2012 Summer Engineering Experiences (SEE) Evaluation Summary
Pre-Engineering Education Collaborative (PEEC) / Indigenous Knowledge in Engineering (‘IKE)

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EXECUTIVE SUMMARY

At three Summer Engineering Experiences (SEE) programs, Native Hawaiian student cohorts were implemented at Kapi’olani Community College (KCC; SEE1), University of Hawai‘i Maui College (UHMC; SEE2), and the University of Hawai‘i at Mānoa (UHM; SEE3) as stipulated by the NSF-funded Pre-Engineering Education Collaborative Grant. SEE1 and SEE2 used the Hawai‘i Math Emporium Model (HMEM) to incorporate a community of practice through math learning. All three programs extensively used hands-on engineering experiences to engage students in engineering course paths.

Participation

The following is a general summary of the SEE participation.

<table>
<thead>
<tr>
<th>SEE Participation</th>
<th>SEE1</th>
<th>SEE2</th>
<th>SEE3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Total</td>
<td>Female</td>
</tr>
<tr>
<td>Summer 2011</td>
<td>6</td>
<td>9</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>Summer 2012</td>
<td>4</td>
<td>17</td>
<td>21</td>
<td>8</td>
</tr>
<tr>
<td>Total (Duplicated)</td>
<td>10</td>
<td>26</td>
<td>36</td>
<td>11</td>
</tr>
</tbody>
</table>

Data collection for SEE1, SEE2, and SEE3 included a Likert Scale paper-based survey and student focus groups. Select questions were given to all three SEE programs, while a number of questions were program specific.

SEE1: Students generally were satisfied to very satisfied (90%) with their SEE1 experience. Students noted that SEE1 gave them the opportunity for a head start in their college coursework and a taste of college academics. Students felt they had hands-on experience through guitar building, however felt that more engineering and physics connection be included by introducing the poster project earlier in the program. Students felt that their huaka‘i gave them a good link between engineering, Native Hawaiian culture, and the modern world. However, students felt there was not enough time on the huaka‘i because of the long bus rides.

SEE2: While 82% of students in SEE2 were satisfied to very satisfied of their overall SEE2 experience, students voiced concerns about several aspects of the program: 1) Student expected math lectures to be incorporated into their math course especially when taking calculus courses, 2) incorporating more Native Hawaiian cultural huaka‘i, 3) providing students with a hands-on engineering project that provides them with a basic engineering background, and 4) more interaction between SEE2 students, faculty, staff, peer mentors. Students also mentioned that the experience of living on Maui taught them personal independence.

SEE3: 83% of students in SEE3 felt that their academic support during SEE3 in upper-lever mathematics courses was good to very good. Since they were in the same math course as other SEE3 students and were provided tutors, students felt they performed better than those not participating in SEE3. However, due to unforeseen circumstances, students felt that they did not get the hands-on engineering experience during SEE3. Students also felt frustrated that the program was not more organized with the lack of communication between students and peer mentors. Students enjoyed the huaka‘i visiting various Native Hawaiian landmarks on O‘ahu.

Math Outcomes

SEE1 and SEE2 implemented the HMEM during their respective summer programs. SEE3 students were enrolled in traditional math courses at UH Mānoa. Please refer to the following table for outcomes.

<table>
<thead>
<tr>
<th>SEE Overall Math Outcomes/Passing Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEE1</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>Summer 2011</td>
</tr>
<tr>
<td>Summer 2012</td>
</tr>
</tbody>
</table>
Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXECUTIVE SUMMARY</td>
<td>i</td>
</tr>
<tr>
<td>1. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>1.1 Background</td>
<td>1</td>
</tr>
<tr>
<td>1.2 Report Organization</td>
<td>1</td>
</tr>
<tr>
<td>2. Overall Participant Information</td>
<td>2</td>
</tr>
<tr>
<td>3. Math Course Outcomes</td>
<td>3</td>
</tr>
<tr>
<td>4. Data Collection Method</td>
<td>3</td>
</tr>
<tr>
<td>5. SEE1</td>
<td>3</td>
</tr>
<tr>
<td>5.1 SEE1 Evaluation Summary</td>
<td>3</td>
</tr>
<tr>
<td>5.2 Paper-based survey results</td>
<td>8</td>
</tr>
<tr>
<td>5.2.1 Math Emporium</td>
<td>8</td>
</tr>
<tr>
<td>5.2.2 Engineering Project(s)</td>
<td>9</td>
</tr>
<tr>
<td>5.2.3 Huaka’i</td>
<td>10</td>
</tr>
<tr>
<td>5.2.4 Overall</td>
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<tr>
<td>5.3 Huaka’i Feedback Raw Data – collected by Aurora Kagawa</td>
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</tr>
<tr>
<td>6. SEE2</td>
<td>17</td>
</tr>
<tr>
<td>6.1 SEE2 Evaluation Summary</td>
<td>17</td>
</tr>
<tr>
<td>6.2 Paper-Based Survey Results</td>
<td>23</td>
</tr>
<tr>
<td>6.2.1 Math Emporium</td>
<td>23</td>
</tr>
<tr>
<td>6.2.2 Engineering Project(s)</td>
<td>24</td>
</tr>
<tr>
<td>6.2.3 Huaka’i</td>
<td>25</td>
</tr>
<tr>
<td>6.2.4 Overall</td>
<td>25</td>
</tr>
<tr>
<td>7. SEE3</td>
<td>27</td>
</tr>
<tr>
<td>7.1 SEE3 Evaluation Summary</td>
<td>27</td>
</tr>
<tr>
<td>7.2 Paper-Based Survey Results</td>
<td>32</td>
</tr>
<tr>
<td>7.2.1 Math</td>
<td>32</td>
</tr>
<tr>
<td>7.2.2 Engineering Project(s)</td>
<td>33</td>
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<tr>
<td>7.2.3 Overall</td>
<td>34</td>
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</table>
1. INTRODUCTION

1.1 Background

Three Summer Engineering Experiences (SEE) were held at Kapi‘olani Community College (KCC; SEE1), University of Hawai‘i at Maui College (UHMC; SEE2), and University of Hawai‘i at Mānoa (UHM, SEE3) in summer 2012. The KCC SEE1 program was held from June 18th to July 27th, 2012 (six weeks). The Maui College SEE2 program was held from May 21st to June 29th, 2012 (six weeks). The UHM SEE3 program was held from June 4th to August 10th, 2012 (ten weeks).

During the SEE programs, students completed intensive math courses through either the Hawai‘i Math Emporium Model (HMEM) or through traditional math courses. Students participated in hands-on engineering experiences through various field trips and activities. At KCC’s SEE1, students built electric guitars by incorporating engineering, various physics concepts, and hands-on work. At UHMC’s SEE2, students had hands on experience with electronics and robotics. UHM’s SEE3 students were involved in projects focused on renewable energy, aquaponics, and engineering design processes.

1.2 Report Organization

This report is organized by creating separate sections for each SEE. An overview of the overall participant information and quantitative math emporium results will be summarized in Section 2 and 3, respectively. The remainder of the report will be separated by each SEE program to facilitate reporting to the audience. The results of the paper-based survey are also included graphically at the end of each SEE section.

2. Overall Participant Information

The following tables summarize SEE participation in summer 2011 and 2012.

**Table 1. SEE1 Participation**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Students</th>
<th>Male</th>
<th>Female</th>
<th>HON</th>
<th>KAP</th>
<th>LEE</th>
<th>MAUI</th>
<th>WIN</th>
<th>MAN</th>
<th>Other</th>
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<tbody>
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<td>9</td>
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<td>-</td>
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<tr>
<td>Recruitment Campus</td>
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<td>14</td>
<td>0</td>
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<td>1</td>
<td>-</td>
<td>-</td>
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<td></td>
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<tr>
<td>Enrollment Campus</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summer 2012</td>
<td>21</td>
<td>17</td>
<td>4</td>
<td>1</td>
<td>17</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Recruitment Campus</td>
<td>1</td>
<td>17</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>-</td>
<td>-</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Enrollment Campus</td>
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<td>10</td>
<td>1</td>
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</tbody>
</table>

**Table 2. SEE2 Participation**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Students</th>
<th>Male</th>
<th>Female</th>
<th>HON</th>
<th>KAP</th>
<th>LEE</th>
<th>MAN</th>
<th>MAUI</th>
<th>WIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer 2011</td>
<td>13</td>
<td>10</td>
<td>3</td>
<td>0</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Summer 2012</td>
<td>24</td>
<td>16</td>
<td>8</td>
<td>1</td>
<td>6</td>
<td>5</td>
<td>8</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

**Table 3. SEE3 Participation**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Students</th>
<th>Male</th>
<th>Female</th>
<th>HON</th>
<th>KAP</th>
<th>LEE</th>
<th>MAN</th>
<th>MAUI</th>
<th>WIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer 2011</td>
<td>20</td>
<td>18</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>13</td>
<td>0</td>
<td>2</td>
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<tr>
<td>Summer 2012</td>
<td>19</td>
<td>15</td>
<td>4</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>9</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

The following table summarizes the overall SEE participation goal as determined in the PEEC grant. The table also summarizes the movement and cohesion of cohorts between the SEE programs.
Table 4. Overall SEE Participation

<table>
<thead>
<tr>
<th></th>
<th>SEE1 (KCC)</th>
<th>SEE2 (UHMC)</th>
<th>SEE3 (UHMCOE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Original portion of the Cohort</td>
<td>Original portion of the Cohort</td>
<td>Complemented portion of the cohort</td>
</tr>
<tr>
<td>Summer 2011</td>
<td>15</td>
<td>13</td>
<td>20</td>
</tr>
<tr>
<td>Summer 2012</td>
<td>21</td>
<td>2*</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>37</td>
<td>39</td>
</tr>
<tr>
<td>Goal</td>
<td>142</td>
<td>170</td>
<td>155</td>
</tr>
<tr>
<td>% of Goal</td>
<td>25.4%</td>
<td>21.7%</td>
<td>25.2%</td>
</tr>
</tbody>
</table>

*One student from 2012 SEE2 was a returning student from the 2011 SEE3.

3. Math Course Outcomes

SEE1 and SEE2 students participated in their math courses through math emporiums. SEE3 students were enrolled in traditional math courses. Please refer to the following tables for outcomes.

Table 5. Overall SEE Math Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Summer 2012</th>
<th>2011 SEE Passing Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Passed</td>
<td>Not Passed</td>
</tr>
<tr>
<td>TOTAL</td>
<td>56</td>
<td>7</td>
</tr>
<tr>
<td>SEE1 (1)</td>
<td>17</td>
<td>3</td>
</tr>
<tr>
<td>SEE2</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td>SEE3</td>
<td>18</td>
<td>1</td>
</tr>
</tbody>
</table>

(1) – Some students in SEE1 were not registered in math course during the summer and are reflected as taken “ALEKS.”

Table 6. Math Outcomes by SEE and Math Course

<table>
<thead>
<tr>
<th>SEE</th>
<th>Course</th>
<th>Summer 2012</th>
<th>2011 SEE Passing Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. Students Enrolled</td>
<td>No. Students Passed</td>
<td>Passing Rate</td>
</tr>
<tr>
<td>SEE1</td>
<td>Pre-Calculus (Math 135)</td>
<td>13</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Pre-Calculus (Math 140)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Calculus 1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Calculus 2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Calculus 3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>ALEKS(1)</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Calculus 1</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Calculus 2</td>
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<td></td>
<td>Calculus 3</td>
<td>11</td>
<td>11</td>
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<tr>
<td></td>
<td>Calculus 4</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Differential Equations (Math 302)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Linear Algebra (Math 307)</td>
<td>7</td>
<td>6</td>
</tr>
</tbody>
</table>

(1) – Some students in SEE1 were not registered in math course during the summer and are reflected as taken “ALEKS” and are not counted toward success rates.
4. Data Collection Method

Student feedback and evaluation method for the Summer Engineering Experiences (SEEs) included a Likert Scale paper-based survey and student focus group sessions. The paper-based survey was administered to the students immediately before their focus group sessions. Select questions were given to all three SEE programs, while a number of questions were program specific. SEE1, SEE2, and SEE3 focus group session questions were approved for use by the University of Hawai‘i Institutional Review Board (CHS#19443 and #19468).

5. SEE1

5.1 SEE1 Evaluation Summary

Three focus group sessions were held near the culmination of the SEE1 program. All focus groups were held at the KCC STEM Center (Kokio 202). The sessions were held from 1PM – 2PM or 2:30PM – 3:30PM on Monday, July 23rd and 1PM – 2PM Tuesday, July 24th, 2012. Twenty (20) students participated in the focus groups (91% student participation).

Focus Group Guidelines: A total of 14 questions were developed for the SEE1 focus groups. The first two questions gained insight into why students decided to participate in SEE1. Questions 3 through 9 are program specific questions. Questions 10 through 14 asked about benefits and overall experiences with SEE1.

Paper-Based Survey Guidelines: A 27-question Likert Scale survey was developed for SEE1. Questions 1 through 6 asked about the math emporium experience. Questions 7 through 12 asked about the engineering projects. Questions 13 through 15 asked about the huaka‘i experiences. Questions 16 through 24 asked overall questions about student experiences in SEE1. Questions 25 through 27 were open-ended questions documenting students likes, dislikes, and suggested improvements.

In this summary, the italicized bold text states the original focus group questions. The narrative (in normal font) describes the focus groups including, but not limited to moderator theme analysis and interpretation, student quotes, and student interactions. Quantitative results from the paper-based survey are also incorporated where appropriate within the summary. Percentages presented refer to results from the paper-based survey. The full results of the paper-based survey can be found in Section 4.2.

INTRODUCTORY FOCUS GROUP QUESTIONS:

How did you first learn about the ‘IKE Summer program?

Many students learned about ‘IKE through their high school teachers or counselors. Several students said representatives from KCC STEM made a presentation at their high school. Students also said they learned about this program through their own personal contacts (parents, friends, previous participants, and siblings).

What was the main reason you decided to sign up for the summer ‘IKE Program?

• Students generally said they applied for SEE1 to:
  o Earn free math credits; Get a head start with math courses
  o Prepare for the transition into college
    ▪ “I was just happy to be in something to gear me up for college.”
  o Gain a better understanding and experience in engineering
  o Have a chance to build a guitar
    ▪ “[We] get to make a guitar, do some math and have credits for college, so it was really good incentive.”
**PROGRAM SPECIFIC QUESTIONS:**

*How did you feel about your mathematics emporium experience?*

- **Overall:** 85% of students surveyed are satisfied to very satisfied of their overall math experience.
- **Collaboration:**
  - Students generally indicated the benefits of being able to work with other students during their math emporium. One student “found it useful because your friend, who is also in the same class might be better at a specific part of that section… and they can help you with that.” 90% of students said collaboration with other students either moderately enhanced or was one of the best parts of their math emporium experience.
  - However, one comment was made that sometimes student collaboration can be distracting, especially at the end of the emporium session.
- **Independent Learning:** Students indicated that they had freedom during their math emporium. Most of the students were generally positive about the amount of independence that the math emporium gave them and said it produced less stress since they were not subjected to hard deadlines and being “on the teacher’s time.” One student mentioned that “It [the individualized learning] is good practice for the transition [to college].”
- **Lecture:**
  - Students from two of the three focus groups said that they prefer emporium over formal lectures. However, students stressed that the additional help from peer mentors and instructors is needed if lectures are not provided.
    - “With a lecture you can’t stop him when you don’t get it, but if there’s peer mentors you can ask them what you need.”
  - Students from one focus group generally thought that the math would have been better if they had some lecture.
    - “I think what would’ve been better is once a week, he [the instructor] would go to each section and basically talk to them about what they’re on… just so everyone’s on the same page.”
- **Taking another emporium style course?**
  - Two of the focus groups generally indicated that they would take another emporium based course. Students emphasized that additional help from peer mentors and instructors is critical.
    - “If it was just by myself, I wouldn’t take it.”
    - “Yes [student would take another emporium-based course], as long as we have the help there when we need it.”
  - One focus group said they probably wouldn’t take another emporium-based math course.
    - “I don’t know if it would be for math… I’d rather have someone lecturing and showing me problems.”

*How can the mathematics emporium be improved?*

- Additional instructors.
  - “I think that I would bring in multiple professors for more individualized academic support. That way one professor can easily help each of the different math levels.”
- Break up the three hours of math into smaller sessions.
  - “Three hours of math is pretty intensive.”
- Have the math be more structured by incorporating some lectures.
  - “It would be more helpful if the teacher lectured and showed the lesson on a board, rather than us figuring out the work for ourselves.”

**Please describe the peer mentoring experience. Was the mentoring useful or helpful? Why or why not?**

- 79% of students said that during the math emporium the level of academic support they got from peer mentors was good to very good.
- Students generally said peer mentors constantly walked around the math emporium providing the students help when needed. A student said, “There was a lot of peer mentors going around all the time.”
• Students mentioned that peer mentors were usually helpful. Sometimes, if the mentor couldn’t answer some questions, students could then ask the instructors.

• Many students said that the peer mentors were friendly. However, one student mentioned on the paper-based survey, “Some of the peer mentors would not interact with everyone, only certain individuals.”

• 90% of the students thought that the level of support from peer mentors during the guitar building was good to very good.

How do you think the mentoring could be improved?
• Several students said additional peer mentors would be helpful.
• Mentors interact with all students, not just certain individuals.

How do you feel about the level of academic support you received (i.e. tutoring, study sessions, etc.)?
• Along with having the peer mentor and instructors available during class time, students said that instructor would go to Starbucks after some classes and inform students that he is available to them for help.
• Instructor also provided that students with additional online resources that they can refer to (Khan Academy, Wolfram Alpha).

How do you think these can be improved?
• Students generally indicated that they had enough academic support available to them during the program (during class and after class).

Please describe your experience with your hands-on engineering activity.
• Overall: 90% of the students said that they were satisfied to very satisfied with the guitar building project.
• Pace: Generally, students said the pace of the project was up to each individual and depended on how creative students were with the design of their guitar. Some students finished about a week before others.
• Level of difficulty: 100% of students felt that the difficulty of guitar building was “just right.” Students indicated that the project was time consuming rather than difficult. The difficulty also depended on the guitar design chosen.
• Instructor: 90% of students felt they received good to very good support from the faculty instructor during guitar building. Students felt that the instructor was knowledgeable and helped guide them through the guitar building process.
  o “[The instructor] knows how to simplify things and make it easy to understand.”
  o “He’s an engineer to look up to.”
• Science/Engineering connection:
  o Some students said that the instructor would sometimes have demonstrations to illustrate the physics and science connection to the guitar. However, some students still felt that the physics/engineering and guitar building connection wasn’t made directly clear to the students.
    ▪ “We weren’t really learning much about the physics which I think would help… being able to understand what you’re building and why you’re building... we didn’t really get to.”
    ▪ “We never went into detail about the physics behind it.”
  o Some students indicated an overall understanding of engineering:
    ▪ “Engineering is all about problem solving, knowing that you’re given this with an objective in mind, and here are the tools to do it. The guitar was like a problem we had to solve.”
  o The poster project at the end of the program would show the connection between the guitar and the physics/engineering behind it. However, students felt that the poster projects were “dumped on us last minute” and they did not have enough time to complete the project thoroughly.
• What did students gain from guitar building:
  o Hands-on experience with power tools
    ▪ “For me, it encourages me that I can do something like this [guitar building] because I never thought I could use those machines and all the drills”
  o Better understanding of engineering
Knowledge of how an electric guitar works
Knowledge of basic circuits
Patience; guitar building can’t be rushed and that the process takes time.

How can it [the hands-on engineering activity] be improved? / Are there any other projects [engineering activities] you would like to see added?
Students suggest the following:
- Introduce poster project at the beginning of the program so students have more time to work on posters.
- One suggestion: have students complete guitars five weeks into program and then work solely on poster project during the last week.
- Integrate physics concepts with the progress of building the guitar.
- Suggestions for other projects:
  - Build a computer tower
  - Build go karts and then race them at the end of the program.
  - Projects where students have enough time to understand what they build.

What did you think about the different huaka‘i field trips that you took this summer?
- **Overall**: 75% of students were satisfied or very satisfied with the huaka‘i.
- Generally, students enjoyed Honolulu Community College where they visited the MELE Recording Studio. Students said that a deeper connection was made between their guitar project and the applied science and engineering behind their guitars.
- The huaka‘i students liked the least was H-POWER and the water reclamation facility. Students thought the H-POWER tour was informative and gave them an idea of what engineers do, however they did not like that the facility odor and uncomfortable temperatures. Students also mentioned that they did not have enough time to see enough of the water reclamation facility.
- **Native Hawaiian culture and engineering**: 70% of students felt that the huaka‘i helped them make connections between Native Hawaiian culture and engineering. Students felt that the field trips to the He‘eia Fishpond and sailing canoes with the Kanehunamoku program provided them with significant connection between culture and engineering.
  - About Paepae o He‘eia: “We learned about the fishponds that our ancestors built a long time ago show the engineering power they had back then.”
  - About Kanehunamoku program: “That was very cool that they were able to go from island to island using just the wind and stars.”
- **Engineering in modern day**: 70% of students felt that the huaka‘i helped further understand what the engineering industry is like. Students indicated that they have a better idea of how things work and that they think more about how things work.
  - “Now we can connect things that we learned to the world we see.”
- **Improvements**:
  - More time on field trips. Students felt they spent too much time on buses traveling to various huaka‘i.

Are there other locations you would like to take field trips related to SEE?
- Kahuku Windmills – would tackle renewable energy and environmental engineering.
- Pearl Harbor Naval Shipyard – to find out more about their programs.
- Field trips with more technology and engineering

Guest Speakers?
- Students said a speaker from the College of Engineering spoke to them about the opportunities at UH Mānoa in engineering. Students thought it was interesting because they were introduced to the different fields of engineering. They also said the speaker made them aware of the services available at Mānoa and the prerequisites they need to be engineering majors.
“It made me realize that if I do need anything or questions about engineering at UH, there’s people that can help me.”

- Student’s suggestions for guest speakers:
  - Working industry engineers to hear about what an engineer’s daily life consists of.
  - Speakers from different engineering fields.

**What did you enjoy the most about the program, and why?**

- Note: This question was posed in the paper-based survey. In general, students pointed out the following:
  - Meeting new people and networking with their peers.
  - Taking a free math course and gaining math course credits.
  - Getting a better understanding of engineering.
  - Going on field trips, visiting new places.
  - Building a guitar.

**What did you enjoy the least about the program, and why?**

- Note: This question was posed in the paper-based survey. In general, students pointed out the following:
  - Schedule/Timing
    - Three hour time block for math
    - Not enough time for field trips
  - Math
    - Amount of work in 6 weeks
    - Homework was difficult
    - Lack of lectures from instructor
  - Poster project for guitar was given too late in program.

**PROGRAM BENEFITS/OUTCOMES:**

**What is the difference between high school and this summer bridge program?**

- Students felt that they were not on their teacher’s time/pace. There was less control from the teachers which led to more expectation for students to work independently and manage their time. The students felt they were expected to work on their own and push themselves.
  - “It [summer bridge] woke me up… it showed me that I can’t just slack off.”

**How do you think the program will help you with college and your college coursework?**

- Students said that while this program wasn’t the full college experience, it still gave them a good idea of what to expect in college (i.e. independence, self-reliance, time management).
  - 100% of the students said they felt that through SEE1 they are more prepared for college.
- Students said they were able to gain a head start in math credits.
- Some students have a better idea about majoring in engineering.
  - “I came into this not knowing if I wanted to do engineering, but I think the program sort of encouraged me to look into engineering as a prospective major.”
  - 95% of students have a better understanding of engineering after SEE1.
  - 50% of students said they will definitely pursue engineering as a major while 40% indicated that there is some chance they will pursue engineering as a major.

**What is the most valuable thing you got out of this program?**

- Program served as a personal checkpoint for students. Student can ask themselves: *How can we handle learning on our own? Where am I? Can I organize myself?*
- The opportunity to network with other students going into engineering field.
  - 85% of the students said they will stay in contact with other SEE1 students after the summer.
- The overall experience of getting a taste of college.
- Getting ahead with math credits.
- Hands on experience with engineering.

**CONCLUSION QUESTIONS:**

*Would you recommend the Summer Bridge Program to other students? Why or why not?*

- 90% of students indicated they would recommend SEE1 to other students for the following reasons:
  - Gain free math credits
  - Meet new friends / network with other students in engineering
  - Hands-on experience
  - Gets you interested in what you want to do
    - “For people who are curious about the engineering field… this program is very good for getting that taste of engineering, what it’s like, more hands-on experience.”
  - Learn independence
- 40% of the students said that they would participate in another ‘IKE summer experience.

5.2 Paper-based survey results

5.2.1 Math Emporium

<table>
<thead>
<tr>
<th>1. How satisfied were you by your overall math experience at SEE1?</th>
<th>2. The amount of time spent during the math lectures was:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfied / Very Satisfied 85%</td>
<td>Appropriate 80%</td>
</tr>
<tr>
<td>Neutral 10%</td>
<td>Not Enough 10%</td>
</tr>
<tr>
<td>Very Dissatisfied / Dissatisfied 5%</td>
<td>Too much 10%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. The amount of time spent working on the online assignments was:</th>
<th>4. I feel that the level of academic support I received from the faculty during the math course was:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriate 80%</td>
<td>Good / Very Good 80%</td>
</tr>
<tr>
<td>Too much 20%</td>
<td>Fair 20%</td>
</tr>
<tr>
<td>Not Enough 0%</td>
<td>Poor / Very Poor 0%</td>
</tr>
</tbody>
</table>
5. I feel that the level of academic support I received from the peer mentor(s) during the math course was:

- Poor / Very Poor: 0%
- Fair: 21%
- Good / Very Good: 79%

6. Collaborating with other students during the math course:

- Was one of the worst parts of the experience: 0%
- Was not allowed: 10%
- Was one of the best parts of the experience: 45%
- Moderately enhanced my experience: 45%
- Moderate diverted my attention: 0%

5.2.2 Engineering Project(s)

7. How satisfied were you by your overall guitar building project?

- Very Dissatisfied / Dissatisfied: 5%
- Neutral: 5%
- Satisfied / Very Satisfied: 90%

8. The amount of time spent on the guitar building was:

- Too Much: 5%
- Not enough: 5%
- Appropriate: 90%

9. I feel that the level of support I received from the faculty during the guitar building was:

- Poor / Very Poor: 5%
- Fair: 5%
- Good / Very Good: 90%

10. I feel that the level of support I received from the peer mentors during the guitar building was:

- Poor / Very Poor: 10%
- Fair: 5%
- Good / Very Good: 85%
11. Working with other students on the guitar building:

- was one of the worst parts of the experience: 0%
- was not allowed: 0%
- was distracting: 0%
- enhanced my experience: 15%
- was one of the best parts of the experience: 85%

12. The guitar building project was:

- Too advanced: 0%
- Too basic: 0%
- Just right: 100%

5.2.3 Huaka‘i

13. The field trips helped bridge a connection between engineering and the Native Hawaiian culture.

- Disagree / Strongly Disagree: 10%
- Neutral: 20%
- Agree / Strongly Agree: 70%

14. The field trips allowed me to further understand what engineering industry is like.

- Disagree / Strongly Disagree: 15%
- Neutral: 15%
- Agree / Strongly Agree: 70%

15. Overall, how satisfied were you by the field trips you took during SEE1.

- Dissatisfied / Very Dissatisfied: 5%
- Neutral: 20%
- Satisfied / Very Satisfied: 75%
16. I will contact a SEE1 peer mentor for academic help after this summer.

17. Based on my overall SEE1 experience, I have a better understanding of engineering.

18. As a result of the SEE1 ‘IKE summer program:

19. I will stay in contact with the other SEE1 students after this summer.

20. Based on my SEE1 experience, I will participate in another ‘IKE summer experience.

21. Based on my SEE1 experience, I feel more prepared for college.
22. How satisfied were you of your overall experience is summer:

<table>
<thead>
<tr>
<th>Satisfied / Very Satisfied</th>
<th>Neutral</th>
<th>Dissatisfied / Very Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>90%</td>
<td>10%</td>
<td>0%</td>
</tr>
</tbody>
</table>

23. I would recommend this summer program to other students:

<table>
<thead>
<tr>
<th>Agree / Strongly Agree</th>
<th>Neutral</th>
<th>Disagree / Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>90%</td>
<td>10%</td>
<td>0%</td>
</tr>
</tbody>
</table>

24. The entire ‘IKE summer program experience was:

<table>
<thead>
<tr>
<th>A little better or much better than I expected</th>
<th>A little worse or worse than I expected</th>
<th>Met my expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td>85%</td>
<td>5%</td>
<td>10%</td>
</tr>
</tbody>
</table>
25. The ONE thing I liked the MOST about the program was: (raw data)

1. Meeting new people
2. The freedom I was given to pursue my goals. Math emporium was a very relaxed experience for me, since I wasn't just forced to sit at a desk and work for 3 hours every day - I could move at a comfortable pace, which made learning the material much more enjoyable.
3. The interaction with other students when helping each other and all that.
4. Being able to take a math 205 class and being ready for math during the fall semester.
5. The program taught me why I like Engineering
6. Being able to experience a lot of new things like guitar building and going on field trips.
7. Free stuff
8. Building the guitar and having hands-on experience with the different fields of engineering really helped me to broaden my views.
9. I enjoy building a guitar.
10. The different field trips we attended. These field trips were some that I would never expect to visit before in my life.
11. Free math credit and lunch.
12. Working within a friendly environment. Being able to comfortably ask help from the other peers, peer mentors, and teachers help significantly.
13. The projects and the field trips we went on.
14. The commodity, just being other people who are smart and share similar interests.
15. The thing I liked most about this program was the free math credits that I received for completing my online math class.
16. I like how helpful and friendly the peer mentors were.
17. Gaining college credit
18. Getting to meet new people
19. The people that I met who have helped me in better understanding of math and engineering. Also guitar building.
20. The one thing I liked most about this program was the hands on learning experience and really going out on field trips to see different pathways for engineering

26. The ONE thing I liked LEAST about the program was: (raw data)

1. The math
2. I was by myself in Calc 3, so I had no help from peer mentors. On the other hand, the support from faculty was excellent so can't complain.
3. The bus rides!
4. The amount of work was condensed because of the 6-week schedule.
5. That the program took up the whole day.
6. The homework was hard.
7. Working
8. Sitting in a class for three hours every day is extremely intensive and really makes one depressed as the uninterrupted time drag on.
9. There wasn't enough time for the field trips.
10. The lack of lectures from our math teacher. Also, some of the peer mentors would not interact with everyone, only certain individuals.
11. Too much time spent on certain tasks
12. Having to learn calculus basically on my own. Although it was very difficult, I learned much about time management.

13. The long 3 hour math session, it could be a little shorter.

14. Timing of incorporating a project along with building guitars. It was just brought up too late and expected to be done quickly. Timing of this project is stressful.

15. Too much subway passes

16. The program was good, no complaints.

17. I liked everything.

18. The homework.

19. I disliked the math because it took really long, but got a lot of help from the peer mentors and instructors.

### 27. The ONE thing I would change about the program is: (raw data)

1. Get the best of both Ha Kilo and ‘IKE

2. Add more field trips! Field trips are fun!

3. More student involvement with each other seeking help from peers as well as peer mentors

4. Nothing

5. Start at 8am and at 3pm

6. One thing I would change is bring more peer mentors

7. Nothing

8. I think that I would bring in multiple professors for more individualized academic support. That way one professor can easily help each of the different math levels., more like a traditional class setting.

9. Make math 2 hours so there is more time for field trips (especially the ones farther away)

10. The math emporium. It would be more helpful if the teacher lectured and showed the lesson on a board, rather than us figuring out the work for ourselves. It is easier to learn when a teacher explains the material

11. More useful second part of the program.

12. Nothing. It's Great!

13. Nothing much, maybe just have a few more peer mentors.

14. Whoever leads timing and coordination of project needs to adjust accordingly to the time we have and see if everyone is on the same page.

15. More food choices.

16. I wish that we had had advance notice of our poster project so that we would have had more time to prepare.

17. Nothing it was a good learning experience.

18. A better layout for studies and homework. More time to get work done.

19. There nothing that I would change.
### HPower + HBWS Honouliuli Water Recycling Facility

- too short, should have been organized better, commute time was long, movie was informative, cool walking through a plant
- I think we should have ate lunch somewhere different so we wouldn't smell the trash. Also, I wish we had more time for the Honolulu Water Supply. Going to HPOWER was interesting because it showed us something different, something we don't really think about, like where our trash goes.
- I thought looking around the factory and learning how exactly our waste products are being used to create energy was interesting. Got to learn about the various applications of engineering concepts and some insight into what being an engineer is actually like. I wish we didn't spend so much time commuting between visits and more time at the sites. Also, we didn't really get to look around the water treatment facility since we spent so much time at H-Power.
- I think that this fieldtrip to HPOWER wasn't very informative due to time constraints. It was my least favorite fieldtrip of all. The incinerator was cool.
- It was very stink. Pick a better place next summer please :)
- The H-power half was very interesting however the Honouliuli part was way too short.
- Decent. Small kine stink.
- Small kine stink brah
- My mana'o on this field trip is that it was a nice place to visit and good to know that our trash is being taken care of. Though on the downside, the field trip was stink and hot. They were to be expected, but the visual in the room and video was enough for me. I'd imagine I'd like this stuff, if this was my field of interest.
- The trip to H-Power was very informative. I learned a lot about the process of converting waste to energy. It helped me realize that, without H-Power, our environment would be much dirtier and detrimental to the health of organisms.
- Smell was horrible. But otherwise very informational.
- Unfortunately I wasn't able to visit the H-Power Plant in 'Ewa. However, listening to my classmates discuss their experience made me want to go there in the future.
- This was pretty interesting, though I was a bit disenchanted by the smells of the place. This was one of the few places I actually felt that I was learning what an engineer would actually do.
- One thing about this field trip that I learned is that Hpower helps the environment a lot. One thing bad about it is it smells pretty bad.
- One thing I didn't like about the HPOWER was that it was stink but it was also informative
- This field trip thought that there is a lot of engineering behind Oahu's trash. I especially liked when we got to see the turbine that the steam of the burned rubbish. I wish we got to spend more time at the water recycling place.
- This field trip was stink. Dirty… but kind of informative on different career aspects. NEED MORE SMELL GOOD PLACES. Showed energy saving tools and machines. Couldn’t hear the instructor/tour guide. Hot and stink.

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### Paepae o Heeia

- I enjoyed the tour very much. Although it didn't smell the best, I thought it was an excellent way to show students how engineers are trying to solve everyday problems. To me, it was the best
- Paepae o Heeia
- really cool! fun and informative, tour guide was the bomb! got a good perspective about the pond
- It's great knowing I contributed into something for the better of this island. Building the wall was fun.
- Looking around the fishpond, learning the history of our ancestors, and building upon the knowledge they left to us was a big picture idea I got from this trip. It was interesting hearing about how the fishponds were built and maintained and their histories. Working hands on to rebuild the wall was also really fun.
- The fish pond fieldtrip was better change of scenery. I did learn some things on engineering aspects of how they constructed the wall.
- Had fun learned a lot wish I got to pet the duck.
- I enjoyed this field trip because it was cool to see the engineering aspect of the fishpond wall
- The guide looks like Jun Jones.
- Lifting rocks like a baws
- In enjoyed this field trip a lot better because I researched this project in high school, but wasn't able to experience first hand. So seeing what I researched was beneficial for me and really enjoyable. The Hawaiians were far more intelligent in my eyes than these foreigners.
- I really enjoyed our trip to the fishpond because it was informative and fun. It was interesting to learn how and why fishponds were built. It showed the engineering prowess of the hawaiians.
- Interesting. Taught me about Engineering in ancient days
- I really enjoyed visiting He'eia Fishpond because I was very impressed on the amount of work that was done over the years. Even though I have been to He'eia Fishpond several times I was more than satisfied with our experience.
- The educational part was fun. When we started working however I felt that although we were working in the traditional way, it wasn't really efficient or productive. The passing would have worked when there were many hundreds (or more) of people. But with our small group, picking up rocks and carrying them would've been better.
- I learned that it takes a lot of time to work in a fish pond
- The fish pond was really fun. I got to learn more about how people in Hawaii used to do it before. I would probably go again.
- This field trip truly showed me the ingenuity of the ancient Hawaiians. I was glad I could help in some way keeping the pond alive.
- It's not the greatest field trip in the world, because we had to carry a lot of rocks. Although we did learn a lot about hawaiian culture and engineering.
- It was pretty cool seeing how a fishpond is made. Lifting rocks is fun when you are doing it with your friends. I wish we were able to see the different kinds of fish living in the pond.
<table>
<thead>
<tr>
<th>He waa he moku, he moku he waa</th>
<th>HCC MELE Studio and CAD lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>• informative about navigation and how we should learn from our ancestors, sailing was the bomb! Very relaxing.</td>
<td>• best field trip no doubt! Like how I got to record in an actual studio and learn how the professionals work.</td>
</tr>
<tr>
<td>• This field trip was one of the most memorable experiences in the IKE program. It was really fun learning about how the Hawaiians navigated in ancient times. It was also fun applying that knowledge and going for a ride on the canoe to put it all together.</td>
<td>• I never thought I would walk through a studio room like that- it was amazing! I would have liked to actually work on the 3d printing, though.</td>
</tr>
<tr>
<td>• Sailing was pretty cool! It got to learn about how sailboats work and some history too! Navigation is pretty intense! Know tying was an interesting thing to learn, too. More time sailing would've been pretty sweet.</td>
<td>• The CAD 3D cutouts were pretty cool. Listening to Mr. Takeya speak about careers in architecture and prospective job opportunities was insightful. Working in the studio and learning a bit about sound engineering was also really fun. The folks at HCC were really helpful and welcoming! I'll definitely look into working with them in the future.</td>
</tr>
<tr>
<td>• I enjoyed learning the navigation techniques of Hawaiian as well as Polynesian ancestors. I did enjoy sailing: It was a lovely day.</td>
<td>• The music studio was as awesome place to go. My favorite plan for a fieldtrip. I love the technology and studio.</td>
</tr>
<tr>
<td>• Had fun paddling and sailing.</td>
<td>• Sign me up next year :)</td>
</tr>
<tr>
<td>• I enjoyed this field trip because the sailing was a cool experience to do.</td>
<td>• I really loved all the field trips we went on but I believed the field trip was the best in terms of our guitar building project.</td>
</tr>
<tr>
<td>• Pretty Gee</td>
<td>• Felt insecure/not safe. Not home to my people</td>
</tr>
<tr>
<td>• didn't go</td>
<td>• pretty gee</td>
</tr>
<tr>
<td>• Sailing canoes, learning how to navigate, and how to tie knots was an afternoon worth spending at the beach. Sailing was eye opening to know Hawaiian Engineers figured out that a sail, with an angle is easier to sail and can travel into the wind. Navigating is difficult seeing all the houses you have to remember along with stars</td>
<td>• This was probably one of the better field trips only because being in a studio was on my bucket list. Seeing how a studio works is simply magic, and the engineering behind it is amazing. Simply put, I wouldn't mind going on another field trip to a studio.</td>
</tr>
<tr>
<td>• Sailing was really fun and educational. I enjoyed learning about ancestral knowledge and how the native Hawaiians navigated using their surroundings.</td>
<td>• The MELE program was really cool because it was truly an interesting program with an awesome recording studio. But I thought the 3D printing was more interesting because it was cool to see that you could print out your 3D drawings.</td>
</tr>
<tr>
<td>• Fun</td>
<td>• It was good.</td>
</tr>
<tr>
<td>• Sailing on the canoe opened my mind about life. Even though I have learned about the Ancient Hawaiians journey to Hawaii, being able to ride on the canoe made me feel like I connected with our ancestors. I learned new things such as the navigational coordinates that the Hawaiians used and learning how to tie a howlan knot.</td>
<td>• Visiting HCC was also a very exciting experience. I have never been to a recording studio before I was fortunate enough to be able to play guitar in one. Also, I learned new things such as CADD and its applications.</td>
</tr>
<tr>
<td>• I think this was my favorite ha'aka'i. I especially like the part where we were learning about Hawaiian navigation on canoes. The guy made us think about the answer rather than just lecturing.</td>
<td>• I really enjoyed going to the MELE Center and learning about Les Paul (sp?)</td>
</tr>
<tr>
<td>• This was a great experience and it seemed really different to paddling but it wasn't really.</td>
<td>• It takes time to control the sound board if you have a big band.</td>
</tr>
<tr>
<td>• Sailing the canoe was pretty fun because we got to go in the water.</td>
<td>• I liked this field trip the most because it was informative and I actually got to record. Plus it was indoors.</td>
</tr>
<tr>
<td>• Sailing was a lot of fun but not as fun as learning how the ancients use to navigate. Learning how to tie knots was fun.</td>
<td>• This field trip was exciting but I lost interest when we got there because we only saw sound engineering and a little bit of 3-D printing. I would have liked to see some other engineering classes.</td>
</tr>
<tr>
<td>• neva go</td>
<td>• This field trip was the best one. Nice, safe, cool, better than others, professional.</td>
</tr>
<tr>
<td>• Sailing was fun even if I just sat on the tarp thing and watched. I wish I was able to spend more time learning knots because I forgot most of them. It was interesting how Hawaiians were able to navigate with a bowl. Somehow, they seemed ahead of their time.</td>
<td>• The equipment looked pretty expensive but it seemed worth it because the demo created sounded good. I wish I knew how to play an instrument because I was only able to press a few button.</td>
</tr>
</tbody>
</table>
6. SEE2

6.1 SEE2 Evaluation Summary

Four focus group sessions were held near the culmination of the SEE2 program. All focus groups were held at the University of Hawai‘i Maui College (UHMC) campus. The sessions were held from 10AM – 12PM or 1PM – 3PM on Saturday, June 23\textsuperscript{rd} and Sunday, June 24\textsuperscript{th}, 2012. Twenty-three (23) students participated in focus groups (96\% SEE2 student participation).

**Focus Group Guidelines:** A total of 15 questions were developed for the SEE2 focus groups. The first three questions gained insight into why students decided to participate in SEE2. Questions 4 through 10 are program specific questions. Questions 11 through 15 asked about benefits and overall experiences with SEE2.

**Paper-Based Survey Guidelines:** A 23-question Likert Scale survey was developed for SEE2. Questions 1 through 6 asked about the math emporium experience. Questions 7 through 12 asked about the engineering projects. Questions 13 through 15 asked about the huaka‘i experiences. Questions 16 through 23 asked overall questions about student’s experiences in SEE2.

In this summary, the italicized bold text states the original focus group questions. The narrative (in normal font) describes the focus groups including, but not limited to moderator theme analysis and interpretation, student quotes, and student interactions. Quantitative results from the paper-based survey are also incorporated where appropriate within the summary. Percentages presented refer to results from the paper-based survey. The full results of the paper-based survey can be found in Section 5.2.

**INTRODUCTORY FOCUS GROUP QUESTIONS:**

**How did you first learn about the ‘IKE Summer program?**
Some students participated in other summer programs at UH Mānoa or KCC. Many students indicated they know other students who participated in previous SEE programs. In general, students heard about SEE2 through various contacts at their home campuses:

- KCC: Keolani Noa, Aurora Kagawa
- UH Mānoa: Native Hawaiian Science & Engineering Mentorship Program - Josh Kaakua, Bubba Lipe, Kelli Ching
- WCC: Letty Colmenares
- LCC: Halau ‘Ike o Pu‘uloa – Aulii Silva, Keala Angay
- UH Maui College: Chanelle Sakamoto, Amir Amirislani
- HCC: Steve Mandraccia

**What was the main reason you decided to sign up for the summer ‘IKE Program?**

- Most students participated because they wanted to take a free calculus course in the summer. Some also included that wanted to use the summer to get ahead in their math courses.
- Many students agreed they wanted the opportunity to gain engineering experience.
  - “Hopefully, after this trip I know what type of engineering I want to do.”
- Some students mentioned they signed up so that they could experience independent living.
- Some students mentioned that they wanted to be able to visit and experience Maui.

**What expectations did you have of the program?**

- Students listed the following as their expectations of the program:
  - Take an intense calculus course with lecture component, work on lots of math, and earn math credit.
  - Cultural field trips
  - Program would be similar to KCC summer bridge program.
  - Students would be building something “fancy” for their engineering project.
  - Participate in unique Maui activities with the program.
**PROGRAM SPECIFIC QUESTIONS:**

**How did you feel about your mathematics emporium experience?**
- **Overall:** 39% of the students surveyed were satisfied or very satisfied by the math emporium experience.
- **Expectations:** Students voiced concern that at the May 2012 orientation meeting at KCC, they were told that each calculus course (1, 2, or 3) would have a daily hour-long corresponding lecture. Instead, students said they only worked independently using an online math program (MyMathLab).
  - 83% of the students felt that not enough time was spent on math lecture during the math emporium.
  - **Math Retention:**
    - Three focus groups generally said they did not feel they retained information from their respective calculus courses. This was especially true for Calculus 1 where students felt they were learning a “new language.”
      - “I don’t feel like I have a good foundation for Calculus 2. I wish they had lectures on stuff you really, really need to know later on.”
      - “I don’t think someone should pick this kind of learning. I don’t think it’s good for any calculus.”
      - “The homework assignments are kind of nice... you just follow the example to get the answer... but when it comes down to it, you don’t really learn too much; you don’t retain.”
    - However, one focus group session said that MyMathLab “takes some time to get used to,” but “I feel like I learned more because you go up to the media and then you actually have to read all the theorems and put stuff together. When the teachers teach... sometimes they only talk about a part of their notes and then write the next part so you usually only write what’s on the board.”
- **Interaction and collaboration:**
  - 52% of the student felt that the support received from the faculty was fair.
  - 48% of the students felt that the support received from the peer mentors was poor or very poor.
  - Students felt there was lack of interaction with the professor and peer mentors. Students felt the professor and peer mentors would sit at the front of the class and wait for students to ask questions.
    - “It’s like a study hall. You just come in and sit at your computer. You don’t really talk to anyone.”
    - “For what reason do we need to go to a classroom to learn everything you need to learn out of a computer.”
  - Collaboration between students was minimal because they were so pushed for time that helping others would be time taken away from doing their own homework.
- **Schedule:**
  - Most students felt that there were too many things due in one day (homework, journals, test). Because of this, some students would skip engineering in the afternoon, especially on days before the test.
  - However, a student pointed out that everyone has enough time to work on their assignments; they just choose not to do work during the weekends.
- **Portfolios:**
  - An overwhelming majority of students said they “did not see the point in the journals.” Students said that portfolio expectations were unclear and they never received feedback about their reflections.
  - Some students pointed out that they liked the portfolio because they felt it was “free points.”

**How can the mathematics emporium be improved?**
- Provide lectures to compliment the online lessons and assignments.
- More interaction between teacher, peer mentors, and students. Many students suggested that the professor and peer mentors walk around the classroom and check on student progress.
- Expand math days to Monday through Friday.
- Have math all day on the day before the exam to allow students to complete their assignments and study for exam.
- Students suggest having a clear example of what is expected in the portfolios.
• Have the teacher go over the exam when he has completed grading them.
• Include more help outside of class time
• Ability to use the campus facilities after class hours.

Please describe the peer mentoring experience. Was the mentoring useful or helpful? Why or why not?
• 48% of students felt the level of academic support from peer mentors during the math emporium was poor to very poor.
  o About half of the students noted that the peer mentors were not actively engaged with them.
    ▪ “Seemed like these mentors didn’t go through mentoring training.”
    ▪ “They’re [the peer mentors] really standoffish.”
  o The other half of the students said the peer mentors were helpful when asked questions.
    ▪ “Peer mentors are fine… it’s up to the students to ask for help.”
    ▪ “Calculus 2 got the most help [from peer mentor] because there’s only three of them and the guy sticks around with them.”
• 61% of students felt the support received from peer mentors in the engineering activity was good to very good.

How do you think the mentoring could be improved?
• Peer mentors should walk around during the math emporium and actively ask about student progress.
• Additional peer mentors, especially for Calculus 1.
• Have a peer mentor that can help the Calculus 3 students.

How do you feel about the level of academic support you received (i.e. tutoring, study sessions, etc.)?
• Students generally said that they did not feel supported academically inside or outside of class time.
• Sometimes students would have small study groups in order to prepare for tests.

How do you think these [academic support resources] can be improved?
The students provided these suggestions for improving the academic support for them:
• Provide more engaged help from professor and peer mentor during class time.
• Ability to use college facilities after hours (i.e. the lab they use for their math course). Internet at the apartments were not reliable making it difficult for students to work on their math outside of class.
• Some suggested having either the professor or peer mentors available outside of class time to answer questions and provide help.

Please describe your experience with your hands-on engineering activity.
• Overall: 48% of students felt satisfied to very satisfied about the engineering activity. 22% felt dissatisfied to very dissatisfied about their engineering activity. 30% of the students were neutral about their engineering experience.
• Difficulty: 62% of the students felt the engineering activities were just right. 38% felt the engineering projects were too basic.
• Letry Car
  o Most students agreed that working on the Letry car for 4 weeks was too long.
  o There was disagreement about the complexity of the letry car project.
    ▪ Approximately half of the students thought that the Letry car was a good project at their level. It was interesting for some students because it was the first time they were exposed to electronics.
    ▪ The other half of the students said that the Letry car was “too elementary.” Some students said that their interest was not in electrical engineering so they “didn’t find any use of learning that stuff [electrical].”
• Mindstorm
  o Students generally enjoyed the Lego Mindstorm project. They mentioned that this project was slightly more challenging than the Letry car. Some felt that there was not enough time on the mindstorm.
- “The Lego stuff was fun. It wasn’t really hard, it was just fun.”
- “We only had three days. The professor only got to teach us the very basics. I would’ve liked to go more into that.”

**Other**
- Approximately half the students mentioned that students would skip the engineering in the afternoon. This would happen especially on days before exam or when homework was due.
  - “We’d want to be there; it would be hard knowing all the problems that I still have left to do and I’m sitting in here which I’m not getting graded for.”
- A number of students felt that the projects were too electrical engineering based and did not focus on other types of engineering.
  - “Not all of us are interested in electrical engineering.”
  - “I was looking forward to getting some basic knowledge… before I take my first civil engineering class next semester.”
- 78% of students felt the level of support received from the faculty/instructors during the engineering activity was good to very good.
  - Most students commented that John Meyer was very welcoming and passionate about what he was teaching.
    - “You could tell he [John] really wanted to be there”
    - John “was enthusiastic.”

**How can it [the hands-on engineering activity] be improved? / Are there any other projects [engineering activities] you would like to see added?**
- Projects that incorporates other disciplines
- Projects with more hands-on work
- Projects that are more problem solving rather than just following directions.
- Do group projects
  - “If we could’ve built like an actual battlebot robot… all the mechanical engineers can put the car together, all the civil engineers are gonna layout the track, all the electrical engineers are gonna make that car go.”
- Build computers.
- Being able to do some soldering or work with motherboards.
- More applied engineering.

**What did you think about the different huaka‘i that you took this summer?**
- Students overall experience with the huaka‘i was approximately equally split between satisfied/very satisfied (36%), neutral (32%), and dissatisfied/very dissatisfied (32%).
- Generally, students felt there was a lack of incorporating Native Hawaiian culture in their field trips.
  - 44% of the student felt neutral about the connection between engineering and Native Hawaiian culture.
  - 43% felt that disagreed that the huaka‘i helped bridge a connection between engineering and culture.
- 62% of students felt neutral that the huaka‘i allowed them to further understand the engineering industry.
- Overall, majority of students enjoyed the Molokini field trip the most because it gave them a chance to get to know each other and get settled into Maui.
- Overall, the majority of students enjoyed the Maui Ocean Center field trip the least because they felt it had no cultural or engineering significance. Some suggested incorporating engineering into this field trip by having someone show them the pumps used at the aquarium.
- Other field trips has mixed review among students as noted below:
  - Maui Tech Park
    - Some students felt that the Maui Tech Park companies were trying to recruit them, but most students would not work on Maui.
    - Some students felt that this field trip helped them to “expand my thoughts in engineering.”
  - Wastewater Plant
Some students did not enjoy this field trip because it “was in the sun and it smelled bad.”
Some students thought that this field trip was good because it “touched base on engineering you can possibly go into.”
   - Hawaiian Commercial & Sugar Company (HC&S)
     - Generally, students enjoyed HC&S because it is unique to Maui. Students were able to see how the factory was self-sufficient. One of the tour guides was an engineer so “it was cool to talk to engineers in the field, too.”
     - However, students thought that it could have been planned better since half of the students couldn’t go on the factory tour because they did not have shoes.

Suggestions for improvements:
   - Lunch be provided on field trip days.
   - Students felt that they should be told if staff would not join them for field trips and if there is no staff available at least notify the students of where and who to meet at the field trip sites. Students felt they were left to fend for themselves.

Are there other locations you would like to take field trips related to SEE?
   - Haleakalā to see the telescopes.
   - Fishpond (Loko ʻia)
   - Hike the windmills and have someone tell them about the engineering behind the windmills.
   - Collaborate with UH Mānoa for a trip to Kahoolawe.
   - More places unique to Maui
   - Irrigation ditches, reservoirs, watershed project
     - “What would’ve made it worthwhile for civil engineers would’ve been to go to the irrigation ditches; how they built the reservoirs in the middle of nowhere and show the well water and how the thing comes down by gravity.”

What did you enjoy the most about the program, and why?
   - Molokini (snorkeling) field trip.
   - Meeting the other students.
   - Experiencing independent living in a new environment.
   - Getting to take a free math course and being able to concentrate solely on math course.

What did you enjoy the least about the program, and why?
   - Format of the math class - all online and no lecture to complement the online work.
   - Students felt that the program was unorganized especially with field trips being canceled and the misunderstanding with the math class format.
   - Students said that they didn’t feel like they were a part of a program. Some students said that there was very little staff to student interaction and would like staff to interact with students on a personal level.

PROGRAM BENEFITS/OUTCOMES:

How do you think the program will help you with your college coursework?
   - Being able to get ahead in math credits.
   - The program helped them set the stage for what is coming up in their academics as the work will not get easier. The program helped them understand their work ethic.
   - The program taught the students how to be self-sufficient and how to figure out how to do things (especially academically) on their own.
What is the most valuable thing you got out of this program?
- Free math credits
- Meeting and networking with new people interested in the same career path.
  - 87% of the students indicated that they would stay in contact with other ‘IKE students.
- Learning independence.

CONCLUSION QUESTIONS:

Would you recommend this summer program to other students? Why or why not?
- 64% of the students said they would recommend this program to other students for the following reasons:
  - It’s an overall good experience.
  - If they make it more organized next year.
  - If they fix the problems (i.e. math format, field trips)
  - Students able to get ahead in math for free.
- 9% of the students said that they wouldn’t recommend the program to others for the following reasons:
  - Student felt it costs more than the stipend they received
  - One student said they’d tell others to skip SEE2 and wait for SEE3 the next year.

Is there anything else we should have discussed, but didn’t?
- Food
  - If food is not available on campus, at least have a microwave available somewhere on campus.
  - Microwaves available at the dorms so students don’t have to spend the money on microwave.
- Settling in
  - Earlier flight into Maui or arrive a day earlier than the Sunday before class begins. Students arrived on Sunday late afternoon/early evening and once orientation was finished the food establishments near the apartments had closed and not all students had transportation.
  - Provide a bus to take students to Wal-Mart when they first arrive on Maui to buy essentials.
  - More/better orientation materials or a bus tour when first arrive on Maui and point out to students where grocery store is, where the campus is located relative to apartments.
  - Have a welcome dinner provided (i.e. pizza) on the first night the students arrive so that they don’t have to spend first night searching for food in a new place they are unfamiliar with.
  - Enough keys for all students in one room.
- Budgeting
  - Give students breakdown of what the stipend will cover.
  - UHMC pay for tuition and books so students don’t worry about paying for them, especially if stipends are late.
  - Start stipend paperwork earlier so students receive them in time.
- Other
  - Students felt that the staff should be more involved with the program and be better at informing students of various program details. Students said that staff should be more engaged with students.
- Overall Satisfaction
  - 82% of the students were satisfied/very satisfied with their overall experience in 2012 SEE2.
6.2 Paper-Based Survey Results

6.2.1 Math Emporium

1. How satisfied were you by your overall math experience at SEE2?

- Satisfied / Very Satisfied: 39%
- Neutral: 35%
- Very Dissatisfied / Dissatisfied: 26%

2. The amount of time spent during the math lectures was:

- Not Enough: 83%
- Appropriate: 13%
- Too much: 4%

3. The amount of time spent working on the online assignments was:

- Too much: 52%
- Appropriate: 44%
- Not Enough: 4%

4. I feel that the level of academic support I received from the faculty during the math course was:

- Good / Very Good: 13%
- Fair: 52%
- Poor / Very Poor: 35%

5. I feel that the level of academic support I received from the peer mentor(s) during the math course was:

- Good / Very Good: 39%
- Fair: 13%
- Poor / Very Poor: 48%

6. Collaborating with other students during the math course:

- was one of the best parts of the experience: 30%
- Moderately enhanced my experience: 48%
- Moderate diverted my attention: 22%
6.2.2 Engineering Project(s)

7. How satisfied were you by your overall engineering project/activity at SEE2?

8. The amount of time spent on the engineering project(s) was:

9. I feel that the level of support I received from the faculty during the engineering project(s) was:

10. I feel that the level of support I received from the peer mentors during the engineering project(s) was:

11. Working with other students on the engineering project(s):

12. The engineering project(s) we worked on was:

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Summer Engineering Experiences Evaluation Summary-Final_01-29-13
1/30/2013
6.2.3 Huaka‘i

13. The field trips helped bridge a connection between engineering and the Native Hawaiian culture.

14. The field trips allowed me to further understand what engineering industry is like.

15. Overall, how satisfied were you by the field trips you took during SEE2.

6.2.4 Overall

16. I will contact a SEE2 peer mentor for academic help after this summer.

17. As a result of the SEE2 ‘IKE summer program:
18. I will stay in contact with the other SEE2 ‘IKE students after this summer.

Disagree / Strongly Disagree 0%
Neutral 13%
Agree / Strongly Agree 87%

19. If it is in my power to do so, I will participate in another ‘IKE summer experience.

Disagree / Strongly Disagree 4%
Neutral 13%
Agree / Strongly Agree 83%

20. If available, I will participate in other ‘IKE opportunities at my home campus during the following school year.

Disagree / Strongly Disagree 4%
Neutral 13%
Agree / Strongly Agree 83%

21. How satisfied were you of your overall experience this summer:

Dissatisfied / Very Dissatisfied 9%
Neutral 9%
Satisfied / Very Satisfied 82%

22. I would recommend this summer program to other students.

Disagree / Strongly Disagree 9%
Neutral 27%
Agree / Strongly Agree 64%

23. The entire ‘IKE summer program experience was:

A little better or much better than I expected 41%
Met my expectations 27%
A little worse or worse than I expected 32%
7. SEE3

7.1 SEE3 Evaluation Summary

Three focus group sessions were held near the culmination of the SEE3 program. All focus groups were held at the University of Hawai‘i Mānoa (UHM) campus. The sessions were held from 3PM – 5PM on Monday, August 6th and 10AM – 12PM or 1PM – 3PM on Tuesday, August 7th, 2012. Eighteen (18) students participated in the focus groups (95% student participation).

**Focus Group Guidelines:** A total of 14 questions were developed for the SEE3 focus groups. The first two questions gained insight into why students decided to participate in SEE3. Questions 3 through 10 are program specific questions. Questions 11 through 14 asked about benefits and overall experiences with SEE3.

**Paper-Based Survey Guidelines:** A 23-question Likert-scale survey was developed for SEE3. Questions 1 through 5 asked about their academic/math experience. Questions 6 through 13 asked about the engineering projects. Questions 14 through 23 asked overall questions about student experiences in the SEE3 program.

In this summary, the italicized bold text states the original focus group questions. The narrative (in normal font) describes the focus groups including, but not limited to moderator theme analysis and interpretation, student quotes, and student interactions. Quantitative results from the paper-based survey are also incorporated where appropriate within the summary. Percentages presented refer to results from the paper-based survey. The full results of the paper-based survey can be found in Section 6.2.

**INTRODUCTORY FOCUS GROUP QUESTIONS:**

*How did you first learn about the ‘IKE summer program?*

Generally students indicated that they heard about SEE3 through:
- Native Hawaiian Science and Engineering Mentorship Program (NHSEMP) with Josh Kaakua, Bubba Lipe, and Kelli Ching.
- Some students participated in SEE2 the previous year where they heard Josh Kaakua talk about SEE3. These students then told their friends about the program.
- Some KCC students heard through the KCC STEM Program, Aunty Keolani, and Aaron Hanai.

*What was the main reason you decided to sign up for the summer ‘IKE Program?*

Students generally mentioned:
- The program seemed like a “good deal” with free math course, hands-on experience, free dorm, free meals, plus stipend at the end of program.
- They wanted/needed something to do during the summer.
- Gain hands-on engineering experience. One student mentioned they hoped this program would help them choose which type of engineering to pursue.
- Network with other engineering students.

*What is a typical weekly schedule for SEE3?*

- Monday, Wednesday, Friday – traditional UHM summer school math course.
  - Mornings – Calculus 4
  - Afternoons – Math 307 (Differential Equations and Linear Algebra)
- Tuesday & Thursday – Students were supposed to work on engineering projects from about 10AM to 4PM.
- Tutoring with math tutors
  - Calculus 4: 2pm – 4pm Sunday through Friday (except Wednesday)
  - Math 307: 3 to 5 times a week. Schedule was based on tutor’s schedule.
PROGRAM SPECIFIC QUESTIONS:

What was your math course like?

- **Professors:** Many students expressed frustration with their math professors. Students in Math 244 said the professor did not complete the course. Math 307 students indicated that the professor mostly covered theorems rather than application. Math 307 students said “our tutor said he [the instructor] skipped some important engineering theorems.”
- **Being in same class as other ‘IKE students:** 89% of students indicated that it was helpful to their academic success to have other ‘IKE students in their math class. Many students said they would study together (either through formal tutoring sessions or on their own) and they would ask each other for help. Students also mentioned that living arrangements helped their studying habits.
  - “It was helpful back at the dorms when other people were studying, you think ‘Oh, I better go study, too.’”
- **Adequate time to concentrate on math course:** 89% of student felt that they had enough time to concentrate on their math course because they had a lot of free time outside of math class and their projects plus they had addition mandatory tutoring provided by the SEE3 program.
- **Tutoring:** 83% of students indicated the level of academic support they received from the math tutors was good to very good. Students felt their tutors were essential to their success in math.
  - “They [tutors] were our teachers… I probably learned more in 5 minutes of tutoring than I did in an hour and a half of class.”
  - “The tutors brought it down to a level we could understand.”
- **Overall:** 83% of students felt they had the appropriate amount of academic support for their math courses. Students also mentioned they felt that as a group they were doing better than the other students in their math class who were not in ‘IKE.
- **Student’s Suggestions:**
  - Allow students to choose between Math 302 and 307. Students said Math 307 is focused for electrical engineering majors.
  - Have a designated space on campus to study that is open later than the library.
  - Have tutors who have taken the specific professor’s course or have tutor and professor communicate on material being taught.
  - Have different professors from those this summer.

Please describe your experience with your engineering project.

- **Overall:** 59% of students indicated they were dissatisfied to very dissatisfied by their overall experience with the engineering projects.
- **Projects:** The projects students said they worked on included 1) Designing and constructing a study room for NHSEMP, which includes furnishing, designing custom computers, 2) Wind Turbine for Papakolea Community Center use, 3) Aquaponics system for the study room.
  - Students indicated that the wind turbine project for the Papakolea Community Center did not pan out because of issues with the distributor. Students also indicated that the design and construction of the NHSEMP study room was also held back due to purchasing issues.
- **Program organization and communication:** Many students expressed frustration over the organization and communication of the program.
  - Students said there was no means of effective communication between students, between mentors, and between mentors and students. Students said that project work hours were set out to be 10AM to 5PM. However, students felt that mentors didn’t follow schedules and if the schedule changed it was not communicated to all students.
  - “We came in the morning and we sat there for like 4 or 5 hours and then at 4 in the afternoon they were like ‘ok, let’s build computers.’ I don’t mind working [at night] if I know about it.”
  - Expectation not made clear to students.
  - “I talked to a peer mentor… and he said ‘that’s why nothing really happens because we’re expecting you guys to take the initiative.’ But we tried and they [peer mentors] weren’t ready at the beginning when we were all ready to work and peer mentors were like, ‘Eehh.’”
• Engineering experience:
  o In general students felt that they did not get the full range of engineering experience.
    ▪ “I feel that this is an engineering program and there’s not much engineering involved.”
    ▪ 56% of students felt that the engineering projects were too basic.
  o Students mentioned that the purchasing process was long and they were “sitting around, just waiting,” for their materials to come in.
    ▪ 56% of students felt that not enough time was spent on the engineering projects and 56% of the students felt that the projects moved too slowly.
  o Students also expressed frustration when they were asked to do research and cost estimates for various aspects of the room, only to find out that the various aspects of the room had already been decided and purchases made without them knowing.
    ▪ “They [peer mentors] didn’t even use our research.”
  o Students also mentioned when there was work to do there wasn’t enough materials for everyone to work at the same time.
  o However, students mentioned some engineering experience they got included:
    ▪ Design processes especially research and budgeting.
    ▪ Learning how to use SolidWorks.
    ▪ Building computers for the study room.

• Additional side engineering projects: Students pointed out that some ‘IKE students were working on side projects including building a go kart with the College of Engineering high school interns and a nerf gun modification project with the freshmen summer bridge. There was disagreement about how some students got involved with these projects:
  o Some students said that “it was up to the students if they wanted more work” and that those that did want more work asked the peer mentors. One student said that they went to help with the high school interns and freshman summer bridge because “we didn’t have any projects to do.”
  o Some students felt that only a “select few [students]” helped with the additional outside projects. Students said they were not informed of the additional outside projects they could work on. Students felt that they should have been told about the additional projects and offered to the whole group.

How can it [the hands-on engineering activity] be improved? / Are there any other projects [engineering activities] you would like to see added?
• Student suggestions for improvements:
  o Better communication about the expectations of the students on the project
  o If there aren’t enough tools for students to use, schedule shifts so that everyone has something to do.
  o If students are asked to suggest projects, have more meetings prior starting the program to gather student input and have everything set up and approved before the summer.
  o Better communication about work schedules.
  o Make sure purchase orders are ready before the summer begins.

• Student suggestions for other projects:
  o Actual engineering projects where students can work with tools.
  o Research, data collection, analysis
    ▪ “Research is like seeing how to make things, optimizing things, efficiency, taking the data and using that later on.”
  o Baja
  o Projects where students can learn how to weld
  o UAV (Unmanned Aerial Vehicle – Summer 2011 project)
  o Smaller scale projects where materials can be bought off the shelf.
  o Have a choice between different disciplines (i.e. EE’s work on the EE part of a project, ME’s work on the ME part of a project, etc)

Please describe the peer mentoring experience. Was the mentoring useful or helpful? Why or why not?
• 39% of students said the level of support from peer mentors during the engineering project was fair.
• There was disagreement among focus groups about their experiences with the peer mentors.
  o Some students indicated that there was a lack of leadership from the peer mentors.
    ▪ Some said the mentors were disorganized and would not communicate expectations with the students. Many said of five available peer mentors, only one showed up consistently and on time.
    ▪ Some said the mentors would only tell details (i.e. daily work schedule) to a few students rather than to the entire group.
    ▪ However, these students did included that peer mentors were helpful “when we had stuff to do” especially with technical details because they had more experience.
  o On the other hand, some students mentioned that peer mentors worked hard and “didn’t force us to do anything. They [peer mentors] told us what to do and we had to pretty much lead ourselves… if we needed help or were confused how to do something we could ask and they would help us.”
    ▪ Students included that, if the mentors were not around it was because they were making sure things were going smoothly with the projects.
• There was agreement among most students that peer mentors would talk to the students about what classes or professors to take at UHM.

How do you think the mentoring could be improved?
• Students suggest the following:
  o Better communication between mentors and students.
  o Have periodic group check-ins with mentors so that students and mentors are on same page.
  o Clear expectation of what mentors want from students.
• Have mentors in other engineering backgrounds (i.e. CE or EE) because most had ME backgrounds.

How did you feel about your peer interactions (i.e. those in your work teams, the activities, etc.)?
• Some students felt that only a select few were given details of projects.
  o “There were people that really had a feel of what was going on, as far as projects. Others were never let in.” This led to some students feeling that not everyone was putting in the same amount of work.
    ▪ “I don’t think even half the students are working hard enough for a stipend.”
• Dorming:
  o Some students enjoyed dorming and being around other engineering students.
  o Others mentioned that they had friction with some of their roommates.
• Team work skills:
  o Some students indicated that their experience in SEE3 helped them understand how to work in teams.
    ▪ “You find people who just don’t want to work and you have to find out how you’re going to deal with it… you find out how to work with them.”

What other types of activities did you participate in?
• Students provided the following:
  o Huaka‘i – students said that this activity incorporated the Native Hawaiian aspect into the program. Students were able to visit various cultural sites on O‘ahu. This gave students a chance to get to know each other better.
    ▪ “I enjoyed getting to know my culture better and just my island better.”
  o Lo‘i – students also said that this activity incorporated the Native Hawaiian aspect into the program.
  o 41% of students said that the integration of Native Hawaiian culture in the program was excellent.
• Suggestions:
  o Tell students date of huaka‘i earlier. Some students said they only found out that week. On the other hand, some students did say it was on a calendar of events provided to them.
  o Other potential field trips:
    ▪ Kahoolawe
    ▪ Engineering companies where “we can possibly work when we get our degree.”
    ▪ Visit wind farms
- Fishponds to see “the way they are designed.”
- Getting dirty, reforestation
- Group oriented activities (i.e. dinner, BBQ, get togethers)

**What did you enjoy the most about the program, and why?**

- Students mentioned the following:
  - The huakaʻi – for the same reasons as explain in the previous question.
  - Building/assembling the computers for the study room since it was the first time for most students.
  - Getting the extra tutoring for their math course because they felt they learned a lot during tutoring.
  - Being able to meet and network with other engineering students.
  - Dorming experience
  - A couple of students said that they enjoyed everything because they felt they learned a lot through helping with the high school internships and freshman bridge students.

**What did you enjoy the least about the program, and why?**

- Students mentioned the following:
  - Not being able to carry out completed projects.
  - The partying going on during the program (at dorms especially).
  - Tiling and painting the study room because it had nothing to do with engineering.
  - Not having enough hands-on engineering experience
  - Projects moving too slowly because of purchasing problems and other unforeseen issues.
  - Not enough for everyone to do
  - Not knowing if they were going to receive their stipend – about half way through the program students said the mentors were telling them that they (as mentors) would be determining how much students will be receiving for their stipends.

**PROGRAM BENEFITS/OUTCOMES:**

**How do you think the program will help you with your college coursework?**

- The opportunity to network with other engineering students (peers and peer mentors).
  - Better idea of what classes and professors to take and what their degree/major is going to be like.
- Reach out for additional tutoring in the future.
  - “I’ll probably be doing that [going to tutoring] more often now in my classes; I won’t feel so ashamed.”
- Learning how to study on their own better.
- 44% of students feel more prepared to take upper level engineering courses.

**What is the most valuable thing you got out of this program?**

- Math class/credit which the program helped support
- Friends and networking with other engineering students.
- More knowledge about how to communicate better and be a good leader
  - “I know more how much a good leader is to a group and what things wouldn’t work.”
- Several students said that they were able to get the hands-on skills especially working with the high school and freshman bridge students.
- Overall opportunity
  - “What I value most is getting the opportunity to be in a program like this.”

**Were your expectations met?**

- With the engineering projects, most students felt their expectations were not met because they did not have the hands-on engineering experience they were expecting. Many students mentioned projects from the previous year and thought the projects for this year would be similar.
Several students said their expectations were met especially since they were able to work with the high school interns and freshman bridge students.

Most students said their expectations of their math course were met.

41% of students said that the program was a little better or much better than they expected.

Another 41% of students said that the program was a little worse or worse than they expected.

**CONCLUSION QUESTIONS:**

**Would you recommend the Summer Bridge Program to other students? Why or why not?**

- 83% of students said they would recommend SEE3 to other students for the following reasons:
  - Good overall experience
  - Students can gain math credit, generally get some engineering ideas, and be financially supported.
  - Students felt that it was not a summer wasted.
  - “We got so much from the program. We got our classes paid for, we got tutors, we got free dorms, we got free food... and on top of that we get a stipend.”
- 17% of students felt neutral about recommending the SEE3 program.
  - One student said that they would tell others to apply for research opportunities at other colleges/universities.

7.2 Paper-Based Survey Results

7.2.1 Math

<table>
<thead>
<tr>
<th>Question</th>
<th>Math 244 (39%)</th>
<th>Disagree / Strongly Disagree 0%</th>
<th>Agree / Strongly Agree 89%</th>
<th>Neutral 11%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Which math course did you take this summer?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Math 307 (61%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question</th>
<th>Disagree / Strongly Disagree 0%</th>
<th>Agree / Strongly Agree 89%</th>
<th>Neutral 11%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Having other ‘IKE students in my math class was helpful in my academic success.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Math 244 (39%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question</th>
<th>Not Enough 0%</th>
<th>Too much 17%</th>
<th>Appropriate 83%</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. I feel that the amount of academic support I received during SEE3 was:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question</th>
<th>Poor / Very Poor 0%</th>
<th>Fair 17%</th>
<th>Good / Very Good 83%</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. I feel that the level of academic support I received from the math peer mentors was</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summer Engineering Experiences Evaluation Summary-Final_01-29-13
1/30/2013
5. Overall, I feel that I had enough time to concentrate on my math course

6. How satisfied were you by your overall engineering project/activity at SEE3?

7. The amount of time spent on the engineering project(s) was:

8. I feel that the level of support I received from the peer mentors while working on the projects was:

9. Working with other students during the projects was:
10. Rate the level of difficulty of the engineering projects:

- Too advanced: 0%
- Just right: 44%
- Too basic: 56%

11. I feel that the pace that we were working on the projects was:

- Too fast: 0%
- Just right: 44%
- Too slow: 56%

12. The projects helped me further understand how to apply engineering design processes in real life applications:

- Agree / Strongly agree: 45%
- Neutral: 22%
- Disagree / Strongly disagree: 33%

13. The projects helped me better understand how engineers work together in teams to complete a project:

- Agree / Strongly agree: 55%
- Neutral: 17%
- Disagree / Strongly disagree: 28%

7.2.3 Overall

14. The integration of Native Hawaiian culture into this ‘IKE summer program:

- Needs work: 25%
- Was good: 35%
- Was excellent: 41%

15. I will contact a peer mentor for academic help after this summer:

- Disagree / Strongly disagree: 17%
- Agree / Strongly agree: 55%
- Neutral: 28%
16. I will stay in contact with other ‘IKE summer students after this semester.

17. My SEE3 experience has reinforced my decision to major in engineering.

18. I will be transferring to UH Mānoa COE:

19. Based on my SEE3 experience, I feel more prepared to take upper level engineering courses.

20. If it is in my power to do so, I will participate in other ‘IKE opportunities during the school year.

21. How satisfied were you of your overall experience this summer:
22. I would recommend this program to other students.

- Agree / Strongly Agree: 83%
- Neutral: 17%
- Disagree / Strongly Disagree: 0%

23. Overall, the ‘IKE summer program experience was:

- A little better or much better than I expected: 41%
- Met my expectations: 18%
- A little worse or worse than I expected: 41%