

ESTUDIO DAMGO

Evaluating the First Filipino Design-Build University Program

research by:

Anna Koosmann, Assistant Professor, Architect

Geraldine Quinones, Ph.D. Candidate

Maria Chona Z. Futralan, Ph.D.

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University of Arizona
San Carlos University
Foundation University
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photographs courtesy of:

Foundation University and Anna Koosmann

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ABSTRACT

Estudio Damgo (Dream Studio) is the first university design-build architecture program of the Philippines, patterned after similar programs for architecture students in the U.S. Founded in 2012 in Dumaguete City, senior architecture students of Foundation University are given the chance to put theory into practice; by researching, designing, and constructing a small structure for a chosen community, that is completed in one academic year. Estudio Damgo's short-term goal is to provide students hands-on experience using native, sustainable, and alternative materials to construct a student-led design with community input and support. The long-term goal is to provide the beneficiary with a unique, sustainable and affordable asset that showcases innovation in the changing face of architecture. There are 26 Estudio Damgo architecture graduates and 5 community projects to date (2017). This research evaluates the first, three projects of the program to gauge the impact on the university students and the target communities.

The first project, Estudio Damgo 1 (led by 2 students, completed 2013), is a 68-square meter (434-square foot) classroom located in a rural mountain village in Barangay Malau-nay, Valencia and 20 km away from the heart of Dumaguete City. Estudio Damgo 2 (led by 3 students, completed 2014) is an 82-square meter (840-square foot) multipurpose building located in a farming village in Dumaguete City. The building serves a relief housing project with over 100 displaced flood survivors from Typhoon Ondoy (2009) and Sendong (2011).

The Estudio Damgo 3 project (led by 9 students, completed 2015) is a 120-square meter (1,144-square foot) floating structure at the Marine Sanctuary in the Philippine Sea for the Bantay-Dagat (village fish wardens) of Barangay Bantayan in Dumaguete City. The structure served two purposes: during the day, for eco-tourism, swimming and snorkeling; at night, a guardhouse to watch for illegal fishing. The research was conducted over the course of 5 months (August – December 2015). The study utilizes qualitative methods and is organized into three parts: questionnaires, post-occupancy evaluations and site observations, and case studies.

The research team consists of university department heads and research faculty, consulting architects, and Estudio Damgo program alumni. The results generally showed that the Estudio Damgo program has a “very high” impact on the university students and the target communities. The findings have been disseminated in a university journal, covered in local media and blogs, presented at universities, and exhibited in galleries. The research has directly impacted the program to highlight best practices and lessons learned, resulting in curriculum changes, improving stakeholder partnerships, and the potential to be a model to other university programs, globally. The Estudio Damgo program of Foundation University is an acclaimed initiative that has received national and international recognition since it launched its first project in 2012. It is on the above premise that the university researchers prioritized this study to ensure the Estudio Damgo program be successful and long-lasting.

PHILIPPINES

islands: > 7,500
 population: > 100 million
 land area: > 300,000 sq km
 capitol: Manila
 national language: Tagalog



morning stroll along rizal boulevard, dumaguete city



dumaguete city's historic belltower (1811)



The Philippines is one of the largest archipelagos in the world with over 7,500 islands making up over 300,000 square kilometers total land area. It is ranked eighth in global population density.¹ It is part of Southeast Asia coral triangle that spans between the Southern tip of Japan, Western point of Malaysia, and the Northern part of Australia and extending to Fiji. The Philippines is a tropical climate located in the northern hemisphere between 5 and 20 degrees north latitude.

There are three regions in the island network: Northern Luzon, the Central Visayas, and Southern Mindanao. Historically, the native Filipinos came from Malaysia; however, through trade, commerce, missionaries, and colonization by China and Spain, the Philippines have adopted both cultures. Their predominant religion is Catholic in the Northern Luzon and Central Visayan regions, while Southern Mindanao is predominantly Muslim carried over from Malaysia. Today, there are about 50 local dialects spoken throughout the regions, where Tagalog is the national language mostly spoken in the nation's capitol, Manila and Northern Luzon. Most educated Filipinos are fluent in English and use English as their second language.²

Dumaguete City is located on Negros Island and is the provincial capitol and largest port terminal in Negros Oriental. It has around 130,000 residents and is known as the “city of gentle people”.³ Dumaguete has 4 colleges and 3 universities and it has been coined the name U-town by the locals. For tourists, Dumaguete is a gateway city for popular dive sites, like Apo Island, where swimming among the sea turtles and coral reefs are the main attractions. Dumaguete’s name comes from the Visayan word “daggit” meaning “to snatch”. The legend claims that Dumaguete is like a pirate that snatches people to stay in the city longer than they had planned and eventually make it their home. This prevailing belief is called “being daggit” by Dumaguete.

THEORETICAL
BACKGROUND

Since the 1990's, hands-on design-build programs have become popularized for creating positive impact on students in the U.S. Today, they are being adapted globally, but there is insufficient research on design-build programs and their impact on communities, and even more so, on the emerging programs in foreign universities. Rather, published design-build projects typically focus on the design process, execution, and putting emphasis on design awards. It is less common to find reports on post-occupancy and beneficiary impact. The limited post-occupancy research might be due to the lack of standardized methods and resources for carrying out the studies. Following-up with post-occupancy and evaluating the impact of design-build projects is an area to be explored, especially since many architecture programs offer some form of hands-on curriculum as an alternative to traditional architecture education.⁴

In the book chapter, "Design/Build/Evaluate: Connecting with Actual Humans", John Quale (a design-build educator) addresses this topic that "among these projects, some are considered exemplary in both process and design, while others are not perceived as successful by the 'beneficiaries' of the work".⁵ He stresses that, "design/build efforts are meaningless without an assessment component. ... [coining] the phrase **design / build / evaluate**".⁵ To focus on the impact of the work, Quale has developed an evaluation tool called the ecoMOD Decision Analysis Tool (MOD DAT). He assigns a team of students to evaluate the projects upon completion. However, in this method the data is focused more on performance measurements and the impact of the structure assembly, rather than the qualitative impact on the beneficiary. Likewise, industry standards for evaluating buildings such as LEED and ILFI's Living Building Challenge, are focused on environmental performance and they do not include qualitative measures on beneficiary impact. Furthermore, the scope of these tools are not always relevant for the scale of academic projects.

Two resources provided a framework for the Filipino design-build program. The Social Economic Environmental Design (SEED) evaluator and the Sustainable Native Communities Collaborative case studies were chosen to synthesize the qualitative and socio-cultural nature of the study. The SEED evaluator is an online communication tool for designers and stakeholders to measure goals, and it "provides guidance through a strategic matrix of questions that critique the social, economic, and environmental viability".⁶ It engages a participatory design process that can be measured and reviewed by a third-party in the SEED community.

The Sustainable Native Communities Collaborative (SNCC) expands on SEED principles by "developing culturally and environmentally responsive designs with Native Americans, First Nations, and Indigenous communities".⁷ The SNCC website publishes case studies of "pathbreaking" projects in Indian Country. The case studies are a transparent resource that evaluates best practices on projects in six areas: design, site, innovation, culture, green, and impact.⁷ The criteria for assessing the qualitative aspects, especially culturally-based designs with indigenous groups, as well as performance criteria, was adapted to the Filipino design-build study. The SNCC evaluations and reporting, although critical, are summaries by SNCC and they are not reviewed by a third-party.

There is not one, standardized method for evaluating impact, especially qualitative impact. Given the lack of reporting post-occupancy research and beneficiary impact, in general, was fuel for conducting the research. The study draws from reputable approaches for evaluating, documenting, and reporting, but it is not confined by these methods. This study reinforces the need for more standardized evaluations and reporting, as a necessary step in project delivery. This study aims to fill this gap by reporting on best practices and lessons learned as an effort to contribute to the architecture profession, worldwide.



estudio damgo bamboo workshop with bambusa collabo, the local bamboo farmer



a student wraps uway (rattan) around bamboo joints

PROJECT BACKGROUND

The program, Estudio Damgo (Dream Studio), was established in 2012 at Foundation University in Dumaguete City. Prior to its launch, the university's architecture program operated like traditional design studios, iterating upon modern forms and materials. It had been a dream of Foundation University's president to establish a design-build program patterned after those in the U.S., to give Filipino students hands-on experience using native materials in a context of community input and support. With this mission, Estudio Damgo was born.

After the initial two years (2012 - 2014), the program gained the university national recognition and student achievement awards in bamboo construction and outreach initiatives. These accomplishments prompted the study by the university, receiving a Fulbright grant, to evaluate and institutionalize the program for long-term success.

The projects studied were: ED 1, a 435-square foot preschool classroom located in a rural mountain village (completed 2013); ED 2, an 840-square foot multipurpose hall for displaced flood survivors (completed 2014); and ED 3, a 1,140-square foot floating guardhouse at the marine sanctuary (completed 2015). The research team organized an advisory committee made up of university department heads, faculty, consulting architects, and program alumni to relay the findings and program development. The research team conducted studies over 5 months (August - December 2015) and the advisory committee met bimonthly, during the study period, to apply the research for program improvements.



the research team en route to conduct POE's on Estudio Damgo project 1

RESEARCH TEAM

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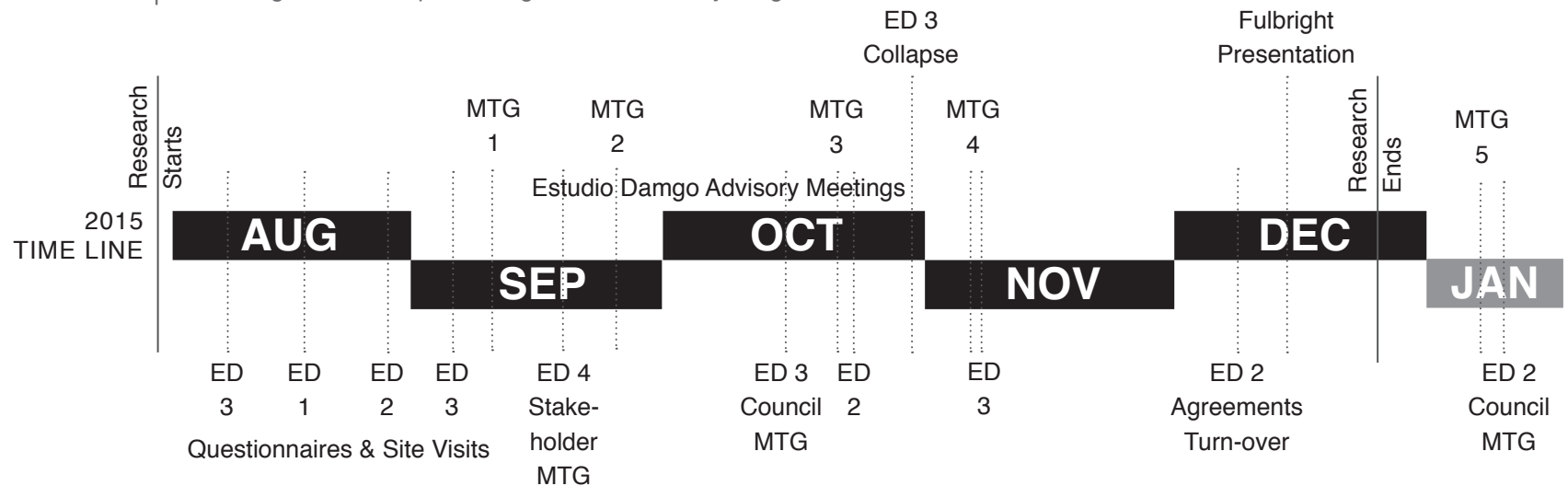
Foundation University

Estudio Damgo Alumni:

Minda Luz Badon
Michael Libertario
Marie Ann Lagudas
Julie Ann Mayoga
Jeff Ponce
Kevin Silorio
Melissa Anne Villalon
Je Vincent Villaruz

The research was conducted under a Fulbright Teaching and Research Grant led by Anna Koosmann, an American architect and former Estudio Damgo instructor (2012 - 2014). Koosmann collaborated with Foundation University's Research and Extension Office Director, Geraldine Quinones, and the College of Arts and Sciences, Maria Chona Z. Futralan Ph.D. and Dean, Kriss Michael A. Tubog MPA. Koosmann and Quinones led the field research assisted by Estudio Damgo student alumni.

Quinones, Futralan, and Tubog created and tallied the questionnaires for the study. Koosmann partnered with the university research team to conduct the POE's, site observations, and attend community meetings. Alumni from Estudio Damgo 3 (2014 – 15) volunteered to assist the POE's and site observations for all the projects. Interactions were conducted in the respondent's native Cebuano language and translated to English. The research team was integral to the study because they had formed trusting relationships with the recipient community during the project development and construction before the study was conducted. This enabled easy site access on all three projects, and brought greater depth for conducting POE's and site observations. Because the research team was active throughout the entire process prior to the study, they had more knowledge of the site conditions and community behaviors. This prior knowledge contributes to the analytical comparisons in the POE's, site observations, and case studies. In addition to feedback from the recipient community, the research team received feedback from the social worker assigned to Estudio Damgo 2. Furthermore, attending community meetings and discussions presented valuable information on multiple perspectives from the community stakeholders perceptions of the projects, that were not addressed in respondent questionnaires, nor were they observed in the POE's and site visits. The case studies document and compare data according to program scale and schedule, and project size and cost, for quality assurance, benchmarking, and creating guidelines on future projects. The case studies include qualitative analysis from the site observations and community meetings.



METHOD

- QUESTIONNAIRES**
- POST-OCCUPANCY EVALUATIONS**
- CASE STUDIES**

The study was conducted over 5 months (August – December 2015). The study commenced at a critical developmental period of the program. At the start of the study, Estudio Damgo 1 and 2 structures were constructed and occupied, the third structure was approaching completion and occupancy, and the fourth project was in the design phase. The university saw value in the study for creating guidelines and recommendations in time for the construction on the fourth project. It was also timely to follow up with the recipients of the completed projects for quality assurance and analytical comparison. It was necessary to identify best practices and transfer knowledge from past leaders to the current instructors. This was done by organizing an advisory committee throughout the study. The research was organized into three parts: questionnaires, POE’s and site observations, and case studies. In August, the questionnaires were distributed to the program students and recipient community respondents. POE’s and site observations were conducted after the ques-



estudio damgo alumnus surveys a community resident on the floating guardhouse

tionnaires. The research team traveled to the project site for initial data collection and follow-up until the study was complete. The research team attended community meetings and collected the data for the case studies throughout the study period. Case studies were documented after the study completion. Midway through the study, Estudio Damgo 3 collapsed on October 30, 2015, five months after the construction was complete. The collapse negated POE’s from that point forward, but ongoing research was collected through December and evaluated and documented for the case study.

QUESTIONNAIRES

- Identify** the impact of the program on the architecture students.
- Evaluate** the social impact of reviving the “bayanihan spirit” within the community.
- Evaluate** the program on the target communities.
- Evaluate** problems encountered by the students during project delivery.
- Evaluate** problems encountered by the communities after completion of the project.
- Identify** the sustainability of the project in relation to the community and the university.

POST-OCCUPANCY EVALUATIONS

- Evaluate** the post-occupancy condition of the structures.
- Evaluate** the community ownership to the structure.

CASE STUDIES

- Compare** the program scope.
- Compare** the project scope and impact.
- Transfer** knowledge.
- Improve** and institutionalize the program.

Questionnaires were completed by 12 (85.71%) Estudio Damgo alumni from the first, three years of the program (2013 – 2015). 57 (95%) community-respondents from Estudio Damgo 2 (2013 – 14). The questionnaires made use of percentage and weighted mean. The responses were then tallied through MAC spreadsheet and data were processed and analyzed to find out if the objectives of the study were carried out. 16 residents from Estudio Damgo 1 (2012 – 13) were interviewed prior to the study. The results support the general findings from the questionnaires. Estudio Damgo 3 (2014 – 15) was not complete and questionnaires were not distributed; however, feedback from ongoing site visits and community meetings were collected, and are included in the study.

POE’s were conducted on three projects. The research team led site observations and walkthroughs to inspect the structure, material, and utility condition and operation. The team interviewed nearby residents and community stakeholders during the site visits. Photographs were taken of the structure in relation to areas that needed work or damage, and notable site improvements and changes. Photographs also document the post-occupancy use of the structure.

Case studies were completed after the study period and utilized the data collection and analysis that was gathered throughout the study period . The research team attended community meetings for Estudio Damgo 2 and 3. All meetings and interviews provided analytical comparisons in the POE’s, site observations, and case studies. The information gathered was presented and discussed at the Estudio Damgo advisory committee meetings to improve future projects and curriculum changes.

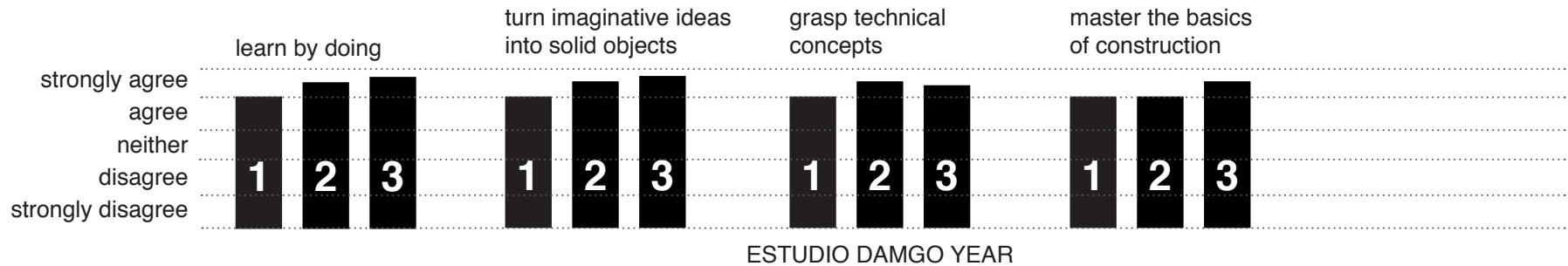
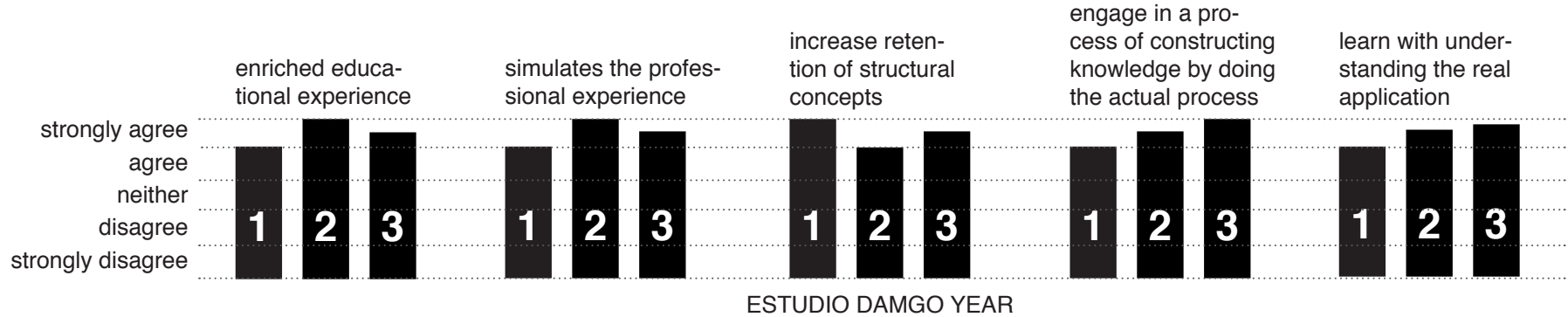
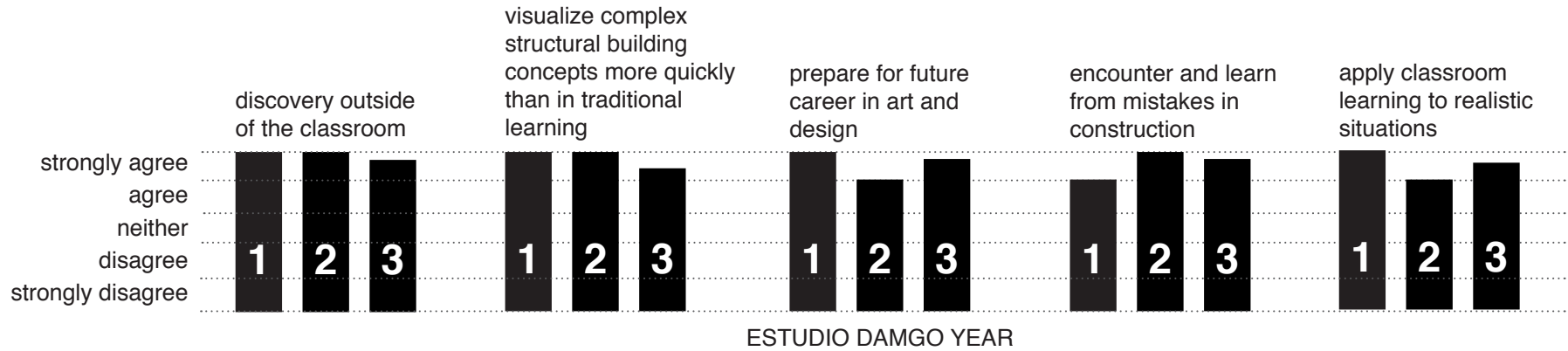
QUESTIONNAIRE

composite mean = 4.56
strongly agree

Estudio Damgo program impact on architecture students in the area of hands-on experience.

12 Estudio Damgo students surveyed

2 students from year 1
3 students from year 2
9 students from year 3



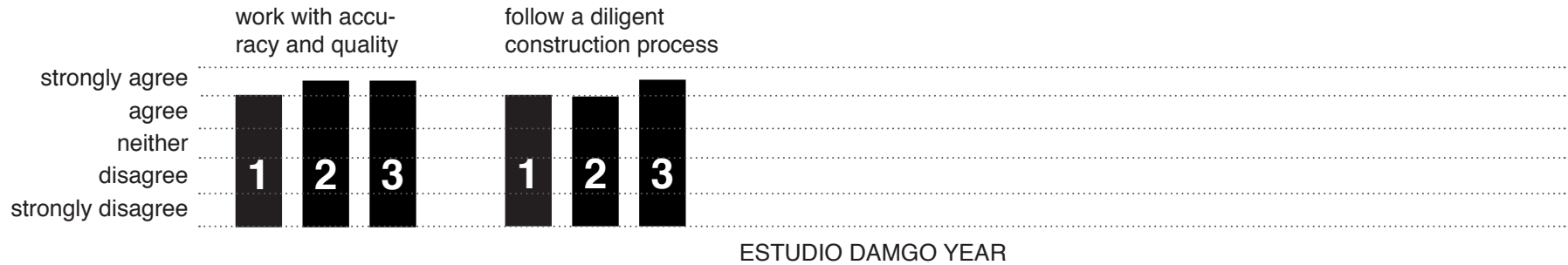
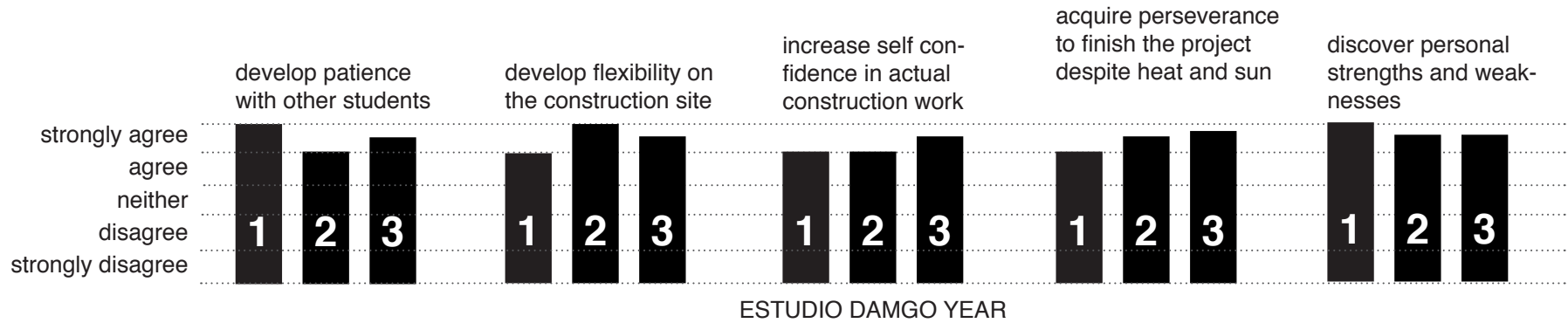
QUESTIONNAIRE

composite mean = 4.45
strongly agree

Estudio Damgo program impact on architecture students in the area of personal attributes.

12 Estudio Damgo students surveyed

2 students from year 1
3 students from year 2
9 students from year 3



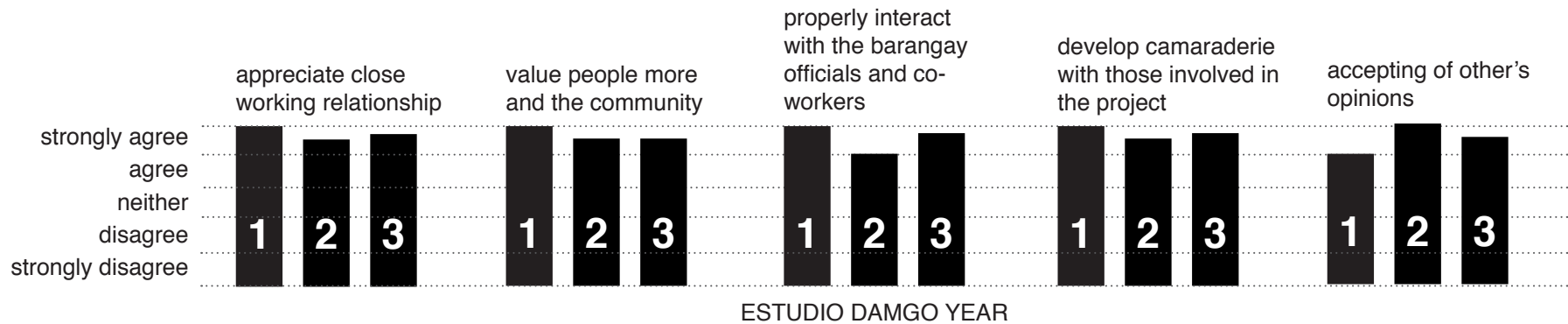
QUESTIONNAIRE

composite mean = 4.63
strongly agree

Estudio Damgo program impact on architecture students in the area of community relations.

12 Estudio Damgo students surveyed

2 students from year 1
3 students from year 2
9 students from year 3



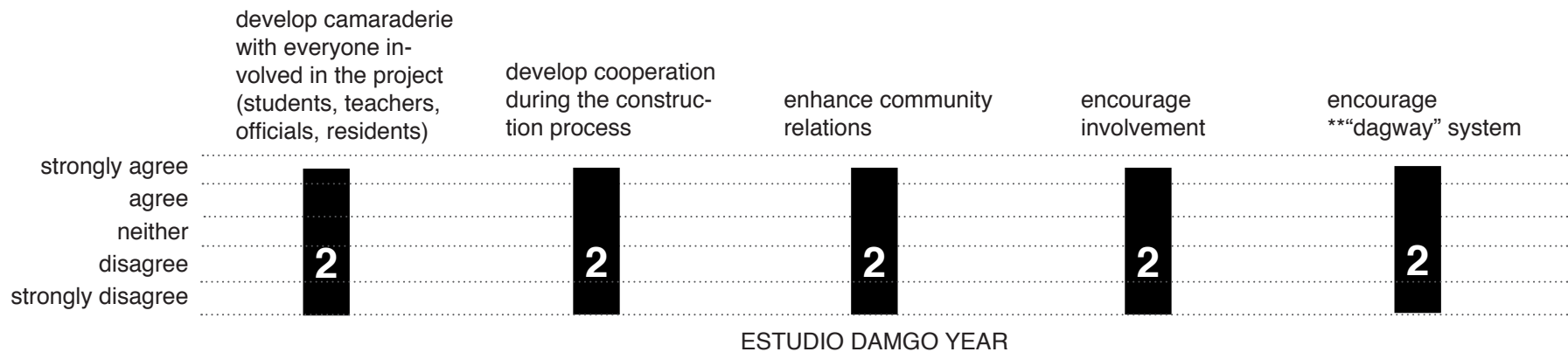
QUESTIONNAIRE

composite mean = 4.36
strongly agree

Estudio Damgo program impact on the community in the area of *"bayanihan spirit".

57 community members surveyed

0 people from year 1
57 people from year 2
0 people from year 3

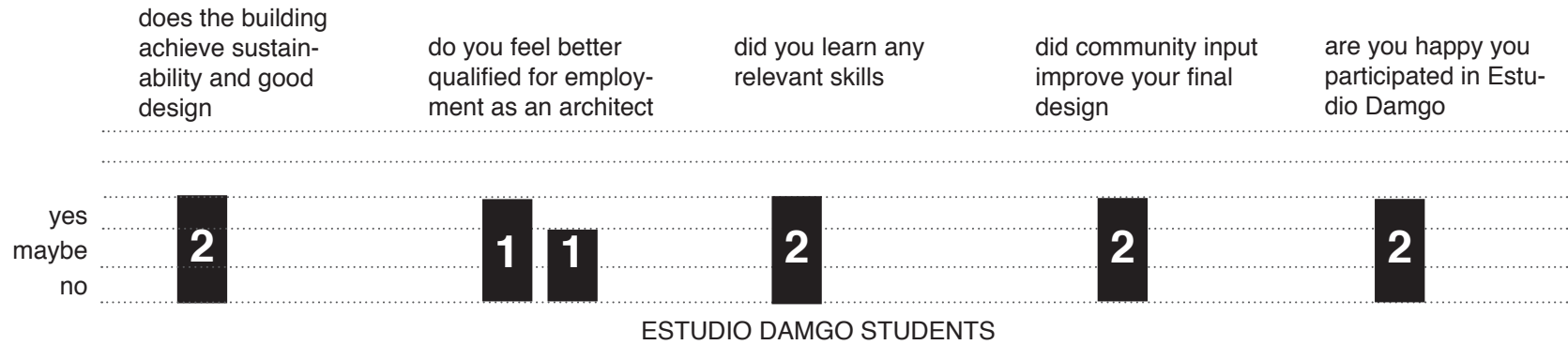


*bayanihan spirit, in Filipino, = to come together to accomplish a difficult task
**dagway, in Filipino, = teamwork

QUESTIONNAIRE
composite mean = 95%
yes

Perception of Estudio Damgo architecture students on project 1 Dungga Classroom.

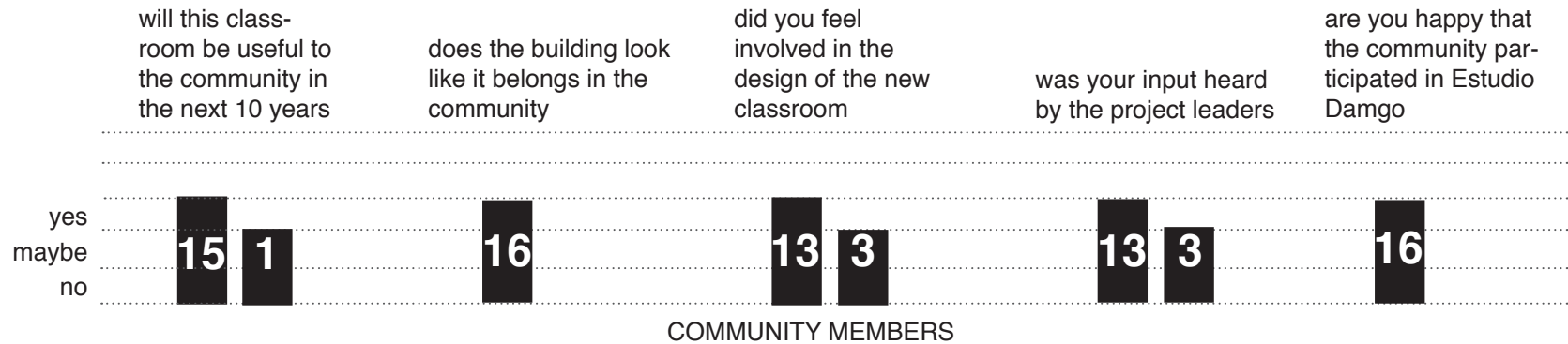
2 Estudio Damgo students surveyed
the questionnaire was distributed after project 1 was completed and before the study period began in August 2015.



QUESTIONNAIRE
composite mean = 91.25%
yes

Perception of the community on Estudio Damgo project 1 Dungga Classroom.

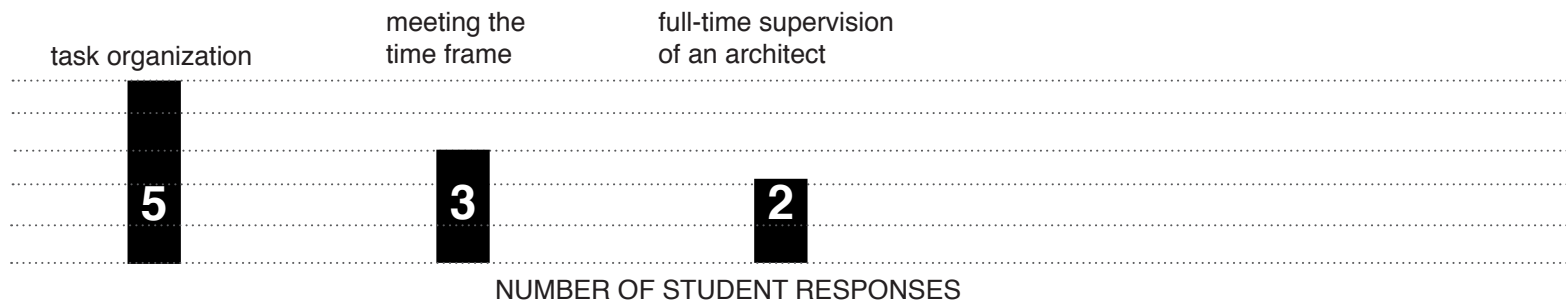
16 community members surveyed
the questionnaire was distributed after project 1 was completed and before the study period began in August 2015.



QUESTIONNAIRE
frequency = 5
task organization

Estudio Damgo program student concerns.

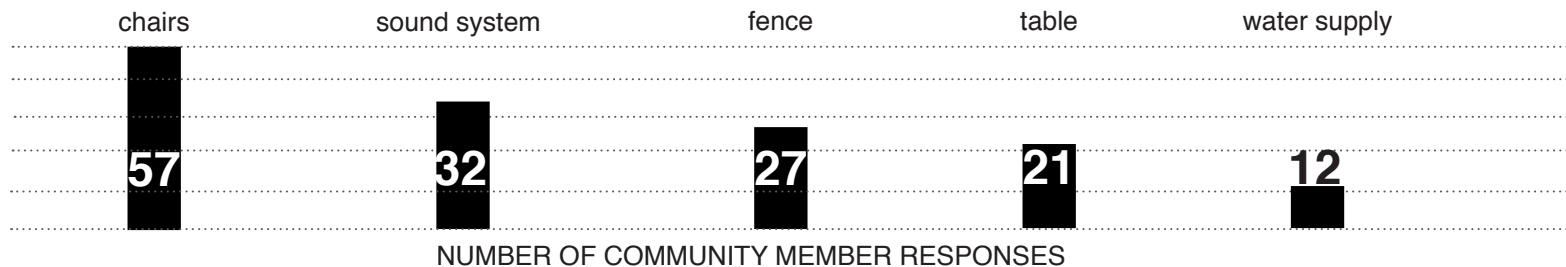
12 Estudio Damgo students surveyed
listed are the top 3 student concerns



QUESTIONNAIRE
frequency = 57
chairs

Estudio Damgo project community concerns.

57 community members surveyed from Estudio Damgo year 2
listed are the top concerns that are lacking from the completion of the project.

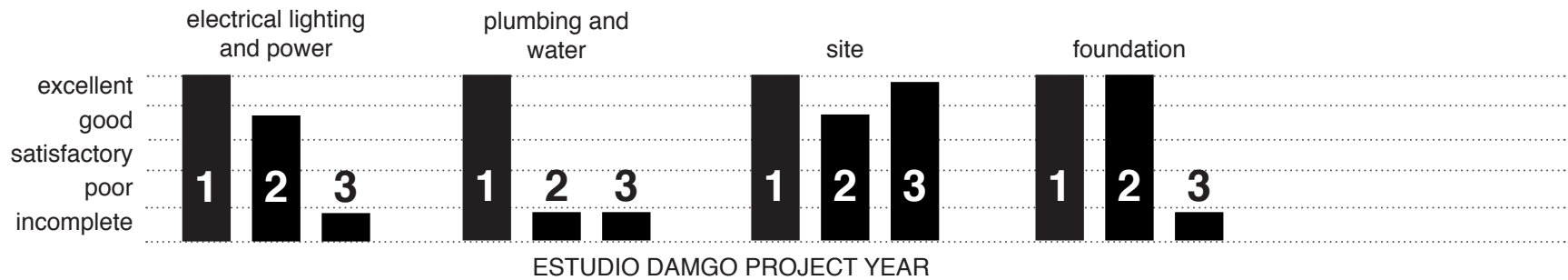
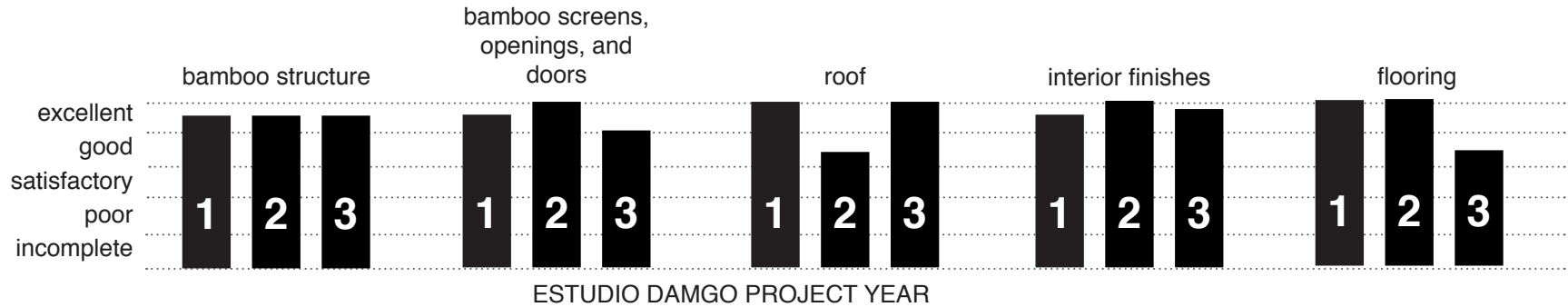


POST-OCCUPANCY EVALUATIONS

Evaluate the condition as observed in the structure, materials, and utilities.

3 community projects evaluated

Project 1 was evaluated 2.5 years after construction
 Project 2 was evaluated 1.5 years after construction
 Project 3 was evaluated 3 months after construction



NOTES

- PROJECT 1 excellent condition overall, one bamboo member had mold and another had a bee infestation
- PROJECT 2 good condition overall, roof leaks after heavy storms, missing light bulbs, verify power outlets, water utilities not hooked up, unfurnished
- PROJECT 3 good condition overall, the structure is not being occupied, raft not fully secured to seaflex anchoring system, electrical and plumbing was not evaluated

POST-OCCUPANCY
EVALUATIONS

Evaluate the recipient community ownership to the structure.

**3 community projects evaluated
August - December 2015**

Project 1 evaluated 2.5+ years after construction
Project 2 evaluated 1.5+ years after construction
Project 3 evaluated 3 - 7 months after construction

ESTUDIO DAMGO
PROJECT 1
Dunga Classroom



PHOTOGRAPHS
TL Top Left to BR Bottom Right

- TL** A net was added to the thatched roof for maintenance
- TR** A new concrete walkway at the school entrance
- BL** A new cooking area next to the building
- BR** A tarpaulin advertising a supplementary feeding program for student lunches

POST-OCCUPANCY
EVALUATIONS

Evaluate the recipient community ownership to the structure.

**3 community projects evaluated
August - December 2015**

Project 1 evaluated 2.5+ years after construction
Project 2 evaluated 1.5+ years after construction
Project 3 evaluated 3 - 7 months after construction

ESTUDIO DAMGO
PROJECT 2
Multipurpose Hall



PHOTOGRAPHS
TL Top Left to BR Bottom Right

- TL Potted plants stationed next to the building
- TR Chalkboard writing from a community meeting and posters taped to the interior
- BL A new white picket fence and community gathering
- BR Decorated casket at a funeral wake, honoring the life of a former resident

POST-OCCUPANCY
EVALUATIONS

Evaluate the recipient community ownership to the structure.

**3 community projects evaluated
August - December 2015**

Project 1 evaluated 2.5+ years after construction
Project 2 evaluated 1.5+ years after construction
Project 3 evaluated 3 - 7 months after construction

ESTUDIO DAMGO
PROJECT 3
Floating Guardhouse



PHOTOGRAPHS
TL Top Left to BR Bottom Right

TL Sign posted by the council reads, "Warning, Anyone caught using the Marine Guardhouse will be arrested and fined"
TR Estudio Damgo alumnus interviews a community resident on the floating guardhouse
BL Floating guardhouse bamboo raft is weathered and loose
BR The structure collapsed on October 30, 2015, Foundation University workers haul in the pieces



ESTUDIO DAMGO 1 | 2013

owner: DepED and Municipality of Valencia
 d+b architect: Foundation University Estudio Damgo
 location: Brgy. Malaunay, Valencia, Philippines
 size: 68sm (434sf)
 cost: Php 450,000 (\$10,000)



ESTUDIO DAMGO 2 | 2014

owner: City of Dumaguete, Brgy. Bajumpandan
 d+b architect: Foundation University Estudio Damgo
 location: Core Shelter Brgy. Bajumpandan, Dumaguete City, Philippines
 size: 82sm (850sf)
 cost: Php 935,000 (\$20,000)



ESTUDIO DAMGO 3 | 2015

owner: City of Dumaguete, Brgy. Batayan
 d+b architect: Foundation University Estudio Damgo
 location: Marine Sanctuary, Brgy. Bantayan Dumaguete City, Philippines
 size: 120sm (1,144sf)
 cost: Php 1,465,000 (\$32,000)

“we have a road map to guide us on future projects”

2 student leaders
 6 fourth year students
 500 volunteer hours

194 Days

100 Design Days | 94 Build Days

June 2012 - March 2013

Best Practices | Bamboo training workshop gave students the skills necessary for construction. Including 4th year architecture students and volunteers on construction helped the project stay on schedule.

Lessons Learned | Remote site access caused delays during construction.

- estudio damgo instructor

3 student leaders
 210 volunteer hours

210 Days

80 Design Days | 130 Build Days

June 2013 - March 2014

Best Practices | Establishing partnerships with City Administrators and community stakeholders early helped the project stay on schedule.

Lessons Learned | Identify owner responsibilities in the contracts at design, construction, and turn-over.

9 student leaders
 150 volunteer hours

266 Days

80 Design Days | 186 Build Days

June 2014 - June 2015

Best Practices | Trial testing floating models of the structure contributed to the final structural design and successful launch.

Lessons Learned | Develop trust with community stakeholders through participatory design practices. The floating guardhouse collapsed October 31, 2015 5 months after its launch.



ESTUDIO DAMGO 1 | 2013
school children reciting the national pledge of allegiance.



ESTUDIO DAMGO 2 | 2014
core shelter residents playing bingo.



ESTUDIO DAMGO 3 | 2015
sign says "WARNING: anyone caught using the Marine Guard House will be fined and arrested."

“we have a lunch program for the students and a place to hold our parent-teacher meetings”

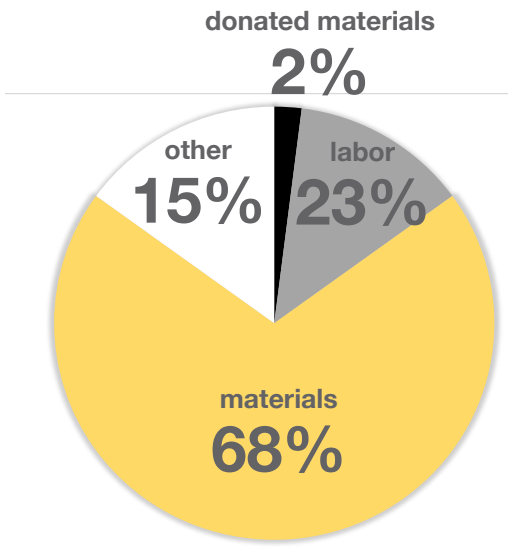
- barangay school teacher

“we can meet in one space to help resolve conflicts”

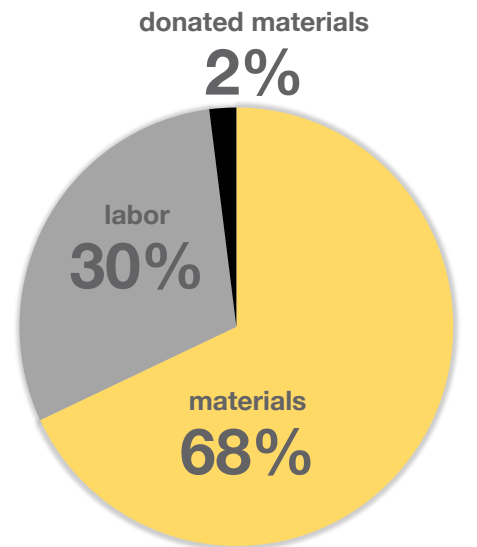
- core shelter community president

“we like the structure, but worried it won't hold up to strong winds and high waves during typhoon season”

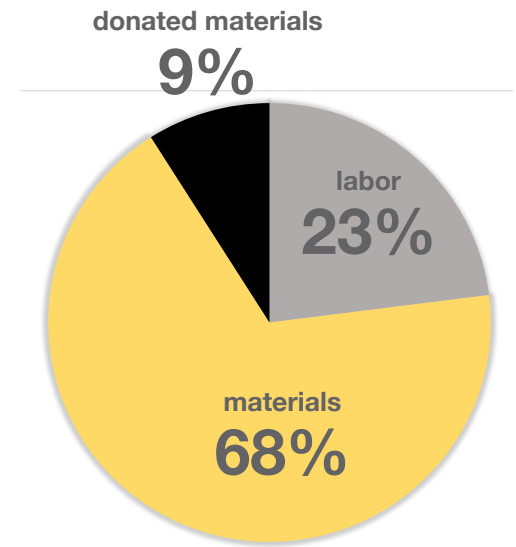
- bantay-dagat resident



TOTAL Php 458,036
\$10,180



TOTAL Php 934,621
\$20,770



TOTAL Php 1,463,578
\$32,525

Design | Bamboo screens and openings are orientated to catch breezes from the mountain valley and expansive views, utilizing daylight and passive cooling.

Site | Before, children walked several kilometers to attend school. Now, pre-school children gain access to daycare and education in their remote mountain village.

Innovation | Showcasing bamboo in new applications, like skeleton screens and in the building form, Filipinos are exposed to re-imagine the “poor man’s” material.

Culture | The building pays homage to indigenous materials while providing a space for pre-school, daycare, and community gatherings.

Green | 60% of the building materials are locally sourced and renewable. Passive cooling and daylight reduce energy costs.

Design | The high pitch roof and large over hangs draw air up and through the building for natural cooling. Folding screen partitions optimize passive cooling, daylight, and an inclusive public space.

Site | The building is located in the dense community of over 100 households. Bio-swales and roof gutter rain chains manage water runoff.

Innovation | Interdisciplinary program trains students and the village residents how to raise fish and grow vegetables in Phase II plans for an aquaponics system.

Culture | The space is flexible and open for community meetings, adult training, and life events such as funeral wakes and services.

Green | Utilizes passive systems and on site water management. 90% of the structure is locally farmed bamboo and 80% of the finishes are locally sourced materials such as clay and amakan.

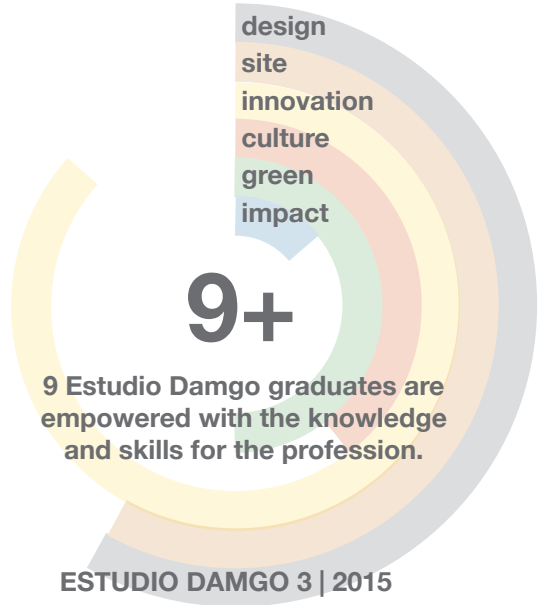
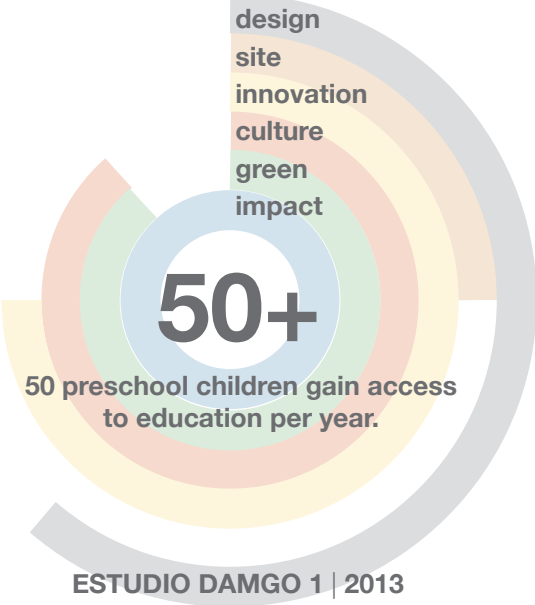
Design | A pyramid is a strong structure with a low center of gravity keeping the structure upright in waves. 360 degree view from the top level give fish wardens unobstructed views over the sanctuary.

Site | Floating near the protected marine sanctuary, the structure is anchored to the sea floor at four points, .

Innovation | Locally sourced materials prefabricated off site and assembled on site. Panels and components can be taken apart and reassembled for ease of construction and maintenance.

Culture | The structure is a raft for the fish wardens to carry out their surveying for illegal fishing. Located near Silliman Beach, it is open to the public for snorkeling and swimming.

Green | The structure uses locally sourced bamboo and mahogany. Passive systems and a solar panel provides enough power for LED lighting.



FINDINGS

The findings from the questionnaires were reviewed by the research team and published in a university journal. After the POE's and site observations were conducted, the research team organized an Estudio Damgo advisory committee made up of department heads and Estudio Damgo student leaders and alumni to support the research, address program needs, make curriculum changes, and it served as a communication platform between university departments. The committee met bimonthly for the duration of the research study. The POE's and site observations revealed areas for improvement on the program and the target communities. Estudio Damgo projects 2 and 3 demonstrated confusion over the ownership of the structure. The research team followed up the turn-over agreements between the recipient community and the university. New agreements were created for Estudio Damgo 2 to correctly identify the recipient owners and users so that structure will be maintained and used, as it was intended. The Estudio Damgo 3 structure collapsed on October 30, midway through the study and before the turn-over agreements were resolved for occupancy. This negated new agreements between Estudio Damgo 3 stakeholders and the university. The case studies generated guidelines, benchmarks, and recommendations for the Estudio Damgo program and future projects. These findings were presented to the advisory committee after the study was complete.

IMPACT

The Estudio Damgo program has a “very high” impact on the students and the target communities. It helps students acquire their full potential in structural design and actual construction. Students put theory into practice by innovating and showcasing native materials; which in-turn, supports sustainable business practice. Furthermore, the program partnered with local businesses and artists for fundraising, music concerts, and art walks. It gave students a remarkable experience serving communities. The communities likewise felt blessed to have met a group of individuals who gave them provisions needed for activities. Beneficiaries of Estudio Damgo 1 reported an increase in classroom attendance. The school has a subsidized lunch program and a space to hold parent-teacher meetings. Estudio Damgo 2 reported an increase in meeting attendance and a decrease in neighbor disputes. Estudio Damgo 3 showed promise before



estudio damgo 2 revised turn-over agreements

its collapse. The Bantay-Dagat reported sea grass growth under the floating structure and the potential for fish population increase at the marine sanctuary. The research findings have influenced positive changes to the program and leadership. Recommendations for the university program resulted in scaling back project size, cost, and bringing on professional consultants. Revisions to stakeholder agreements clarify responsibilities and expectations at critical points during project development, construction, and turn-over. The study reinforces the importance of community buy-in during the design process, by creating and maintaining trusting relationships. It also shows the benefits of following up and POE's after construction. The program instills a sense of empowerment for both the students and the target communities. Their mutual and full involvement in the project benefited the entire community and has instilled the Filipino “bayanihan spirit” of working together for positive impact.

SUMMARY

The questionnaires evaluated the program's impact on the students and the target communities from the first, two projects. General findings showed that students benefited from the hands-on experience and that it strengthened their personal attributes and community relations. Likewise, the communities reported a revival of the "bayanihan spirit". They were grateful to be part of the program.

Post-occupancy evaluations documented the condition of the structures, materials, and utilities, while site observations assessed community ownership. The preschool POE was conducted 2.5 years after occupancy and found the building to be in great condition. Materials showed little signs of weathering and the utilities were in working order. Site observations showed the school had a new net on the thatched roof (which aids in its maintenance) and the community had also added an outdoor kitchen and a new concrete walkway. These signs indicated the building was being maintained and owned.

The multipurpose hall POE was conducted 1.5 years after occupancy and showed that the building was in great condition. Materials had no signs of weathering; however, water had not been hooked up. This resulted in additional follow up and new agreements between the village and city administrators to clarify roles and responsibilities. Overall, site improvements indicated that the building was being maintained and owned.

The floating guardhouse POE was conducted 3 months after construction and turnover. The structure was not yet occupied due to confusion over its readiness. The villagers were waiting for the students to make repairs and generally felt the structure would not hold up and refused to take ownership until after typhoon season. Furthermore, the village council posted a sign stating, "Warning: anyone caught using the marine guardhouse will be arrested and fined." The community's concerns were validated when the structure collapsed on October 30, 2015, the victim of tidal waves.

Case studies document the projects according to size, scope, schedule, cost, and impact. The information was summarized into best practices, lessons learned, and notable project attributes. The research findings and case studies were presented to the advisory committee and resulted in revisions to the curriculum and agreements, scope reduction, and capping of budgets on future projects.

Project summaries showed the preschool was completed on time and with a surplus of funds which rolled over to the next project. The multipurpose hall was completed on time; however, it was larger and produced debts going into the next project. The floating guardhouse was larger still and costlier, and it was not finished on time. The multipurpose hall had the greatest community impact, serving over 100 households of displaced flood survivors. Intangible outcomes included an increase in local meeting attendance and a reduction in neighbor disputes. The preschool teachers initiated a subsidized lunch program in their schoolhouse and reported an attendance increase. Even at the guardhouse, before its collapse, the villagers reported new sea grass underneath and the potential for an increase in the fish population.

Notable attributes in all the projects utilized locally grown bamboo, when properly treated and maintained, can last 20 years or more. At ED 1 and 2, bamboo columns are bundled for structural redundancy and can be replaced, if damaged. Large roof overhangs draw in breezes for passive cooling. Best practices at ED 1 and 2 include: working with city officials to identify projects, organizing community workshops early in the design phase with reviews for critical feedback, working on site and involving the community during construction, and providing a maintenance plan at turnover. ED 3 students did not engage in a participatory process, the structure was pre-fabricated off-site, and they pushed through on a challenging design to float a structure without community buy-in, which resulted in a collapse. General lessons learned include, plan for better site access and define the roles and responsibilities of each party at every phase in the agreements.

RECOMMENDATIONS

Establish consistent and committed leadership.

Build trust among community stakeholders for community buy-in and sign agreements.

Involve the community in all phases of design and construction.

Provide a maintenance plan and take time to instruct owners on building maintenance and operations.

Follow up and follow through long-term success plays out after turnover and when the building takes on the lives of its users.

The research provides insights into the complexities of adapting a design-build pedagogy to reform Filipino architectural education and it reinforces the above practices.

Furthermore, the POEs, on site interviews and observations, and attending community meetings provided information that the questionnaires lacked. Following up resulted in gaining greater detail of the successful attributes in each project and the problems that needed attention.



"palihi" dancers at the ground breaking ceremony for estudio damgo 2 project

Recommendations for Estudio Damgo's hands-on pedagogy extend its value beyond the building and design awards. Building and donating a structure alone does not guarantee success; rather, the complexity of social impact design engages communities in all phases of planning, design, and construction that addresses the needs expressed by the community. This is integral and conducive to best practices. Educating emerging professionals within their local context serves as an alternative to the global initiatives for building resilient communities. Storms like Super Typhoon Haiyan are becoming stronger and more frequent, putting the Philippines seasonally at risk. Estudio Damgo has begun to reform architecture education and revive the "bayanihan spirit" for resiliency, may it continue and foster the spread of a local, architectural language inherent to Filipinos' place and cultural values.

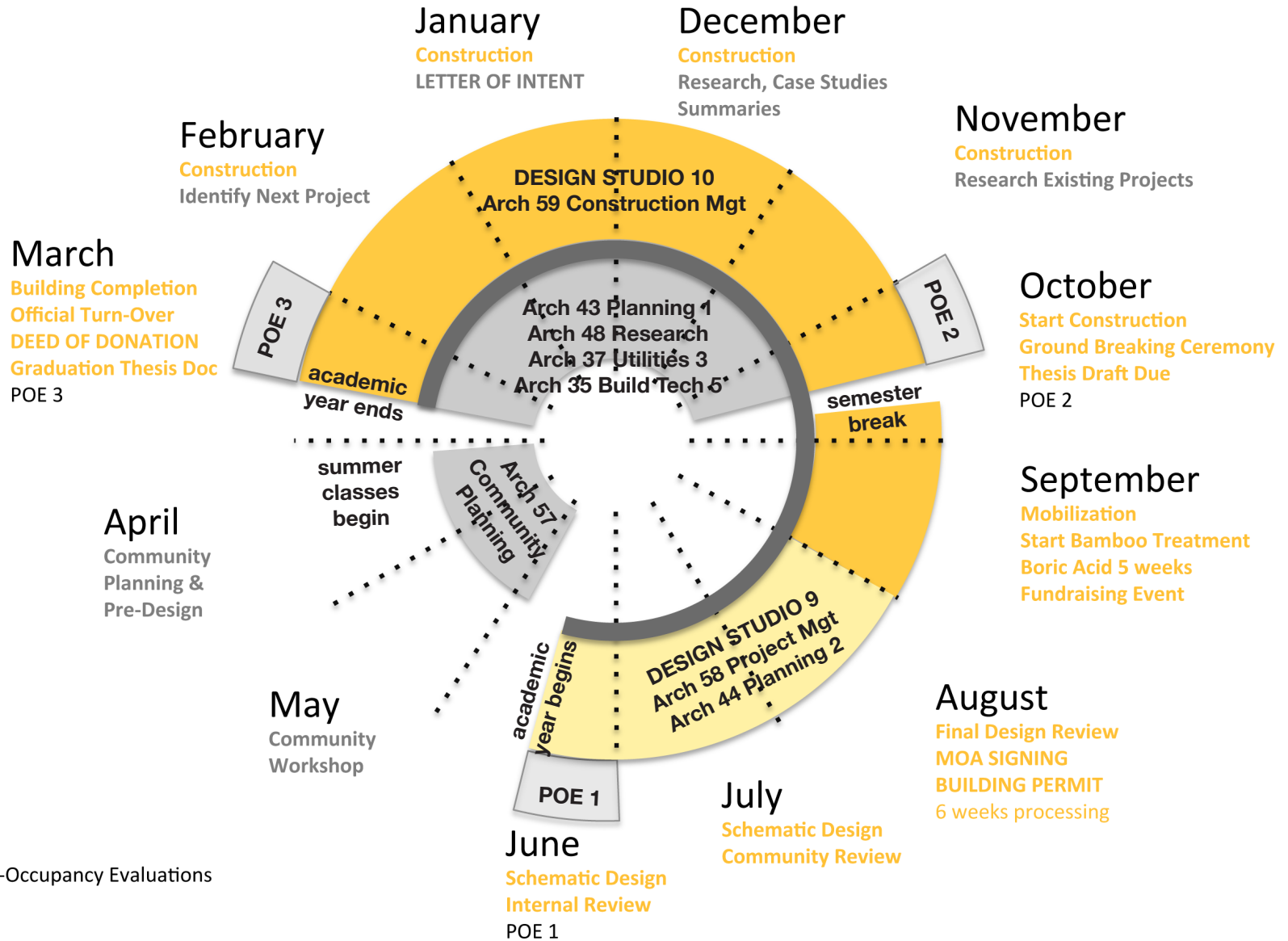
BIBLIOGRAPHY

- [1] “Philippines Population 2015 Census,” www.psa.gov.ph
- [2] Arcilla S.J. Jose S. *An Introduction to Philippine History*. Quezon City: Ateneo de Manila University Press, 1998.
- [3] “Dumaguete City,” www.dumaguete.gov.ph
- [4] Kraus, Chad. *Designbuild Education*. New York: Routledge, 2017.
- [5] Quale, John. “Design/Build/Evaluate.” *Designbuild Education*. New York: Routledge, 2017, pp 33-47.
- [6] Abendroth, Lisa M. and Bryan Bell. *Public Interest Design Practice Guidebook*. New York: Routledge, 2016.
- [7] Sustainable Native Communities Collaborative, www.susatainablenativecommunities.org
- Alcorn, Christopher G. “Improving Student Knowledge through Experiential Learning. A Hands-On Statics Lab at Virginia Tech.,” scholar.lib.vt.edu. May 28, 2003.
- Kolb, David A. *Experiential Learning*. New York: Prentice-Hall, Inc, 1984.
- The SEED Network, “SEED Evaluator 4.0,” www.seednetwork.org/seed-evaluator-4-0.

APPENDICES

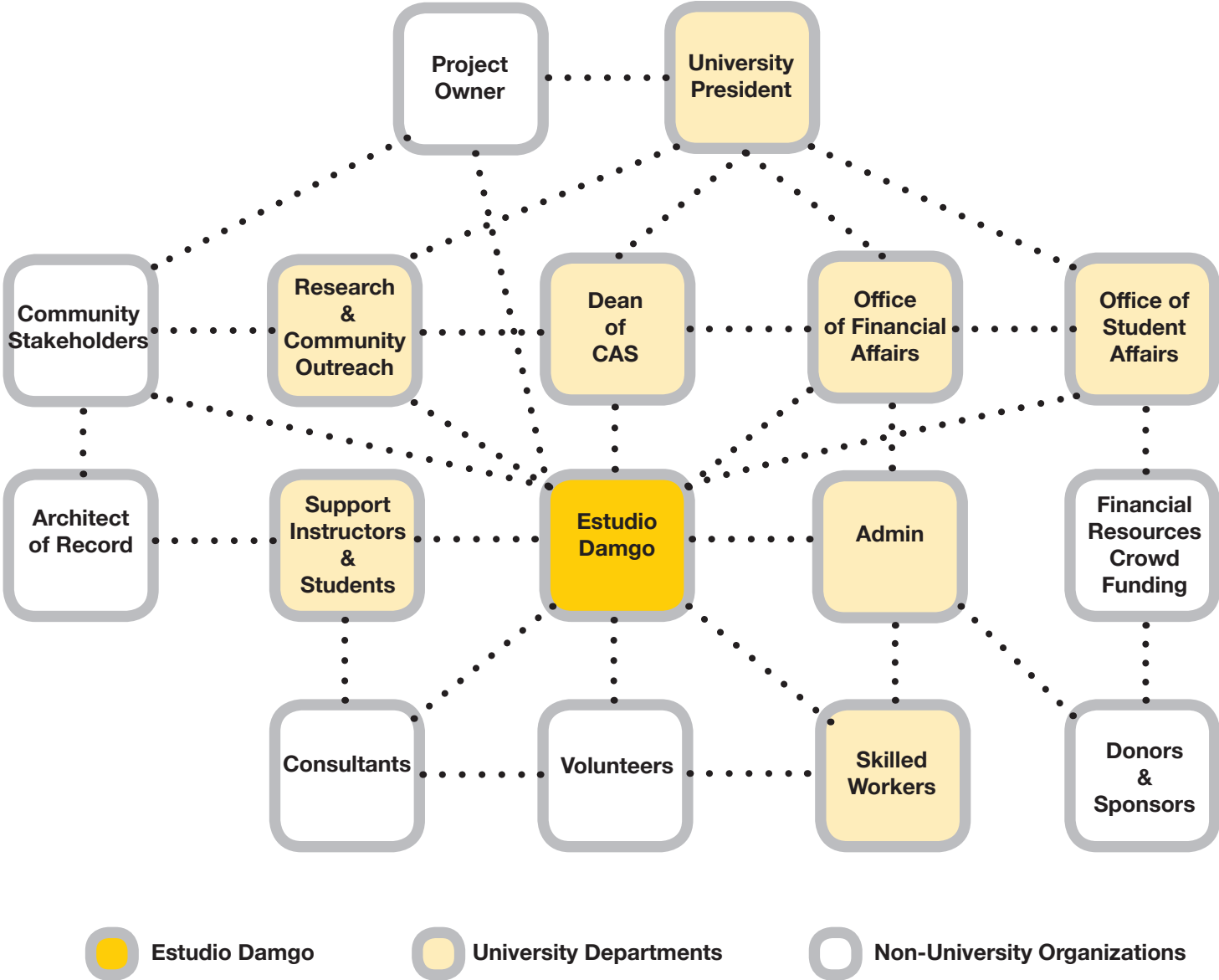
- APPENDIX A** Estudio Damgo Academic Calendar incorporating curriculum changes
- APPENDIX B** Estudio Damgo Program Organization
- APPENDIX C** Estudio Damgo Project Location Map
- APPENDIX D** Estudio Damgo Projects:
Dungga Classroom, Multipurpose Hall,
Floating Guardhouse

APPENDIX A Estudio Damgo Academic Calendar Incorporates Curriculum Changes



* POE = Post-Occupancy Evaluations

APPENDIX B Estudio Damgo Program Organization



APPENDIX C Estudio Damgo Project Location Map

ESTUDIO DAMGO

Evaluating the First Filipino Design-Build University Program
Projects Completed for the Study
(2012 - 2015)



estudio damgo project location map

APPENDIX D Estudio Damgo Projects



owner: DepED and Municipality of Valencia
 d+b architect: Foundation University Estudio Damgo
 location: Brgy. Malaunay, Valencia, Philippines
 size: 68sm (223sf)
 cost: Php 458,000 (\$10,000)
 instructors: Ray Villanueva & Anna Koosmann,
 students leaders: Von Jovi Biala and Rick Gando
 donors: Bambusa Collabo, Global Giving Gifts
 awards: TAYO UAPS Php 50,000 Scholarship
 TAYO 2013 National Program Award

ESTUDIO DAMGO 1

Malaunay, Valencia, Philippines 2013

Dungga Classroom is Estudio Damgo's pilot project established in June 2012. A partnership between Foundation University, the Department of Education (DepED), and Municipality of Valencia showcases innovation in bamboo and sustainable design strategies. Dungga is an annex preschool classroom located at the elementary site in Malaunay, Valencia. The building features locally sourced bamboo, thatched (or sak-sak) roof, and rammed earth. Located in a rural, mountain village, it captures expansive views, utilizes passive cooling, and natural daylight, to make it energy efficient.

APPENDIX D Estudio Damgo Projects



APPENDIX D Estudio Damgo Projects



APPENDIX D Estudio Damgo Projects



owner: City of Dumaguete, Brgy. Bajumpandan
 d+b architect: Foundation University Estudio Damgo
 location: Core Shelter Brgy. Bajumpandan,
 Dumaguete City, Philippines
 size: 82sm (840sf)
 cost: Php 935,000 (\$20,000)
 instructors: Anna Koosmann & James Casao
 students leaders: Rhea Dicen, Leigh Lagrimas, Daryl Suasin
 donors: Bambusa Collabo, Counselor Teves,
 Global Giving Gifts

ESTUDIO DAMGO 2

Dumaguete City, Philippines 2014

Multipurpose Hall is Estudio Damgo's second project. A partnership with Dumaguete City's relief housing efforts for displaced flood survivors, from two national disasters, Typhoon Ondoy (2009) and Sendong (2011). The building name, Panaghiusa, means "to unite" in the local, Visayan dialect. Uniting over 100 households and providing access to medical services, training, and assembly, the building showcases sustainable and energy efficient design using locally sourced bamboo as its primary structure, locally made interlocking clay bricks and clay floor tiles, passive cooling, and day lighting.

APPENDIX D Estudio Damgo Projects



APPENDIX D Estudio Damgo Projects



Foundation University ©2014

APPENDIX D Estudio Damgo Projects



Foundation University ©2014

APPENDIX D Estudio Damgo Projects



owner: City of Dumaguete, Brgy. Batayan
 d+b architect: Foundation University Estudio Damgo
 location: Marine Sanctuary, Brgy. Bantayan
 Dumaguete City, Philippines
 size: 120sm (394sf)
 cost: Php 1,465,000 (\$32,000)
 instructors: Paul Marin & Zorich Guia
 students leaders: Mimin Badon, Florabelle Caloy, Frankie
 Magalso, Julie Ann Mayoga, John Memis,
 Marie Ann Lagudas, Al Shamir, Efen Tor-
 res, and Melissa Anne Villalon
 donors: Seaflex, Global Giving Gifts

ESTUDIO DAMGO 3

Dumaguete City, Philippines 2015

Floating Guardhouse is Estudio Damgo's third project at Dumaguete City's marine sanctuary. The structure is designed for five fish wardens, or *bantay-dagat*, to guard the sanctuary at night from illegal fishing. During the day, the raft is open for eco-tourism and public access for swimming and snorkeling near the sanctuary. The raft platform is made of bamboo that are tied to plastic barrels and anchored to the sea floor at four points. The two-level pyramid is constructed of bamboo frame and mahogany in-fill panels, which were prefabricated off-site and assembled on shore before the structure was launched and anchored in place. After 5 months and its launch, the structure collapsed on October 30, 2015, from tidal waves.

APPENDIX D Estudio Damgo Projects



APPENDIX D Estudio Damgo Projects



APPENDIX D Estudio Damgo Projects

