Examples	
Working in a team/division of labor	43	19.3%	Team dynamics were sometimes challenging—there were some members that were clearly more engaged and invested in the project than others. However, the same can be said for professional work environments, so in that sense, the Practicum helped teach me how to navigate team dynamics and work with different types of people.	Some group members not contributing as much as others was annoying for obvious reasons.
Client choices/project assignments	29	13.0%	I didn't think the Friday lectures were that helpful, and I also thought that there were too many people on the team. We had 7-8 people in my Practicum group, but really only needed around 5, meaning that many people didn't do much work.	The process of being sorted out into the groups we were interested in. During my year, there were a few projects that were basically on the top of everyone's list but not everyone could be in those groups. I think more people would have been satisfied if the selection process was made more clear.

Working with advisor/faculty	22	9.9%	Our faculty advisor was overbearing and extremely controlling, so we had almost no freedom in the direction of our project. His expectations were high and unreasonable.	Interaction with the working professional/clients was varied from project to project. This left some teams feeling micromanaged and others feeling left in the dark. I understand that the role of the advisor can be to help to mitigate any problems that stem from this, but consistent interaction with the working professionals/clients would help to add value to the work beyond what the staff advisor can provide. This is a difficult problem to solve, as each client/working professional will always have their own managing style. And a lot of it will boil down to personality dynamics. Maybe it was just an issue from my time that has since been solved. At the time, I would have suggested the advisors being upfront about the time availability of the working professional/clients so that students can use that to weigh into their decision on project choice.
Working with client (communication especially)	20	9.0%	Our stakeholder did not really seem interested in the project which was disheartening.	Our group could've used more help with the statistical analysis of the health surveys we conducted. We tried to work out the statistics on our own, but this was a very frustrating experience. We also didn't get much feedback from our client, so that made it difficult to know if we were headed in the right direction with our project.
Not starting project early enough	19	8.5%	I did not like the mandatory classes fall quarter. They seemed pointless to me and we could have used more time on our Practicum team	I felt like the time we had was too short...I would have loved another quarter or even another year to work with my team and advisor on the project. I think my whole team felt the time constraint as a drawback, and we wished we could've gotten the ball rolling earlier to have more time to actually do the research and synthesize our results.
Use of Fall quarter class	15	6.7%	The first quarter of the Practicum shouldn't focus simply on learning GIS. I feel like there should be more workshops on R, GIS, other tools, along with More on how to do research.	Team dynamics, like most team work it was difficult to establish and find a rhythm of work. I think it would actually benefit students to receive more coaching on teamwork and potentially include interpersonal skills training in the

			Some groups may feel disconnected from their clients. More communication between the students and them should be required.	Fall quarter.
Not making a difference	14	6.3%	I think there were too many limitations to our ability to actually influence any change. The stakeholders' expectations (not particularly for my team) were usually unrealistic compared to what we had the resources and capacity to do. My team could barely get enough data points for our study and the results were fairly inconclusive so it didn't feel like our research was really supplementing any actual work that would be done. I guess I could say it was good practice for a professional job after college but there's little motivation to work hard when you feel like your work is nothing more than another grade.	The partners are using the Practicum groups as a feel-good form of engagement. They didn't actually want or need help.
Lack of direction in project	8	3.6%	While our advisors were extremely helpful, I felt that there was a lack of guidance in the beginning when figuring out the direction of our project, which led to difficulties that maybe could have been avoided going forward	The lack of guidance was difficult to cope with. I recognize now that I learned a lot from this but had our advisor been more engaged in the day to day work, I think that we could have had better outcomes.
Inability to follow up on project results	8	3.6%	I did not get to hear about how the project turned out afterwards and whether our work helped with any decisions that were made regarding the project.	My project was a continuation project, so I wish I would have been able to keep updated on the progress of the project over time after my team finished our work and the next team picked it up.
Learning GIS	8	3.6%	I thoroughly disliked the GIS lab portion of the Practicum. I felt it was irrelevant to most of us not pursuing future GIS work. The labs were also very difficult and time consuming for those less technologically savvy while others found them simple.	GIS because it is hell
Not enough structure in program	7	3.1%	My group had a lot of guidance with clear questions to answer and a path to answering them. But other groups were not as fortunate, with more ambiguity in paths to take which created discord in approaches. While I loved the autonomy of the project, I think there should be more of a level	While the free form nature of the Practicum made it much more interesting, the lack of structure also made success extremely dependent on project team members and advisors.

			playing field between groups as well as clear milestones during winter and spring quarter.	
Not enough GIS/GIS not taught early enough	6	2.7%	I would have preferred the GIS course prior to the Practicum to have more assistance and information on the software for better use in the Practicum.	Learning about GIS so late. I think this should be introduced freshman year. I think had I known I liked it so much I would have gotten a minor in this and gone for GIS jobs.
Lack of networking/career pipeline	6	2.7%	Not enough networking / exposure to potential employers	We could have better clients and a better recruiting pipeline with them.
Not being able to continue project/do more	5	2.2%	It would have been nice for my team to create another deliverable for our client besides a final report. I think the original plan for my team was to have our final paper published in an academic journal, but that didn't happen. Having a publication with our names would have stood out on our resumes and CVs.	I wish we had more opportunities to work with our clients after the school year ended.
Not having enough technical resources	5	2.2%	I felt that at times we did not have the resources to do what we wanted to. We were using a technical model, and I think we needed to be put in touch with more people who knew how this model worked because trying to learn it on our own (when there weren't many online resources) was very stressful.	Our group could've used more help with the statistical analysis of the health surveys we conducted. We tried to work out the statistics on our own, but this was a very frustrating experience. We also didn't get much feedback from our client, so that made it difficult to know if we were headed in the right direction with our project.
Writing a literature review	4	1.8%	I think the second quarter where we wrote research reviews could be tweaked so students get more out of it. I enjoyed doing the task, but I think it would have been more helpful to dedicate more class time so students could refine their writing/communication techniques.	typing up the literature review mostly because I didn't have any experience doing one before

Other	56	25.1%	I felt like the my project and many of the other projects lacked the resources and/or time to get adequate data. I was looking forward to drawing up useful conclusions and recommendations for our client, but in the end we lacked the data to provide something significant. I think many teams had the same issue. I also felt like the grading was too subjective and should've been weighed more heavily on the team members' evaluations of each other since they were the most informed about what each person was actually doing.	My least favorite parts were the amount of dead ends that we were sent on. I feel like it was impractical because there is modeling tools that we were not exposed to prior to the Practicum and methodologies that we couldn't even fathom with our limited knowledge.

Table 1.2: Alumni Survey, Question 4. Summary of responses to the free-response question posed to alumni, "What did you like least about the Practicum? Why?" Topics mentioned three or more times were grouped into a category, resulting in 12 categories, including "Other." Responses including multiple topics are counted in multiple categories. Percent of responses were calculated by dividing the number of responses in a category by the total number of responses to the question, 223. Percentages, therefore, do not sum to 100% because individual responses were counted multiple times. Table of all categorized responses can be found in the Appendix (Table A2).

2. Experience of the Practicum process for alumni and clients

When asked to rate four aspects of the Practicum on a 0-5 "Agree" to "Disagree" scale, on average, alumni rated them between just below and just above "Somewhat Agree" (equivalent to 3.75 out of 5) (Figure 2.1). Alumni felt that their suggestions were taken seriously by teammates and their advisors, with average ratings of 4.63 and 4.47 out of 5, respectively. Alumni also felt, on average, that they received enough support from their advisor with an average rating of 4.26 out of 5. Though the average rating for the amount of support from clients was not low, 3.5 out of 5, it was the lowest and fell below "Somewhat Agree".

For clients, the outcome of working with students that was most valuable to them was the final work product/deliverable (Table 2.1). Nearly 43% of client respondents noted that the deliverable was the most valuable outcome, but working with students and benefiting students was the most valuable part of the process for 28.6% of clients, for both outcomes.

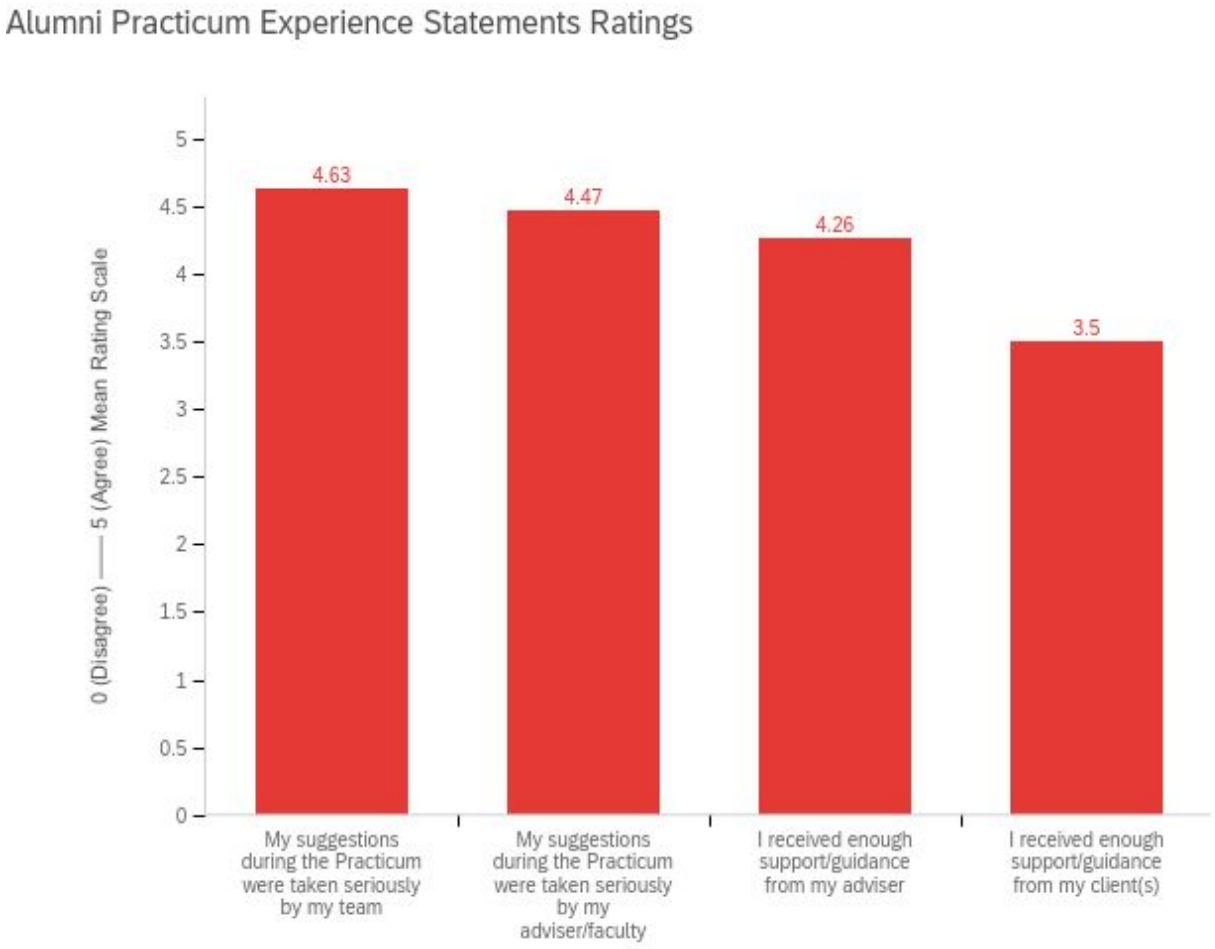

Figure 2.1: Alumni Survey, Question 15. Indicate the extent to which you disagree or agree with the following. There were a total of 230 responses. Respondents rated these statements on a 0-5 mean scale, 0 corresponding to 'Disagree" and 5 corresponding to "Agree". ¾ of these statements had a high average response rating, with above a 4 indicating that the average response was "Somewhat Agree" or "Agree". The only statement that had a lower response rating was the last statement, "I received enough support/guidance from my client(s)." With an average of a 3.5 rating, this indicating that the average response was "Neither Disagree Nor Agree."

Summary of client responses to "What was the most valuable aspect of working with students from the Practicum?"

Category	Number of responses	Percent of responses	Examples
Student contributions/deliverables	16	45.7%	Contributions of supporting research that helped fill data gaps that we would not have been able to tackle ourselves. Also a good opportunity for UCLA students to interact with peers from other universities through our internship program through LMU's Coastal Research Institute.

Helping students	10	28.6%	Helping to foster the next generation of conservation-aware adults.
Student interaction	7	20.0%	They are really high-functioning, organized, hard-working, and smart. It has been a joy interacting with them.
Not sure	2	5.71%	Hard to say, the student group was too large and as such challenging to focus on a shared vision as they all seemed to be doing the work for different reasons.

Table 2.1: Client Survey, Question 16. What was the most valuable aspect of working with students from the Practicum? Out of a total of 38 responses, a majority of clients (12 responses) reported the most valued aspects of the Practicum were the final deliverables. 8 clients valued the opportunity to interact with students the most and another 8 clients most valued helping students become professionally equipped for a job after graduation.Table of all categorized responses can be found in the Appendix (Table A3).

3. Alumni preparation for the Practicum (as students)

When asked to remember how prepared they felt they were for the Practicum, only 29.05% of alumni said they felt prepared before the project. The largest portion of alumni said that they felt somewhat prepared, 46.89% or 113 out of 241 responses.

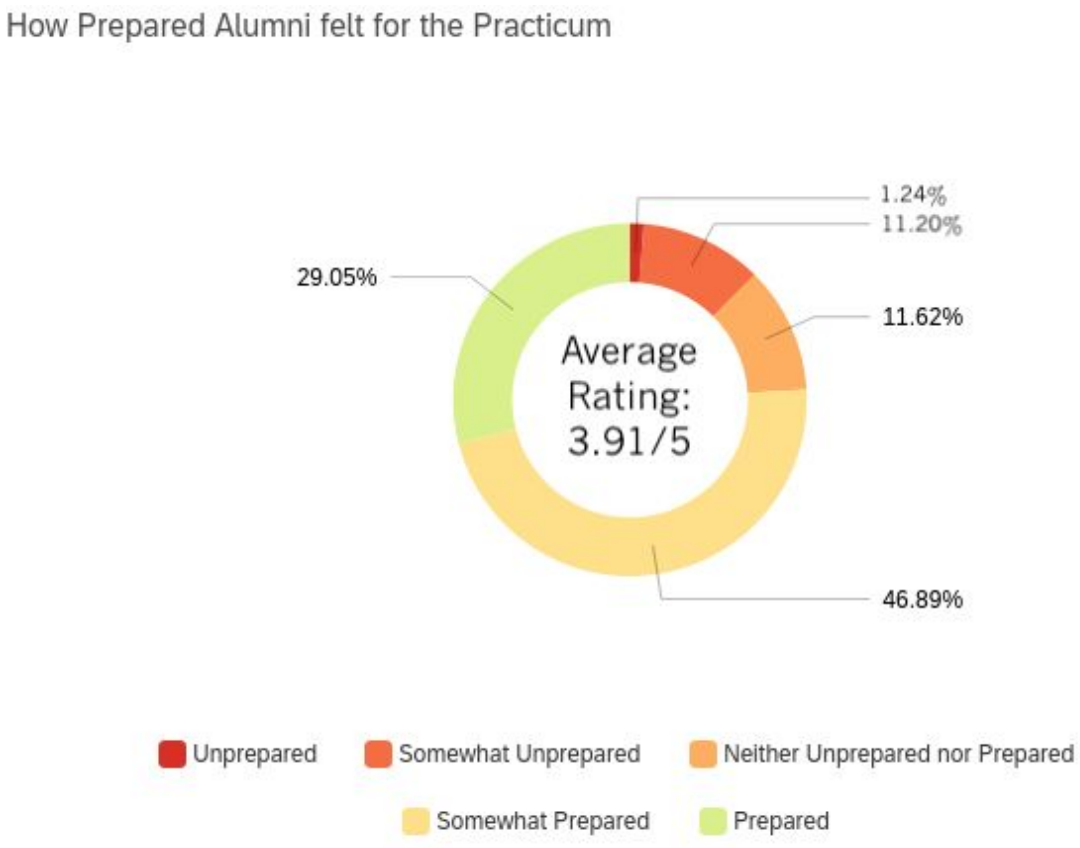

Figure 3.1: Alumni Survey, Question 6. How prepared did you feel you were for your Practicum project? Alumni responded on a 0-5 scale, with 0 corresponding to “Unprepared” and 5 corresponding to “Prepared”. With a total of 241 responses, the average response rating was a 3.91/5 which translates to slightly below “Somewhat Prepared.” 70.95% of the alumni (171 respondents) felt less than prepared.

4. Skills acquired by alumni for workforce, according to clients and alumni

Alumni were asked to choose the three most useful skills that they gained from the Practicum, and the three most-frequently noted skills were communication with clients/professionals, working in a group, and presentation skills (Figure 4.1). All of the skills alumni could have chosen from were skills that would be applicable to post-graduate situations, including graduate school and the working world. These skills were compiled by our group with the input of Dr. Delmas, our faculty advisor, and Dr. Garrison and Dr. Nordby from IoES. Writing skills, which had the lowest average performance rating by clients (Figure 4.2), was 9th in the list of most useful skills (Figure 4.1). This may have been due to the wording of the question, which asked only about skills that alumni did gain from the Practicum. It is possible that though writing may be an important skill for them post-undergraduate education, students did not gain sufficient writing skills during the Practicum.

Clients were asked to rank students in various skills related to professional work and interaction, and they were ranked most highly in teamwork and in conducting the research process on a 0-5 mean scale with 0 being “Very Poor” and 5 being “Excellent” (Figure 4.2). Notably, interacting with stakeholders (the clients themselves) was ranked in the low to middle of the group of skills, around 3.5 out of 5. Clients were also asked how likely they would be to hire students they worked with in the Practicum, and the majority (62.5%) said they would “likely” hire Practicum students (Figure 4.3)

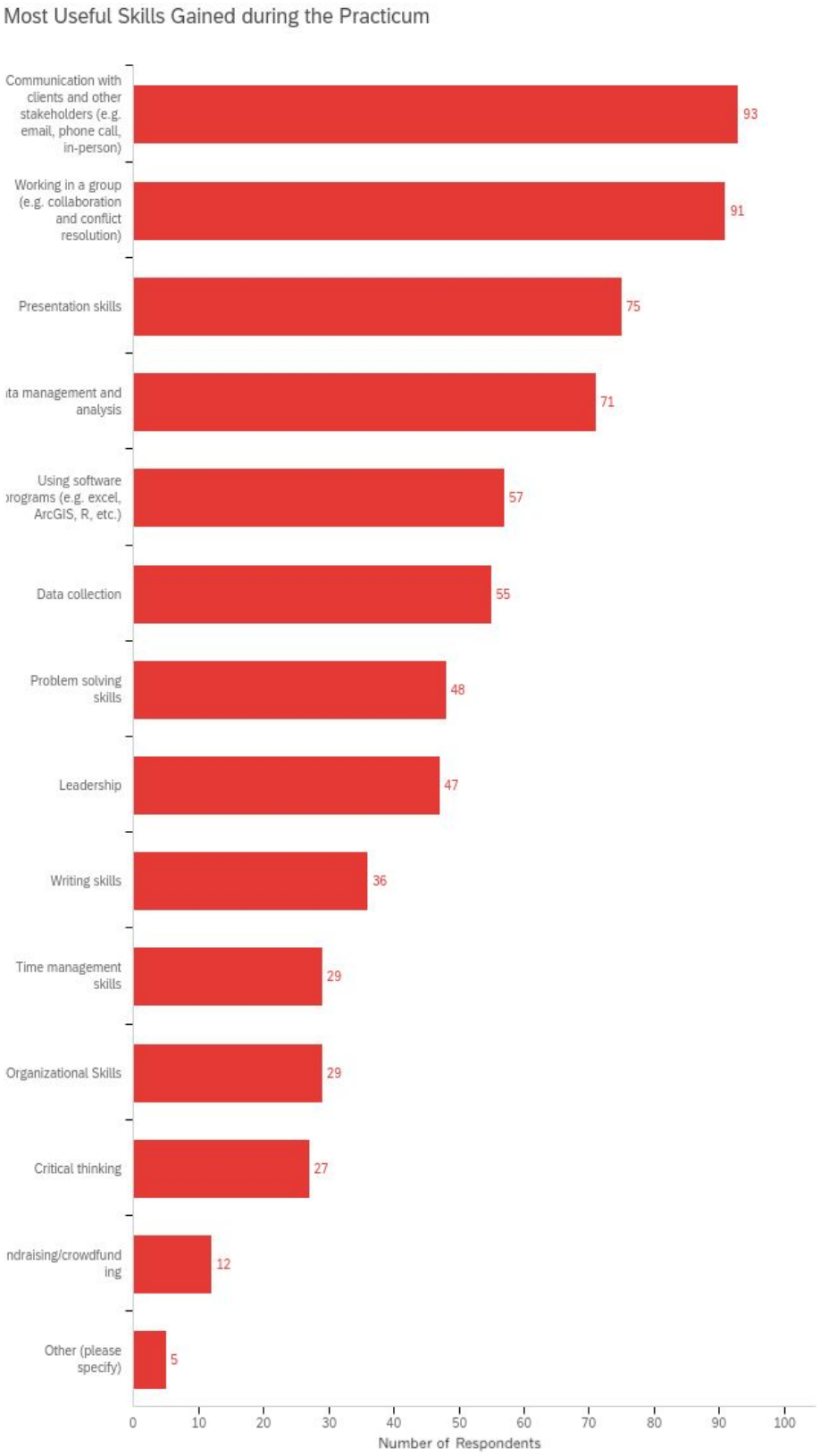
Most Useful Skills Gained during the Practicum
Communication with clients and other stakeholders (e.g. email, phone call, in-person)
93
Working in a group (e.g. collaboration and conflict resolution)
91
Presentation skills
75
ıta management and analysis
71
Using software ›rograms (e.g. excel, ArcGIS, R, etc.)
57
Data collection
55
Problem solving skills
48
Leadership
47
Writing skills
36
Time management skills
29
Organizational Skills
29
Critical thinking
27
ndraising/crowdfund ing
12
Other (please specify)
5
0
10
20
30
40
50
60
70
80
90
100
Number of Respondents

Figure 4.1: Alumni Survey, Question 9. What were the 3 most useful skills you gained during the Practicum? Out of a total of 23 responses, the top 3 responses were “Communication with clients and other stakeholders,” “Working in a group,” and “Presentation skills.” These top skills seem to be the most transferable when going into the workforce, according to alumni.

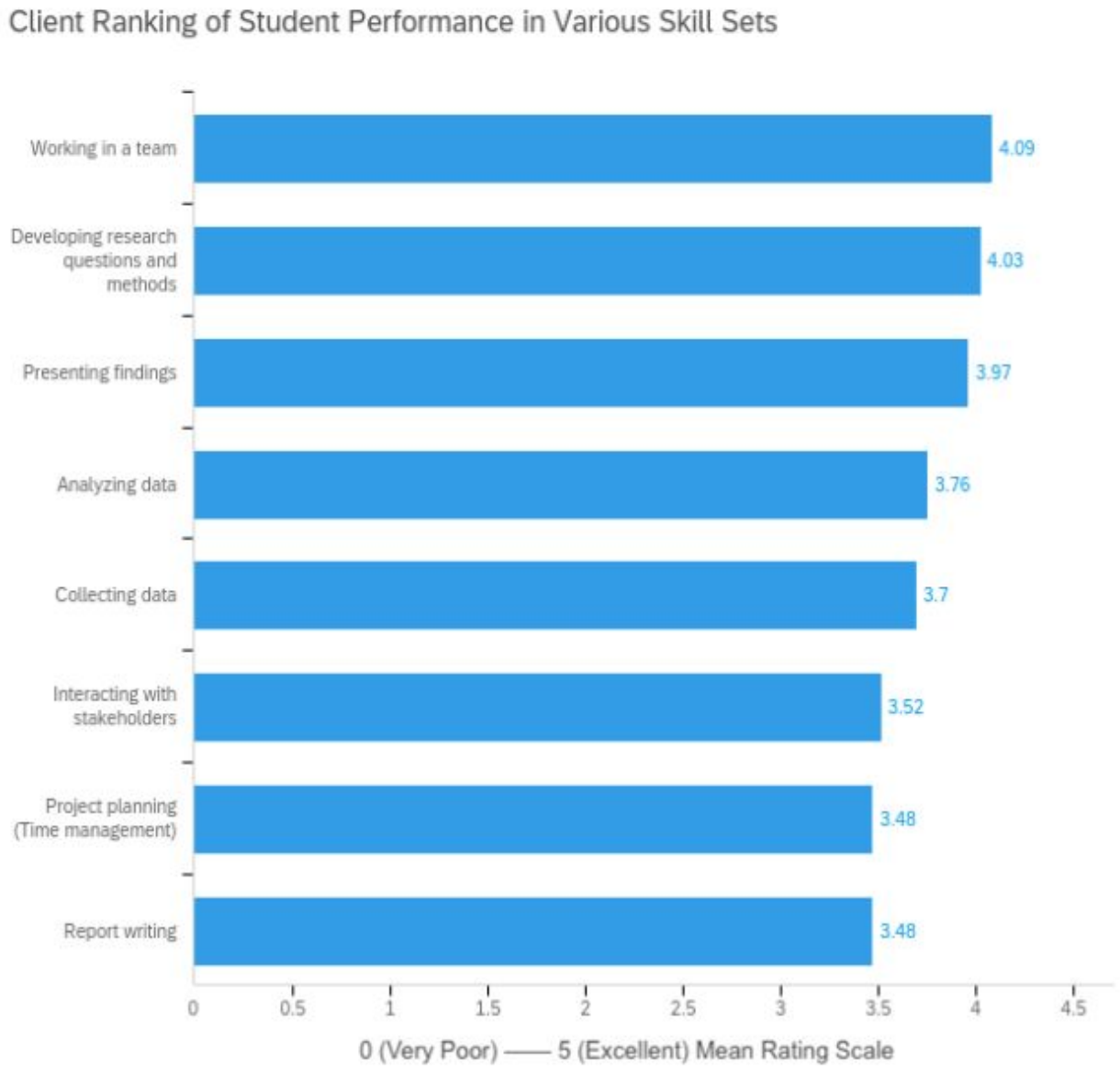

Figure 4.2: Client Survey, Question 8. How would you rate student performance in these different areas? Pictured are client rankings of student performance in skill sets relevant to most (if not all) Practicum projects. 33 people responded to this question and entered 264 responses across 8 skill sets. According to this graph students did best in “Working in a team” and comparatively the worst in “Report Writing”. 33 responses, or 11.36% of total responses, were “Not Observed/Do Not Know” across all skill sets. These responses were not given value in the overall ratings depicted in the above graph.

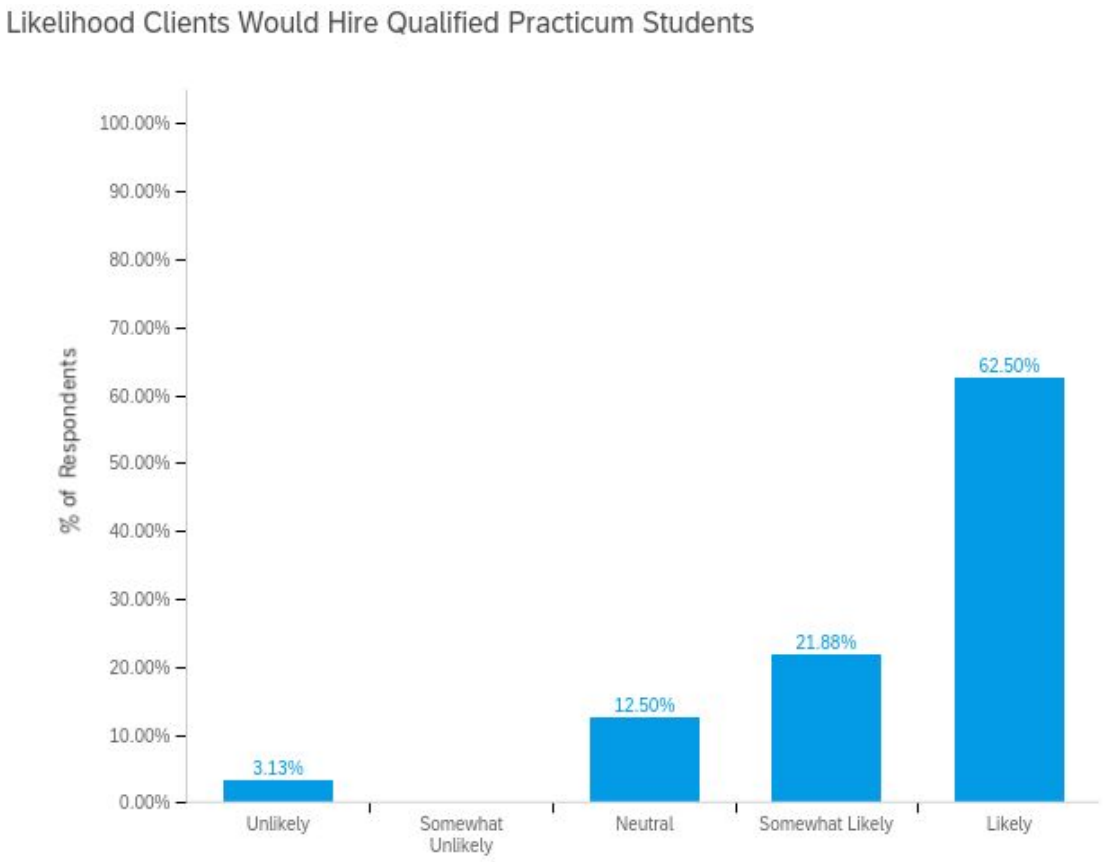

Figure 4.3: Client Survey, Question 21. Based on your experience with Practicum students, how likely would you be to hire them if you had a job for which they were qualified? This graph shows how likely clients of the Practicum are to hire qualified students on their Practicum team(s). Out of 32 total respondents, 20 (62.5% of clients) would likely hire a qualified Practicum student. Only 3.12% of clients said they are unlikely to hire a qualified Practicum student. The average likelihood is 4.41 on a 0-5 mean scale, with 0 being “Unlikely” and 5 being “Likely”.

5. Usefulness of project deliverables for clients

When asked how useful final deliverables were, clients overwhelmingly said that deliverables were “Useful” to “Extremely Useful” at 68.75% of responses. Only 9.38% of responses rated the deliverables as “Not Useful” or “Minimally Useful” (Figure 5.1). Deliverables were most often used as part of a larger project within the client organization or were used to inform the organization (Table 5.1).

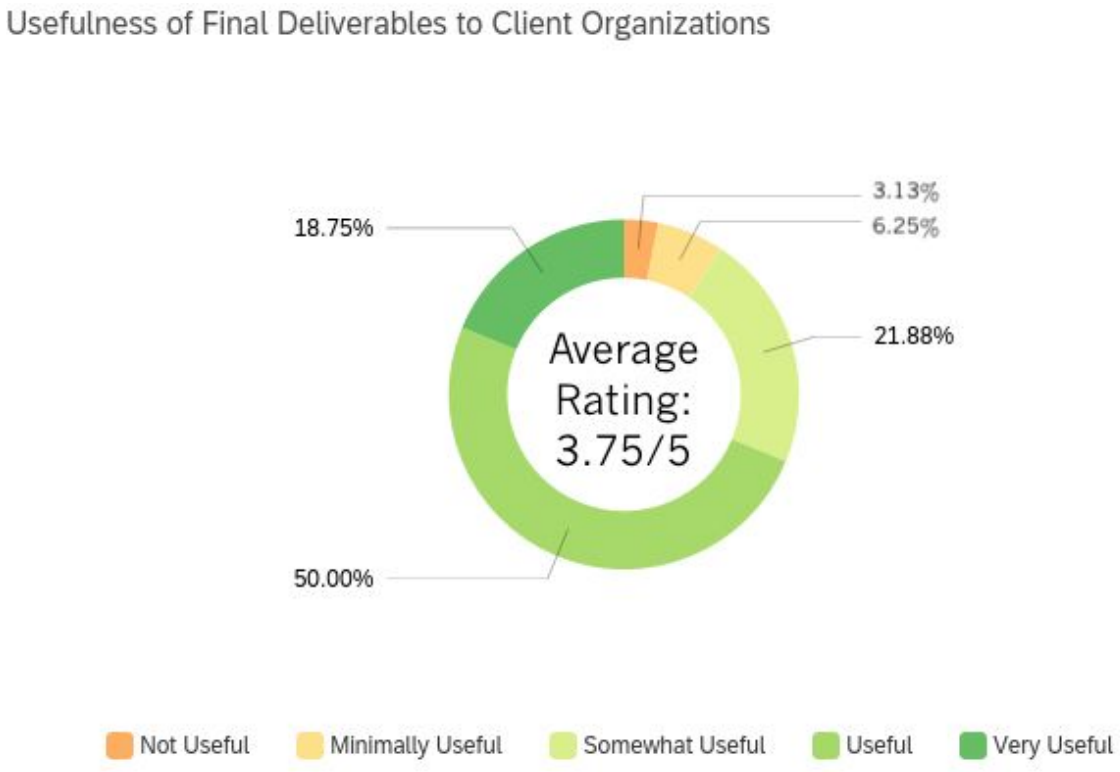

Figure 5.1: Client Survey, Question 14. Were the final deliverable(s) useful to your company/organization? Pictured are client ratings of usefulness of the Practicum's final deliverables to their company/organization on a 0-5 scale, 0 being "Not Useful" and 5 being "Very Useful". There were a total of 32 responses. This graph shows that half of clients rated students' final deliverables as "Useful" (16 responses). The next most selected rating was "Somewhat Useful" (7 responses) and then "Very Useful" (6 responses). This implies that there could be a greater emphasis on ensuring the final deliverables align with a client's clearly stated goals and standards.

Summary of client responses to "If applicable, please explain how you used your final deliverable(s)."

Category	Number of responses	Percent of responses	Examples
Used for a bigger project	9	34.6%	This project conceptualized and delivered a field survey component to a biodiversity project. Prior to the Practicum, we lacked the expertise to design the survey. By the end of the Practicum, we had all the data we needed.
Used to inform internally/externally	9	34.6%	The deliverable helped with adding nuance to our understanding of LA River perceptions.
Was not as applicable as hoped	4	15.4%	While the project was not able to answer the initial questions, it did inform next steps.
Awaiting deliverables	2	7.7%	We are still waiting for the results to be published before we are allowed to share/publicize through our

			network.
Have not used/Did not receive them	2	7.7%	Unfortunately, due to Covid-19 we weren't able to implement the changes we wanted in the project from year 1 to year 2. Year 1 was lacking, but we felt confident about the change in course going into our second year.

Table 5.1: Client Survey, Question 15. If applicable, please explain how you used your final deliverable(s). With nine responses each, a majority of clients found use for their deliverables, whether it be to inform their organization and the general public or for a bigger project that their organization can now complete. There were approximately a quarter of clients that were not satisfied with the usefulness of their deliverables or did not receive their deliverables. There are two clients of the 2019-2020 Practicum waiting for their final deliverables. Table of all categorized responses can be found in the Appendix (Table A4).

Discussion and Recommendations

Based on the results of the survey of alumni and clients, there are several areas in which we propose recommendations to improve the Practicum. Although there was an overall positive evaluation of the Practicum, we did find that there were areas of improvement repeatedly mentioned by both clients and alumni. These relate to team member relations, preparation, and the timeline of the Practicum.

Experience of the Practicum process

Team Relations

Alumni reported that the second most useful skill gained during the Practicum was “working in a group” (Figure 4.1). “Working in a group” was also ranked the highest by clients in terms of student performance. However, the part of the Practicum that alumni reported liking least was “working in a team/division of labor” (Table 1.2). The findings mentioned above may suggest that while students in the Practicum learn how to work with team dynamics and recognize that it is an important skill in the workforce, it is still an area for improvement. We recommend addressing this concern by better defining team members’ roles in the Fall Quarter through a workshop, which was also suggested by an alumni (Table A5). A better defined description of roles and responsibilities may help teams when first deciding on roles and delegating tasks throughout the project.

Beyond better defining roles, team members would also work better together if there were more chances to bond during the Fall Quarter class. Therefore, we recommend incorporating more communication and team building activities in the Fall Quarter course. Especially if the timeline was moved forward, as discussed below, there would be more opportunity for the team to work with each other during the different lessons taught in the Fall Quarter course. However, even if the timeline remained the same, we think it would be beneficial to incorporate a team building activity during each class. For example, Sustainability Action Research (SAR) at UCLA started off every class with a team building exercise, led by a

particular group that week, which helped strengthen relationships in the team throughout the entire course.

One area that both surveys assessed in a similar fashion was the relationship between clients and students. Between client and teams, 33 alumni noted that a skill they wish they had gained during the Practicum was communication with clients and other stakeholders (Table A6). From the client perspective, 23.5% of clients also noted that there should be more frequent interactions between clients and students (Table A7) and 24% noted that "regular/sufficient updates" were lacking (Figure A6). As seen in Figure 2.1, alumni noted that they fell between "Neither Disagreeing nor Agreeing" and "Somewhat Agreeing" when asked if they received enough guidance from their client. At the same time, clients chose in 10 out of 25 responses that "Regular, sufficient updates" and "Understanding [my] expectations" were lacking from students in their projects (Figure A6). Lack of communication and support appear to be an issue, going both ways, between clients and students. Additionally, clients rated students almost exactly between "Average" and "Good" in interacting with stakeholders (themselves) (Figure 4.2), while alumni noted 94 out of 228 times (41.2%) that communication with clients and stakeholders was one of the three most important skills that they gained from the Practicum. Graduates are finding that professional communication is an important and valuable skill, and the Practicum is providing an opportunity for students to learn and practice this type of communication. At the same time, it appears that the Practicum is the first time that students learn how to communicate and interact professionally because, from the clients' perspective, there is room for improvement on this front. In consideration of the clients' needs, potentially improving the outcomes of projects, and helping students even more, it may also be beneficial to provide students with training in professional communication and relations before the Practicum begins, which is discussed further in the following section.

Preparation

In terms of preparation for the Practicum, we considered the Fall Quarter Class and courses leading up to the Practicum. As noted in our findings, nearly 71% of alumni said they felt less than prepared (i.e., "Somewhat Prepared" and "Unprepared") for the project (Figure 3.1).

Fall Quarter Class

For the Fall Quarter class, in general, 9% of alumni noted that the use of the Fall Quarter class was their least liked aspect of the Practicum (Table 1.2). One suggestion is to better prepare students to work in a team, which was just discussed. In response to our question regarding the skills they wish they gained but did not (Table A2), the highest response (23%) was again related to technical skills. Additionally, for our question asking alumni to suggest a topic that was not covered during the Fall Quarter class that they wished was covered, the highest response (16.38%) was related to software and technical skills (Table A5). Therefore, while the quarter was focused on GIS, alumni noted that they wished they had also learned other software, particularly R and Excel, and technical skills such as data and statistical analysis as well as survey design. The problem of teaching data analysis and R may be

mitigated by a new required course entitled ‘Env. 175: Big Environmental Data’, which future students will likely be required to take their Junior Year. However, it is important to note that the 3 largest reported research methodologies were gray literature/case studies analysis, field data collection, and statistics (Figure A7). While GIS was the 4th most used methodology, there seems to be little preparation for the other methodologies. Although it is difficult to cover all of these different areas in-depth, and may be better done through an entire course in the IoES curriculum, it would also be beneficial to have at least two Fall Quarter lessons devoted to varying research methodologies where students can attend workshops directly related to their project.

11.33% of alumni also noted that they wish the Fall Quarter class taught research and project management (Table A5). While this was briefly covered this past year at the end of our presentations, it would be helpful to spend more time on how to manage and organize your research and project.

Lastly, 8.3% of alumni wished they had started their projects earlier. 2 clients also emphasized that they wished there were more time for deliverables (Table A7). Therefore, we would suggest making team decisions earlier so students can spend more time understanding the scope of their project, working on their research, and communicating with clients. We understand the timeline is tight, so we suggest implementing this by releasing a video and report proposal for each client Week Zero. Before the first class students should be required to submit notes for each client proposal, to ensure every student considers each project. From there, the first 2-3 weeks would be Q & A sessions with clients and seniors, with the Practicum Director as the facilitator.

Skills acquired by alumni for the workforce

IoES Curriculum Courses

In response to Question 11 in the alumni survey, (Which skills do you wish you had gained, but didn’t in the Practicum?), software and technical skills received the highest number of responses (Table A6). We recommend a greater focus on teaching coding and programming in the major or the Practicum Fall Quarter class. While it would be difficult and ineffective to incorporate all sorts of softwares and programs into the Fall Course, it would be beneficial to have more classes in the curriculum that teach these programs, with an environmental focus or application.

Additionally, 16.66% of alumni, the second largest response, noted that they wish the Fall Quarter class had a larger emphasis on career and networking (Table A6). Students wanted to learn more about career options, how to interview, resume/cover letter tips, etc. While the annual alumni panel often addresses these career-prep concerns, it would be worthwhile to look into spending a full lecture or even an entire course on these points. This is due to the fact that the Practicum is designed to equip students to begin impactful careers and while our experience from our projects may help us prepare for these careers, it seems like students still feel there is another element missing to obtaining these careers. Although the Practicum is not necessarily a career development course, this is clearly an area that alumni felt was missing. A course on

career development in the environmental field as well as increasing awareness of the IoES Alumni Association and their events might help mitigate these concerns.

From the client perspective, student performance was ranked lowest in report writing (Figure 4.2). Although we did not see parallel findings in the alumni survey, additional practice with writing is always beneficial. Therefore, while we should continue to have a lecture or two on writing and make it a collaborative and interactive process during the Fall class, it would be most beneficial to have an entire course dedicated to professional writing and communication. This course would also address the issue of client-student communication by teaching students how to speak, communicate, and interact in a professional setting. Understanding that academic schedules are tight, we suggest implementation of this recommendation by restructuring or removing the sustainability talk courses 185A and 185B and replacing them with professional writing and communication courses.

Usefulness of deliverables

The last section of our guiding questions involves analyzing the usefulness of final deliverables for clients. The overall rating was 3.75 out of 5 and 68.75% of clients indicated useful or very useful. While 3.75 is overall a positive score, 24% of clients noted that "regular,sufficient updates" and 16% noted that "understanding expectations" were lacking on the student team (Figure A6). 23.5% of clients noted that there should be increased interaction between students and clients. However, 9.8% of alumni mention that working with clients is the part they liked least part of the Practicum since they did not receive much feedback from clients (Table 1.2). Students suggest that clients should be more engaged and communicative in the project (Table A8).

Therefore, this data may suggest that an improved relationship and a transparent communication between clients and alumni could enhance the usefulness of deliverables. Therefore, we would highly recommend mandatory periodic meetings between clients, advisers, and students all together in order to ensure the project proceeds smoothly. Additionally, we also suggest encouraging "exit interviews" between clients so students and clients have a chance to debrief. This also allows students to get a better sense of the future of their deliverables and may help clients better understand their role for future years. And we would recommend advisers to be responsible for leading transparent and effective communications.

Future Research

The scope of this analysis covered the student and client experience, but there are many other aspects of the Practicum to analyze that time and resources did not allow for. Further research in these areas would allow for better understanding of the process, outcomes, and methods of conducting a capstone program.

An integral part of the Practicum process is the role and involvement of the advisors, who are the next most integral party to the projects which this analysis did not assess. A similar survey of past advisers' experiences could provide further insight into what works and what

does not in the Practicum. This report also was unable to describe in-depth how advisers are chosen and assigned to projects, nor the extent to which they are prepared for clients' specific needs and goals. Additionally, if the method of choosing advisers changes in the near future, it may affect the quality of teamwork and deliverables or the level of subject expertise, whether in a positive or negative way. Having more specific data on advisers' experiences would contribute overall to making specific recommendations for the improvement of the Practicum.

An outcome of the Practicum that was of early interest in this assessment was whether IoES alumni were better prepared in the workforce because of their experience in the Practicum. There were initial plans to interview employers of IoES alumni to see if they noticed a difference in alumni's technical or professional skills, problem-solving ability, or any other abilities versus employees who were non-IoES graduates. The current extent of research only looks as far as what alumni are doing post-undergrad, which is significant. However, being able to compare their performance with non-IoES graduates would provide insight into whether the Practicum sets students apart or prepares them better for their pursuits after graduation.

In terms of making comparisons, this assessment was limited to being solely a case study of one environmental education capstone program. Many other formats of capstone programs exist, in environmental science programs at other universities and in different departments and majors within UCLA. These programs may be the same or differ in length of program, group size, research topics, presence of an advisor, and many other variables. Conducting a parallel study with other capstone programs could reveal strengths, weaknesses, and potential improvements to all programs, including the Practicum.

Conclusion

To conclude this report, we will reiterate the importance of emphasizing quality in environmental education. Malcolm X said, "Education is the passport to the future, for tomorrow belongs to those who prepare for it today." As members of the class of 2020 graduate on to become engineers, cartographers, policy-makers, activists, and more, it is critical to remain grateful for the guidance and support we received from our educators in and out of the classroom. In a similar vein, teachers must acknowledge themselves as life-long learners and honor their students as the products of their pedagogy. Lectures and slideshows only go so far in giving students the tools they will need to make their mark on the world. This is why action-oriented education programs that actively engage and inspire students are critical. Inspiration is where education takes flight.

As a university that celebrates the diversity of its student body, it is indebted to its students who bring their different perspectives, backgrounds, passions, and beliefs to class along with their school supplies. An institution of higher learning owes its students an education that unlocks potential, fosters optimism and ingenuity, and teaches us how to use who we are and where we're from to solve the world's most pressing problems. The only way to do this is to intentionally engage with individual students. We believe that the IoES Senior Practicum is a leading program in educating, engaging, and equipping students to be leaders; at the same

time, new students require new methods to face an ever-changing future. Environmental science is a field built on progress and action, and an education program with these values would make much room for innovation, improvement, and future progress to celebrate.

References

Ballantyne, R., Packer, J., & Everett, M. (2005). Measuring Environmental Education Program Impacts and Learning in the Field: Using an Action Research Cycle to Develop a Tool for Use with Young Students. *Australian Journal of Environmental Education, 21*, 23-37. doi: 10.1017/S0814062600000926

Barr, R. B., & Tagg, J. (1995). From teaching to learning—A new paradigm for undergraduate education. Change: The magazine of higher learning, 27(6), 12-26.

Bergman, B.G. (2014). Assessing Impacts of Locally Designed Environmental Education Projects on Students' Environmental Attitudes, Awareness, and Intention to Act. *Environmental Education Research, 22*(4), 480-503. doi: 10.1080/13504622.2014.999225

Beringer, A., & Adomβent, M. (2008). Sustainable University Research and Development: Inspecting Sustainability in Higher Education Research. *Environmental Education Research*, *14*(6), 607-623. doi: 10.1080/13504620802464866

Cacioppo, J. T., Petty, R. E., Feinstein, J. A., & Jarvis, W. B. G. (1996). Dispositional differences in cognitive motivation: The life and times of individuals varying in need for cognition. Psychological Bulletin, 119, 197–253.

Choi, B.C.K., Pak, A.W.P. (2005). A catalog of biases in questionnaires. *Preventing Chronic Disease*, 2. Retrieved from: http://www.cdc.gov/pcd/issues/2005/jan/04_0050.htm

Fong, M., Francis, A., Hairapetian, M., Hem, M., Park, J., Paset, S. (2018) Collaborative Action-Oriented Learning for the Environment: Benefits and Challenges. UCLA IoES Practicum.

Gralton, A., Sinclair, M., & Purnell, K. (2004). Changes in Attitudes, Beliefs, and Behavior: A Critical Review of Research into the Impacts of Environmental Education Initiatives. *Australian Journal of Environmental Education, 20*(2), 41-52. doi: 10.1017/S0814062600002196

Klein, J. T., & Newell, W. H. (1997). Advancing interdisciplinary studies. *Handbook of the undergraduate curriculum: A comprehensive guide to purposes, structures, practices, and change*, 393-415.

Krosnick, J.A. (2018a). Improving Question Design to Maximize Reliability and Validity. In D.L.

Vannette, J.A. Krosnick (Eds.) *The Palgrave Handbook of Survey Research* (pp. 95-102). Cham, Switzerland: Palgrave.

Kudryavtsev, A., Krasny, M.E., Stedman, R.C. (2012). The Impact of Environmental Education on Sense of Place among Urban Youth. *Ecosphere 3*(4): 29, 1-15. doi: 10.1890/ES11-00318.1

Lattuca, L. R., Knight, D., Seifert, T. A., Reason, R. D., & Liu, Q. (2017). Examining the impact of interdisciplinary programs on student learning. Innovative Higher Education, 42(4), 337-353. doi:10.1007/s10755-017-9393-z

Liddicoat, K., Krasny, Marianna. (2012). Research on the Long-Term Impacts of Environmental Education. *International Handbook of Research on Environmental Education Routledge,* 289-297. doi: 10.4324/9780203813331

McClaren, M., & Hammond, B. (2005). Integrating education and action. Environmental education and advocacy: Changing perspectives of ecology and education, 267.

Robertson, C.C. (2016). Environmental Education as a Transformative Social Process: An Activity Systems Analysis of Environmental Education and the Role of Environmental Educators. (Doctoral dissertation). New York University, New York, USA.

Ruiz-Mallen, I., Barraza, L., Bodenhorn, B., & Reyes-Garcia, V. (2009). Evaluating the Impact of an Environmental Education Programme: An Empirical Study in Mexico. Environmental Education Research 15(3), 371-387. doi: 10.1080/13504622.2013.838749

Stern, M.J., Powell, R.B., & Hill, D. (2014). Environmental Education Program Evaluation in the New Millennium: What do we Measure and What have we Learned? *Environmental Education Research*, 20(5), 581-611. doi: 10.1080/13504622.2013.838749

UCLA Academic Planning and Budget. (n.d.) “UCLA 2018-19 Undergraduate Profile.” https://www.apb.ucla.edu/Portals/90/Documents/Campus%20Stats/UGProfile18-19.pdf

UCLA Institute of Environmental Science. (2019) “IoES Student Handbook 2018-19.” www.ioes.ucla.edu/wp-content/uploads/Student-Handbook-091019-UPDATE.pdf.

United Nations Educational, Scientific, and Cultural Organization. (1978). Tbilisi Declaration. Connect, 3(1), 1-8.

U.S. Department of Education, Office of Elementary and Secondary Education, School Support and Rural Programs, *Evaluation Matters: Getting the Information You Need From Your Evaluation*, Washington, D.C., 2014. Retrieved from https://www2.ed.gov/about/offices/list/oese/sst/evaluationmatters.pdf

Vannette, D.L. (2018). Best Practices in Survey Research. In D.L. Vannette, J.A. Krosnick (Eds.) *The Palgrave Handbook of Survey Research* (pp. 331-343). Cham, Switzerland: Palgrave.

Appendix

Appendix A: Supplemental graphs and tables

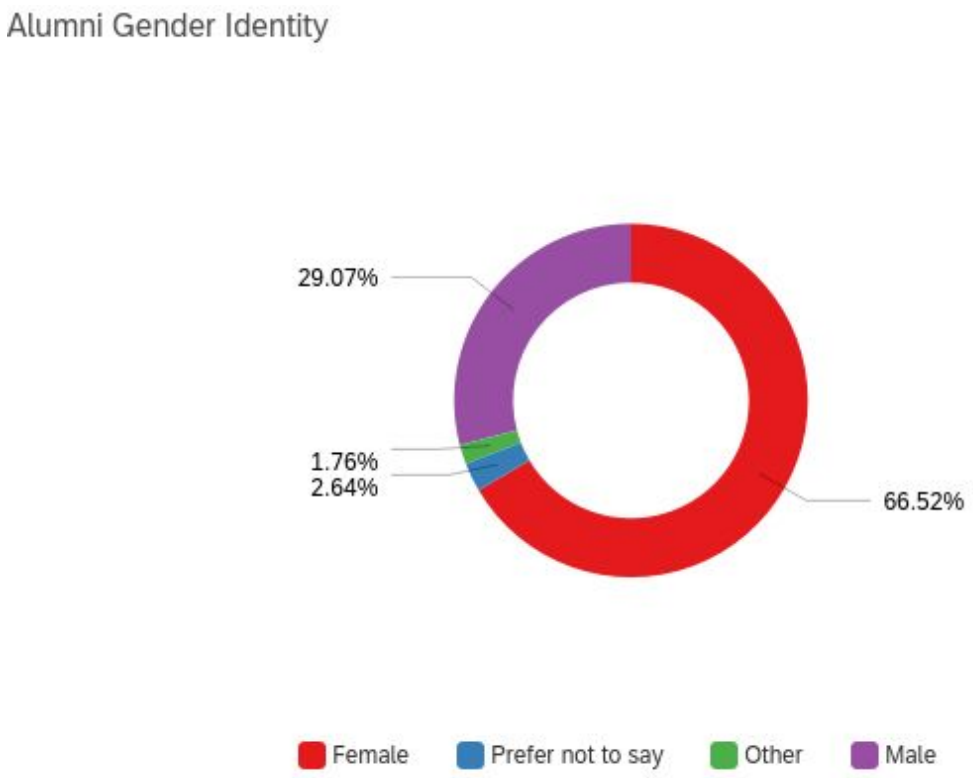

Figure A1: Alumni Survey, Question 23. What is your gender identity? There were 227 responses for this question. More than half of respondents (66.52%) identified as Female, 66 identified as Male (29.07%), 6 indicated “Prefer not to say”, and 4 identified as “Other.”

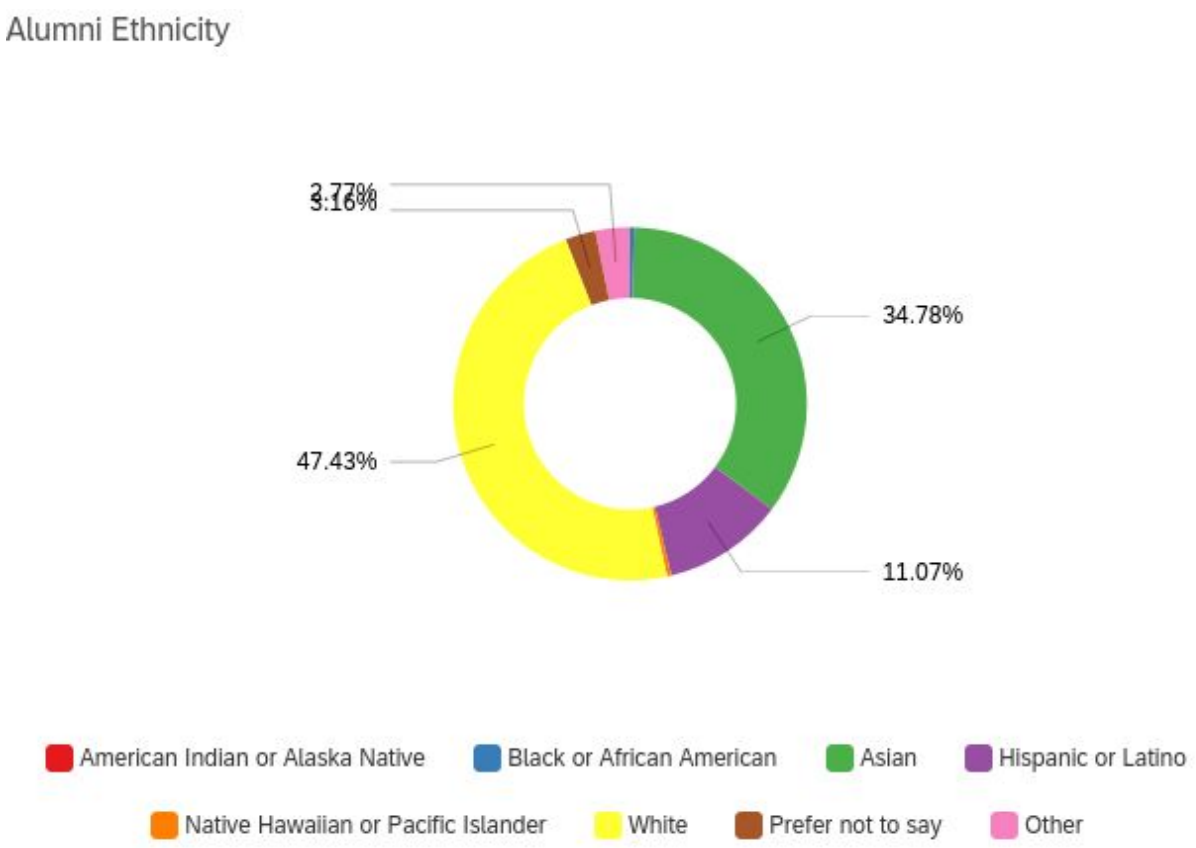

Figure A2: Alumni Survey, Question 24. What is your Ethnicity? There were a total of 253 respondents for this question. Nearly half (47.3%) of respondents are White, with 34.78% of respondents being Asian. Only 1 respondent identified as Black or African American and only 1 identified as Native Hawaiian or Pacific Islander. No respondents identified as American Indian or Alaska Native.

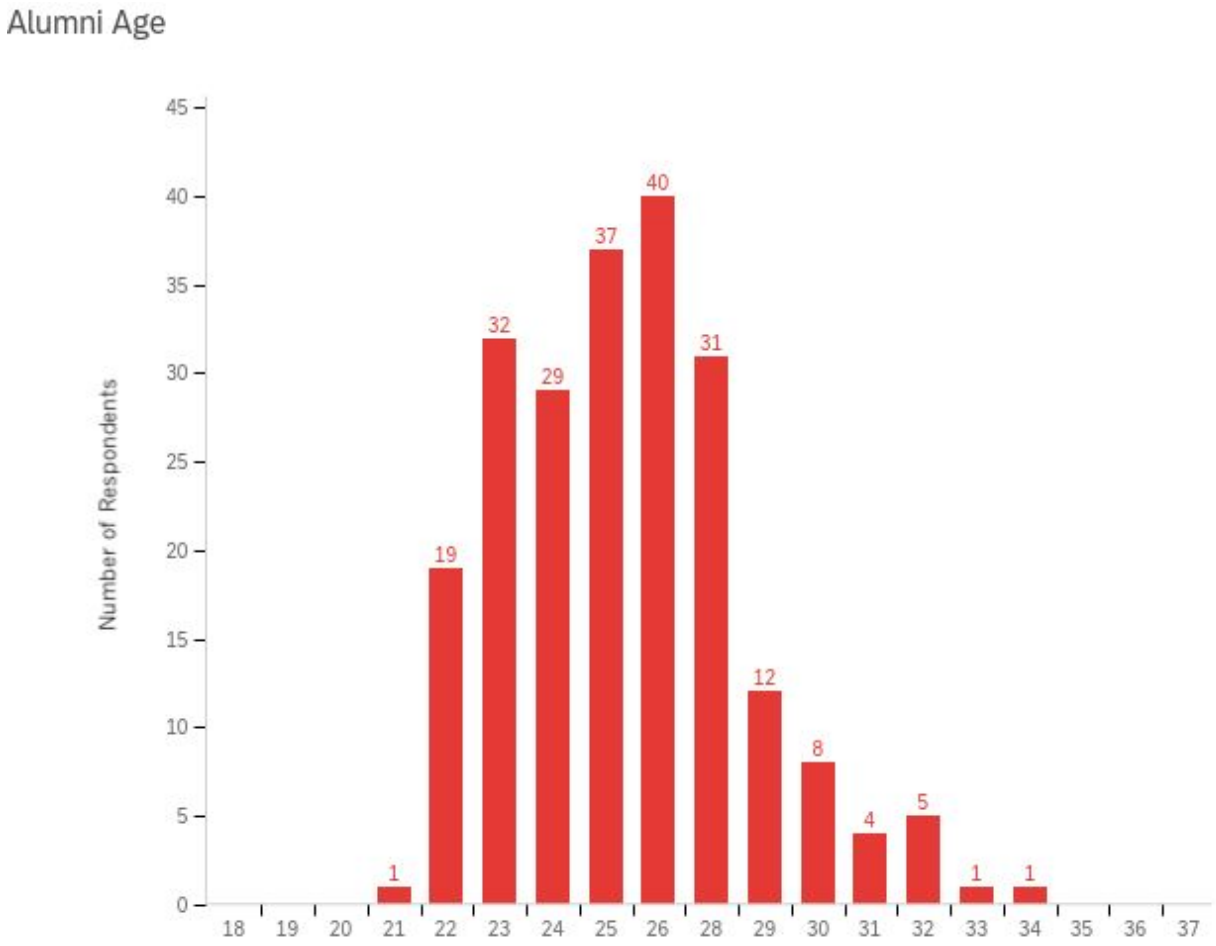

Figure A3: Alumni Survey, Question 22. How old are you? With a total of 220 respondents, nearly half are 25-28. Due to a technical error, there is no option for 27, but 2 alumni noted that they were 27 years old. Past the age of 28, there are less respondents, possibly due to the fact that the program was smaller and alumni are less inclined to take it after an extended time away from the program.

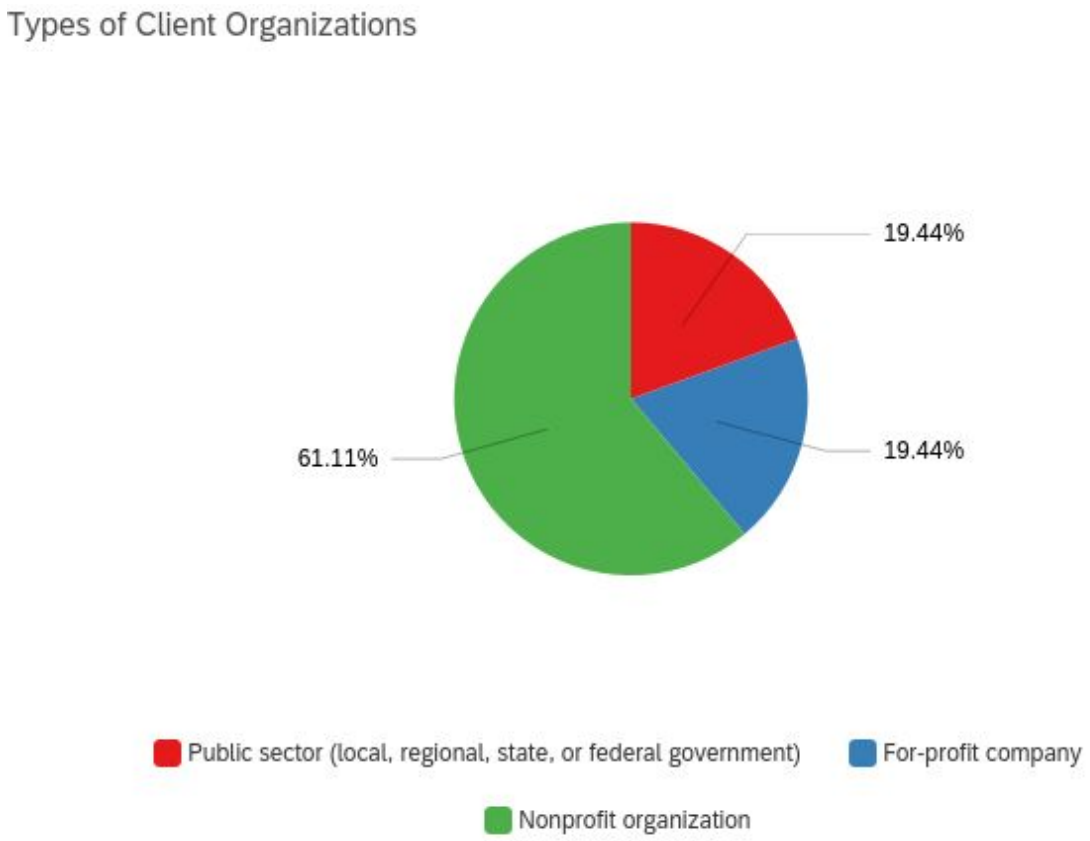

Figure A4: Client Survey, Question 3. What type of organization is it? There were 36 total responses for this question. 22 clients (61.11%) indicated that their participating organization was a nonprofit.

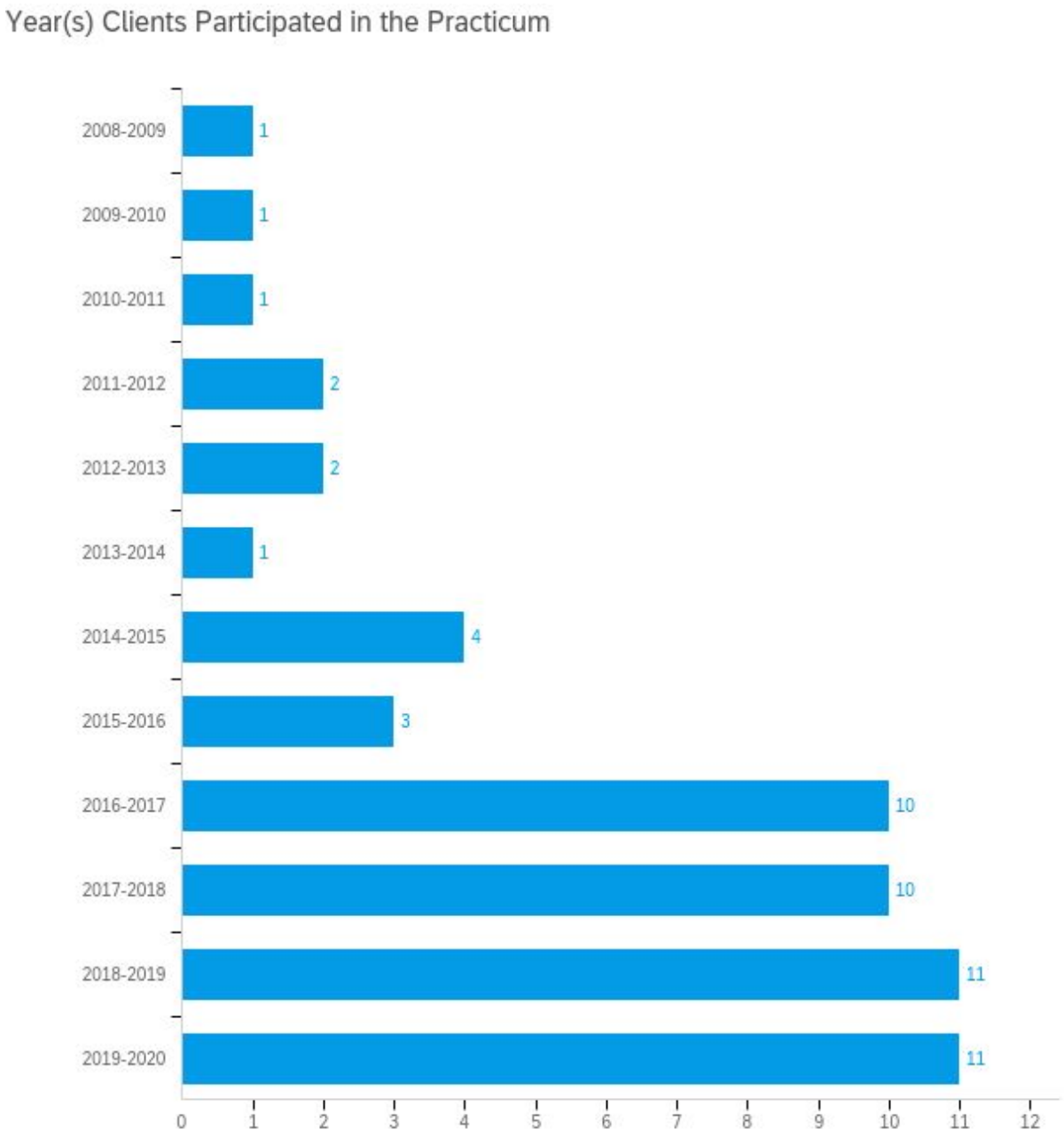

Figure A5: Client Survey, Question 5. What year were the project(s) conducted? Check all that apply. There were a total of 57 responses for this question. The majority of clients (73.6%) indicated that they had conducted their project in the last 4 years. This is likely due to the fact that clients are less inclined to take this survey the more time since the project was conducted, possibly due to the fact that they do not have a good recollection of the project after a few years.

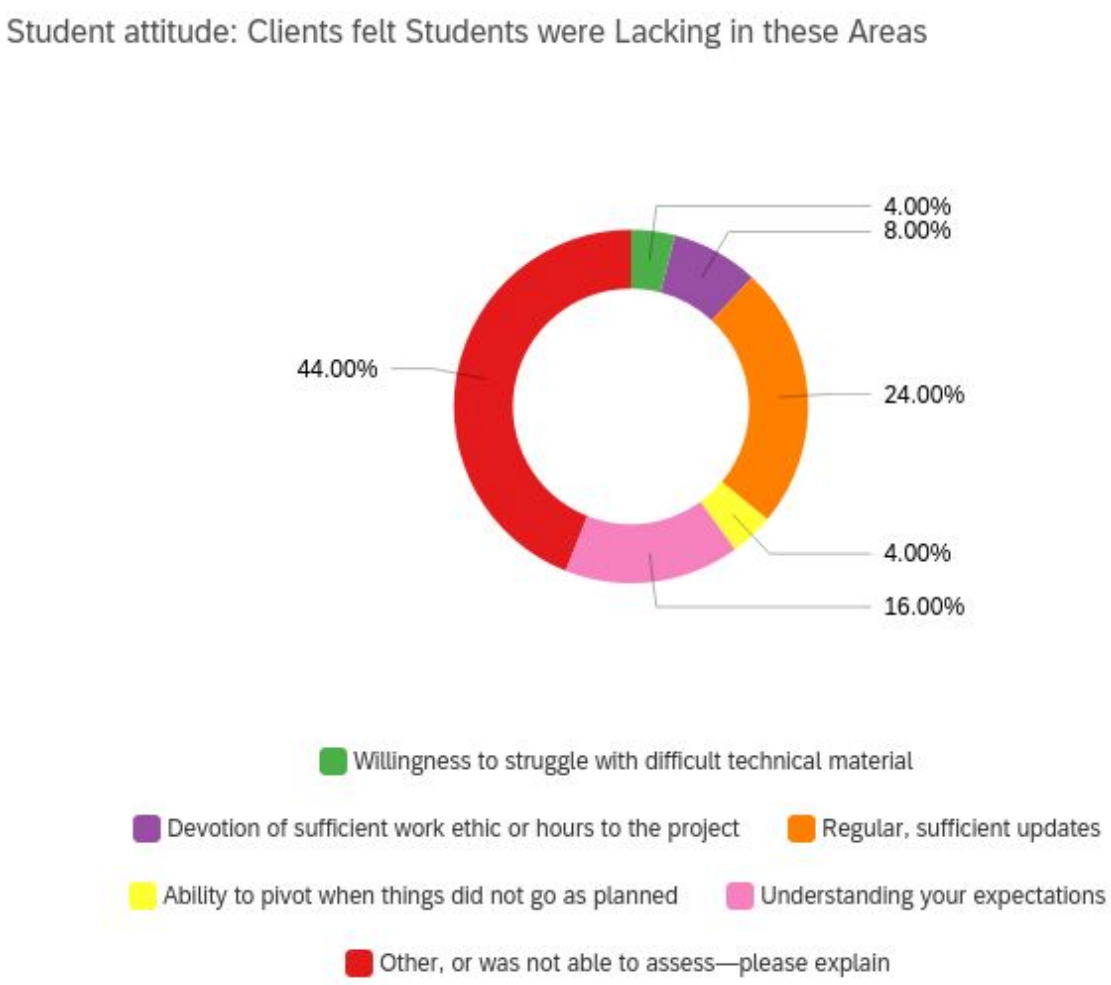

Figure A6: Client Survey, Question 10. In terms of student attitude toward the project, which of these (if any), were lacking on the student team and negatively impacted the results of the project? There were a total of 25 responses for this question. The majority of clients (44%) or 11 out of the 25 respondents indicated “Other, or was not able to assess.” The next highest response (24%) was “regular, sufficient updates” and 16% indicated that students did not understand their expectations. This data indicates that there may be insufficient interactions between the clients and students.

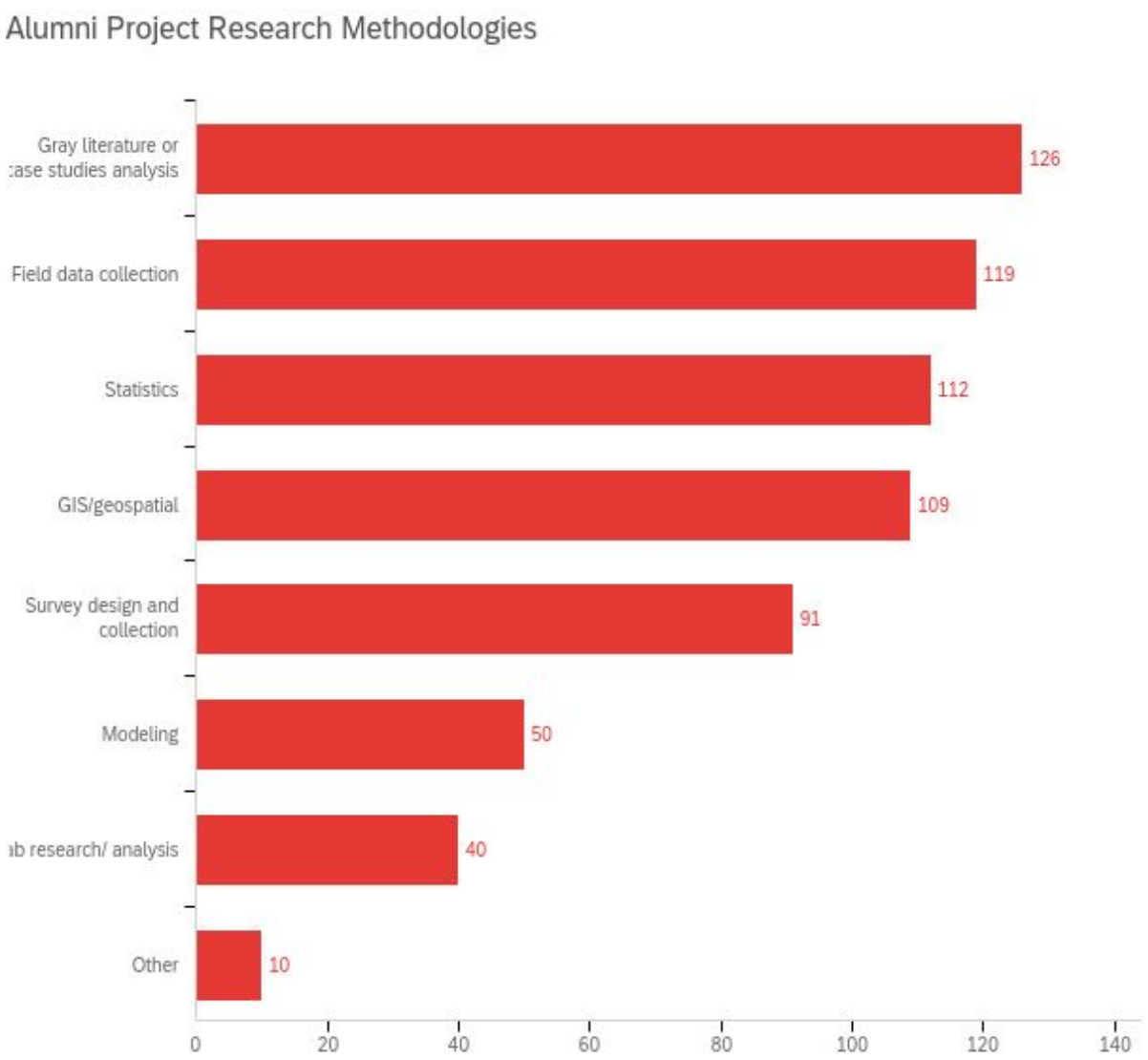

Figure A7: Alumni Survey, Question 14. What research methodology did your project use? There were a total of 657 responses indicating that most projects used more than one form of research methodology. Gray literature or case study analysis likely has the highest number of responses because all teams did a literature review.

Table A1: Alumni Survey, Question 4. What did you like most about the Practicum? Why? There were a total of 232 responses. The highest category of response was by far “real-life experience/applied learning” with 99 responses (42.67%). The next highest category with 49 responses (21.12%) was “working in a team” and “working with a client” with 40 responses (17.24%). This may support that the defining aspect of the practicum, being action-oriented with the intention to prepare for future careers, is executed well because it is the part alumni like most.

Table A2: Alumni Survey, Question 5. What did you like least about the Practicum? Why? There were a total of 223 responses. The highest category of response was “working in a team/division of labor” with 43 responses (19.28%) followed by “client choices/project

assignments with 29 responses (13%) and “working with advisor/faculty” with 22 resposnes (9.87%). The data seems to indicate that alumni had the most difficult time with team dynamics whether that was with their peers, advisors/ stakeholders, or due to the project they were assigned.

Table A3: Client Survey, Question 16. What was the most valuable aspect of working with students from the Practicum? There were a total of 35 responses. The highest category of response was “student contributions” with 15 responses (45.71%) followed by “helping students” with 10 responses (28.57%). This data seems to indicate that clients like working with students because they feel it either benefits the client organization or benefits the students.

Table A4: Client Survey, Question 15. If applicable, please explain how you used your final deliverable(s). There were a total of 32 responses. The highest category of responses was “used to inform internally/externally” with 12 responses (37.5%) followed closely by “used for another project” with 11 responses (34.38%). This seems to indicate that most deliverables are helpful as a foundation or background for further work clients want to do.

Table A5: Alumni Survey, Question 12. What is one topic you didn’t cover during the Practicum course in the Fall class that you wish was covered? There were a total of 177 responses for this question. The highest category of responses was “other” with 34 responses (19.21%), with the majority of comments being “N/A” or “Don’t remember.” The next highest category is “Software/Technical Skills” (16.38%) with 29 responses. “Career/networking” follows with 25 responses (14.12%). Lastly, 22 alumni (12.43%) indicated that they wish the Fall Course covered various environmental sectors such as environmental policy and other areas of environmental industry.

Table A6: Alumni Survey, Question 11. What other skills do you wish you had gained, but didn’t in the Practicum? This question provided space for alumni to indicate 3 skills they wish they had gained. There were a total number of 452 responses. Complementing our results from Table A1, the highest category of responses was “Software/Technical Skills” with 103 responses (23%). The next highest category of responses was “Data Analysis/Visualization with 58 responses (13%) followed by “Research Methods/ Data Collection and Management” and “Presentation/Public Speaking/Science Communication”. Data analysis and various research methods oftentimes require software/technical skills which indicates that technical skills are useful for future careers and should be emphasized not only in the Practicum but in the major.

Table A7: Client Survey, Question 25. Is there anything you would suggest to improve the Practicum? There were a total of 20 responses for this question. The highest category of suggestions were related to increasing interaction and communication (28.57%) which is consistent with our findings and recommendations as well.

Appendix B: Alumni postgraduate situations

Alongside the five main research questions discussed above, the alumni survey also provided data on the practical outcomes and situations of IoES alumni. The tertiary research question of "Where are graduates now?" is separate from the rest of the analysis and discussed here because it is more tangential to the topic of the Practicum proper. It is also a question that calls for data and summarization rather than recommendations. These data focus on alumni's employment situations, fields of work/study, and these areas compared to ethnicity and gender.

Graphs and explanation of the ethnic and gender breakdown of alumni respondents can be found in the Methods and Appendix A sections above. In terms of where students work and study, most of them remain in fields related to the environment and sustainability, nearly 70% (Figure B1). Of these alumni, they also work in a diverse array of environmental fields (Figure B3). But accounting for all alumni respondents, most work either at a for-profit company or in the public sector (Figure B2).

When considering the field of current work/study according to demographics, gender is not a significant predictor as to whether or not someone will be in an environmental field. 71.83% of females and 65.08% of males are currently in an environmental field, and only 10 respondents combined out of 220 chose "Prefer not to say" or "Other" when answering what their gender identity was (Figure B4).

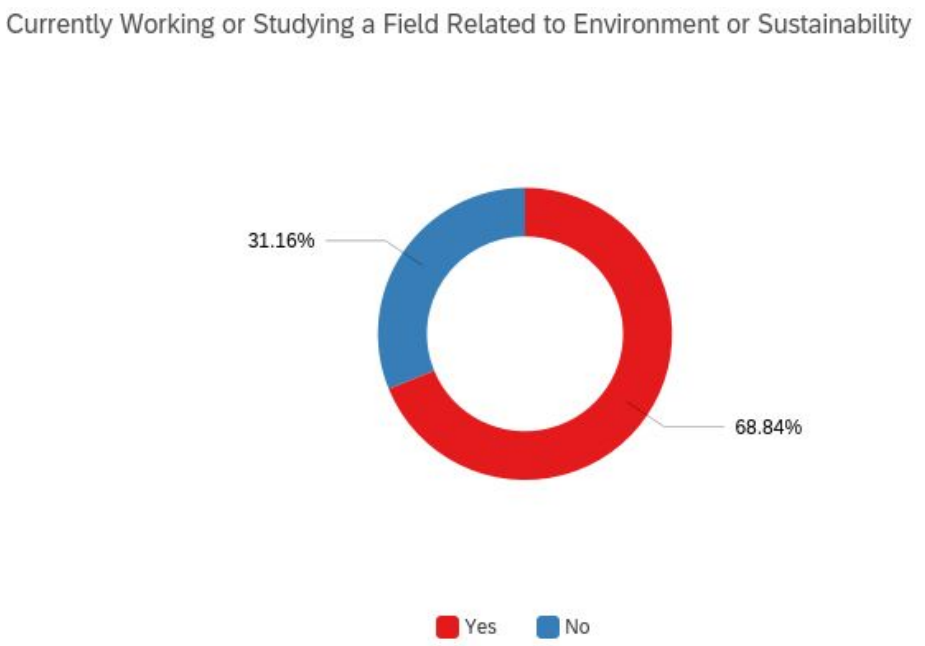

Figure B1: Alumni Survey, Question 26. Are you currently working in or studying a field related to the environment or sustainability? 209 alumni responded to this question, and over ⅔ of the respondents said that they were studying or working in a field related to the environment or sustainability.

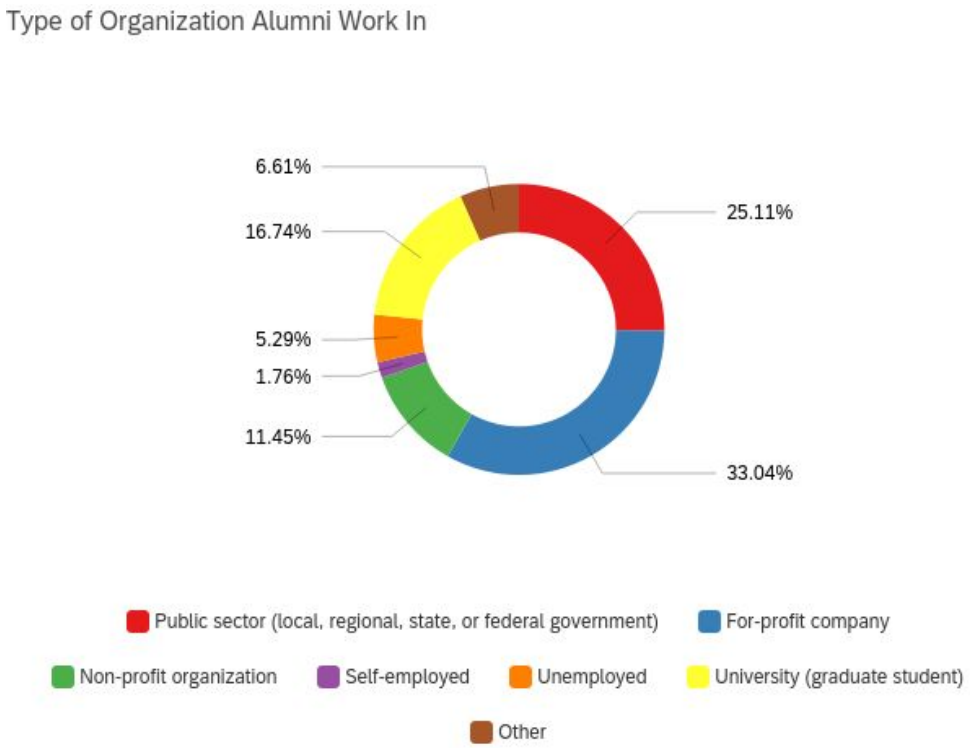

Figure B2: Alumni Survey, Question 25. What type of organization do you currently work for? There were 220 respondents to this question, and over half work in for-profit organizations and the public sector. 16.74% either work at a university or are graduate students, Just over 10% work at non-profit organizations, and the remaining 13.66% reported that they were self-employed, unemployed, or “Other.”

Environmental Field Alumni Currently Working In or Studying

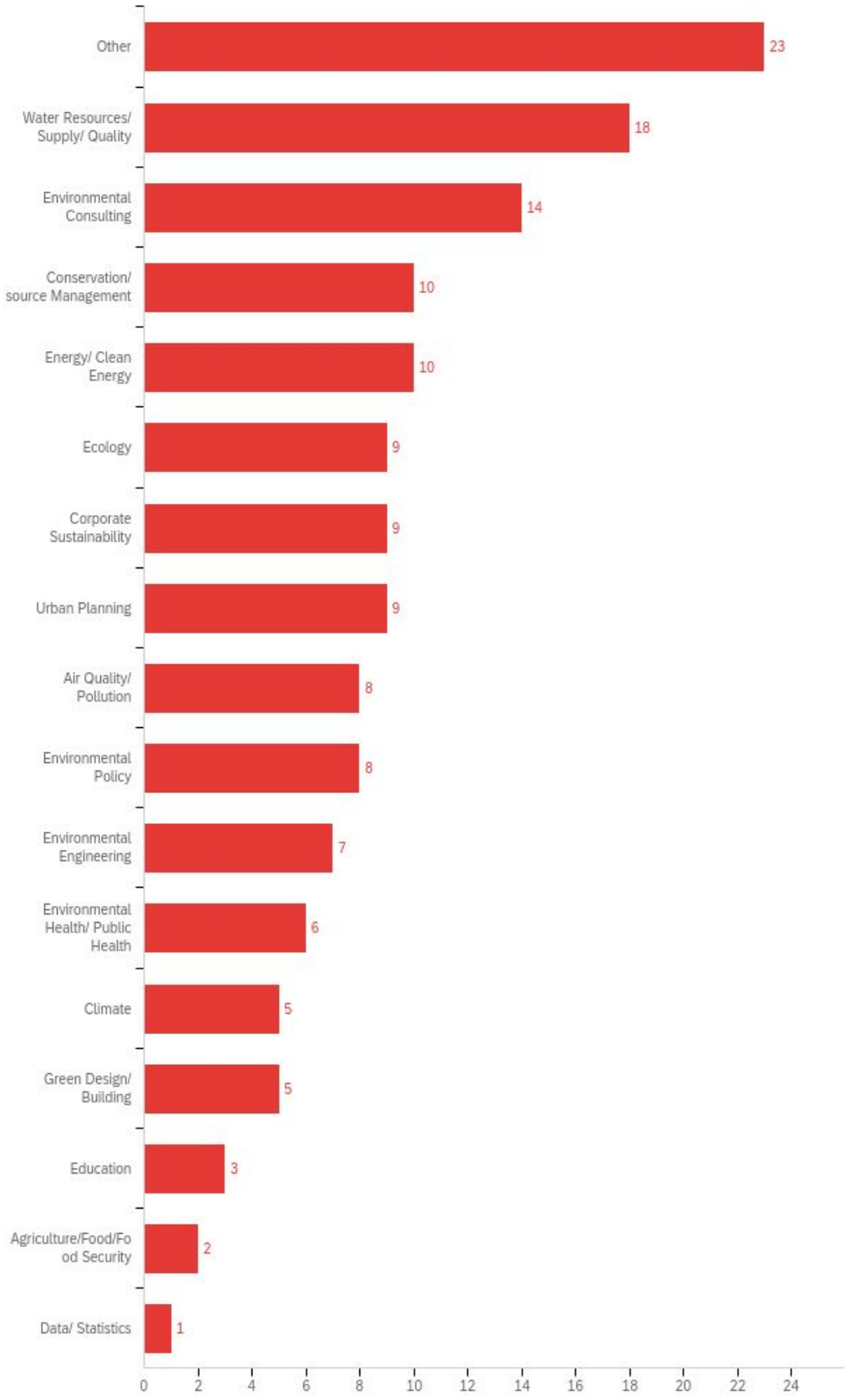

Figure B3: Alumni Survey, Question 27. In what environmental field or area are you currently working? 142 respondents answered this question, and the most common fields are water resources, environmental consulting, conservation, and energy. None of the fields, however, make up a majority.

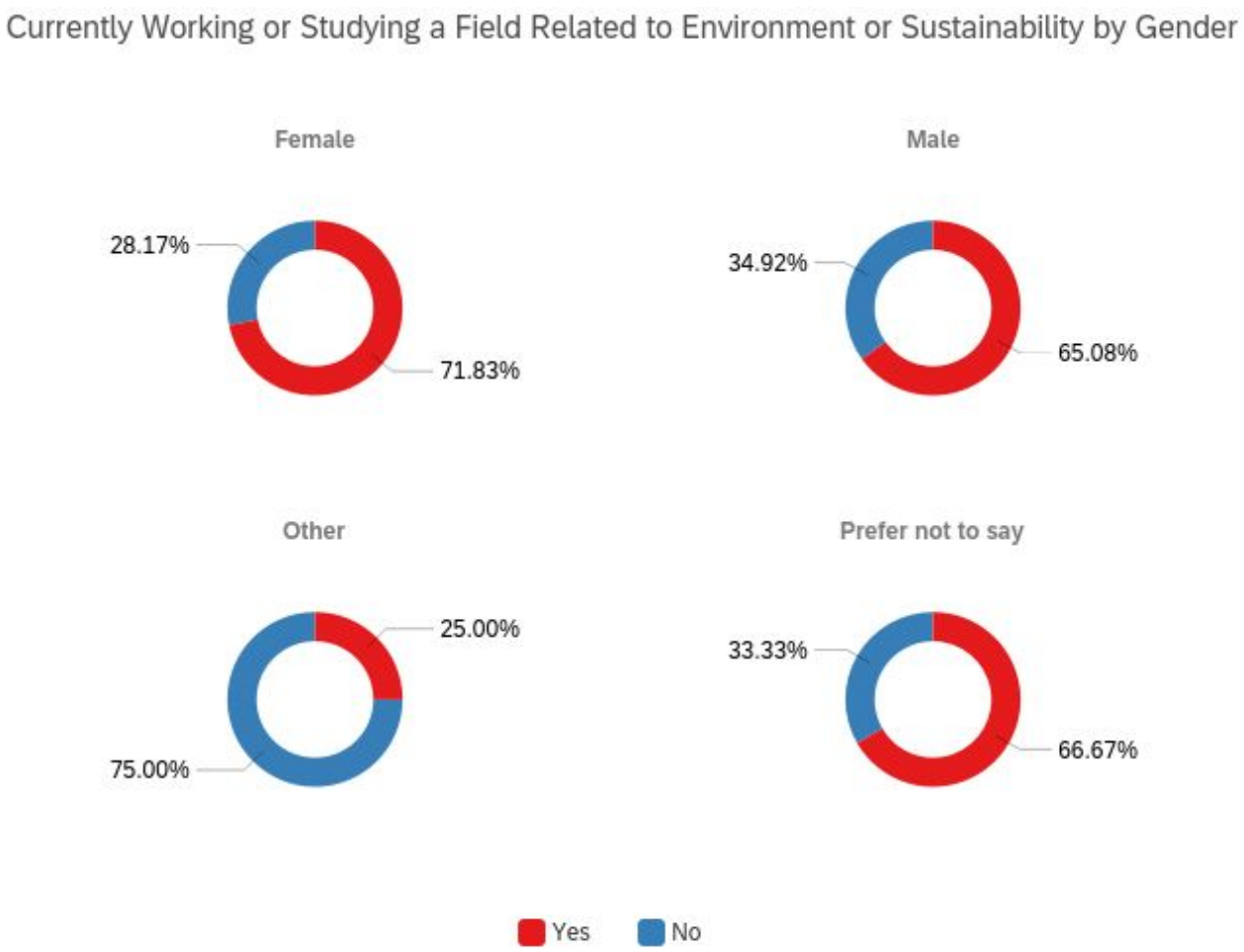

Figure C4: Alumni survey breakout. Working/studying in an environmental field vs. gender. Male and female graduates are overall equally likely to enter an environmental field post-undergraduate. For responses "Prefer not to say" and "Other," the sample size is too small, 10 respondents combined, to draw conclusions.

When assessing whether someone works in an environmental field versus ethnicity, the results are similar. For samples large enough (e.g., respondent groups who identify as white, Asian, Hispanic or Latino), there is either no correlation with ethnicity or a slight increased likelihood that they will go into an environment-related field. For all other groups (e.g., Black or African American, Native Hawaiian or Pacific Islander, American Indian or Alaskan Native, Other, and prefer not to say), the sample is too small to make conclusions about likelihood or predictability (Figure B5).

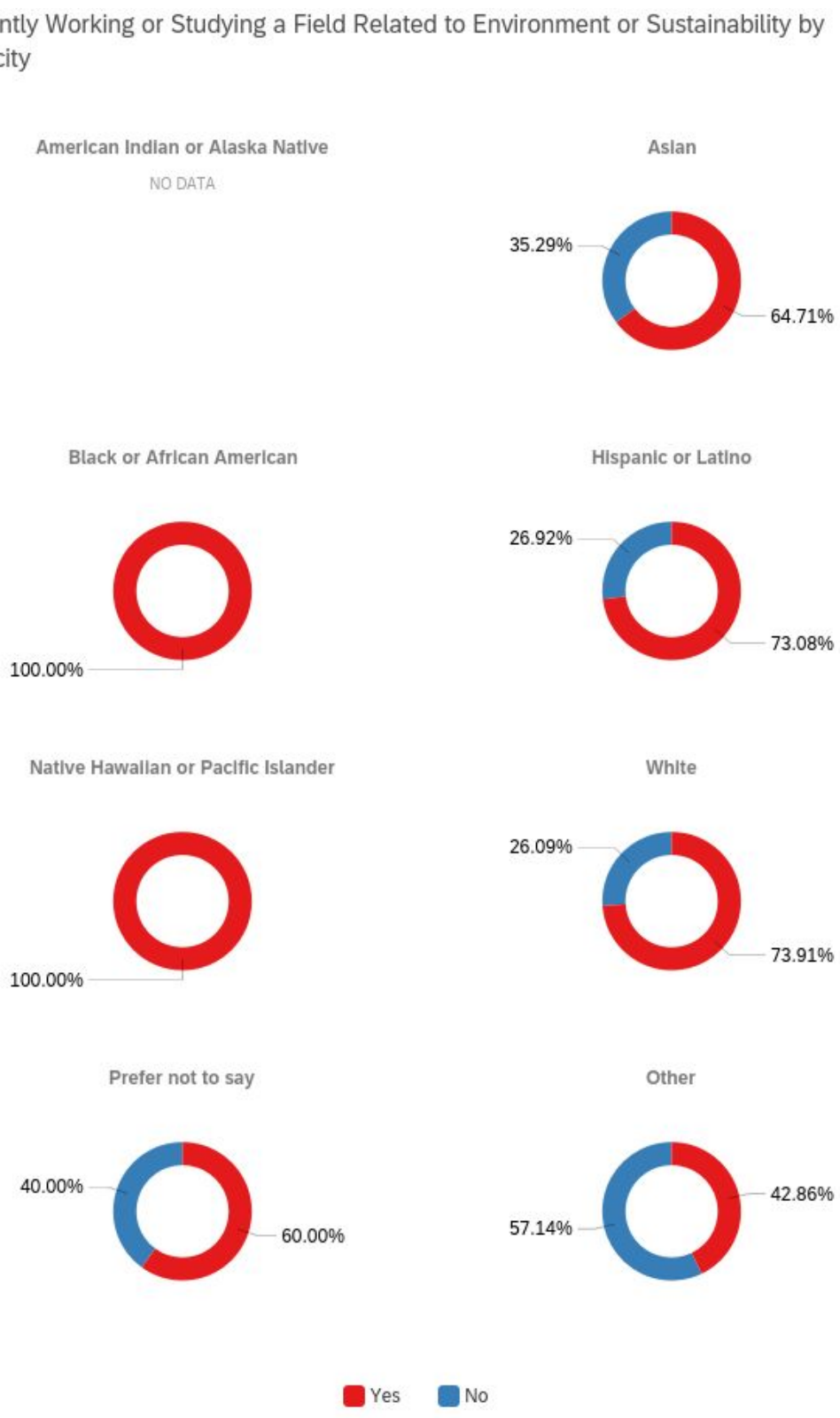

Figure B5: Alumni survey breakout. Working/studying in an environmental field vs. ethnicity. Alumni who identified as white or Hispanice or Latino were slightly more likely than the average to enter an environmental field.

Those who identified as Asian were nearly as likely as the average to enter an environmental field. All other groups had fewer than 10 respondents, so it is difficult to draw conclusions on correlation or predictability.

When assessing the type of organization by demographic data, one interesting finding is that alumni who identified as female were approximately 5 times more likely to work at a nonprofit organization than male alumni (15.23% vs. 3.03%) (Figure B6). Male alumni were more likely to work in the public sector or at a for-profit organization. There was not much correlation between organization and ethnicity, though, as stated before, data on half of ethnic groups in our sample is limited. Alumni who identified as Hispanic or Latino were slightly more likely than the average to work at nonprofit and for-profit organizations (Figure B7).

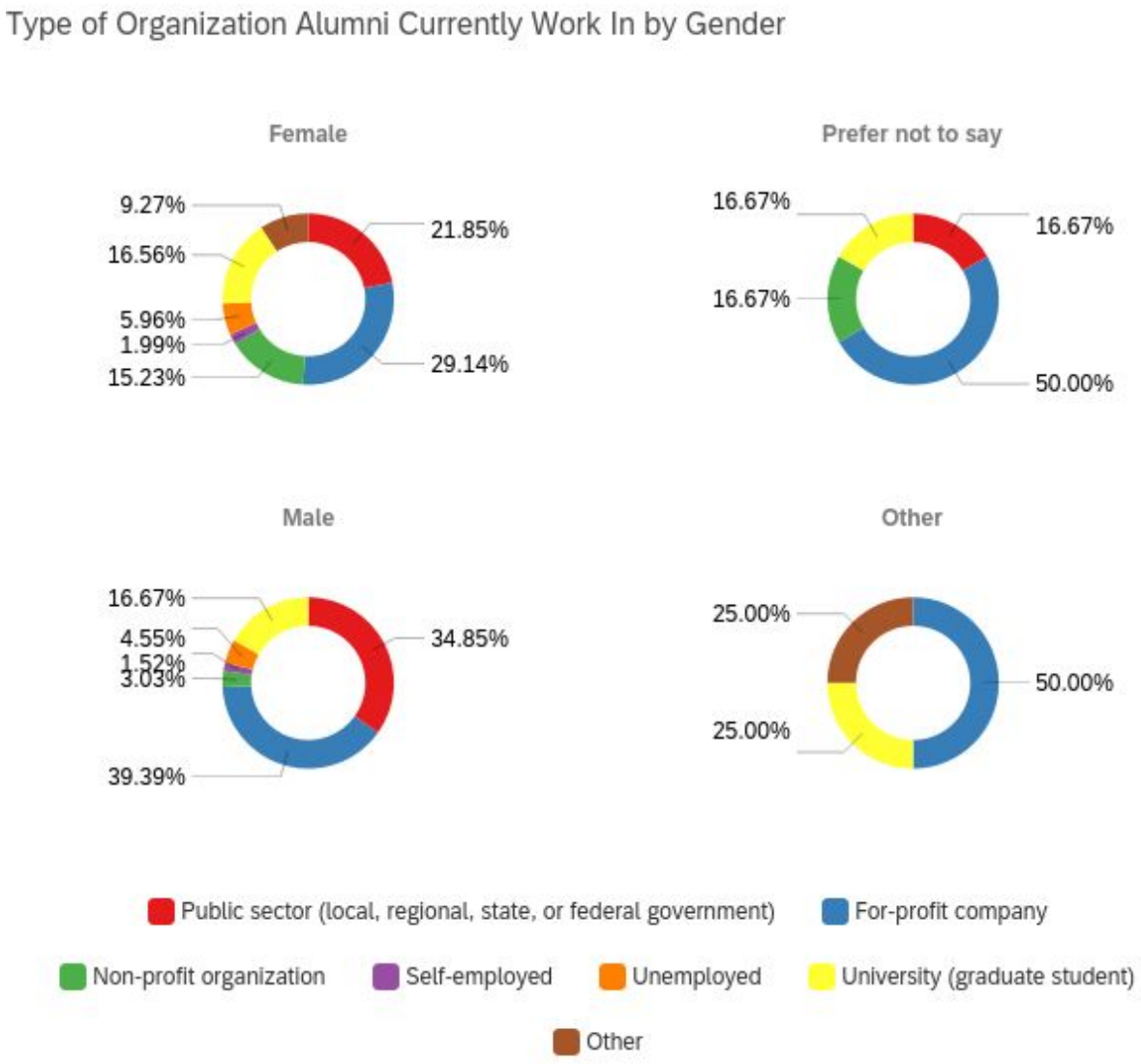

Figure B6: Alumni survey breakout. Type of organization vs. gender. Because only 6 alumni responded “Prefer not to say” and 4 responded “Other,” these results cannot be generalized. However, there are differences between alumni who identified as male or female, especially in their likelihood to work for a non-profit or for-profit organization.

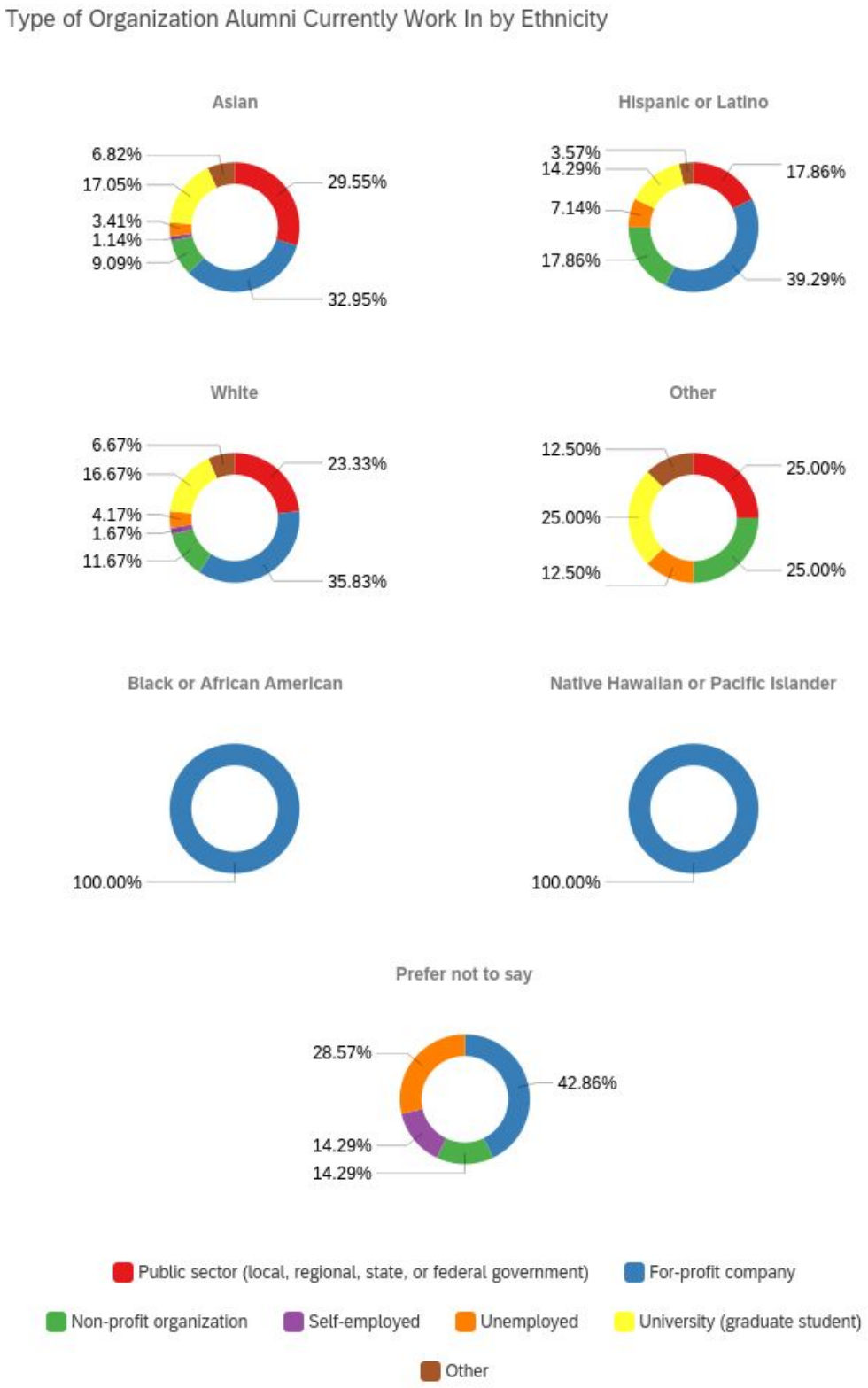

Figure B7: Alumni survey breakout. Type of organization vs. ethnicity. Amongst the ethnicity groups with enough respondents to draw conclusions, there is not a large correlation between ethnicity and type of organization alumni work or study in. The only group with noticeable differences were alumni who identified as Hispanic or Latino, who were more likely than the average to work at nonprofit and for-profit organizations.

Appendix C: Client and alumni surveys

A. Introduction

IoES Practicum Evaluation Survey

The IoES is undertaking a review of the Practicum program to improve educational experiences and outcomes for our students and clients. As former students in the Practicum, your familiarity and insight into the program is invaluable. We greatly appreciate your taking the time to fill out this survey, which is being administered by a team of student researchers at the Institute of the Environment and Sustainability as part of the 2019-20 Practicum program under Principal Investigator Professor Magali Delmas.

What will happen if I take part in this research study?

If you volunteer to participate in this study, the researcher will ask you to complete a survey that will ask about your experiences at UCLA and in the Practicum, particularly what skills you developed through participation in the Practicum and what the process of working as a team was like for you individually.

How long will I be in the research study?

Participation will take a total of approximately 10-12 mins.

Are there any potential risks or discomforts that I can expect from this study?

There are no anticipated risks or discomforts.

Will information about me and my participation be kept confidential?

Confidentiality will be maintained by means of an anonymous questionnaire.

What are my rights if I take part in this study?

Your participation is voluntary and you may withdraw your consent and discontinue participation at any time. Whatever decision you make, there will be no penalty to you and no loss of benefits to which you were otherwise entitled. You may refuse to answer any questions that you do not want to answer and still remain in the study.

Who can I contact if I have questions about this study?

If you have any questions, comments, or concerns about the research, you can talk to one of the researchers. Please contact:

Alicia Kwan (aahzkwan@ucla.edu) or Professor Magali Delmas (delmas@ioes.ucla.edu).

If you have questions about your rights as a research subject, or you have concerns or suggestions and you want to talk to someone other than the researchers, you may contact the UCLA OHRPP by phone:

(310) 206-2040; by email: participants@research.ucla.edu or by mail: Box 951406, Los Angeles, CA 90095-1406.

Clicking on the arrow below indicates that you have read the above information.

Section A Introduction

Please describe your Practicum experience in one word.

How satisfied were you with the overall Practicum experience?

Extremely Dissatisfied	Dissatisfied	Somewhat Dissatisfied	Neither Dissatisfied nor Satisfied	Somewhat satisfied	Satisfied	Extremely Satisfied
○	○	○	○	○	○	○

What did you like most about the Practicum? Why?

What did you like least about the Practicum? Why?

How prepared did you feel you were for your Practicum project?

Unprepared	Somewhat Unprepared	Neither Unprepared nor Prepared	Somewhat Prepared	Prepared
○	○	○	○	○

Which classes or experiences, if any, helped you prepare for your Practicum project? Select all that apply.

- ☐ Sustainability Action Research (SAR/ART)
- ☐ Grand Challenges Undergraduate Research Program
- ☐ Undergraduate Research Scholars Program

- [ ] Faculty Research Lab
- [ ] Other (please specify)
- [ ] None

The next two questions will be asking you about 1) skills you found useful **in preparation** of the Practicum and 2) skills you **gained** during the Practicum.

What were the 3 most useful skills that helped you **prepare** going into the Practicum?

- [ ] Leadership
- [ ] Working in a group (e.g. collaboration and conflict resolution)
- [ ] Data collection
- [ ] Data management and analysis
- [ ] Presentation skills
- [ ] Time management skills
- [ ] Problem solving skills
- [ ] Organizational skills
- [ ] Writing skills
- [ ] Fundraising/crowdfunding
- [ ] Using software programs (e.g. excel, ArcGIS, R, etc.)

- [ ] Communication with clients and other stakeholders (e.g. email, phone call, in-person)
- [ ] Critical thinking
- [ ] Other (please specify)

What were the 3 most useful skills that you **gained** during the Practicum?

- [ ] Leadership
- [ ] Working in a group (e.g. collaboration and conflict resolution)
- [ ] Data collection
- [ ] Data management and analysis
- [ ] Presentation skills
- [ ] Time management skills
- [ ] Problem solving skills
- [ ] Organizational Skills
- [ ] Writing skills
- [ ] Fundraising/crowdfunding
- [ ] Using software programs (e.g. excel, ArcGIS, R, etc.)
- [ ] Communication with clients and other stakeholders (e.g. email, phone call, in-person)
- [ ] Critical thinking
- [ ] Other (please specify)

What other skills do you wish you had gained, but didn't, in the Practicum?

Skill 1

Skill 2

Skill 3

What is one topic you didn't cover during the Practicum course in the Fall class that you wish was covered?

Section B. Process

What was your primary role during the Practicum?

- ○ Project Manager

- ○ Author/Editor
- ○ Data Manager
- ○ Data Collector
- ○ Data Analyst
- ○ Field Manager
- ○ Client Liaison
- ○ Social Media/Communications
- ○ Survey Designer
- ○ Don't know/Don't remember
- ○ Other

What research methodology did your project use? Check all that apply.

- ☐ GIS/geospatial
- ☐ Modeling
- ☐ Survey design and collection
- ☐ Field data collection
- ☐ Statistics
- ☐ Gray literature or case studies analysis
- ☐ Lab research/ analysis
- ☐ Other

Indicate the extent to which you disagree or agree with the following:

	Disagree	Somewhat Disagree	Neither Disagree nor Agree	Somewhat Agree	Agree
My suggestions during the Practicum were taken seriously by my adviser/faculty	○	○	○	○	○
My suggestions during the Practicum were taken seriously by my team	○	○	○	○	○
I received enough support/guidance from my adviser	○	○	○	○	○
I received enough support/guidance from my client(s)	○	○	○	○	○

What skills from your adviser were most helpful to the team in completing your project? Choose up to 3.

- [ ] Improving writing
- [ ] Facilitating communication within team
- [ ] Suggesting ideas
- [ ] Troubleshooting
- [ ] Team management/guidance
- [ ] Mentorship
- [ ] Data collection
- [ ] Data analysis
- [ ] Subject matter expertise
- [ ] Developing soft skills (emails, phone calls, communication with stakeholders)
- [ ] Research design
- [ ] Other

Is there any way your adviser could have helped your team better?

Section C. Results of the Practicum

College & Career

Indicate the extent to which you agree with the following:

	Disagree	Somewhat Disagree	Neither Disagree nor Agree	Somewhat Agree	Agree
The Practicum inspired me to pursue graduate studies	○	○	○	○	○
The Practicum inspired me to pursue research	○	○	○	○	○
My career interests changed due to the Practicum project	○	○	○	○	○

Which of the following, if any, helped you in applying to jobs or graduate school? Choose all that apply.

- [ ] A recommendation letter from your adviser
- [ ] A recommendation letter from your client
- [ ] Hired by client
- [ ] Hired by contact I networked with during the Practicum
- [ ] Work product of my project
- [ ] Skills gained during the Practicum, please list skill(s) below
- [ ] Other
- [ ] N/A

Section E. Demographic information

We will now ask you a few demographic questions.

What year did you participate in the Practicum?

- 2008-2009
- 2010-2011
- 2012-2013
- 2013-2014
- 2014-2015
- 2015-2016
- 2016-2017
- 2017-2018
- 2018-2019
- 2019-2020

How old are you?

What is your gender identity?

- Female
- Male
- Other

- ○ Prefer not to say

What is your ethnicity?

- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Hispanic or Latino
- ☐ Native Hawaiian or Pacific Islander
- ☐ White
- ☐ Prefer not to say
- ☐ Other ____

What type of organization do you currently work for?

- ○ Public sector (local, regional, state, or federal government)
- ○ For-profit company
- ○ Non-profit organization
- ○ Self-employed
- ○ Unemployed
- ○ University (graduate student)

○ [ ] Other

Are you currently working in or studying a field related to the environment or sustainability?

- ○ Yes
- ○ No

In what environmental field or area are you currently working?

- ○ Agriculture/Food/Food Security
- ○ Air Quality/ Pollution
- ○ Climate
- ○ Conservation/ Resource Management
- ○ Data/ Statistics
- ○ Ecology
- ○ Education
- ○ Energy/ Clean Energy
- ○ Environmental Consulting
- ○ Environmental Engineering
- ○ Environmental Health/ Public Health
- ○ Environmental Policy
- ○ Green Design/ Building

- ○ Corporate Sustainability
- ○ Urban Planning
- ○ Water Resources/ Supply/ Quality
- ○ Other

What is your current field of work or study?

Would you like to be a client for a future Practicum? If so, please contact Noah Garrison at ngarrison@ioes.ucla.edu.

- ○ Yes
- ○ No
- ○ Possibly in the future

Section F. Additional Comments

Do you have any comments or suggestions to improve the Practicum?

Thank you so much, we appreciate your taking the time to fill out this survey. Your opinion is important to us as we work to enhance the Practicum experience for UCLA environmental science students and clients. If you would like to receive the results of this survey, you will be redirected to our web page where you can enter your email.

Section A. Introduction

IoES Practicum Evaluation Survey

The IoES is undertaking a review of the Practicum program to improve educational experiences and outcomes for our students and clients. As former clients of the Practicum, your familiarity and insight into the program is invaluable. We greatly appreciate your taking the time to fill out this survey, which is being administered by a team of student researchers at the Institute of the Environment and Sustainability as part of the 2019-20 Practicum program under Principal Investigator Professor Magali Delmas.

What will happen if I take part in this research study?

If you volunteer to participate in this study, you will be asked to complete a survey that will ask about your experiences working with the Practicum.

How long will I be in the research study?

Participation will take a total of approximately 8-10 mins.

Are there any potential risks or discomforts that I can expect from this study?

There are no anticipated risks or discomforts.

Will information about me and my participation be kept confidential?

Any information that is obtained in connection with this study and that can identify you will remain confidential. Only the UCLA research team will have access to the data. Your response will be disclosed only with your permission or as required by law.

What are my rights if I take part in this study?

Your participation is voluntary and you may withdraw your consent and discontinue participation at any time. Whatever decision you make, there will be no penalty to you and no loss of benefits to which you were otherwise entitled. You may refuse to answer any questions that you do not want to answer and still remain in the study.

Who can I contact if I have questions about this study?

If you have any questions, comments, or concerns about the research, you can talk to one of the researchers. Please contact:

Alicia Kwan (aahzkwan@ucla.edu) or Principal Investigator: Professor Magali Delmas

(delmas@ioes.ucla.edu).

If you have questions about your rights as a research subject, or you have concerns or suggestions and you want to talk to someone other than the researchers, you may contact the UCLA OHRPP by phone: (310) 206-2040; by email: participants@research.ucla.edu or by mail: Box 951406, Los Angeles, CA 90095-1406.

Clicking on the arrow button below indicates that you have read the above information.

What is the name of your company/organization?

What type of organization is it?

- ◯ Public sector (local, regional, state, or federal government)
- ◯ For-profit company
- ◯ Nonprofit organization

How many times have you been a client with IoES for a Practicum project?

- ◯ 1
- ◯ 2
- ◯ 3+

What year were the project(s) conducted? Check all that apply.

- ☐ 2008-2009
- ☐ 2009-2010

- [ ] 2010-2011
- [ ] 2011-2012
- [ ] 2012-2013
- [ ] 2013-2014
- [ ] 2014-2015
- [ ] 2015-2016
- [ ] 2016-2017
- [ ] 2017-2018
- [ ] 2018-2019
- [ ] 2019-2020

Section B. Process and Skills

How satisfied were you with the Practicum project? If you were the client for several projects, please indicate your overall experience.

Extremely Dissatisfied	Dissatisfied	Somewhat Dissatisfied	Neither Dissatisfied Nor Satisfied	Somewhat Satisfied	Satisfied	Extremely Satisfied
○	○	○	○	○	○	○

If you indicated "Extremely Dissatisfied," "Dissatisfied," or "Somewhat Dissatisfied," please explain.

How would you rate student performance in these different areas? If you were the client for several projects, please indicate your overall experience.

	Very Poor	Poor	Average	Good	Excellent	Not Observed/ Don't Know
Working in a team	○	○	○	○	○	○
Project planning (Time management)	○	○	○	○	○	○
Developing research questions and methods	○	○	○	○	○	○
Collecting data	○	○	○	○	○	○
Analyzing data	○	○	○	○	○	○
Presenting findings	○	○	○	○	○	○
Interacting with stakeholders	○	○	○	○	○	○
Report writing	○	○	○	○	○	○

If you indicated "Very Poor" or "Poor" or you were not able to observe or assess student performance in these areas, please explain.

In terms of student attitude toward the project, which of these (if any), were **lacking** on the student team and **negatively** impacted the results of the project?

- [ ] Willingness to struggle with difficult technical material

- [ ] Devotion of sufficient work ethic or hours to the project
- [ ] Regular, sufficient updates
- [ ] Understanding your expectations
- [ ] Ability to pivot when things did not go as planned
- [ ] Sensitivity to your time
- [ ] Other, or was not able to assess—please explain

How satisfied were you with your interactions with the Practicum Director (Travis Longcore or Noah Garrison)? If you were the client for several projects, please indicate your overall experience.

Extremely Dissatisfied	Dissatisfied	Somewhat Dissatisfied	Neither Dissatisfied Nor Satisfied	Somewhat Satisfied	Satisfied	Extremely Satisfied
○	○	○	○	○	○	○

How satisfied were you with your interactions with the Faculty Advisor? If you were the client for several projects, please indicate your overall experience.

Extremely Dissatisfied	Dissatisfied	Somewhat Dissatisfied	Neither Dissatisfied Nor Satisfied	Somewhat Satisfied	Satisfied	Extremely Satisfied
○	○	○	○	○	○	○

If you indicated "Extremely Dissatisfied," "Dissatisfied," or "Somewhat Dissatisfied" for above options, please explain.

Section C. Results of the Practicum

Were the final deliverable(s) useful to your company/organization? If you were the client for several projects, please indicate your overall experience.

Not Useful | Minimally Useful | Somewhat Useful | Useful | Very Useful

If applicable, please explain how you used your final deliverable(s).

Section D. Concluding Assessments

What was the most valuable aspect of working with students from the Practicum?

Would you recommend to other companies/organizations that they be a Practicum client?

- Yes
- Maybe

- ○ No

If indicated "No," please explain.

Would you like to work with IoES again in the future as a client?

- ○ Yes
- ○ Maybe
- ○ No

If you have worked as a client more than once, what encouraged you to return as a client?

Based on your experience with the Practicum students, how likely would you be to hire them if you had a job for which they were qualified?

Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely
○	○	○	○	○

Based on your experience and the results of your Practicum project(s), would you have been willing to pay a fee to be a Practicum client?

- ○ Yes
- ○ No

If yes, how much would you be willing to pay? If no, why not?

Is there anything you wish you had known before serving as a Practicum client?

Is there anything you would suggest to improve the Practicum?

Do you have any additional comments?

Thank you so much, we appreciate your taking the time to fill out this survey. Your opinion is important to us as we work to enhance the Practicum experience for UCLA environmental science students and clients. If you would like to receive the results of this survey, you will be redirected to our web page where you can enter your email.

Powered by Qualtrics