From Aspiration to Realization: A Comparative Study of Salary Expectations and Real-World Experiences among Alumni and Current Students in Hawai'i

By

Amanda Nitta

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Thesis Committee:

Dr. Scott Robertson (Principal Investigator - Co-Chair/Co-Advisor)

Dr. Dylan Moore (Co-Chair/Co-Advisor)

Dr. Anthony Peruma

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Abstract

Students tend to pursue post secondary education with the perspective that gaining these credentials allows them to be more employable. Thus, the examination of salaries and personal fulfillment allows for students to understand how alumni perceive their post secondary education success. The objective of this study is to understand how University of Hawai‘i (UH) alumni fare post graduation in Hawai‘i compared to those in the continental United States (US), US Census Bureau data, and student perception of their post-graduation prospects. This study entailed a survey being sent out that consisted of various questions surrounding demographics, campus attending, latest/current degrees in progress, and occupational details (e.g. salary, place residing, etc.). Upon data collection, all data was anonymized and all salaries were considered with inflation. Furthermore, data science principles were used to conduct the comparison and aggregate statistical analysis. The majority of alumni data collected can be noted to be statistically similar compared to the US Census Bureau data. It can also be observed that those who currently work in Hawai‘i have more personal fulfillment in their careers. The student perception demonstrates a desire to stay in the islands, but the salary expectations differ. These findings demonstrate how UH alumni fare in industry and allow for the community/administration to see how their students succeeded and how they perceived their career successes.

Keywords: Hawaii, data science, alumni success, economics

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Table of Content

List of Figures and Table

Introduction

One of the primary reasons students attend post secondary education is to obtain a degree or credentials that make them more employable. The objective of this research is to gather, analyze, and synthesize the salary data relevant to the current student prospects and graduates of the University of Hawaii (UH) alumni at different stages of their careers, along with analyzing personal fulfillment amongst alumni.

In higher education, Mckenzie (2022) emphasizes that there is more to evaluating a graduate's success than degree completion rates, but rather to consider wages and non-economic impact. Evaluating graduates' success encompasses various attributes, such as personal fulfillment and investment in community, along with economic success (Buchanan, 2023; Mckenzie, 2022). In the past three decades, Buchanan (2023) notes that graduation rates from institutions were the main factor in determining the success of individuals. However, there has been a shift to focus on the outcomes of graduates themselves, how they foster personal fulfillment upon leaving the institution, and the economic success of the individual (Buchanan, 2023; Mckenzie, 2022). These outcomes reflect what alumni aspire from their education and degree in assisting with achieving their goals. Thus, the economic success of graduates and how they perceive their personal success requires further research.

There are various factors that influence salary, particularly inflation and living conditions. The realities of expected salaries amongst graduates is noted to be higher than the reality. Therefore, it is important to evaluate graduates' salaries in the workforce so that UH understands how graduates are doing along with what students can expect when going into the workforce. Conducting this research in Hawaii, will allow for the understanding of how local industries are assisting UH alumni in their work endeavors and continue to foster the growth of the local

community. The findings will also allow leadership to determine how to equip UH students to succeed locally and to remain in Hawaii. Being able to live and work in Hawaii can lead to higher morale among students as well as encourage future graduates to stay in Hawaii and be employed in the local workforce.

Research Questions:

There are several research questions that will be examined in this study to gain an understanding of how UH alumni fare in industry. There is currently no data nor an understanding of how UH students fare with an emphasis on whether they work in Hawaii post graduation. This would be beneficial for incoming students to see the success of these graduates post graduation. Research questions will be denoted by RQ followed by the number and the corresponding hypothesis as H followed by the number.

- RQ1: How do University of Hawaii alumni fare post graduation in Hawaii?
    - H1: Alumni that work in Hawaii, in terms of salary and personal fulfillment, are less fulfilled than those who choose to go to the mainland.

Oftentimes as students search for jobs post-graduation, there is some uncertainty or too high expectations. Therefore, this research aims to understand how students' perceptions of salaries compare to what alumni receive in industry.

- RQ2: How do the alumni's experiences post graduation compare to student perceptions?
    - H2: Student perceptions are higher than what is received by Alumni for their first job

To see how the data collected from the survey generalizes, a comparison between the US Census Bureau allows for an understanding of how similar or different the results are compared to the previously larger sample of respondents.

- RQ3: How does the alumni survey compare to the US Census Bureau statistics?
    - H3: The alumni data have similar trends to the US Census Bureau statistics

To compare the salaries appropriately, it is important to consider them relative to early, mid and late career since as a person progresses through their career, salaries tend to increase. Therefore, it allows for a better understanding of how individuals fare in their overall relative careers.

- RQ4: How do University of Hawaii alumni fare within early, mid and late career in terms of personal fulfillment and salary?
    - H4: As Alumni progress through their career they have increased fulfillment and salary. The hypothesis is that there are differences between those who decide to work on the mainland compared to Hawaii.

Overall, these research questions are able to bring insight into the success of UH Alumni post-graduation and understand how they compare long-term in their careers.

Significance

Mulin & Powers (2021) notes that one of the main and most common post-graduation metrics that institutions use to track the success of graduates is considered to be employment rates and salaries. Institutions typically invest a significant amount of effort in keeping in touch with alumni to determine how their programs fare in preparing students for post graduation. However, although these are important metrics to examine, the University of Hawaii currently does not collect data on the success of their alumni post-graduation. Thus this research is important to continue to propel their programs and continue to be competitive with mainland institutions.

At the system-wide level, the University of Hawaii (UH), does not collect data on the salary of their alumni after graduation, mid-career, or late career; nor student's perception of

salary. This study will focus on the respective classification of the University of Hawaii students. Evaluating the results will also allow the UH system to understand the salaries of alumni, as well as understand how the current students perceive their prospects post graduation. The analysis will be conducted in anonymity and is described in the upcoming sections.

Contributions

Upon data collection and analysis of data, all aggregate statistics will be available to all students, administration and the general public to gain an understanding of how alumni succeed post-graduation. Following the collection and analysis of data, all aggregate statistics will be available to all students, administrators, faculty, and the general public. Making the results of this study publicly available will provide insight into the future of current students along with assisting UH administrators and departments to reflect on the success and value of their programs. It also allows for an understanding of how local residents try to return to Hawaii to give back to the economy of their local institution or residence that they used to live in. It will also demonstrate the desire for local residents to stay in the islands and assist in demonstrating the salary comparison of what salaries are received by those in industry relative to being in Hawaii and not in Hawaii.

Literature Review:

Many factors influence salaries of college graduates. These include providing students with a realistic view of starting salaries upon graduation, insight into how Hawaii compares with national salaries, and the impact of the economic climate on starting salaries. By examining and identifying these attributes, it allows students to realistically understand the starting salary they

may expect upon graduation. The evaluation of salaries helps bring a better understanding to the University students' financial success post graduation.

College Degree Expectations of Jobs:

Studies have found that students have unrealistic expectations when considering their first job offers. Briihl (2001) emphasizes that students tend to overestimate starting salaries, thus leading to a falsified expectation of what to expect when going into the workforce. Brihi (2001) further emphasizes that students are “overly optimistic” when anticipating the salaries that may be offered and further notes the lower starting salaries in the psychology field compared to other fields. Although Brihi (2001) focuses on the low salaries obtained by psychology graduates, the idea of low starting salaries can be applied more broadly to the expectation of university graduates of all majors and the perception of expecting a higher starting salary.

A degree is part of the essential qualifications to be considered for jobs. Thus, students are led to expect their knowledge and expertise obtained from these universities to provide them with adequate knowledge to fulfill their position’s duties and responsibilities (Brihi, 2001; Rajeck and Borden, 2009). There is an expectation of the knowledge an individual has when entering the field. This, then justifies the low salaries received compared to the high salaries that are expected upon entry.

In a society, where professional skills are becoming increasingly more specialized, individuals need a college degree to be more competitive. Rajecki & Borden (2009) notes that in the United States, it is necessary for an individual to have a college degree in a specific course of study, to be considered for these “low tiers,” known as entry level salary. Thus, although there is an expectation of higher salaries with a college degree, it has shifted to where low tier jobs

require a degree.(Brihi, 2001; Rajeck and Borden, 2009). Hence, there is an increased falsified perception of the expectation of high salaries upon graduation from institutions.

Some individuals attend school and become more educated in the discipline than is required for their job prospects. Juster (1975) notes that this is due to individuals viewing education as the source of higher salaries, thus leading to individuals seeking to be more educated than necessary and to be overeducated upon applying for entry-level positions (Juster, 1975; Brihi, 2001).

Inflation Effects on Salary:

Inflation is known as the "most harmful economic phenomenon in contemporary economies" (Mândricelu, 2012). Inflation pertains to the increase of services and goods in the economy that leads to an increase in other aspects, such as salary. Necsluescu (2013) discusses how inflation is reflective of a general rise of price levels that lead to less purchasing power. This prompts companies and countries to maintain income for their employees which leads to higher salaries. However, it leads to driving prices/ inflation up further and an unprecedented rise in salaries. The annual increase in inflation, as concluded by Necsulescu (2013), is a strong influence on the exchange rates and the nominal salary known as the hourly pay increase. This leads to the average salary being depreciated as the years and society progress.

Impacts of Geographic location on Salary:

Fournier et. al (1986) explains how the location and economic situation of a state plays a role in the salary that individuals receive by examining teachers' salaries. Based on the location of the work, the salary is commonly adjusted based on the cost of living and the inflation that the state experiences (Necsulescu, 2013; Fournier et. al, 1986). Although there is a focus on teacher

salaries, it can be applied to salaries more broadly since work location can influence salaries to accommodate for the cost of living and inflation. Teachers in different states see significant differences in salary (Fournier et. al, 1986). However, by adjusting these salaries to make them equivalent, some teachers would fare worse but have better purchasing power. Thus, Fournier et. al (1986) concludes that it is inaccurate to draw conclusions about an individual's salary without considering cost of living.

Personal Fulfillment:

There are several metrics that are used across academia to determine the success of their programs' post-graduation. According to Buchanan (2022), previously the metrics for determining the success of alumni, was mainly based on degree completion and economic success. However, he also notes along with Mckenzie (2022) that evaluating the success of graduates is not limited to only degree completion and economic success but also to personal fulfillment post-graduation. Considering personal fulfillment as an outcome for alumni, allows programs, practices, courses and policies for alumni to achieve these outcomes. There is a new shift to the importance of a holistic approach in evaluating success where it is no longer about degree completion and is not sufficient for prospective students (Mckenzie 2022). Thus, it is important to track both post graduation economic and non-economic success. The term "fulfillment" as noted by Hanson (2022) is the alumni's perspective on whether the education that one completed or sought and the influence of the education setting contributes to multidimensional successes. Examining fulfillment and improving the investments of individuals, families, employers, governments and communities can be documented (Hanson, 2022; Mckenzie, 2022; Buchanan, 2022). Thus, although it is important to understand economic success, it is also important to understand the holistic success of alumni.

Summary:

It can be noted that success of institutions to prospective students is no longer merited by degree competition rates, but rather a more holistic understanding of how their students succeed in their careers. Thus, leading to an important strife to see how alumni are personally fulfilled by the skills that they had acquired in college and the financial success obtained. It also brings the importance of ensuring that students are adequately prepared to enter the workforce with realistic expectations of salaries. Furthermore, a holistic approach to understanding the success of alumni is important to ensure the quality of courses and education given at institutions.

Methodology

To gather information from students and alumni, a single survey was distributed to graduates and current students over six (6) months. The survey targets all alumni who graduated from the University of Hawaii system from its foundation in 1907 to present, as well as current students at all campuses (University of Hawaii at Manoa, 2022).

Design of Survey:

The survey was designed through the lens of Human Computer Interaction (HCI), with an emphasis on User Centered Design. The main element of user centered design that was incorporated into the survey was encouragement and motivation. This can be seen in the carefully chosen language of ‘latest’ and ‘first’ to encourage respondents to remember where they came from but also motivate them to continue to higher education. The survey also underwent a form of pilot testing about phrasing of questions and formatting to ensure the questions used were the most effective in getting the response desired. It also included elements that are qualitative data, so individuals could communicate their thoughts properly, along with creating questions that further ensured that the human was in the loop while participating - such as whether they were a local resident and what high school they graduated from. These methods included receiving qualitative data / free responses if people wanted to communicate more information. The survey was also more broad for the whole UH system, for inclusion of all the different campuses and majors to ensure participation. There were also multiple modules in the survey to ensure that it was geared toward the participant only entering the requested data once.

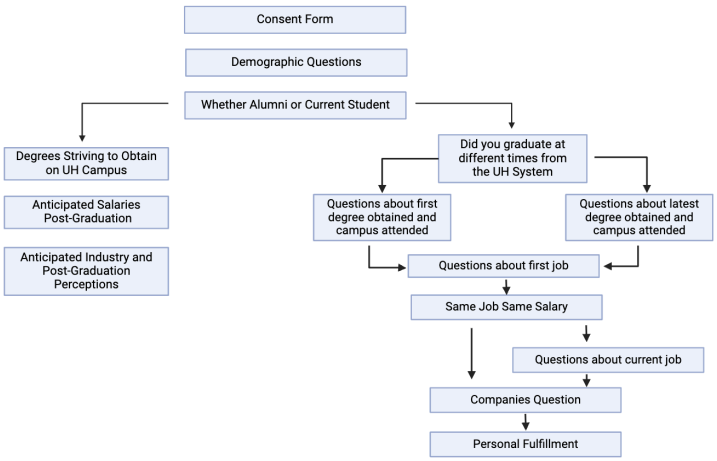

Figure 1: Design of Survey

Distribution of the Survey:

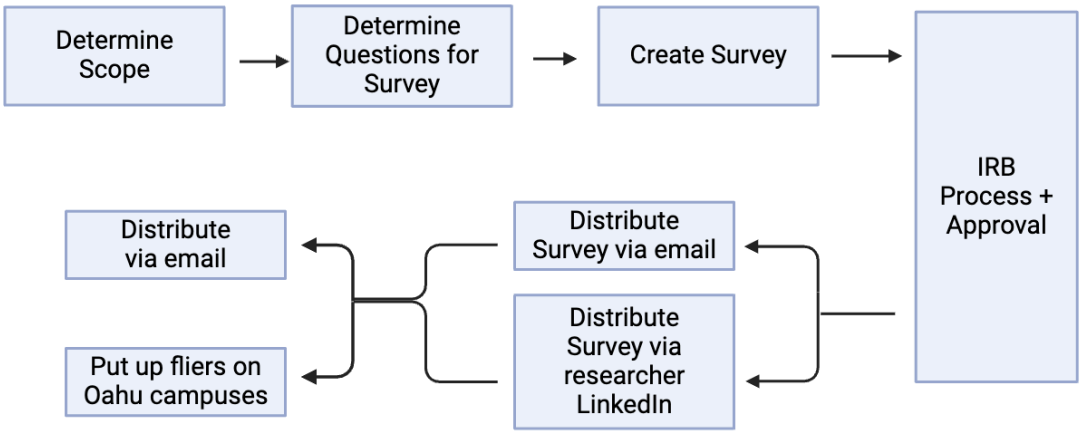

Figure 2: Overview of Methodology of Creation and Distribution of Survey

The survey received Institutional Review Board approval on April 18, 2023, Protocol #2023-00010. The plan was to start marketing the survey in April, since, upon graduation, it takes three to six months on average for alumni to secure a job/ become employed (University of Washington, 2022). It is likely that alumni from the most recent Spring graduation would have found jobs, which can help the university gauge how recent alumni fare in the workforce. April is also around the time when current students are considering future job prospects due to summer vacation and graduation occurring in May. Thus, an email was sent to Chairs within the University of Hawaii System to request for the distribution of survey materials (eg, poster and blurb) to be sent to their respective students in April. Then the second solicitation started, before the first week of school of the Fall semester, so students would see the posters as they came to explore the campus or to their first day of classes. These posters were put up on all the UH Oahu Campuses at various locations, such as the Student Life Center or on the poster boards around campus with approval of the departments that owned the poster boards. A second email was also sent at the beginning of the semester to all the Deans of the Colleges and Department Chairs to advertise to their students. Upon sending the emails, there were over 30 chairs that responded

promptly that they had shared the survey with their respective students. Thus, the survey was widely distributed amongst the desired population for current students and amongst Alumni who remain connected to their departments. It was also shared through LinkedIn with a reach of over 3,000 impressions. During data collection, communicating to all individuals about the current number of survey respondents, a boundary between 100 - 1,000 was communicated to ensure consistency in motivation to fill out the survey.

The survey was delivered/ accessible through a Google form. Prior to beginning the survey a consent form was given to ensure respondents know that their salary information will remain confidential and only be used for data analysis purposes. All data collected has been anonymized, and there will be no connection to the individual in the aggregate statistics. All raw data continues to be only accessible by the Principal and Student Investigator. Only aggregate de-anonymized statistics were shared and discussed with others beyond the scope.

Aggregation:

To ensure and protect all information of all those who participated in the survey, all data was anonymized using several different methods in data preprocessing that are outlined in the following section. Through this aggregation all aggregate statistics are not able to be extrapolated to a single respondent.

Demographics/ information about person:

If a person were to have more than one major across disciplines, they will be considered independently in their respective disciplines. The year will be strictly used to determine the respondents' career stage. The University of Hawaii campus information is strictly used to help gain information in exploratory analysis of response distribution, and all campuses were treated together in the overall analysis.

Salary

The salary will be collected for the person's first job after college along with their current job. There will be two options for how people can report their salaries similar to the National Science Foundation (NSF) Survey of Earned Doctorates. Thus, there will be two ways to report salary, through reporting the exact salary or providing the salary within intervals of $30,000 or less, to $30,000 or more with intervals of $5,000 such as $30,001 - $35,000.

Based on the information that is collected and based on significance testing, it brings insight into whether the information collected is an adequate data size to make a general conclusion about the data. After each respective salary report, there is a question of the year when at the job to make the salaries equivalent to the contemporary era due to factors such as inflation that cause salaries to increase. There is also a question of employment status to get an understanding of what type of salary that is being reported.

Other Questions:

Other questions that follow are; "During this period were/are you living in Hawaii?", and "Is the company that you (the respondent) worked for based in Hawaii?" along with the options to write the state where the office is based. This information will be specifically used to understand how the alumni fare in places other than Hawaii. By collecting whether the information is related to working in Hawaii or in a company other than Hawaii, can assist in determining how UH students fare in the local industry/economy.

There were also questions about whether the work is remote or in-person work to provide insight into the types of jobs that alumni are working at and will strictly be used in the creation of aggregate statistics. All aggregate statistics conducted are only reported by discipline and

degree. The questions included about general industry work, allow for determining what industry and type of work alumni engage in post-graduation.

There will also be a question at the end of the survey asking alumni about personal fulfillment post graduation since it is noted that when evaluating alumni success, it is an important metric to consider. Thus, to measure the fulfillment amongst alumni, the question "Do you agree with the statement 'My education helped me achieve my goals'" was included. The response was given with a linear scale where respondents can choose between 1 (Strongly Disagree) to 5 (Strongly Agree). If the respondent chooses 1 it refers to not using their education in the job, and 5 refers to that they had learned a lot and currently apply it in life. There is also a question for any other comments if there is a desire to provide more detailed feedback.

There is a module of the survey where current students can report their expected salary after graduation. Similarly to the alumni reporting their salaries, there will be boundaries, as noted above along with potential exact amounts. The other information that will be collected will be the demographic information of the individual and their respective major. This data will strictly be used to identify perception of the salaries that they receive and compare it to the actual salaries.

All data has been held in strict confidentiality and will continue to not be disclosed to the public or anyone besides those involved directly in the project. The only information that will be available to the departments and releasable is the aggregate statistics that is reported using data science principles and through the generation of this technical report in a tangible format (eg, data visualization).

Data Processing:

To process the raw data, there were several data science techniques that were used to create a dataset that was the most effective and efficient for data analysis. The majority of the data collected was qualitative. Thus, it needed to be processed into codes of general themes that are quantitative, boolean, or multinomial formats that were appropriate for the variables. The process will further be discussed in the following paragraphs, and was done through Python code with data science principles.

Since the survey data was collected in the format of a Google form, demographic column names/ variables were formatted to respectfully represent the data contained in the columns (eg, nationality, race) and grouped by the respective status of Alumni and Current Students. Once grouped, then the rest of the columns were given names that were respective of the question such as (eg, personal_fufillment, salary_current_job_range, Hawaii_office_first). Then all data was cleaned (eg, changing complete sentences to only have the information desired) and converted to the correct format (eg, string to integer). If there were only two options, data was converted to boolean data types such as whether a person was still in the same job and same salary. If the person was in the same job and same salary, the information from their first job was broadcasted to the other columns.

To account for individuals that graduated from the University of Hawaii system multiple times, there were two different submodules to minimize confusion when the user was filling out the form. If a person had only received one degree from the University of Hawaii System the degree information was kept in a separate set of data. If there was more than one degree, the latest degree was requested, and it was kept in the another set of data. Therefore, the information from those with one degree was broadcasted to those with the latest degree so that although a

person only attended the institution once it was still the latest degree earned. All salaries were reported in U.S. Currency for salary range and exact salary amount, therefore the data was not considered. All respondents were United States citizens, besides one, so nationality was also not considered.

The lower range and upper range were also converted from the label string format to a numerical format. All exact salaries reported were translated to a numerical format and bounded with the respected lower and upper bound of the salaries. Those who noted being not located or working in Hawaii offices due to the limited data for the regions, all locations outside of Hawaii were translated to “Not in Hawaii” for a more broad classification to focus on the differences between Hawaii compared to the general mainland.

Disciplines

Discipline	Examples Related Branches of Disciplines
Business	Accounting, economics, finance, management, marketing
Humanities	Art, history, languages, literature, music, philosophy, religion, theater
Natural and Applied Sciences	Biology, chemistry, computer science, engineering, geology, mathematics, physics and medicine
Social Sciences	Anthropology, education, geography, law, political science, psychology, sociology

Table 1: Lumen Learning Classification of Academic Disciplines

Due to the sample size of 81 alumni, all data was aggregated by disciplines that have been recognized by Lumen Learning disciplines (business, humanities, natural and applied sciences, and social sciences) that have been widely accepted by hundreds of institutions and examples can be viewed in Table 1. Degree types were also aggregated. All aggregation was determined upon careful inspection and labeling, implemented through creating a dictionary and

using the replace function to create new columns for the respective columns for the degree type and discipline.

Career Stages

Career Stage	Numbers of Years
Early Career	0 - 10 years
Mid-Career	11 - 20 years
Senior Career	21 years and over

Table 2: Career Stages based on years of experience

Career Stage was determined by the metrics adhered to by the American Psychological Association with the modification of not separating late-senior career due to the small sample size of alumni data. The metrics can be viewed in Table 2.

All analysis was conducted in Python using pandas, numpy and sklearn libraries to apply data science methods (eg, visualization, data wrangling, data preprocessing).

Consumer Price Index (CPI):

Although salaries often do not keep up with inflation, measures were taken to account for inflation to compare and normalize first job salaries across multiple years. Thus, the Consumer Price Index (CPI) considers how prices of goods and services change over time, with respect to also finding substitutions for goods that can serve as a replacement for a good that has increased in cost (US Bureau of Labor, 2024). The annual CPI index from the US Bureau was used to account for inflation relative to 2023 for each salary through multiplying the inflation of the respective year divided by 2023 inflation multiplied by the salary and then further added to the salary to get the salary respective to the current year.

United States Census Bureau:

The United States Census Bureau through the Postsecondary Enrollment Options (PSEO) surveys graduates from the state of Hawaii's Partner Institutions known as the University of Hawaii system for 1 year post graduation, 5 years post graduation and 10 years post graduation. However, this is limiting to not see graduates that are further into their career. Furthermore, in this research it strives to fulfill this gap. The PSEO data for the 50th percentile will be used to validate the findings, since it would represent the general population. The data conveyed by the PSEO is composed of hundreds of thousands of respondents as the United States Census Bureau does with the majority of its data to make conclusions. The data for instance includes the destination flow of graduates allowing for an understanding of where the various degree levels proceed to find success.

Years post-graduation	Degree Level	Destination Flow for Geography of Employment of Graduates to Hawaii
1 year	Associates	82%
	Baccalaureate	76%
	Masters	79%
	Doctoral - Research/ Scholarship	50%
	Doctoral - Professional Practice	61%
5 year	Associates	76%
	Baccalaureate	66%
	Masters	68%
	Doctoral - Research/ Scholarship	42%
	Doctoral - Professional Practice	54%
10 year	Associates	73%

	Baccalaureate	61%
	Masters	59%
	Doctoral - Research/ Scholarship	33%
	Doctoral - Professional Practice	61%

Table 3: Destination workflow of graduates in Hawaii

Source: United States Census Bureau PostSecondary Enrollment Options, 2023

The data conveyed by PSEO allows for an understanding of where the alumni end up post graduation in relation to staying in Hawaii. Thus, bringing an understanding to how the different degrees vary in staying in Hawaii post graduation. The data from PSEO also brings insight into the general expected salaries overall for the respective degree levels as they proceed through the benchmarks of 1 year, 5 years, and 10 years post graduation.

Years post-graduation	Degree Level (Overall)	Salary
1 year	Associates	$ 30,557
	Baccalaureate	$ 34,402
	Masters	$ 53,296
	Doctoral - Research/ Scholarship	$ 65,768
	Doctoral - Professional Practice	$ 60,815
5 year	Associates	$ 42,628
	Baccalaureate	$ 50,761
	Masters	$ 64,621
	Doctoral - Research/ Scholarship	$ 81,336
	Doctoral - Professional Practice	$ 97,350
10 year	Associates	$ 53,586
	Baccalaureate	$ 62,908

	Masters	$ 75,658
	Doctoral - Research/ Scholarship	$ 94,037
	Doctoral - Professional Practice	$ 116,681

Table 4: Salary Earnings by Degree for Graduates of All Institutions of University of Hawaii System within the 50 percentile

Source: United States Census Bureau, PostSecondary Enrollment Options, 2023

The United States Census includes data that considers earnings for the different degrees post graduation, but does not consider the salaries relative to whether the graduates stay within the state of the institution. Therefore, this study further brings an understanding of how graduates fare in the local economy compared to out of state. The United Census Bureau aggregates all the data with respect to different program categories as well as the overall instructional programs. However, the data collected in this study is too sparse and therefore more overarching categories are used to ensure aggregate data is explained. The salary for each respective category is therefore averaged amongst the degree programs that can be classified. The United States Census Bureau data classified by degree can be found in the appendix. Based on the public downloadable data it can be observed that the data for each category is comprised of individuals

Cost of Living Index

When doing the analysis of the salaries with consideration of cost of living, the Cost of Living Index that is produced by the Council for Community and Economic Research that promotes community and economic research and adopted by the Missouri Economic Research and Information Center was used. The salaries were considered within cost of living using the below equation:

$$Normalized\ Salary\ =\ Salary\ x\ \frac{State\ Cost\ of\ Living\ Index}{Hawaii\ Cost\ of\ Living\ Index}$$

For the salaries that noted not living in the United States, cost of living was determined by using the Cost of Living index from Numbeo that is created relative to New York, thus it was converted from relative to New York to relative to the United States through conversion.

Data Analysis:

In order to make all the data comparable, it will be considered with inflation rates to see how the salaries compare. All other data will be coded into themes/ categories to assist in data processing. Upon completion it led to data science principles to be applied such as data wrangling, and hypothesis testing, to determine the medians of the salaries and how it compares to national averages and the student perception. The analysis will also include an unsupervised machine learning model to see if clustering is possible between the salaries of those who worked in Hawaii offices for their first job. There will be a particular focus on how UH alumni fare in the local industry in the Hawaiian islands.

Results:

To evaluate the data, exploratory analysis was conducted to get an understanding of what the dataset consists of, followed by data wrangling by various groupings to bring out nuances in the data. Then hypothesis testing was conducted on the data to determine how generalisable the data collected is to the general population. Then a machine learning, unsupervised, algorithm was created to see whether clustering could be achieved.

Alumni Analysis:

For the alumni data to draw effective conclusions, exploring the data and understanding the distribution is important. Along with exploratory analysis allows for the development of

further knowledge into the types of jobs that alumni receive post graduation as well as understand the demographics of those who responded to the survey. UH consists of 10 different campuses that stretch the Hawaiian islands. The survey was attempted to be distributed to all students at all campuses.

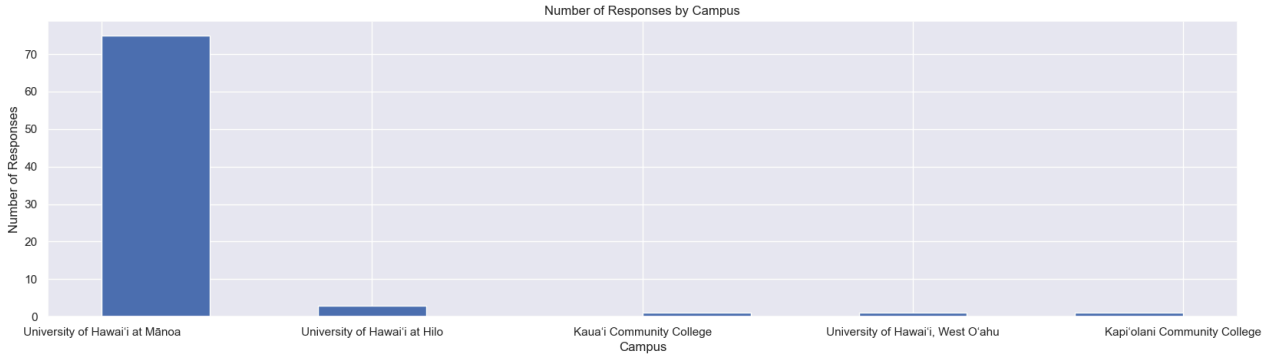

Figure 3: Number of Responses Received by Campus for Alumni

Based on the results, it can be observed that the majority of alumni respondents were from the UH at Manoa campus, followed by University of Hawaii at Hilo. It is important to note that not all 10 campuses had alumni who responded to the survey. To determine whether individuals were considered locals or residing in Hawaii, graduates of Hawaii high school were included.

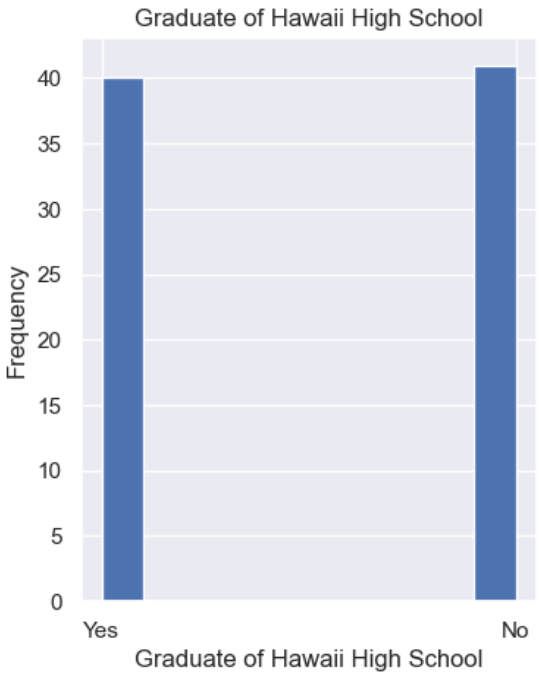

Figure 4: Number of responses based on attendance of Hawaii high school for Alumni

As observed, there were 40 respondents who graduated from a Hawaii High School and 41 respondents that did not attend a Hawaii school. Therefore, also serving as a classification metric that there are about equal proportions of Hawaii locals that responded to the survey. To validate that the students were residents, public and private school metrics were considered to see the demographic of the population, as well as provide insights into more general demographics of the alumni who responded to the survey.

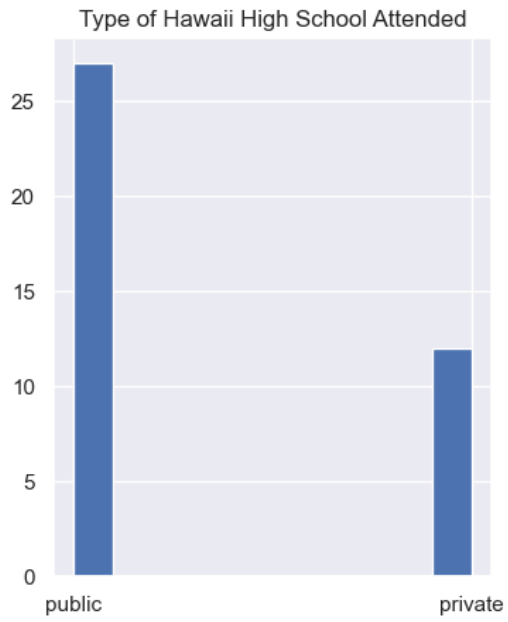

Figure 5: Classification of Type of Hawaii High School for Alumni

As observed, based on the number of respondents there were more alumni who declared as attending a public school compared to a private school. Thus, demonstrating further the demographics of the alumni who responded to the survey. To further understand the demographics of the data, gender was analyzed.

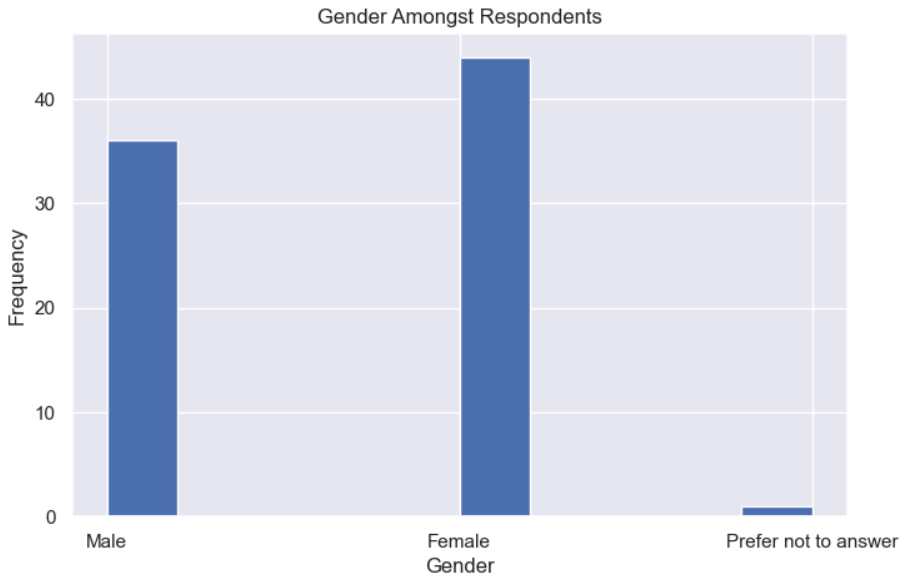

Figure 6: Classification of Gender Amongst Respondents for Alumni

There were 44 females, 36 males and 1 who abstained from answering, of alumni who partook in the survey. Thus, displaying the gender ratio of those who responded to further understand the different populations that responded. Furthermore, the exploratory analysis about the alumni demographics allows for the understanding of the background to further understand the makeup of the respondents.

Furthermore, to understand the makeup of the respondents degree type programs that they were in, multinomial coding had been done to process the data to observe the distribution of degrees that the alumni hold.

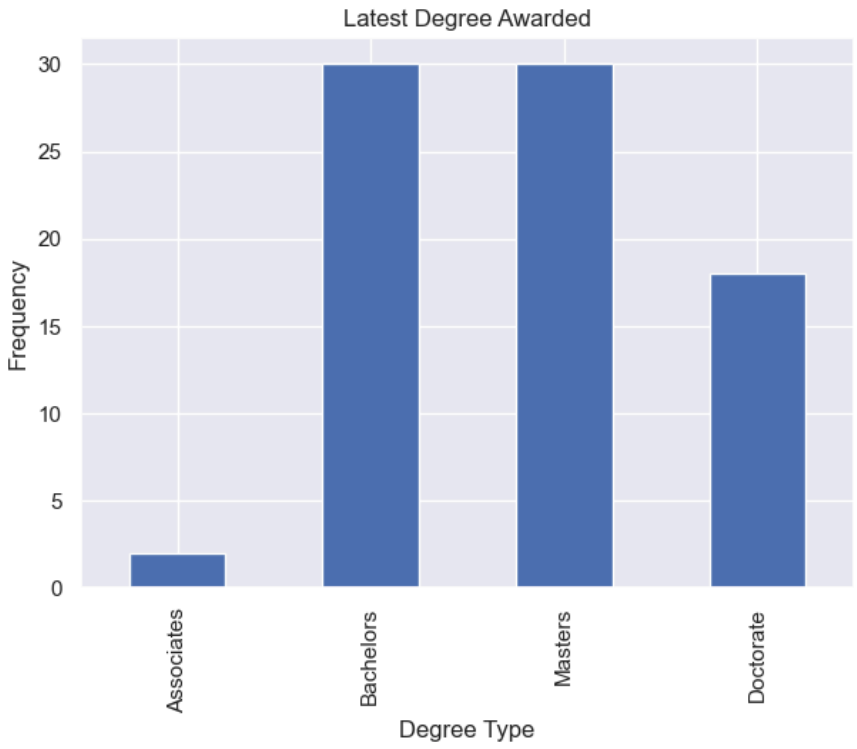

Figure 7: Highest Degrees held by Alumni from University of Hawaii System

From the distribution it can be observed that the population of those sampled are mainly those who have masters or bachelors degrees from the UH systems, followed by a sample of those who have received their doctorate degrees. Thus, indicating that there is a portion of alumni who have

continued to pursue their education post bachelors. It is then important to examine the different disciplines that they were awarded their degrees from.

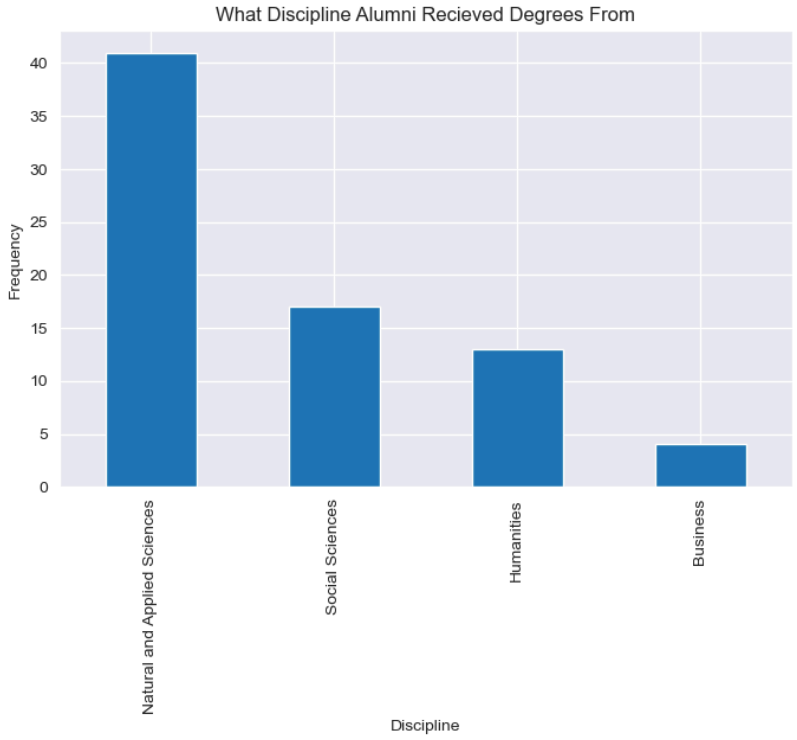

Figure 8: Disciplines of Degrees Held by UH Alumni

It can be observed that there are over twice as many respondents in Natural and Applied Sciences compared to the other disciplines. Therefore, it can be examined that the results are heavily biased towards the Natural and Applied Sciences. It also allows for an understanding of the distribution of salaries across the different disciplines that alumni could work in.

Furthermore, these demographics and exploratory analysis provide insight into the background of the alumni and how the distributions are reflected in the future analysis of the data. It also allows for an understanding of implicit biases that may be within the data as discussed in the discussion section.

Evaluation of How UH Alumni Fare In Industry:

Upon understanding the demographics of the data, it allows for the understanding of the background of the data to be able to understand the perspectives that are depicted in how these alumni fare in industry. Success is defined as not only financial success but also as personal fulfillment.

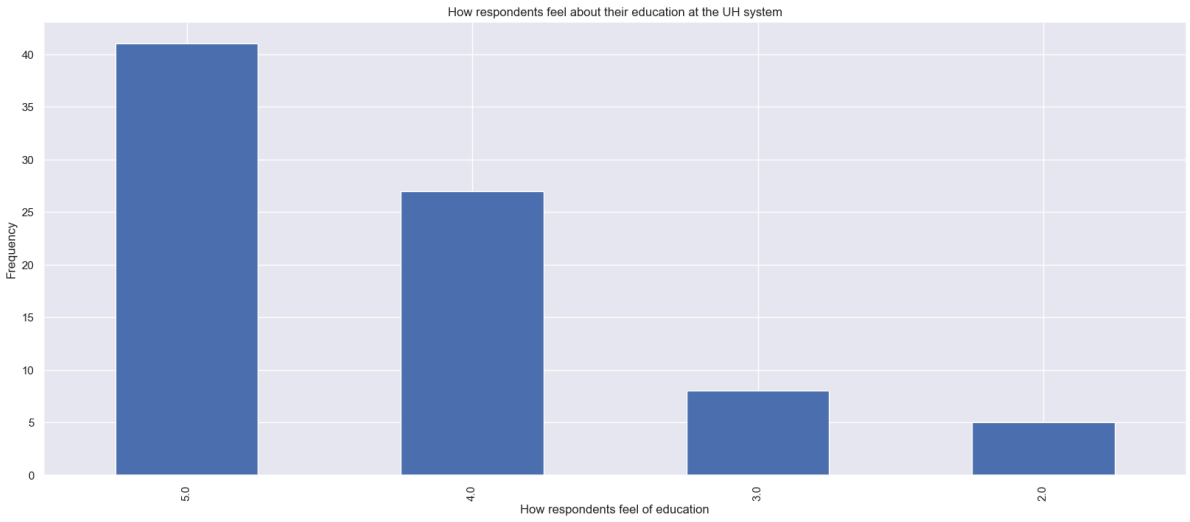

Figure 9: How respondents feel about their personal fulfillment towards their education assisting in achieving their goals

The majority of respondents feel that their education has assisted them in their aspirations and feel fulfilled with their education received by the UH institution. Thus, the majority of respondents exemplify appreciation for the skills that they have received. The respondents further can be seen to have various modalities of work.

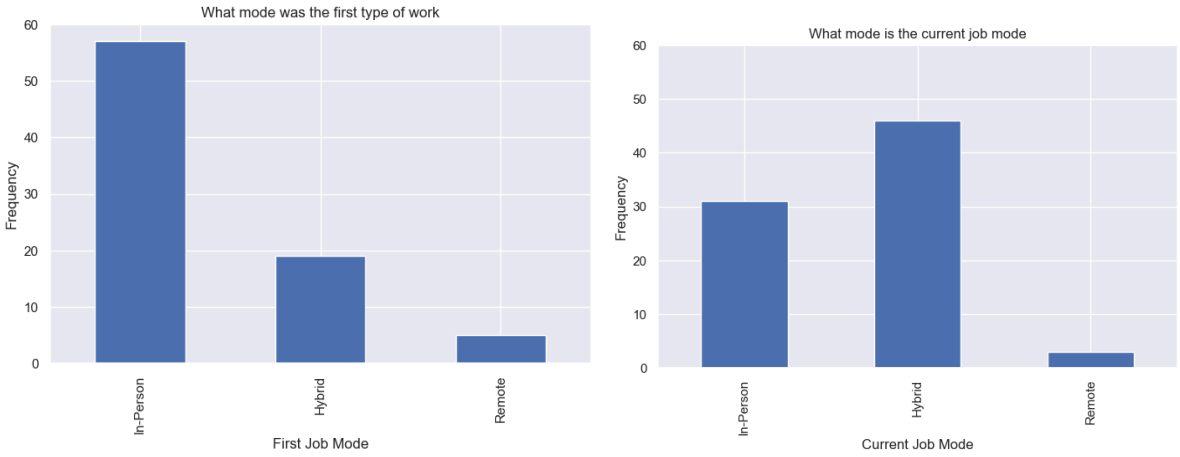

Figure 10: Mode of Work for their first job and current job

Amongst the Alumni, between the first job and current job, there has been a shift in the majority from in-person to hybrid. This could possibly be due to the COVID pandemic in 2020 that has led to greater abilities in communication amongst teams, or the shift could be associated with continuing to progress through their careers. Thus, as people progress through their careers it requires people to have skill sets that are both of technical and managerial backgrounds.

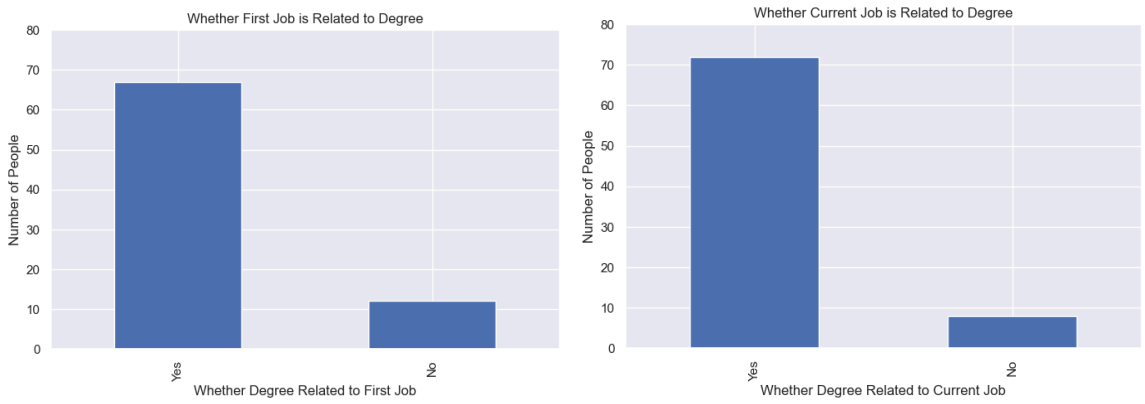

Figure 11: Comparison of whether their first job post graduation and current job is related to their degrees

This leads to the majority of respondents to note that the further along in their careers the more the knowledge from their degree is used. In particular this displays that although people may not be using their degree for their first job, alumni progress through their careers and start to align with the degree that they studied. To further analyze this, shift in using degree related skills by

observing the location of offices that alumni work for.

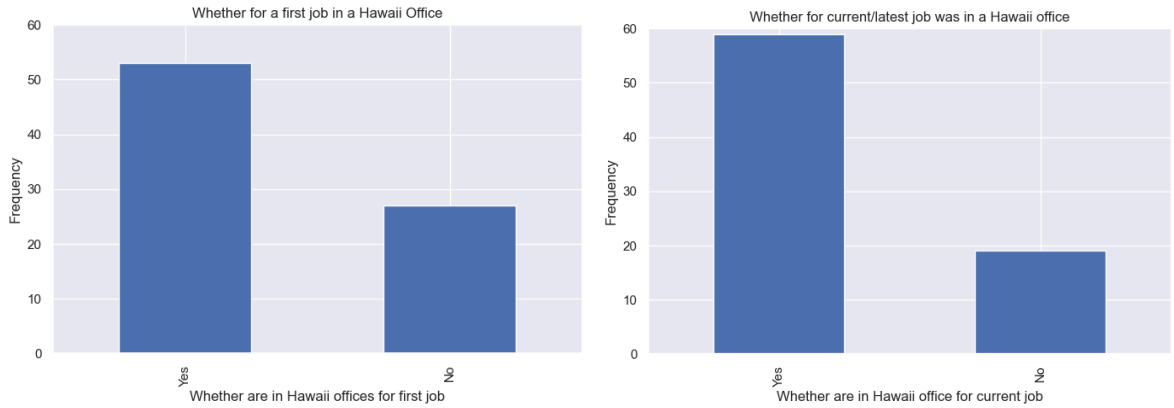

Figure 12: Whether their job had an office located in Hawaii

As the alumni progress through their careers, they are becoming increasingly more employed by companies that have an office in Hawaii, and feel that as they work they are using the skill sets that they have learned from their education. Further, it is important to analyze the location of work of alumni when working in these offices.

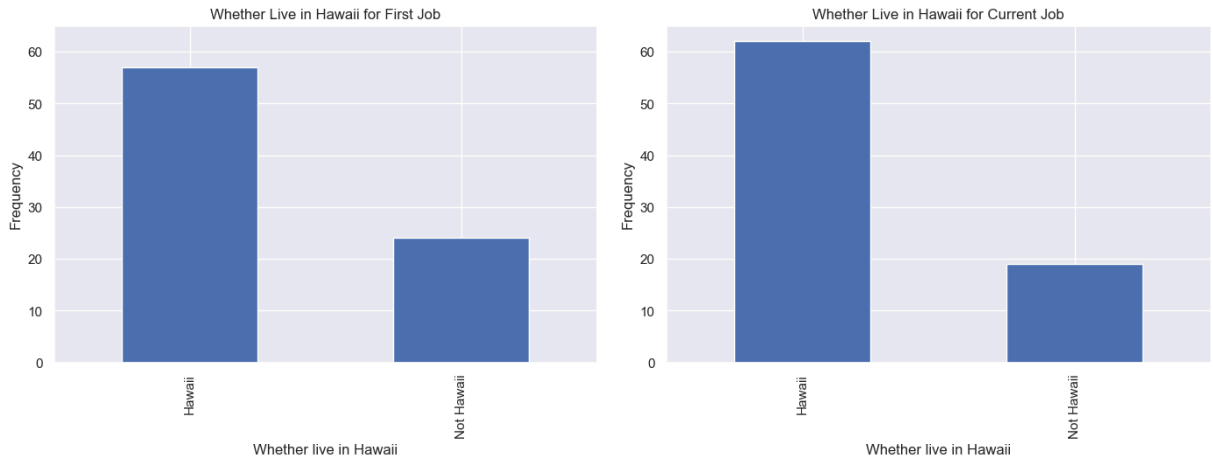

Figure 13: Whether they live in Hawaii

It can be observed that for the majority of people's first jobs they are located in Hawaii and as people progress through their careers they remain in the islands as well as return back to the islands to live and work in Hawaii. Therefore, showcasing that people seek to return to give back to the local landscape of the state of their post-secondary education. To quantify this act of

“giving back”, we can compare the personal satisfaction gain against the financial compensation achieved.

	Median Salary First Job (Adjusted for Inflation)	Median Salary Current Job
In Hawaii	$ 80,005.70 - $ 91, 205.34	$ 81,612.50 - $ 91,235.00
Not Hawaii	$ 81,612.50 - $ 94, 873.42	$ 115,000.00 - $ 125,00.00

Table 5: Median Salaries of Jobs held by UH Alumni living in the islands adjusted for inflation

It can be observed that although the financial gains may be lower while working in Hawaii, UH Alumni continue to work for the Hawaii ecosystem despite the lower pay. Subsequently, the salaries of UH alumni can be seen to increase as they progress through to their current careers. This then leads to a more complete understanding that the median of the salaries are similar.

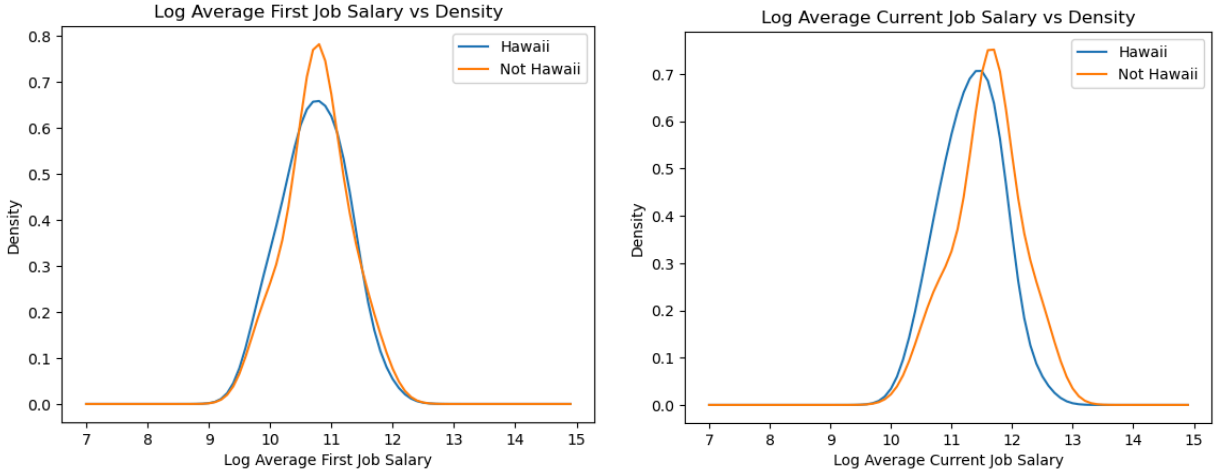

Figure 14: Comparison of Gaussian Kernel Density Estimation for the salaries of those living in Hawaii and not in Hawaii

The Kernel Density Estimation (KDE), displays the general distribution of the data. Thus, it can be observed that both salaries could be considered similar to a normal distribution. When comparing the normal distributions of whether the individual worked in Hawaii, there is an overlap indicating similarity. But as discussed in the Discussion Section the amplitude is

different, thus showcasing the distribution of salaries to be closer to the mean for those in the mainland. However, when considering the salaries respective to cost of living in each state,

	Median Salary First Job (Adjusted for Inflation and Cost of Living relative to Hawaii)	Median Salary Current Job (Adjusted for Cost of Living relative to Hawaii)
In Hawaii	$ 80,005.70 - $ 91,205.34	$ 91,055 - $ 91,235.00
Not Hawaii	$ 116,151.94 - $ 138,953.17	$ $ 198,175.72 - 223,355.13

Table 6: Median Salaries of Jobs held by UH Alumni living in the islands adjusted for inflation and cost of living

Hawaii is seen to have a lower salary when accounted for cost of living, indicating that there is less purchasing power with Hawaii salaries compared to the salaries received on the mainland, displaying that locals have the potential to continue to go to work in the mainland for a greater financial gain. When comparing current salary amongst career stage and personal fulfillment of their education, it allows for more insight into the perspective of alumni.

Place of Residence	Stage in Career	Current Salary	Personal Fulfillment
In Hawaii	Early Career	$80,001 - $90,000	4.0
	Mid Career	$70,001 - $80,000	5.0
	Senior Career	$125,00.50 or more	5.0
Not in Hawaii	Early Career	$115,000.00 - $125,000	4.0
	Mid Career	$110,000.00 - $120,000.00	4.0
	Senior Career	$155,344.00 - $169,537.50	4.5

Table 7: Current salary with consideration for inflation by Stage in Career and Personal Fulfillment

It can be observed that there is high personal fulfillment amongst all alumni no matter where they reside. However, there is higher personal fulfillment amongst those that live in Hawaii, showcasing that individuals are more fulfilled with their skill sets if they live in Hawaii. It raises the question of whether individuals that live in Hawaii are remote workers that work for companies on the mainland or are working within the local ecosystem.

Offices Location	Stage in Career	Number of Respondents
In Hawaii	Early Career	38
	Mid Career	8
	Senior Career	12
Not Hawaii	Early Career	13
	Mid Career	3
	Senior Career	2

Table 8: Distribution of responses with jobs in Hawaii currently

Majority of alumni respondents are currently working for companies that have offices in Hawaii. It, thus, indicates that the sample being analyzed mainly represents those that are currently working in Hawaii offices, and that, especially, those in their early career mainly work for companies with offices located in Hawaii.

Offices Location	Stage in Career	Current Salary (Median)	Personal Fulfillment (Median)
In Hawaii	Early Career	$80,001 - $90,000	4.0
	Mid Career	$90,001 - $100,000	5.0
	Senior Career	$125,000 or more	5.0
Not in Hawaii	Early Career	$110,000 - $120,000	4.0
	Mid Career	$110,00 - $120,000	5.0
	Senior Career	$155,344 - $169,538	4.5

Table 9: Current salary with consideration of inflation by career stage and whether there are offices in Hawaii

When considering the salary of these individuals based on their office location it can be observed that although working for companies that have Hawaii offices have lower salaries. There is more personal fulfillment amongst Alumni as they progress through their careers in Hawaii.

Machine Learning/ Principal Component Analysis

To bring an understanding of the difference of the alumni data between those who are in Hawaii and those not in Hawaii. An unsupervised machine learning algorithm known as principal component analysis, that reduces dimensionality of the data while preserving the variance. Thus to create this algorithm, a pipeline was created using one hot encoding for categorical data and MinMax scaling for the numerical data. There were 6 components used to test for variance in the model.

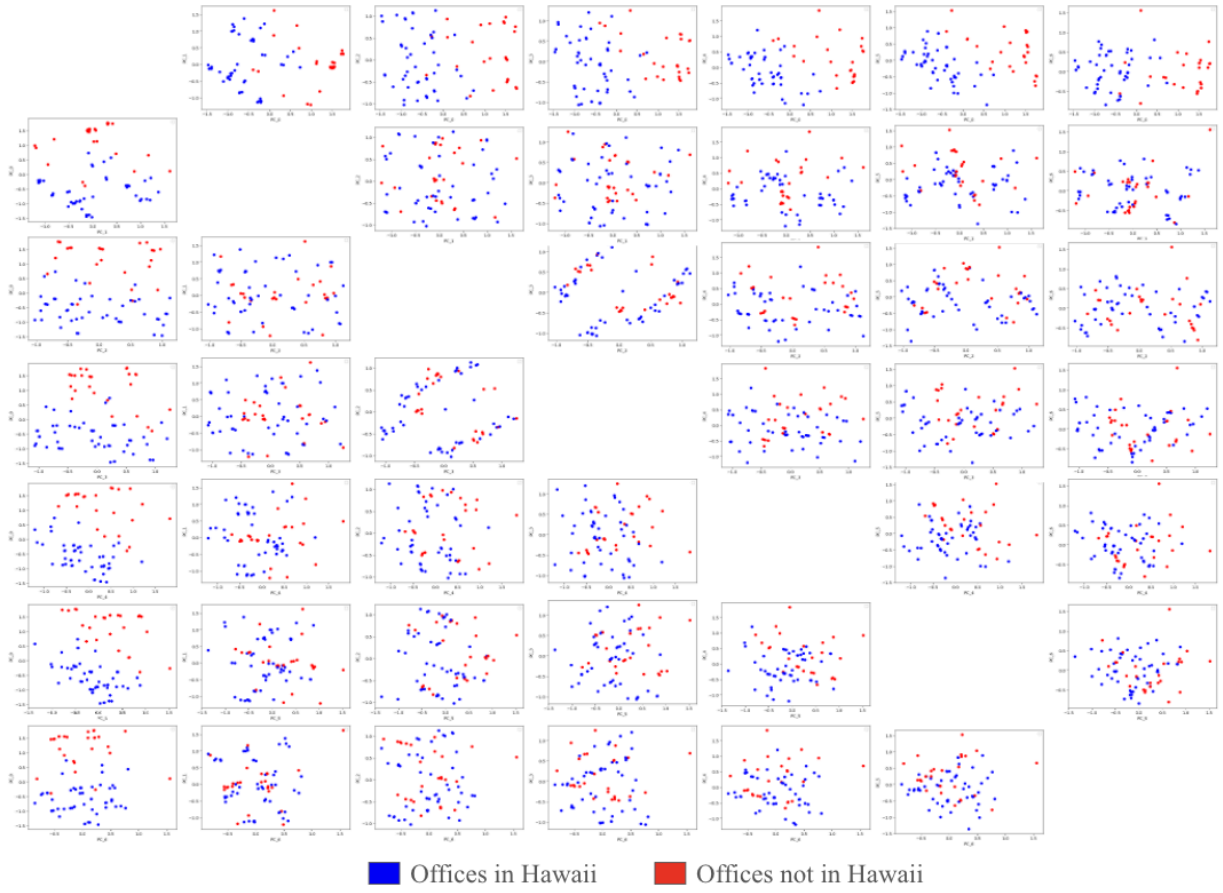

Figure 15: Unsupervised Learning Algorithm for First Jobs in Hawaii

When conducting the observation of the data, the Principal components that had the best separation were PC_0 and PC_5. From this separation of variance it is able to display that there is a difference in the alumni first jobs in Hawaii compared to those not in Hawaii.

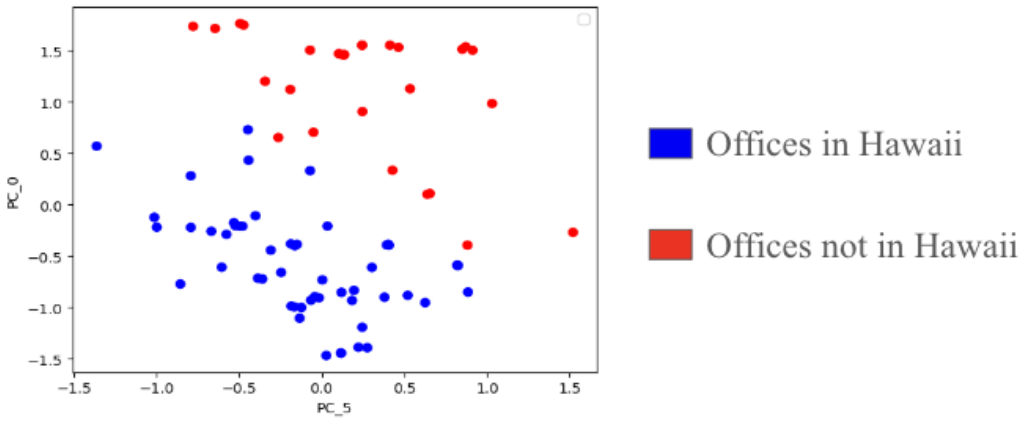

Figure 16: Best PCA Separation for First Jobs

Similarly, when considering the current jobs, when using the same methodology to create the PCA algorithm using the best separation components. There is still evidence of separation indicating a distance in the current jobs alumni have.

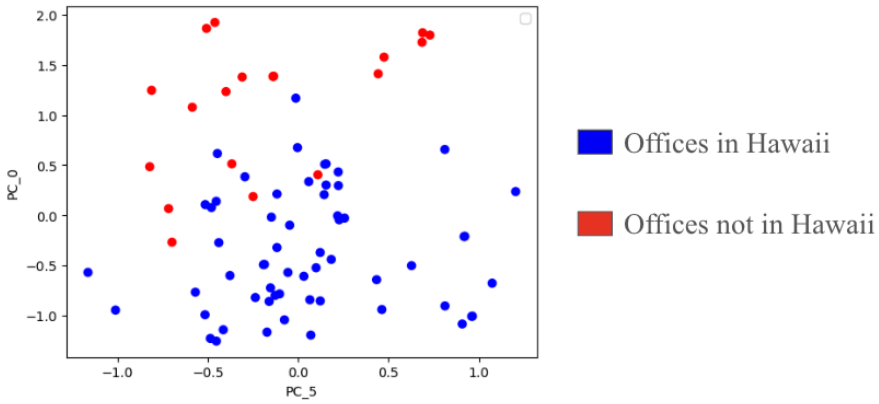

Figure 17: PCA for Current Jobs

Furthermore, through using PCA it is able to create variance in the data and further bring insight into whether the jobs on the mainland compared to Hawaii can be classified as different.

Further bringing an understanding of how Alumni may describe their education fulfillment. When considering success, it can also be noted to be demonstrated through analysis by discipline, it allows for further understanding of how UH alumni fare better in their respective industries.

Degree Discipline	Median First Job Salary (adjusted for inflation)	Median Current Salary	Personal Fulfillment (Median)
Business	$113,742.15 - 132,789.51	$94,012.50 - $108,814.00	4.0
Humanities	$70,001 - $80,000	$80,001.00 - $90,000.00	5.0
Natural and Applied Sciences	$82,758.61 - $94,464.76	$100,001 - $ 110,00.00	4.0
Social Sciences	$71,570.17 - $85,330	$75,001.00 - $85,000.00	5.0

Table 10: Current Salary with consideration of inflation for the Latest Degree Disciplines

When considering success within the disciplines, the humanities and social sciences are more fulfilled with their work despite the lower pay. Further creating an awareness of how the different disciplines fare in industry overall and signifies the success of alumni of the programs in the UH system. This allows current students to understand how individuals can view their future success.

Student Analysis:

Current students were also surveyed in this research to understand how students perceive their future earnings post graduation. Inclusion of the student perspective allows for an understanding of the expectations or aspirations that students have ideally upon graduating, along with bringing awareness to potential expectation gaps between job seekers and the jobs

that are received upon graduation. Subsequently, it is important to understand the demographics of the students that responded to the survey to gain an insight into the data.

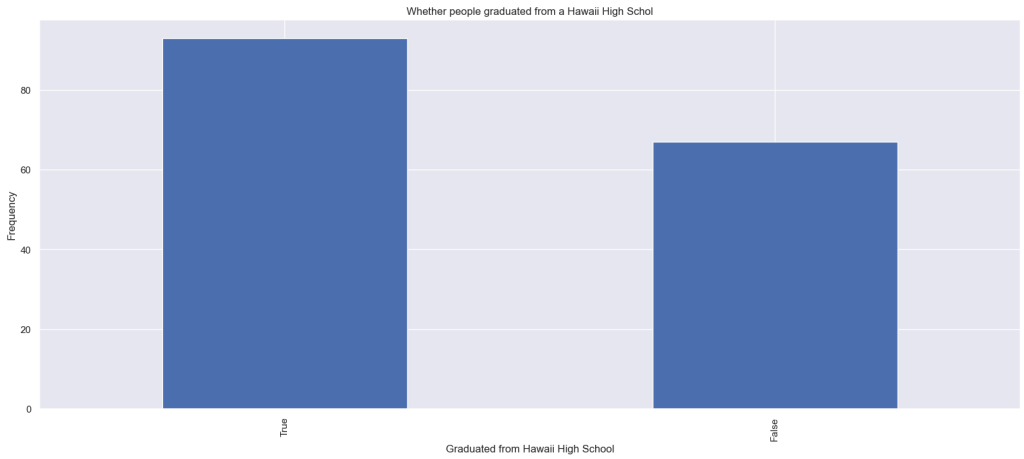

Figure 18: Whether Current Students graduated from a local Hawaii High School

As mentioned in the alumni analysis, local high school is an important demographic that many locals in Hawaii use. From the results it can be observed that the majority of current students attended and graduated from a local high school. Furthermore, similar to the alumni data to further understand the demographics of the population, the type of school was then observed.

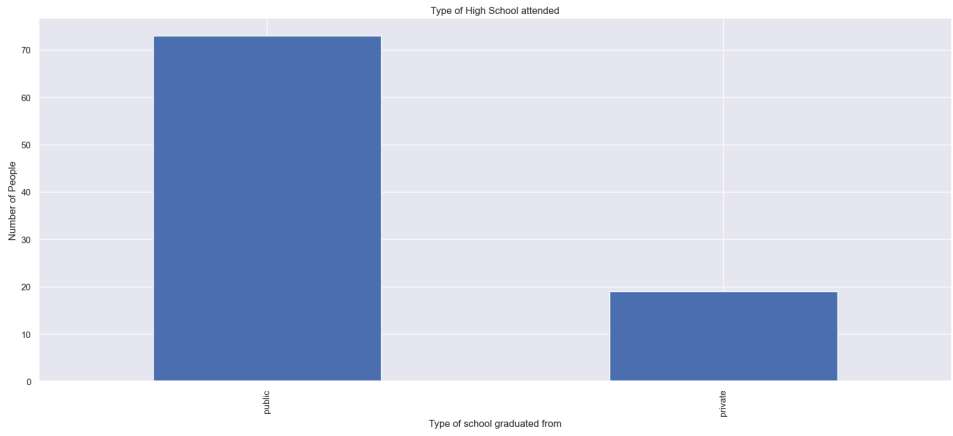

Figure 19: If graduated from Hawaii High School, Distribution of the type of High school graduated from for Current Students

The majority of current students attended a Hawaii public high school, further demonstrating the demographics of students who responded to the survey. To understand the demographics of the students who responded, gender was also analyzed.

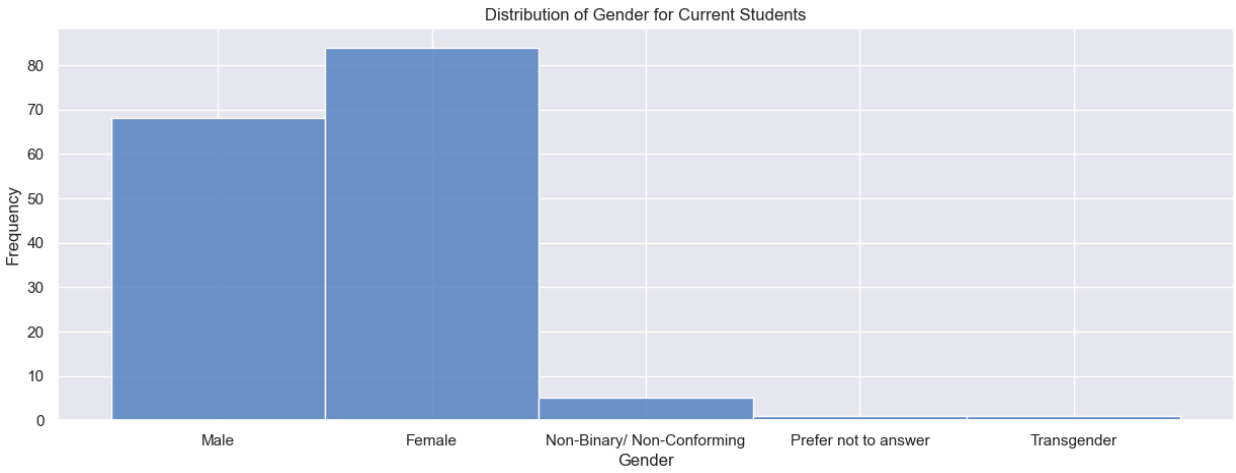

Figure 20: Distribution of Gender of Current Students in the University of Hawaii System

Based on the data, the majority of those who responded are females. However, there is more variation amongst the classification of gender amongst the current students. This displays the gender variation in the data, and brings a complete understanding to the background information of the student population.

To understand the composition of the academic demographics of the populations, degree programs were coded similarly to the alumni data. The goal is to primarily observe the distribution of the degrees that the students are aspiring to receive at graduation.

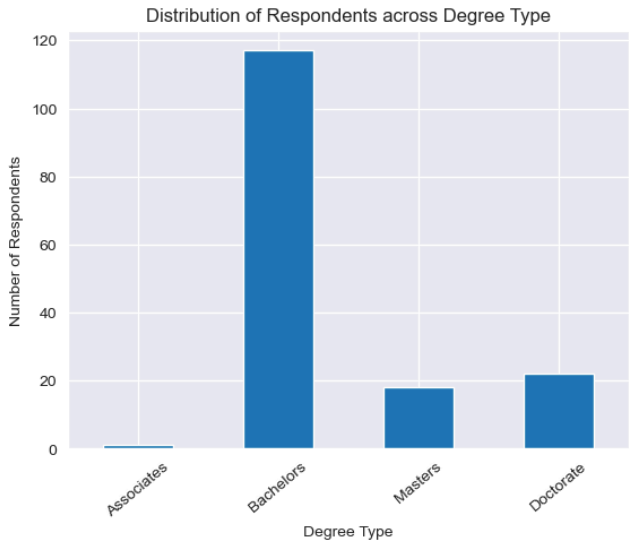

Figure 21: Distribution of Students by Degree Type

The majority of current student respondents are those pursuing their bachelors degrees. Therefore, indicating that there is a concentration in certain broad academic fields. Analyzing the disciplines creates more insight into the programs that current students are participating in.

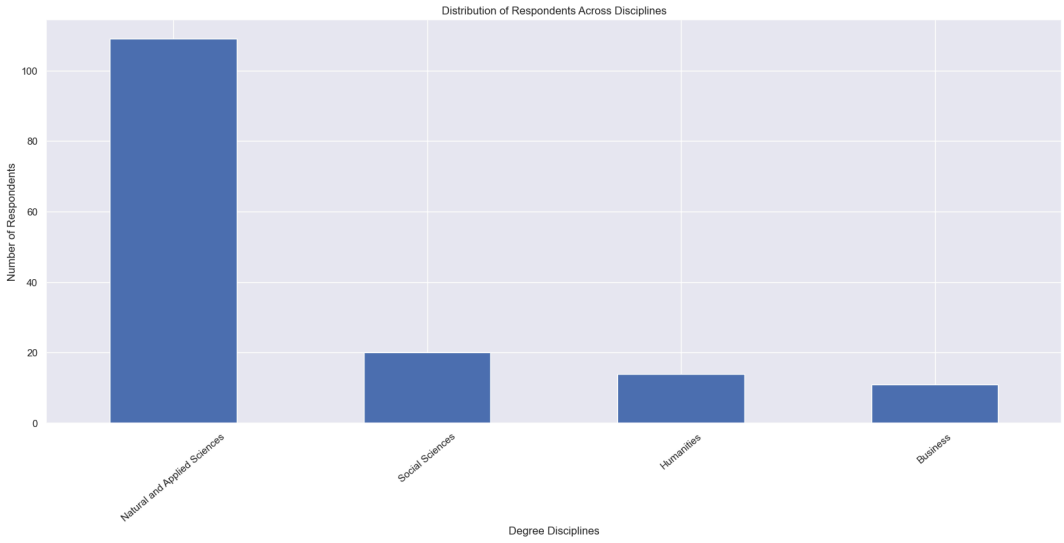

Figure 22: Distribution of Current Student Respondents by Disciplines

The majority of current student respondents were from the Natural and Applied Sciences. The results can then be considered skewed to the discipline especially since the number of

respondents in Natural and Applied Sciences is more than the other disciplines combined. Thus it allows for the most understanding of the perspective of Natural and Applied Science students..

Discipline	Expected Salary (median)
Overall	$60,000.50 - $61,500
Business	$60,001 - $70,000
Humanities	$50,001 - $60,000
Natural and Applied Sciences	$60,000 - $70,000
Social Sciences	$50,001 - $60,000

Table 11: Current Student Perception of Salary Post-Graduation

It can be observed by the graph that the median salary expectations can be considered to be around the same for all disciplines and overall being between $50,000 - $70,000. This demonstrates that amongst current students the expectations for salaries are relatively consistent across disciplines, demonstrating that students are desiring to have a wage that is consistent with living standards.

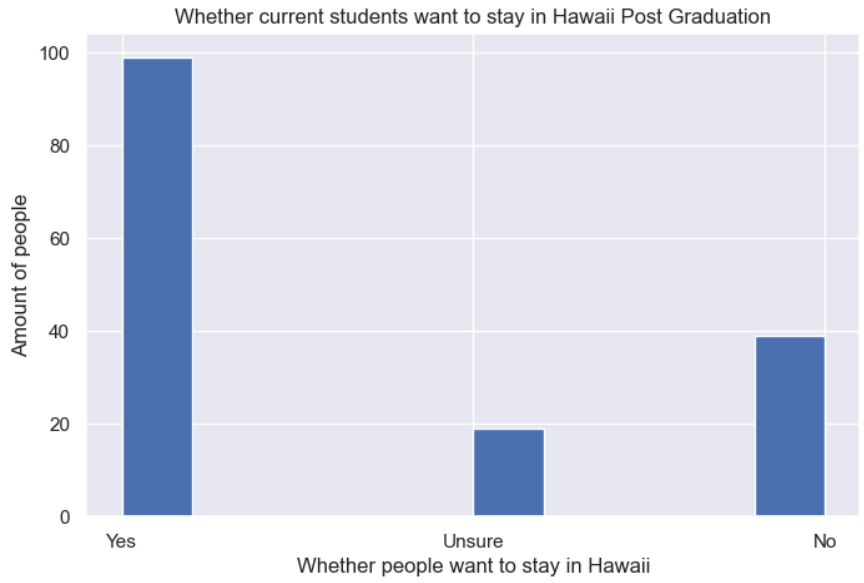

Figure 23: Students desire to stay in the islands post graduation

Based on the distribution, it can be observed that the majority of students would like to stay in Hawaii post-graduation. It also further demonstrates the locality of wanting to stay in the same ecosystem as an individual's institution.

The student survey demonstrates that the majority of students have a desire to stay in Hawaii post graduation and are relatively consistent with expectations of salaries amongst all the different disciplines. Similarly, the desire to want to come to Hawaii can be seen by the graduates going away for their first jobs after graduation and then coming back to Hawaii as they progress into their current careers.

Hypothesis Testing:

To determine whether the data and the results are statistically significant hypothesis testing was conducted. The test conducted three different hypothesis tests to analyze the significance of the data, and the significance level accepted in economics is the p-value of 0.05. All salary statistics from the research data collection is based on the lower bound reported. The hypothesis test that was conducted was the two sided population mean tests, difference of two means ($\mu_1 - \mu_2 = 0$), and population proportion with the following null and alternative hypothesis:

$$\text{Null Hypothesis: } \mu = \mu_0$$

$$\text{Null Hypothesis } p = p_0$$

$$\text{Alternative Hypothesis: } \mu \neq \mu_0 \text{(for population mean)}$$

$$\text{Alternative Hypothesis: } p \neq p_0 \text{ (for difference of means)}$$

$$\text{Alternative Hypothesis: } \mu_1 \neq \mu_2 \text{ (for population proportion)}$$

To ensure that the data received was representative of the general population, hypothesis testing was conducted to ensure the validity of the data. Thus the surveyed data was compared to the United States Census Bureau's Post Secondary Enrollment Options (PSEO) data. However, there is the limitation of the duration of time post graduation of alumni surveyed. Therefore, the data from PSEO was used for the 50th percentile for the 10 years as it is the upper bound for early career. The survey data was also compared, between the alumni data and student perception data.

Some of the aggregate statistics was tested to check for generalizability and comparability to the general population of UH System graduates. Furthermore, to check for the generalizability of people's first jobs post graduation lead them to live in Hawaii, the null hypothesis was that the percentage reported by the PSEO is the same as the percentage of graduates in the survey, and the alternative hypothesis was that they were not the same

Test Used	Population Proportion
p -value	0.3121
Conclusion	Cannot Reject Null Hypothesis Populations are Equal

Table 12: Significance of whether graduates stay in the islands for their first job post-graduation

Upon doing the population proportion test, since the p-value is greater than 0.05, the null hypothesis is not able to be rejected. Since the null hypothesis of equivalence is not able to be rejected, it indicates that the surveyed data can be considered to be the same as the PSEO data. Furthermore, to test the validity of the alumni data, the first job salaries were compared to determine whether they can be considered to be the same (null hypothesis) or are different (alternative hypothesis).

Test Used	Two-sided

	Population Proportion
p -value	< 0.01
Conclusion	Reject Null Hypothesis Averages are not equal

Table 13: Significance of salaries received by graduates at their first job compared to the first year Census Data in Hawaii

Based on a two-sided population proportion test, the p-value is less than 0.05, and leads to the rejection of the null hypothesis of them being the same. Therefore, the first job salaries from the United States PSEO do not match the Hawaii salaries. However, when comparing the PSEO salaries for the first job to the jobs not in Hawaii:

Test Used	Two-sided Population Proportion
p -value	< 0.01
Conclusion	Reject Null Hypothesis Averages are not equal

Table 14: Significance of salaries received by graduates at their first job compared to the first year Census Data not in Hawaii

The p-value is less than 0.01 and thus less 0.05, so the equivalence is rejected leading to the salaries of the first job salaries not in Hawaii also not having equivalence compared to the PSEO data that was collected. However, when testing the significance of the 10 year data, regarded in this study as early career where the null hypothesis is equivalence and the alternative is negation of the salary amounts being equal.

Test Used	Two-sided Population Proportion
p -value	0.003
Conclusion	Reject Null Hypothesis Averages are not equal

Table 15: Significance of Alumni Data Early Career compared to overall Census Data for 10 years

Upon completion of the hypothesis testing, it can be noted that the null hypothesis can be rejected and thus the averages are not equal for early career alumni compared to the PSEO data. Indicating that the data has overall differences in comparison to early careers. When comparing it by degrees for current jobs, specifically bachelors and masters since there is the largest sample of within the data collected for those in Hawaii offices.

Test Used	Two-sided Population Proportion
p -value	0.62
Conclusion	Cannot reject null hypothesis Averages are equal

Table 16: Significance of Bachelor's Degree Current Job Salaries in Hawaii compared to Census Bureau Data for 10 years

From the hypothesis test, it can be concluded that the null hypothesis is not able to be rejected and therefore, the averages can be considered statistically significant as the same. Furthermore when comparing masters degrees it yields a similar result.

Test Used	Two-sided Population Proportion
p -value	0.3121
Conclusion	Cannot reject null hypothesis Averages are equal

Table 17: Significance of Master’s Degree Current Job Salaries in Hawaii compared to Census Bureau Data

By comparing the master degrees salaries it can be concluded that the null hypothesis cannot be rejected and thus the data can be considered statistically significant to be the same for those in Hawaii compared to the PSEO data. Thus displaying that the salaries of Hawaii are statistically similar to those that are observed by the PSEO Data. However, when comparing the

Bachelor's and Master's degree current salaries outside of Hawaii it can be noted as statistically different from the PSEO Data as shown below.

Test Used	Two-sided Population Proportion
p -value	0.008
Conclusion	Reject null hypothesis Averages are not equal

Table 18: Significance of Bachelor's Degrees Current Job Salaries not in Hawaii compared to Census Bureau Data for Early Career

Test Used	Two-sided Population Proportion
p -value	0.484
Conclusion	Cannot reject null hypothesis Averages are equal

Table 19: Significance of Masters' Degrees Current Job Salaries not in Hawaii compared to Census Bureau Data 10 years compared to those in their Early Careers

Based on the significance tests, it can be observed that the null hypothesis are not able to be rejected for the majority of the cases. Therefore indicating that the data collected can be considered to be similar to the PSEO data. However, there are indications that the alumni data within Hawaii is more similar to the PSEO data than out of state.

Student Data Hypothesis testing:

By understanding the student perception of the data it allows for an understanding of how the student expectations are similar or different from the PSEO data. Thus, when comparing the PSEO data of destination outcomes is able to provide insight into whether students' desires to stay are similar to what is observed.

Test Used	Population Proportion
p -value	0.075
Conclusion	Cannot reject null hypothesis Averages are equal

Table 20: Significance test of whether students desire to stay in the island post graduation matches outcomes by the United States Census Bureau

Based on the significance tests, it can be noted that it is statistically significant to be similar and thus leads for a further emphasis on the desire to stay in the islands. Furthermore when comparing the expected salaries post graduation, with an emphasis on bachelor degrees, brings evidence to understanding student perception.

Test Used	Two-sided Population Proportion
p -value	< 0.01
Conclusion	Reject null hypothesis Averages are not equal

Table 21: Significance of student perception of salary upon obtaining a Bachelor's Degree compared to United States Census Bureau

Based on this hypothesis test, it displayed that the expected salaries are not equivalent to the data received in the PSEO data. Leading to an indication that there is a difference in the salaries. Furthermore, when comparing the average salary perception by students compared to the salaries received in industry for those who work in Hawaii offices for their first job, the null hypothesis attributes that they are equivalent and the alternative is the non-equivalence.

Test Used	Difference of Two Means
p -value	0.001
Conclusion	Reject null hypothesis Averages are not equal

Table 22: Significance of student perception of salary comparing the Alumni in Hawaii Offices for their first job

When comparing the hypothesis testing in the data, it can be concluded that the student perception of salaries are not statistically similar. Thus furthermore, then conducting a hypothesis test to compare the student perception to the salaries not in Hawaii.

Test Used	Difference of Two Means
p -value	0.0104
Conclusion	Reject null hypothesis Averages are not equal

Table 23: Significance of student perception of salary comparing the Alumni not in Hawaii Offices for their first job

The comparison of outside of Hawaii leads to student perceptions to not be equivalent to the salaries that alumni receive in industry. Furthermore demonstrating that although students have a desire to stay in Hawaii post graduation, the expectations are not statistically similar to the salaries that are received in industry by alumni.

Discussion:

Demographics:

As the University of Hawaii System is composed of several institutions, it is important to ensure inclusivity. All aggregate statistics have been presented in terms of the University of Hawaii system, but the data is skewed to the University of Hawaii at Manoa campus as noted above.

Since the University of Hawaii is a public institution the demographics include locals along with out-of-state residents attending the University of Hawaii System. Based on the statistics from the Manoa Institutional Research Office (MIRO) (2024), it notes that there are 58% of Hawaii (in-state) residents. Therefore my sample of nearly equivalent responses based on if they attended a Hawaii high school, as a classifier for in-state residency and local, with not attending a local high school is slightly more, represents the overall University of Hawaii population, to an extent. Similarly for my current status students it can be observed that there is more bias towards Hawaii (in-state) residents compared to out of state residents, and does not match the ratios of MIRO. However, it allows for a greater understanding of how local residents may perceive their future outlooks post graduation. Also, a notable Hawaii distinguisher within the local population is whether a person attended a public or private school, and thus the inclusion of the data allows for a better understanding of the demographics of the data. There was also the observation of gender where amongst the alumni population females dominated with over 50% matching MIRO statistics of the student statistics being 59% females. This can be similarly observed in the current data, however, there is slightly more females in the studies sample.

When considering degree distribution compared to the distribution of degrees awarded with reference to MIRO, the higher degrees usually have fewer graduates than the preceding degree. Therefore, there is bias in the data towards the higher degrees, which may be expected as the distribution of the survey was through academic staff and professors for the alumni data. However, the distribution in the student data being majority bachelor's degrees may be due to the survey being publicized as an undergraduate Honors thesis and therefore leading for undergraduates being motivated to participate in peers research projects. Another reason for the

biased sample is attributed to the author's background as a Computer Science major in the College of Natural Sciences, shifting the distribution to focus on the discipline of Natural and Applied Sciences.

Alumni Fare in Industry:

McKenzie (2022) and Buchanan (2023) as mentioned previously emphasizes the shift to evaluate alumni success beyond completion rates and economics, but rather to consider the non-economic impact of graduates and encompass attributes such as personal fulfillment. Therefore in this study for the first time, evaluates the personal fulfillment of alumni generally and specifically in career stages. From the alumni perspective it can be observed that generally the majority of alumni rank their personal fulfillment to be a 5, indicating that the majority of respondents feel fulfilled with their education, and had aided them in succeeding in their aspirations.

For the first time, it has also been observed the characteristics of alumni's first job post graduation with a comparison to their current job. It can be observed that in the alumni's first jobs were mainly in person and as they progress through their careers there has been a shift to majority hybrid work, which could be due to the effects of the COVID pandemic as well as progressing in their careers. It can also be seen that as Alumni progress through their careers the careers become more relevant to the skills learned in their degree. This shows that though their first job may not be the ideal job, it is a stepping stone towards their dream job related to their degree.

This is also the first time to understand how Alumni fare specifically in Hawaii. The United States Census Bureau data allows for the filtering of data by the state followed by selecting partner institutions of the state, but it is generally for all Alumni from the UH system

Alumni including those who have relocated or moved to the mainland United States, with no distinction of location of work. Although, it breaks down the flow of graduates to the different geographies, it does not break down the earnings by location of work. Therefore, this study fulfills the gap of uncovering how UH system graduates fare specifically in Hawaii.

Thus, upon evaluating the data it can be observed that upon alumni graduating from the UH system their first job often has offices located in Hawaii. Then as they progress through their careers more graduates are coming back to Hawaii to be employed by companies that have offices in Hawaii. Also upon graduating, the majority of alumni continue to live in the islands and then, as they progress through their careers, alumni start to move back to the islands. This is contrary to popular belief that as alumni graduate, the "brain drain" occurs with alumni moving to the mainland for work. However, it is important to note that the data may be skewed that not all alumni have been sampled, and it may be a convenient sample of those who had seen the survey currently live in Hawaii. The alumni coming back to Hawaii to work may be due to having family ties in the state as displayed by those who have attended a local Hawaii high school.

When describing salary, the median with consideration for inflation was used to ensure proper display since averaging of the salaries may cause misleading results. The salary was also considered for inflation to ensure all salaries were comparable. Cost of living was not considered for all analysis, since purchasing power of salaries was not studied in depth, and not all data included current state of residence but can be studied in the future. This analysis allows for a more holistic understanding of how alumni fare relative to each other with respect to Hawaii. In particular, the data received primarily included state names, and few city names, thus when examining the salaries in relation to cost of living, only the state overall was considered.

When considering the kernel density estimation of salaries, it can be noted that the first job salaries and current job salaries follow a similar gaussian distribution, but there is a difference in the amplitude of the distributions where there are more people in the mainland getting the average salary compared to Hawaii. However, it is more apparent in the first job compared to the current job.

When comparing the first job salary, it can be seen that there is only a slight difference after adjusting for inflation, between those who are living and not living in Hawaii. There is only a difference of around $1,500.00 between the lower bound of the salary for the first job. Therefore, it is less than one standard deviation away from each other and whether a graduate is employed out of state or instate does not make that big of a difference. However, the difference becomes more evident as the alumni progress through their careers where the difference between the median current salary is different between those living in Hawaii and those not in Hawaii, is a difference greater than $30,000 indicating, economically, that alumni are able to fare better in places outside of Hawaii.

However, when breaking the current salary down by career stages, there is a more definitive gap in the salary of those employed in state and those out of state, between each career stage. However, when considering an individual's personal fulfillment in each stage relative to where they live, it can be seen that those living in Hawaii are more fulfilled than those who are not living in Hawaii. In the early career stage it can be noted that the personal fulfillment is around the same, with no difference of living in Hawaii or not living in Hawaii. However, when evaluating those in their mid-career and senior career it can be noted that those who live in Hawaii feel more fulfilled than those who do not live in Hawaii. Although there is a lower salary for those in their mid-careers in Hawaii compared to those not in Hawaii, there is a higher

personal fulfillment of 5.0, compared to 4.0. Similarly for senior career individuals, people outside of Hawaii rank their personal fulfillment to be a 4.5 compared to those in Hawaii who rank their personal fulfillment to be a 5.0.

To understand how alumni fare within the local Hawaii industry, it is important to aggregate by whether alumni work for companies that have offices in Hawaii. By observing the data it can be noted that for each career stage there are consistently more respondents in Hawaii offices compared to mainland offices. Therefore, showcasing that majority of alumni seek to remain in Hawaii. Furthermore, when observing the current salary it can be noted, similarly to the analysis of those living in the state, that people feel more fulfilled by working for offices in Hawaii compared to the mainland.

When considering current salaries relative to the degree discipline it can be observed that those with a lower median salary feel more personally fulfilled such as Humanities and Social Sciences, while within the disciplines of Natural and Applied Sciences and Business there is a tendency to feel less personal fulfillment.

Student Data:

Upon observing student data, the overall expected early career salary ranges consistently for all the disciplines are about $60,000. It can also be noted that the majority of students are seeking to stay in Hawaii post graduation if they are able to.

Hypothesis Testing:

There were several hypothesis tests that I ran to determine whether there was statistical significance in my findings. To determine whether there was significance in the proportion of alumni to stay in the islands for their first job, it can be concluded that it is statistically

significant when compared to the average of the census data for their first year post graduation, and can be considered an equal representation in comparison.

When comparing the first job salaries with respect to in Hawaii and out of Hawaii to the first year salaries of the Census data, it can be observed that there is a statistically significant difference between the average salary observed in the alumni data and thus does not match the salary reported by the US Census Data. Also the limitations of the census data of only having data for graduates 10 years post graduation, led to only those in their early career being compared. This supports the conclusion that it is statistically the same for early careers and the 10 year post graduation salaries reported on the US Census Data. When comparing the data for Bachelors and Masters degree alumni in regards to being respectfully in Hawaii and not Hawaii, it can be noted that there is no statistical difference between the census data for all respective combination besides for those that have Bachelor's degree and are not in a Hawaii office, that lead for the salaries have a statistically significant difference. But overall, all data collected is statistically significant to be the same when comparing it to the census data.

When considering the current student perceptions of staying in the islands post graduation to the reported flow in the US Census data, it can be found that there is statistical significance in that the proportion of alumni wanting to stay in Hawaii post graduation being similar to the reports of how graduates remain in the local companies/ecosystem. In particular when comparing the student perceptions post graduation compared to US census data, it can be observed that there is a statistically significant difference.

Furthermore when comparing the Alumni First Job Salaries to the student salaries it can be found that when comparing the student perception relative to Hawaii offices it is statistically significantly different. However when compared to those working out of state it is found to be

similar indicating that although students desire to stay in Hawaii their salary aspirations are more similar to those not in Hawaii.

Threats to Validity:

There was an attempt to send emails to the department chairs at the respective campuses on other islands and to put posters on the other campuses. However, the main number of respondents were from the University of Hawaii at Manoa campus, due to various reasons including being the primary institution of the researchers. There was also an attempt to collaborate with the Hawaii Chamber of Commerce to connect with more Alumni, however, there were issues with data privacy and restrictions due to the sensitive nature of data and the differences in standards between academia and industry.

Implications:

From this study it can be observed that although there are lower salaries in Hawaii and can overall be considered different than those not in Hawaii, it allows for a more complete understanding of how alumni from a local institution fare in the local ecosystem. Specifically, the uniqueness of Hawaii having multi-generation households, allows for insight on how alumni progress through their careers then progressively come back to the islands. This supports the claim that people residing and working in Hawaii have greater personal fulfillment than those on the mainland. This reinforces, importance of following alumni beyond the 10 years post graduation that the US Census data provides. It also allows for a better understanding of how alumni from the local institution fare in the local industries that has not been observed before.

Future work in this area includes having a larger and more representative sample of the alumni throughout the entire UH system to allow for more generalizability. This may include a

more united UH system initiative to connect with alumni and current students of various disciplines, degrees, campuses and career stages to get a more holistic picture of how alumni fare in the local industry. By creating a more united UH system initiative to survey alumni on their progress through their careers it allows for a greater understanding by discipline, and allows for further aggregation of data. Along with surveying more current students, it allows for a more complete understanding of how current students perceive their futures post graduation. Specifically, surveying all the degrees, campuses, and disciplines with respect to the completion rates by each respective category, would allow for more generalizable conclusions. Other work includes further analysis of purchasing power of alumni salaries in different states and understanding of how alumni fare in different states/regions.

This study as described in the discussion has several limitations due to the responses received and therefore, cannot be generalized to all current students or alumni of the UH system. But it allows for insight into how UH system alumni currently fare in the industry and needs further research. Thus, although these findings are based on data, it is with caution to overly generalize the findings due to the bias in the data sample as discussed in the discussion section. Thus future research includes gathering data at a larger scale with more diverse data for broader implications of findings.

Overall, this study brings insight into whether UH students and UH alumni seek to remain or come back to the island post-graduation. Thus, it is important to acknowledge the significance of local companies hiring local graduates, as they feel more fulfilled working for the local economy. This also highlights an unexplored area at UH of the importance of keeping in touch with alumni to understand the long term success of the education given to students.

Conclusion:

Based on this study, although the data is biased towards the discipline of Natural and Applied Sciences, it is able to provide insight into how Alumni fare in Hawaii's industry as well as the trends of Alumni. It can be observed that alumni have more personal fulfillment by working for Hawaii offices, despite the wages being lower. Along with the student perception being interested in staying in the islands. When comparing the data collected to the United States Census Bureau data it can be observed that there are some similarities and some differences. This study provides insight into the long-term success of graduates as well as the perception of how those who graduate desire to stay in the islands. Although Hawaii salaries are lower, it can be noted that individuals gain more personal fulfillment. This continues to empower the statement that "it is not about where you go, but what you make out of it for your personal fulfillment."

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Appendix

Survey Questions:

a) Nationality at the time of graduation
b) Choose one or more race
c) Are you a Hawaii High School graduate?
d) If you are a graduate from a Hawaii High School, please provide the name of your school: (short answer)
e) Are you a Current Student or an Alumni?
    i) Current Student:

1) What was the first degree/certificate you earned from the University of Hawaii System? (Eg: Bachelor of Science Biology,

   Bachelor of Arts History,

   Master of Arts Anthropology,

   Master of Science Astronomy,

   PhD Computer Science

   Or for multiple degrees obtained at the same time:

   Bachelor of Science Biology, Honors, Certificate in Japanese)
2) Which campus are/were you attending?
3) Anticipated salary at your first job (eg, $50,000):
4) In which currency did you report your salary above?
5) If another currency, please specify in the other field.
6) If you prefer not to report an exact amount, please indicate the range of your salary for your first job:
7) What industry do you want/expect to work in?
8) What job title do you expect to get into? (eg, Software Engineer, Counselor, Pediatrician, Sales Associate, Interior Designer)
9) Do you hope to stay in Hawaii post graduation?

ii) Alumni

1) Did you graduate at different times from the University of Hawaii System?
   (a) One Time

(i) What was the first degree/certificate you earned from the University of Hawaii System? (Eg: Bachelor of Science Biology,

Bachelor of Arts History,

Master of Arts Anthropology,

Master of Science Astronomy,

PhD Computer Science

Or for multiple degrees obtained at the same time:

Bachelor of Science Biology, Honors, Certificate in Japanese)

(ii) What year did you graduate?

(iii) Which campus did you graduate from?

(iv) Job title at your first job:

(v) Annual salary at your first job (eg, $50,000):

(vi) In which currency did you report your salary above?

If another currency, please specify in the other field.

(vii) If you prefer not to report an exact amount, please indicate the range of your salary at your first job:

(viii) What year did you begin your first job?

(ix) What was your employment status at your first job?

(x) Did you live in Hawaii while employed at this job?

If not in Hawaii, in what city did you live? (eg, San Francisco)

(xi) Does the company have offices here in Hawaii?

(xii) Was your work remote or in person?

(xiii) Was this job related to your degree(s) obtained?

(xiv) What industry did you work in?

(xv) Are you currently employed at this job at the same salary?

(1) Yes, I'm at the same job getting the same salary

a. What companies have you worked for?

b. Please list the names of the companies (eg, Hawaiian Telcom, Amazon)

(2) No

What is/was your most recent salary:

Please provide either the exact amount or select a range

a. Job title at your current/most recent job:

b. Annual salary at your current/most recent job (eg, $50,000):

c. In which currency did you report your salary above?

If another currency, please specify in the other field.

d. If you prefer not to report an exact amount, please indicate the range of your salary at your current/most recent job:

e. Is the salary reported above current or from your most recent job? If from your most recent job, please indicate the year of employment:

f. Employment status at your current/most recent job?

g. During this period were/are you living in Hawaii?

   If not in Hawaii, in what city did you live? (eg, San Francisco)

h. Does the company have offices here in Hawaii?

i. Was/Is this remote or in person work?

j. Is your current or most recent employment related to your degree(s) obtained?

k. What industry do/did you work in?

l. What companies have you worked for?

   Please list the names of the companies (eg, Hawaiian Telcom, Amazon)

m. Do you consent to your company name(s) being included in the survey findings?

(xvi) Do you agree with the statement

"My education helped me achieve my goals"

Salary Data from US Census Bureau (2023)

Table I: Salary Expectations Post Graduation Reported By Institutional Program based on the 50-percentile for Associate Degrees

Source: United States Census Bureau PostSecondary Enrollment Options, 2023

Years post-graduation	Instructional Program	Salary
1 year	Liberal Arts and Sciences	$ 25,715
	Health Professions and Related Programs	$ 54,368
	Business, Management, Marketing and Related Support Services	$ 30,351
	Mechanic and Repair Technologies/ Technicians	$ 32,176
	Culinary, Entertainment and Personal Services	$ 27,681
	Education	$ 26,089
	Engineering/ Engineering-Related Technologies	$ 36,575
	Homeland Security, Law Enforcement, Fire-Fighting and Related Protective Services	$ 33,081
	Computer and Information Sciences and Support Services	$ 31,864
	Multi/Interdisciplinary Studies	$ 28,554
	Construction Trades	$ 33,376
	Communications Technologies/ Technicians	$ 29,485
	Legal Professions and Studies	$ 41,130
	Public Administrations and Social	$ 31,422

	Service Protections	
	Precision Production	$ 27,408
	Visual and Performing Arts	$ 25,202
	Area, Ethnic, Cultural, Gender and Group Studies	$ 38,141
	Agricultural/ Animal/ Plant/ Veterinary Sciences	$ 28,984
	Family and Consumer Sciences/ Human Services	$ 22,784
5 year	Liberal Arts and Sciences	$ 38,437
	Health Professions and Related Programs	$ 81,328
	Business, Management, Marketing and Related Support Services	$ 40,190
	Mechanic and Repair Technologies/ Technicians	$ 45,053
	Culinary, Entertainment, and Personal Services	$ 45,651
	Education	$ 36,557
	Engineering/ Engineering-Related Technologies	$ 49,646
	Homeland Security, Law Enforcement, Fire-Fighting and Related Protective Services	$ 45,443
	Computer and Information Sciences and Support Services	$ 49,305
	Multi/Interdisciplinary Studies	$ 59,861
	Construction Trades	$ 46,606
	Communications Technologies/ Technicians	$ 32, 856
	Legal Professions and Studies	$ 49,711

	Public Administrations and Social Service Protections	$ 38,431
	Precision Production	$ 48,167
	Visual and Performing Arts	$ 33,981
	Area, Ethnic, Cultural, Gender and Group Studies	$ 33,141
	Agricultural/ Animal/ Plant/ Veterinary Sciences	$ 39,538
	Family and Consumer Sciences/ Human Services	$ 31,384
10 year	Liberal Arts and Sciences	$ 49,293
	Health Professions and Related Programs	$ 95,375
	Business, Management, Marketing and Related Support Services	$ 46,433
	Mechanics and Repair Technologies/ Technicians	$ 60,220
	Culinary, Entertainment and Personal Services	$ 45,651
	Education	$ 40,519
	Engineering/ Engineering-Related Technologies	$ 60,345
	Homeland Security, Law Enforcement, Fire-Fighting and Related Protective Services	$ 65,626
	Computer and Information Sciences and Support Services	$ 54,211
	Multi/Interdisciplinary Studies	NaN
	Construction Trades	$ 53,454
	Communications Technologies/ Technicians	$ 41,182

	Legal Professions and Studies	$ 60,636
	Public Administrations and Social Service Protections	$ 39,890
	Precision Production	$ 61,864
	Visual and Performing Arts	NaN
	Area, Ethnic, Cultural, Gender and Group Studies	NaN
	Agricultural/ Animal/ Plant/ Veterinary Sciences	NaN
	Family and Consumer Sciences/ Human Services	NaN

Table II: Salary Expectations Post Graduation Reported By Institutional Program based on the 50-percentile for Bachelor Degrees

Source: United States Census Bureau PostSecondary Enrollment Options, 2023

Years post-graduation	Instructional Program	Salary
1 year	Business, Management, Marketing and Related Support Services	$ 37,541
	Social Sciences	$ 30,130
	Health Professions and Related Programs	$ 63, 044
	Education	$ 61,591
	Psychology	$ 27,093
	Engineering	$ 55,836

	Communication, Journalism and Related Programs	$ 30,674
	Biological and Biomedical Sciences	$ 26,966
	Family and Consumer Services/ Human Services	$ 28, 698
	Visual and Performing Arts	$ 24,773
	Foreign Language and Literature	$ 27,771
	Public Administration and Social Service Professions	$ 34,051
	Area, Ethnic, Cultural, Gender and Group Studies	$ 27,828
	Liberal Arts and Sciences, General Studies and Humanities	$ 28,811
	English Language and Literature/ Letters	$ 27,765
	Parks, Recreation, Leisure, Fitness and Kinesiology	$ 26,515
	Computer and Information Sciences and Support Services	$ 42,472
	Muli/Interdisciplinary Studies	$ 34,760
	Agricultural/ Animal/ Plant/ Veterinary Science and Related	$ 28,011
	Physical Sciences	$ 31,939
	History	$ 27,248
	Natural Resource and Conservation	$ 28,397
	Philosophy and Religious Studies	$ 28,578
	Homeland Security, Law Enforcement	$ 30,192
	Communication Technologies/ Technicians	$ 27,689
	Architecture and Related Services	$ 38,141

	Mathematics and Statistics	$ 31,259
5 year	Business, Management, Marketing and Related Support Services	$ 53,387
	Social Sciences	$ 44,545
	Health Professions and Related Programs	$ 95,939
	Education	$ 54,003
	Psychology	$ 44,093
	Engineering	$ 78,752
	Communication, Journalism and Related Programs	$ 45,609
	Biological and Biomedical Sciences	$ 45, 685
	Family and Consumer Services/ Human Services	$ 41,375
	Visual and Performing Arts	$ 37,454
	Foreign Language and Literature	$ 42,201
	Public Administration and Social Service Professions	$ 49,406
	Area, Ethnic, Cultural, Gender and Group Studies	$ 44,276
	Liberal Arts and General Studies and Humanities	$ 44,243
	English Language and Literatures/Letters	$ 42,302
	Parks, Recreation, Leisure, Fitness and Kinesiology	$ 47,921
	Computer and Information Sciences and Support Services	$ 64,367
	Muli/Interdisciplinary Studies	$ 53,964
	Agricultural/ Animal/ Plant/ Veterinary Science and Related	$ 44,478

	Physical Sciences	$ 44,478
	History	$ 44,408
	Natural Resource and Conservation	$ 48,309
	Philosophy and Religious Studies	$ 38,757
	Homeland Security, Law Enforcement	$ 47,889
	Communication Technologies/ Technicians	$ 37,958
	Architecture and Related Services	$ 62,145
	Mathematics and Statistics	$ 62,712
10 year	Business, Management, Marketing and Related Support Services	$ 68, 362
	Social Sciences	$ 59,761
	Health Professions and Related Programs	$ 94,626
	Education	$ 49,117
	Psychology	$ 56,840
	Engineering	$ 94,271
	Communication, Journalism and Related Programs	$ 58,089
	Biological and Biomedical Sciences	$ 65,481
	Family and Consumer Sciences/ Human Sciences	$ 57,384
	Visual and Performing Arts	$ 49,236
	Foreign Language, Literatures and Linguistics	$ 56,048
	Public Administration and Social Service Professions	$ 59,873
	Area, Ethnic, Cultural, Gender and Group Studies	$ 60,239

	Liberal Arts and Sciences and General Studies	$ 55,597
	English Language and Literature/Letters	$ 56,402
	Parks, Recreation, Leisure, Fitness, and Kinesiology	$ 68,271
	Computer and Information Sciences and Support Services	$ 82,633
	Muli/Interdisciplinary Studies	$ 56,958
	Agricultural/ Animal/ Plant/ Veterinary Science and Related	$ 59,997
	Physical Sciences	$ 69,027
	History	$ 59,161
	Natural Resource and Conservation	$ 58,241
	Philosophy and Religious Studies	$ 59,105
	Homeland Security, Law Enforcement	$ 53,036
	Communication Technologies/ Technicians	NaN
	Architecture and Related Services	NaN
	Mathematics and Statistics	$ 64,712

Table III: Salary Expectations Post Graduation Reported By Institutional Program based on the 50-percentile for Masters Degrees

Sources: United States Census Bureau PostSecondary Enrollment Options, 2023

Years post-graduation	Instructional Program	Salary
1 year	Library Sciences	$ 44,387
	Biological and Biomedical Sciences	$ 36,166

	Psychology	$ 36,834
	Physical Sciences	$ 36,576
	Foreign Languages, Literatures, and Linguistics	$ 37,719
	Social Sciences	$ 33,367
	Education	$ 58,568
	Business, Management, Marketing and Related Support Services	$ 60,036
	Public Administration and Social Services	$ 49,551
	Health professions and Related Programs	$ 71,395
	Engineering	$ 60,995
	Visual and Performing Arts	$ 33,320
	Parks, Recreation, Leisure, Fitness and Kinesiology	$ 48,084
	Area, Ethnic, Cultural, Gender and Group Studies	$ 39,664
	Natural Resources and Conservation	$ 42,325
	English Language and Literature/ Letters	$ 52,178
	Architecture and Related Services	$ 54,304
	Communication, Journalism and Related Programs	$ 41,359
	Agricultural/Animal/Plant/ Veterinary Science and Related Fields	$ 39,890
	Computer and Information Services and Support Services	$ 65,302
	Philosophy and Religious Studies	$ 32,293

	Mathematics and Statistics	$ 38,528
5 year	Library Sciences	$ 54,077
	Biological and Biomedical Sciences	$ 57,492
	Psychology	$ 54, 181
	Physical Sciences	$ 62,171
	Foreign Languages, Literatures, and Linguistics	$ 59,149
	Social Sciences	$ 53,166
	Education	$ 65,063
	Business, Management, Marketing and Related Support Services	$ 80,933
	Public Administration and Social Services	$ 59,333
	Health professions and Related Programs	$ 92,555
	Engineering	$ 80,583
	Visual and Performing Arts	$ 44,763
	Parks, Recreation, Leisure, Fitness and Kinesiology	$ 60,783
	Area, Ethnic, Cultural, Gender and Group Studies	$ 54,765
	Natural Resources and Conservation	$ 57,732
	English Language and Literature/ Letters	$ 52,178
	Architecture and Related Services	$ 61,175
	Communication, Journalism and Related Programs	$ 56,686
	Agricultural/Animal/Plant/	$ 55,597

	Veterinary Science and Related Fields	
	Computer and Information Services and Support Services	$ 71,780
	Philosophy and Religious Studies	$ 33,081
	Mathematics and Statistics	$ 38,528
10 year	Library Sciences	$ 66, 256
	Biological and Biomedical Sciences	$ 70,446
	Psychology	$ 65,841
	Physical Sciences	$ 92,092
	Foreign Languages, Literatures, and Linguistics	$ 66,922
	Social Sciences	$ 69, 890
	Education	$ 75,346
	Business, Management, Marketing and Related Support Services	$ 100,893
	Public Administration and Social Services	$ 67,914
	Health professions and Related Programs	$ 90,779
	Engineering	$ 98,978
	Visual and Performing Arts	$ 60,329
	Parks, Recreation, Leisure, Fitness and Kinesiology	$ 68,271
	Area, Ethnic, Cultural, Gender and Group Studies	$ 63,091
	Natural Resources and Conservation	$ 71,420
	English Language and Literature/	$ 67,461

	Letters	
	Architecture and Related Services	$ 76,849
	Communication, Journalism and Related Programs	$ 83,974
	Agricultural/Animal/Plant/ Veterinary Science and Related Fields	$ 79,022
	Computer and Information Services and Support Services	$ 115,772
	Philosophy and Religious Studies	$ 49,711
	Mathematics and Statistics	NaN

Cost of Living Index

Table IV: 2023 Annual Average Cost of Living
Adopted from the Council for Community and Economic Research
Source: Missouri Economic Research and Information Center

Rank	State	Index	Grocery	Housing	Utilities	Transportation	Health	Misc
1	Oklahoma	86.2	94.4	68.5	98.2	92.6	92.6	91.3
2	Mississippi	86.3	97.2	70.9	86.0	87.7	98.4	92.5
3	Kansas	87.1	97.2	67.4	106.6	90.1	96.9	91.8
4	West Virginia	87.7	98.4	66.9	95.7	94.0	96.6	95.0

5	Alabama	88.3	96.1	70.0	102.4	90.8	87.0	95.8
6	Missouri	88.5	95.3	77.0	98.6	90.9	89.9	91.5
7	Arkansas	89.0	95.3	74.6	91.6	89.6	87.5	97.7
8	Tennessee	90.3	97.7	82.4	92.6	88.7	88.1	93.9
9	Iowa	90.3	96.6	74.1	95.5	98.6	99.4	95.9
10	Michigan	90.6	98.8	77.1	101.1	96.7	93.3	93.1
11	Georgia	90.8	98.1	78.2	85.5	93.5	100.3	97.3
12	Nebraska	90.9	95.8	78.6	85.7	100.0	97.9	96.4
13	Louisiana	91.0	95.0	81.6	84.0	95.8	98.7	96.5
14	Indiana	91.0	98.5	75.8	106.7	95.4	96.4	94.4
15	Kentucky	92.0	101.3	73.7	104.4	92.0	83.7	101.3
16	Illinois	92.1	98.0	79.8	88.6	103.0	95.0	96.8
17	South Dakota	92.4	97.0	87.1	87.5	97.4	97.9	93.7
18	Wyoming	92.4	102.3	80.0	87.6	94.4	100.1	98.0
19	Texas	92.7	95.7	83.1	104.0	91.8	93.9	96.4
20	New Mexico	94.0	96.4	87.3	93.1	94.7	99.3	97.9
21	Minnesota	94.1	98.2	82.1	93.4	97.2	109.2	99.5
22	North Dakota	94.6	94.2	83.4	99.2	99.3	111.2	99.2
23	Ohio	94.7	101.4	81.2	99.2	100.4	97.9	99.5
24	Wisconsin	95.1	99.2	84.7	102.2	97.9	112.3	96.9
25	South Carolina	95.3	99.2	86.5	106.5	90.8	94.5	99.5
26	North Carolina	95.3	98.1	90.2	94.5	91.8	108.1	97.9
27	Pennsylvania	95.6	99.5	81.9	107.3	105.6	94.3	99.3
28	Idaho	98.6	101.0	96.0	85.7	105.2	98.9	101.0
29	Florida	100.7	99.5	106.3	97.3	99.3	96.5	98.4

30	Nevada	101.0	102.9	107.4	99.1	116.6	91.7	91.6
31	Delaware	101.1	102.0	97.0	97.9	102.1	103.2	104.5
32	Virginia	101.9	100.6	105.7	104.3	94.8	102.2	101.0
33	Montana	102.9	102.5	103.8	92.8	109.0	97.7	103.8
34	Utah	103.2	99.3	110.7	94.9	105.1	91.0	101.9
35	Colorado	105.1	101.4	113.6	91.3	105.2	100.4	103.8
36	Arizona	108.4	102.2	124.1	95.3	106.1	93.8	104.1
37	Maine	109.9	101.8	117.4	106.7	109.0	102.9	109.3
38	Rhode Island	110.7	101.7	116.8	112.4	92.5	107.7	115.3
39	Connecticut	112.8	101.7	122.6	130.4	100.4	108.7	109.5
40	New Jersey	113.9	102.6	135.8	108.3	104.7	99.3	107.1
41	New Hampshire	114.1	102.0	109.5	131.0	109.9	113.2	120.2
42	Oregon	114.7	108.8	136.3	95.9	116.6	105.3	104.9
43	Vermont	115.3	104.8	133.1	120.8	106.9	106.0	107.5
44	Washington	116.0	109.8	128.7	92.1	123.3	120.4	111.3
45	Maryland	116.5	106.4	146.4	110.7	98.3	97.4	105.9
46	Alaska	125.2	123.5	122.5	157.9	115.3	148.1	119.7
47	New York	125.9	103.2	176.0	103.1	106.0	106.4	108.8
48	California	138.5	112.0	198.8	126.8	125.6	108.5	110.8
49	Massachusetts	146.5	105.3	218.5	133.9	117.5	112.9	121.6
50	District of Columbia	146.8	105.4	237.7	110.6	105.5	110.0	116.6
51	Hawaii	180.3	116.7	313.1	151.3	135.0	123.1	126.8
USA	***	100.0	100.0	100.0	100.0	100.0	100.0	100.0