The Education for Sustainability in Galapagos Program

Origin, Purpose, Structure, Philosophy and Initial Progress at the Program’s Midpoint
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Preface

The purpose of this document is to share information about the origins, activities, philosophical underpinnings and initial progress of the Education for Sustainability in Galapagos Program (ESG Program). It is intended for various audiences, including current and potential technical collaborators and funders, as well as individuals and organizations conducting or contemplating similar teacher professional development activities elsewhere in Latin America and other parts of the world.

The ESG Program has evolved over time, with important input from the local educational community in Galapagos (teachers, school administrators, students, parents, employers and local community leaders), specialists in Ecuador’s Ministry of Education, and experienced educators from the United States, Ecuador and other Latin American countries.

While planning the ESG Program, we found few “roadmaps” for conducting intensive, evidence-based professional development in a remote location like the Galapagos Islands and no examples of initiatives that seek to implement Education for Sustainability on a regional scale. While some aspects of our approach may be specific to the needs and realities of Galapagos, it is our hope that different facets of the model and activities described in the following pages will be helpful to others pursuing deep educational change in other places.

The progress the ESG Program has achieved to date has been possible thanks to Ecuador’s Ministry of Education, the more than 40 members of the ESG Program’s Advisory Team, ESG Program staff, and the program’s generous and committed donors. The enthusiasm of the 400 participating educators, and their deep commitment to the 7,500 students in Galapagos, is a source of inspiration and gives us reason to expect significant, lasting results.

The ESG Program welcomes questions, comments and suggestions from educators and others interested in our work. One of the hallmarks of the ESG team is its desire to share experiences, learn from others and optimize its activities in Galapagos.
Executive Summary

The Education for Sustainability in Galapagos Program (ESG Program) is an intensive, 5-year teacher professional development initiative implemented through a tripartite partnership comprised of Galapagos Conservancy (a US non-profit conservation organization authorized to operate in Ecuador), the Fundación Scalesia (an Ecuadorian education NGO based in Galapagos) and Ecuador's Ministry of Education.

The ESG Program focuses on the long-term vision (10+ years) of a strong education system in Galapagos that becomes a sustainable “seedbed” of effective education practitioners who demonstrate the power of Ecuador’s national education priorities and evidence-based instructional practices. The program provides approximately 135 hours of professional development (PD) annually to all 375 teachers and 30 school leaders who serve the 7,500 school-age children in Galapagos. Education for Sustainability (EfS), which involves teaching and learning core subjects in the context of real-life local and global examples and overarching sustainability principles, is a key component of the program.

The program responds to the findings of a participatory needs assessment (the Listening Phase) which collected data related to seven areas of activity that have been identified as critical to school effectiveness: 1) School leadership, 2) Professional capacity of teachers, 3) Relationships within schools, 4) Parent and community relationships with schools, 5) Teacher incentives, 6) Helpful mechanisms, and 7) Outside environment.

The ESG Program was designed based on the recommendations of the Listening Phase and input from representatives of Ecuador’s Ministry of Education and the program’s External Advisory Team. It pays attention to PD delivery (i.e. it uses evidence-based approaches to help teachers learn new skills) as well its content (i.e. it promotes evidence-based instructional strategies to improve student learning). The three program strategies include:

- Intensive teacher PD consisting of biannual 50-hour Teacher Institutes, ongoing instructional coaching and professional learning circles.
- Strengthening local capacity to sustain PD and quality education, through educational leadership training for school directors, training a cadre of local instructional coaches, and building capacity at a local NGO to support education improvements over time.
- Implementation of a rigorous monitoring and evaluation plan to adjust PD delivery and measure impact.

In addition to EfS, the program promotes the thinking of constructivist and sociocultural theorists, such as Piaget and Vygotsky, who hypothesize that individuals build their knowledge through meaningful experiences. The program also promotes a shift in the roles of student and teacher in the classroom, towards an environment where students become responsible for engaging in the learning process and building new knowledge and teachers become facilitators of learning, nudging students toward understanding and intellectual autonomy.

Since the ESG Program’s launch in April 2016, program partners have refined the processes associated with large-scale PD delivery by subject and grade groupings on two separate islands. Institutes run smoothly and instructional coaching and professional learning circles occur according to schedules planned and communicated well in advance. Initial monitoring and evaluation results reveal strong participant enthusiasm, positive shifts in several essential teacher and school leader attitudes, and initial changes in practice. Many lessons have been learned that will improve implementation during the second half of the program and replication efforts elsewhere.

Program partners agree that the ESG Program’s PD model is highly relevant for other remote locations with limited Internet connectivity and relatively small concentrations of teachers and look forward to identifying ways in which the model could be adjusted, with the help of internet, video, published materials, etc., to serve significantly larger concentrations of teachers in less isolated locations.
Children play in Puerto Ayora on Santa Cruz Island.

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The Origins, Purpose and Impact of the ESG Program

The Education for Sustainability in Galapagos Program (ESG Program) is an intensive, five-year teacher professional development initiative implemented through a tripartite partnership comprised of Galapagos Conservancy (a US non-profit conservation organization authorized to operate in Ecuador), the Fundación Scalesia (an Ecuadorian education NGO based in Galapagos) and Ecuador’s Ministry of Education (MinEduc).

The main goal of the ESG Program is to improve education quality for the 7,500 school age children in Galapagos by strengthening the teaching skills of the 375+ teachers in the 20 K-12 schools on the Islands. Over time, we believe that improved education will build a local society of civic-minded critical thinkers who understand and appreciate what makes Galapagos unique, and who have the skills, attitudes, and commitment to pursue and promote livelihoods that are consistent with preserving the delicate ecosystems in protected areas like the Galapagos Islands.

Education Realities in Galapagos

Historically, Galapagos education has faced chronic challenges: teachers have had limited access to professional development; instruction has relied heavily on rote learning; and school directors have viewed their role as administrators, as opposed to champions of quality improvements within their schools. In general, the Galapagos education system has not developed the competencies required in the local work place or for university study and has not taken advantage of the tremendous opportunity to integrate Galapagos’ unique physical surroundings as a natural laboratory for sustainability-focused education.

Concern about the state of education has been voiced by several sectors over the decades:

- In 1993, concerned community members on Santa Cruz established the Fundación Scalesia to develop a new educational model more suited to needs and conditions in the islands. The following year they founded the Tomás de Berlanga School, with the idea that it would become a model for what could and should occur in every school in Galapagos.
- In the Special Law of 1998, community members pushed for changes in Galapagos education, including a special curriculum for Galapagos, greater local authority over education, and higher salaries for Galapagos teachers.
- In 2007, prior to placing Galapagos on its list of World Heritage in Danger, UNESCO’s Mission Report identified 12 areas, including education, in need of urgent attention. UNESCO noted a lack of attention to preparing Galapagueños for local employment opportunities, which resulted in migration and non-residents often filling good jobs on the islands (UNESCO 2007).
- In its 2010 Mission Report, UNESCO noted progress on many fronts, but it could not point to any significant improvements in the area of education (UNESCO, 2010).

In 2006, Ecuador’s Ministry of Education launched and ambition 10-Year Plan (Table 1), tripling government investments in education and focusing attention on key drivers of education quality. As a result of these efforts, education quality improved faster in Ecuador from 2006 to 2013 than in most countries in

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Table 1: Goals of MinEduc’s 10-Year Plan (2006-2015)

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<th>Number</th>
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<tr>
<td>1</td>
<td>Achieve universal early childhood education for children under five years of age</td>
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<tr>
<td>2</td>
<td>Achieve universal elementary education through 10th grade</td>
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<tr>
<td>3</td>
<td>Achieve 75% participation in high school (Bachillerato)</td>
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<tr>
<td>4</td>
<td>Eradicate illiteracy and strengthen adult education</td>
</tr>
<tr>
<td>5</td>
<td>Improve educational infrastructure and equipment</td>
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<tr>
<td>6</td>
<td>Strengthen quality and equity of education and establish a national system for evaluating students, teachers and schools</td>
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<tr>
<td>7</td>
<td>Raise the profile of the teaching profession through formal training, ongoing professional development and better work and living conditions</td>
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<tr>
<td>8</td>
<td>Increase educational investments to 6% of GNP</td>
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Source: Ministry of Education, 2017

1 In Ecuador, PreK-12 education is divided into five levels: Preparatoria (PreK-K in the US system), Básica Elemental (1st-3rd grade), Básica Media (4th-6th), Básica Superior (7th-9th) and Bachillerato General Unificado/Técnico (10th-12th).
Latin America, according to the results of the SERCE and TERCE studies coordinated by UNESCO. However, the physical and electronic isolation of Galapagos (600 miles off the coast of Ecuador and extremely limited Internet bandwidth) limited its involvement in many of these reforms. According to the results of national standardized exams during 2013 (the Ser Estudiante exam administered in the US equivalent of grades 4, 7 and 9 and the ENES college entrance exam, which measures verbal, reasoning, and abstract thinking skills) the performance of Galapagos students continued to lag behind that of their mainland counterparts, across all subject areas.

The ESG Program has its roots in a multisector workshop conducted in 2012 that provided an opportunity for representatives of GC, FS, MinEduc and members of the Galapagos educational community to discuss collaborative approaches to strengthen the quality of preK-12th grade education in the islands. Conversations were founded in the shared belief that the quality of the local education system was one of the most important factors in determining the future of Galapagos. All agreed that Galapagos’ status as the world’s most ecologically intact oceanic archipelago depended on young residents being educated to understand and assume key roles in building a sustainable society in Islands. This dialogue generated ideas and enthusiasm, and all parties agreed that external technical support was needed to define the best way forward.

THE LISTENING PHASE: METHODOLOGY

During 2013, GC and FS worked with specialists from the Consortium for Educational Policy Research (CPRE) to design a process to further understand educational realities in Galapagos and to collect data needed to design a program to improve PreK-12 education. In May 2014, the MinEduc signed an agreement authorizing GC and FS to implement the process, which came to be known as the Listening Phase.

The Listening Phase was carried out from July 13-19, 2014 by a team of educators with expertise in natural science, language arts, English language and Educational Leadership. Over a period of five days, team members conducted learning walks at 14 of the 21 schools offering pre-K through 12th grade education on Santa Cruz and San Cristobal, interviewed all school directors on these islands, and conducted focus groups with teachers, parents and students from each school.

The framework used to guide observations and analysis was based on the work of sociologist and organizational development practitioner Marvin Weisbord and the research of Tony Bryk and colleagues from the Chicago Consortium for School Research (Weisbord, 1978; Bryk et. al., 2010) focusing on seven areas of activity that have been identified as critical to school effectiveness: 1) School leadership, 2) Professional capacity of teachers, 3) Relationships

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2 Coordinated by UNESCO, the Second Regional Comparative Explanatory Study (SERCE 2006) and the Third Regional Comparative Explanatory Study (TERCE 2013) assessed student performance in the US equivalent of third and sixth grades in the areas of mathematics, language (reading and writing) and sixth grade in the area of natural sciences. The main objective of these studies was to provide information for debate and decision making related to effective public policies (UNESCO, 2013).

3 CPRE (http://www.cpre.org) CPRE is a network of renowned researchers from universities and other institutions across the United States who study and publish on a range of topics relevant to education from early childhood to higher education at the local, state, and national level. Institutional members include: University of Pennsylvania, Teachers College (Columbia University), Harvard University, Stanford University, University of Michigan, University of Wisconsin-Madison, Northwestern University.

4 GC and FS originally sought to focus PD on these four areas. Based on the findings of the Listening Phase and subsequent discussions with the Ministry of Education, the decision was made to include PD in mathematics and social studies, as well.
within schools, 4) Parent and community relationships with schools, 5) Teacher incentives, 6) Helpful mechanisms, and 7) Outside environment (see Figure 1).

THE LISTENING PHASE: FINDINGS

The Listening Phase collected data and provided recommendations in each of the seven components of the diagnostic model (a full copy of the report can be found at www.galapagos.org/listeningphase). While all this information was helpful to understanding local capacity, needs and opportunities, the findings in the following four areas were most critical for defining a path forward.

EDUCATION LEADERSHIP

Research identifies the following essential educational leadership-related tasks: 1) defining purpose, 2) incorporating the purpose into programs, 3) ensuring the quality of teaching and supporting improvements to it, and 4) maintaining order regarding internal conflict. Studies also emphasize the important role of inclusive leadership and the ability of the director to cultivate a team of leaders who develop the sense of shared responsibility for school advancement (Burke, 1992; Selznick, 1957; Bryk et al., 2010). The questions explored in this area included: Is there a clear vision for each school? What kind of leadership dominates? How are decisions that affect teaching and learning taken? To what extent, and in what way, do formal leaders (the rectors and directors) engage in teaching? Do teachers have a voice in decisions that affect teaching and learning?

Listening Phase observers noted weak coordination and alignment between school leadership and the execution of schools’ missions. This had resulted in a range of - or lack of - implementation strategies and, consequently, a wide variation in the quality of the delivery of educational services. While some directors interviewed clearly had the desire and the potential to become strong school leaders, if training could be provided, these same leaders were products of schools that had not benefitted from the kind of effective educational leadership that has been documented as essential to school improvement.

Recommendation: Improving education in Galapagos would require transforming the role of school directors and ensuring their capacity to fill this role. Directors must come to believe that they are capable of affecting positive change in their schools, even in the face of many challenges, such as incomplete teaching tools or the added challenges of running a school in a remote archipelago. “Grit” and a “can do” mindset and culture are essential for school change.

PROFESSIONAL CAPACITY OF TEACHERS

Bryk et al. (2010) describe schools as “human resource-intensive enterprises that are only as strong as the quality of faculty, the professional development that supports their learning, and the faculty’s capacity to work together to improve instruction.” Questions explored in this area included: What is the quality of the professional staff? What is the quality of the
observed instruction? Are classrooms active? Is the observed teaching student-centered? Are teachers willing to try new approaches? Is there a sense of professional community? Do teachers collaborate on lessons? Do they observe each other? Do they share lessons and materials? Are there regular meetings to discuss teaching and student progress?

While observers identified bright spots, they noted that most teachers were unprepared to implement effective teaching strategies and instead relied on traditional, knowledge-recall oriented techniques that cannot prepare students to be thoughtful, critical thinkers. Observers reported a readiness for dialogue about improving instruction from teachers in all subjects. However, as reported in the case of professional development previously offered in Galapagos in the area of English language, teachers will not necessarily embrace professional development opportunities if their schools do not provide the time (which is not explicitly mandated in by formal MinEduc directives), flexibility, and support to do so, and if there are no consequences for not improving, or no incentives beyond one's own professional growth (K. Havjovski, personal communications, June 12, 2014).

**Recommendations:** Any school improvement program in Galapagos should include ongoing professional development opportunities focused on pedagogy and content knowledge and must recognize the time and support needed to make significant changes in classroom practice. Based on comments of many teachers, it would be useful for a school improvement program to work closely with directors, teachers and Ministry officials to identify ways to optimize the use of the afternoon work periods, either for planning, professional development or participation in professional learning communities within and among schools.

**HELPFUL MECHANISMS**

Bryk et al. (2010) highlight the importance of timely access to information on teacher and student performance, teaching materials, and effective professional development that articulate the “what” and “how” of instruction and instructional routines. Accordingly, observers sought to answer questions such as: What supportive mechanisms are available to leaders and teachers? Do principals and teachers have access to data on student performance that can identify needs and guide interventions? Is the available data used to focus improvement efforts? Are there lesson plans? What forms of instructional guidance are provided? Are there adequate instructional materials available to teachers? Are there computers in the classrooms or available to teachers, to students? What is teachers’ access to professional development? What is the perceived quality of the professional development?

In general, Galapagos teachers had limited access to support mechanisms. Formal lesson planning was not a common practice. Except for several sessions to introduce the new national curriculum, most professional development opportunities for Galapagos educators were carried out on the mainland and/or online. The teachers interviewed explained that participation in PD events on the mainland is expensive in terms of time and money and that online training is impractical due to the slow Internet connectivity in Galapagos. As for data on student performance, teachers and directors reported that the results of standardized test implemented by INEVAL were not available in a useful format (e.g. disaggregated by student or grade) for decision making.

**Recommendations:** Considerable improvements could be made in Galapagos schools if teachers had access to instructional guidance and support, including high-quality professional development and coaching designed by subject area and grade and greater access to useful student data for decision making.

**OUTSIDE ENVIRONMENT**

Bryk et al. (2010) identified the importance of various aspects of the community context (available resources, social capital, etc.) that could impact school performance. CPRE expanded this concept to include external policies and professional cultures that also may be crucial to schools in Galapagos. In this area, questions included: What are the most critical aspects of the school context? What other policies, practices and organizations deeply affect the operation of the schools? What other influences should be considered in planning an improvement project?

Observers noted that the physical and electronic isolation of Galapagos presented a significant challenge for the local education community in terms of keeping pace with the mandates of the Ministry of Education’s 10-Year Plan (2006-2015) whose implementation required considerable time and effort of school leaders and teachers (see Table 1). Observers also noted
that the unique natural and social environment context in Galapagos and the experience of local organizations and institutions (Galapagos National Park Directorate, Fundación Scalesia, Charles Darwin Foundation, etc.) represented potentially powerful opportunities for extending learning beyond the classroom and connecting it with the concept of sustainability.

**Recommendations:** Technological upgrades or “work-arounds” would need to be implemented to deal with the limited internet connectivity in the islands, such as mirroring relevant web content (teaching materials, teacher training tools, etc.) on school or island-wide networks and/or making these materials available offline. Observers also pointed to research that underscores the important role played by “middle-tier” organizations, which are often non-profit organizations that operate between schools and central government offices in support of school improvement initiatives (Aston et al., 2013). During the Listening Phase, the Board of the Scalesia Foundation expressed strong interest in serving as a local champion of a school improvement program by seeking funding to hire and support a team of lead teachers/mentors. Finally, observers noted the importance of taking advantage of the natural environment of Galapagos as a “living laboratory” for contextualizing Galapagos education to local realities and the concept of sustainability.

In summary, the Listening Phase concluded that a well-designed school improvement initiative could be an empowering process for Ministry officials and Galapagos educators. It could provide directors and teachers with the tools they need to implement Ministry directives, while providing the Ministry with the opportunity to explore new strategies for implementing different components of the 10 Year Education Plan on a relatively small scale with the benefit of added technical expertise. To be effective and fully embraced by all parties, the school improvement program should be closely aligned with the ongoing national education reform process, and carefully crafted in ways that recognize Galapagos’ special needs and opportunities.

**PROPOSAL TO THE MINISTRY OF EDUCATION**

In March 2015, GC and FS presented the conclusions and recommendations of the Listening Phase to the MinEduc and described the initial parameters of a five-year program designed to build a sustainable process to strengthen the professional capacity of the teachers in Galapagos in ways that would improve student performance and their ability to contribute to a more sustainable society in Galapagos.

The proposal consisted of an archipelago-wide professional development (PD) program with the following components:

1. Intensive, ongoing PD delivered by subject and grade level, comprised of in-person workshops, coaching and Professional Learning Circles.
2. Specialized PD in educational leadership to prepare a team of school leaders (directors and rectors) and teacher leaders (coaches) capable of fostering educational improvements in their schools.
3. Measures to build local capacity to sustain PD and continuous education improvements over time.

Following the presentation, the MinEduc authorized GC and FS to launch the ESG Program in April 2016, at the beginning of the 2016-2017 academic year.
Students at the Tomás de Berlanga School on Santa Cruz Island.

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Vision, Program Strategies and Anticipated Outcomes

The ESG Program seeks to contribute to our long-term vision (10+ years) of a strong education system in Galapagos that becomes a sustainable “seedbed” of effective education practitioners who demonstrate the power of Ecuador’s national education priorities, evidence-based instructional practices and the principles of Education for Sustainability. This education system, in turn, will improve education opportunities for the 7,500 school age children in Galapagos, forming civic-minded critical thinkers who understand and appreciate what makes Galapagos unique, and who have the skills, attitudes and commitment to contribute to sustainability in Galapagos and beyond.

While fully achieving this vision will require attention to all seven domains of the CPRE framework for quality education (i.e., the framework used during the Listening Phase; see Section 1), the ESG Program focuses on making significant improvements in four key areas (professional capacity of teachers, educational leadership, helpful mechanisms and external context) to establish the following preconditions (5-10 years) to our vision:

1. Teachers who are highly-skilled in evidence-based, student-centered instructional practices that help students to develop higher-level thinking skills, a strong understanding of the special place where they live and a desire to participate in its protection (professional capacity).

2. School leaders (directors, subdirectors, rectors and vice rectors) who champion ongoing education improvements in their schools and the professional growth of their teachers (educational leadership).

3. Access to ongoing instructional support, such as classroom observations and feedback from school-based coaches and locally-led professional development workshops (helpful support mechanisms).

4. Teachers who are committed to working collaboratively to improve their practice, through professional learning communities (helpful support mechanisms).

5. Essential support mechanisms, including effective local logistical support and sustained networks of external education specialists and funders, to ensure access to high-quality, cost-effective teacher professional development over time (external context).

Education for Sustainability (EfS) is a key building block of this vision. EfS helps students to acquire the knowledge, skills, attitudes and values necessary to shape a sustainable future (UNESCO, 2014). When implemented as envisioned by our program, EfS involves teaching core subjects in the context of real-life local and global examples and overarching sustainability principles. EfS embraces evidence-based instructional approaches and has been shown to improve student content knowledge across subject areas and develop the critical thinking and problem-solving skills they need to be successful in an increasingly complex world (Barrat Hacking et al., 2010; Ofsted, 2009; Duffin et al., 2005; Duffin et al., 2007). Additional information on the program’s approach to EfS can be found in Appendix 2.

PROGRAM STRATEGIES

To achieve this vision, the ESG Program implemented the following three strategies:

Strategy 1: Implement intensive teacher professional development (PD)

In April 2016, the ESG Program launched a PD program that offers Galapagos educators approximately 135 hours of Ministry-accredited teacher PD per year. This allows teachers to complete the 330 hours of PD required to qualify for professional advancement within a three-year period (Table 2). The PD offered by the program consists of four complementary components:

Teacher Institutes

Teacher Institutes are intensive, biannual PD workshops presented by a team of approximately 40 members of the program’s External Advisory Team. The Institutes last five days (40 hours) each and are delivered in accordance with the
five grade bands of the Ecuadorian national curriculum (the equivalent PreK, Kindergarten, and grades 1-3, 4-6, 7-9, and 10-12 in the U.S. system) and subject matter (mathematics, science, language and literature, Social Studies and English language).5

Participants include all 375 teachers and 30 school leaders (directors, subdirectors, rectors and vice rectors) from all 20 schools in Galapagos. The Ministry of Education has established two weeks of professional development time during the school calendar (one week in June and one in October) during which the ESG Program conducts the Institutes.

Pre-school through 6th grade teachers (Prebasica-7o de Básica) generally teach all four core subjects (mathematics, natural science, language arts and social studies). Except for a small group of teachers from Isabela and Floreana, who travel to Santa Cruz for the Institutes, these teachers participate in Institutes on their home island according to Table 3, below.

Middle school and high school teachers (8-10 de Básica and 1-3 de Bachillerato) usually teach a single subject and receive five years of training in mathematics (n = 40), biology (n = 24), physics (n = 12), chemistry (n = 7), language and literature (n = 27), Social Studies (n = 44) or English language (n = 38). To minimize the need to move teachers from one island to another, most of this training is delivered on Santa Cruz, home to most specialized teachers.

Each day of an institute is divided into four two-hour blocks, although facilitators can combine blocks to offer longer periods of instruction, depending on the topic and concept to be addressed. During each workshop, facilitators model a lesson or activity connected with learning objectives in Ecuador’s national curriculum, with teachers taking the role of students. During these sessions, facilitators also model one or more High-Leverage Instructional Practice (see Section 3).

Beginning during the first Institute, facilitators helped teachers to develop lesson plans that made simple connections to the local context. Beginning in Year 3, once teachers developed stronger planning skills and greater familiarity with the national curriculum, at least 50% of the workshops connect learning objectives in the curriculum, local examples and sustainability principles (Education for Sustainability). When possible, facilitators help teachers locate workshop topics in Ministry textbooks and teacher guides.

Facilitators also dedicate time during each workshop for metacognition, where teachers reflect on what they experience during the workshop, discuss the theoretical underpinnings of the activity or approach, and how they can apply what they learn in their classrooms.

### Instructional Coaching

Classroom observations and feedback sessions represent an essential component of the ESG

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5 The English language Institutes began in June 2017.
Program. Each year, most teachers participate in 3–4 coaching sessions with program coaches or visiting facilitators. These three-hour sessions often begin with a pre-observation meeting during which a coach and teacher review a lesson plan to be delivered and discuss topics such as classroom organization or teaching strategies to be used. The coach then observes the class using a teacher observation guide based on Ministry standards and ESG Program priorities. Following the class, the teacher and coach hold a post-observation meeting during which the coach facilitates teacher reflection on their delivery of the class and formulation of a personalized PD plan to improve their practice.

Professional Learning Circles (PLCs)

PLCs provide opportunities for teachers to work collaboratively to address shared needs and grow as educators. PLCs are generally organized within schools by grade level (for preschool and elementary teachers) and by subject area (for middle school and high school teachers). PLCs generally consist of 5–12 teachers and meet every two weeks for two-hour sessions outside of normal school hours, although some schools have adjusted this approach (i.e., they hold weekly one-hour meetings, or meetings are held during school hours).

During the first two years of the program, most PLCs focused on reviewing activities and pedagogy presented during the Institutes, providing teachers additional time to practice new techniques, discuss the learning theory behind what was presented, and plan collaboratively for implementation in their own classrooms. Some circles focus on MinEduc requirements, such as the development of teacher portfolios, or evolving needs identified by teachers or program coaches.

Self-guided Study

Participating teachers complete 20 hours/year of self-guided study consisting of assignments prior to each Teacher Institute (reading and responding to technical articles related to topics addressed in the workshops, and lesson plans to be reviewed by program facilitators) as well as additional assignments from coaches and facilitators during Institutes and throughout the year.

### Table 4: Teacher Institute PD Blocks

<table>
<thead>
<tr>
<th>All workshop blocks include:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Clear objectives connected to specific learning objectives in the national curriculum</td>
</tr>
<tr>
<td>• Modeled exercises, with teachers playing the role of students, which can be adapted and replicated by teachers.</td>
</tr>
<tr>
<td>• Modeled High Leverage Instructional Practices</td>
</tr>
<tr>
<td>• Time dedicated to metacognition to ensure participants reflect on the activities and pedagogy modeled as well as the underlying research supporting the selection of the activity/instructional practice.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Many workshops include:</th>
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<tbody>
<tr>
<td>• Education for Sustainability connections</td>
</tr>
<tr>
<td>• Time for teachers to identify connection of modeled activities with Ministry textbooks and teacher guides</td>
</tr>
<tr>
<td>• Time for teacher planning.</td>
</tr>
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</table>

Strategy 2: Establish local capacity to sustain professional development and quality education over time

As is the case in any school system in any part of the world, sustained quality education in Galapagos will require that teachers have ongoing access to high-quality professional development. Beginning in Year 3, the program began to implement three measures to ensure that such training will be available well beyond the conclusion of the program in March 2021:

Strengthening Educational Leadership

In June of 2018, the ESG Program initiated specialized PD for 30 school leaders (directors, sub directors, rectors, vice-rectors) and 40 high-performing teachers who were selected as coaches-in-training. These activities are designed to help participants understand the essential role of supportive educational leadership and to acquire key skills, such as learning walks (brief classroom visits that allow principals and teachers to reflect on different aspects of the learning environment in a classroom), analyzing student work, instructional observation and feedback, and data-based decision making and planning. This training consists of four biannual Leadership Institutes (two days each) and a series of professional learning circles focused on
leadership and instructional coaching. During the 2019–2020 academic year, school leaders will begin to implement new leadership techniques and coaches-in-training will conduct classroom observations and professional learning circles in their schools.

**Increased involvement of local teachers in workshop planning and delivery**

Beginning in the June 2019 Institute, high-performing teachers, most of whom participate in the Educational Leadership PD, will assist PD facilitators in the design and delivery of Teacher Institute workshops. Their role will increase in each subsequent Institute. During the final Institute of Year 5, local educators will take the lead in designing and implementing the workshops, with program facilitators playing a supportive role.

**Strengthening the capacity of the Fundación Scalesia to support future education improvement initiatives**

The Ministry of Education and the Governing Council of Galapagos are responsible for articulating and implementing national strategies for education in Galapagos. However, as noted in the Listening Phase, education reform in remote places like Galapagos can benefit from ongoing support from an effective, stable middle-tier organization. Since the launch of the program in April of 2016, FS has played an increasing role in the organization of Institutes and supporting program coaches. During the final two years of the program, FS will play a more active role in program coordination, fundraising, and maintaining the program’s international network of education specialists, so that it is prepared to support education improvement once the ESG Program has concluded.

**Strategy 3: Implement a rigorous monitoring and evaluation plan to adjust program delivery over time and to measure impact over time**

The ESG Program’s monitoring and evaluation plan is coordinated by the Center on Research and Evaluation (CORE) at Southern Methodist University. Data is collected via participant satisfaction surveys, teacher and school leader construct surveys, interviews with school leaders and program staff, review of workshop plans and PD attendance data, and observation of workshops, coaching sessions and professional learning circles.

During the first half of the program, monitoring and evaluation focused on determining the extent to which each delivery mechanism (Institutes, coaching and professional learning circles) adhered to the agreed upon evidence-based approaches to teacher PD and adult learning. During 2019–2021, CORE will analyze data on teacher performance, including videos of teachers in their classroom filmed prior to the first PD workshops and performance data collected by program coaches during classroom observations. See Appendix 3 for an overview of the monitoring and evaluation plan.

**ANTICIPATED OUTCOMES**

While we expect to observe significant measurable impact within the five-year program time frame, especially in terms of the practice of individual teachers, the deep, sustained change we seek in schools and throughout the Galapagos education system will occur over a longer period.

The ESG Program’s monitoring and evaluation team focuses most of its attention on measuring teacher impacts, which by the end of the five-year program we expect to include:

1. Greater use of evidence-based approaches associated with student-centered, active learning and the principles of Education for Sustainability, as measured by coaches’ observations of teachers, self-reporting via teacher construct/attitudinal surveys, and comparison of pre-PD classroom videos with video recorded in year five of the program.
2. Greater teacher self-confidence, pride in teaching and commitment to professional growth, as measured by teacher construct/attitudinal surveys.
3. A strong peer support network among teachers, as measured by teacher construct/attitudinal surveys and observation data on the effectiveness of Professional Learning Circles.
4. School leaders who promote ongoing quality improvements in their schools and the professional growth of their teachers, as measured by teacher and school leader construct/attitudinal surveys and observation of school leaders.
While not a part of our current monitoring and evaluation program, we expect student impacts to include:

1. Improved student achievement, measurable via performance on the Ministry of Education's standardized exams and college admissions and graduation rates.
2. Improved social and environmental awareness and action, measurable by the Middle School Environmental Literacy Instrument (this tool, used to measure the ability of students to think critically about the environment's condition and to implement actions to better it, was administered in 2014 during the Listening Phase) and research on the professional endeavors of graduates from Galapagos schools.

We anticipate that long term (10+ years) community impacts will include:

1. Sustained quality of local schools, measurable by a new (yet-to-be launched) Ministry of Education school quality monitoring program.
2. A workforce better prepared to meet local labor demands, measurable by labor data of the Governing Council of Galapagos.

### Table 5: ESG Program’s Theory of Change

A summary of the four drivers of education quality addressed by the ESG Program, strategies employed, and the short-, medium- and longer-term expected outcomes from the program.

<table>
<thead>
<tr>
<th>These drivers of education quality...</th>
<th>will be strengthened by these strategies...</th>
<th>and will result in these medium-term outcomes (Year 5)</th>
<th>and these longer-term outcomes/preconditions (Years 5-10)</th>
<th>to achieve the 10+ year vision of the program.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional capacity of teachers</td>
<td>Strategy 1: Implement intensive teacher professional development.</td>
<td>A growing percentage of teachers make frequent use of evidence-based approaches associated with student-centered, active learning, and the principles of Education for Sustainability, as measured by coaches' observations of teachers, self-reporting via teacher construct/attitudinal surveys, and comparison of pre-intervention classroom videos with video recorded in year five of the program.</td>
<td>Most teachers are highly-skilled in evidence-based, student-centered instructional practices that help students to develop higher-level thinking skills, strong core skills and understanding of the special place where they live, and a desire to participate in its protection (strong professional capacity).</td>
<td>Galapagos is known for the high quality and effectiveness of its schools.</td>
</tr>
<tr>
<td>Education leadership capacity of school leaders</td>
<td>Strategy 2: Establish local capacity to sustain professional development and quality education over time.</td>
<td>Directors demonstrate high-impact leadership through ongoing education improvement initiatives in their schools. Teachers and school leaders demonstrate greater self-confidence, pride in their profession, and commitment to ongoing professional growth, as measured by construct/attitudinal surveys.</td>
<td>All school leaders (directors, rectors and vice rectors) champion on-going education improvements in their schools and professional growth of their teachers (effective educational leadership).</td>
<td>The local education system is a &quot;seedbed&quot; of effective education practitioners who demonstrate the power of Ecuador's national education priorities and a broad range of evidence-based pedagogical practices and the principles of Education for Sustainability.</td>
</tr>
<tr>
<td>Helpful mechanisms to support quality Education</td>
<td>Strategy 3: Implement a rigorous monitoring and evaluation plan to adjust program and measure impact.</td>
<td>Teachers and school leaders form a strong peer support network, as measured by teacher construct/attitudinal surveys and observations of Professional Learning Circles. Initial indications of improved student achievement, as measured by performance on the Ministry of Education's standardized exams.</td>
<td>Teachers have access to ongoing pedagogical support, via classroom observations and feedback from school-based coaches and ongoing PD workshops (effective support mechanisms).</td>
<td>This education system, in turn, forms civic-minded critical thinkers with strong core skills who understand and appreciate what makes Galapagos unique, and who have the skills, attitudes and commitment to contribute to sustainability in Galapagos and beyond.</td>
</tr>
<tr>
<td>External factors</td>
<td></td>
<td>Initial indications of improved social and environmental awareness and action measured by the Middle School Environmental Literacy Instrument.</td>
<td>Teachers and school leaders are committed to ongoing professional growth via professional learning communities that help them improve their craft (effective support mechanisms).</td>
<td></td>
</tr>
</tbody>
</table>
During the Institutes, teachers have developed hands-on elementary science units focused on native and invasive species, the life cycle of plants, and creating and maintaining nature journals. © Jonathan Drake/T2T-G
Evidence-based Approaches to the ESG Program’s PD Activities

The ESG Program’s professional development activities were designed based on the recommendations of the Listening Phase Report, a bibliographic review of evidence-based teacher PD programs conducted by the Center on Research and Evaluation/CORE at SMU (see Appendix 3), and input from representatives of Ecuador’s Ministry of Education and the program’s External Advisory Team during a planning retreat held in January 2016. Our approach pays attention to the form in which the PD is delivered (i.e. it uses proven approaches to help teachers learn new skills) as well as the content of the PD (i.e. it promotes evidence-based approaches to improve student learning).

The ESG Program is implemented under the premise that teachers and members of the PD delivery team are partners who learn together as professional colleagues. This means that the program requests and responds to input from participants and over time increases the involvement of teachers in the planning and delivery of PD activities. By the end of the five-year program, it is expected that the most advanced Galapagos educators will able to play a leadership role in future PD delivery, drawing on the experience of external advisors, as needed.

KEY EVIDENCE-BASED PRINCIPLES

The following evidence-based principles guide the ESG Program’s professional development activities:

PD is aligned with priorities of the Ministry of Education and ongoing school initiatives.

Research shows that professional development is more effective when teachers feel a connection between the PD received and ongoing priorities and initiatives in their schools (Darling-Hammond et al., 2009). The introduction of Ecuador’s curriculum (MinEduc, 2016) lays out the following evidence-based approaches that are consistent with the PD delivered by the ESG Program:

- Active learning, where students are involved directly in the learning process, developing intellectual autonomy, critical thinking, and problem-solving skills.
- Collaborative learning and learning-by-doing, that place the student as the center of the learning process.
- Reading and writing that develops critical and reflective thinking.
- Connection of the learning process to the place students live, to develop understanding of local and global sustainability.

Also, many of the Ministry’s teacher performance standards (MinEduc, 2017b) align with those of the ESG Program, including:

- Mastery of the subject teachers teach (Darling-Hammond, 2005; Goe & Stickler, 2008; Harris & Sass, 2007; OECD, 2009; OECD, 2010a), how to teach it (Goe & Stickler, 2008; OECD, 2009; Mourshed, Chijioke, & Barber, 2010), and how students learn it (Darling-Hammond, 2005; OECD, 2009; Mourshet et al, 2010; Wenglinsky, 2002).
- Mastery of student-centered practices that foster active learning (Marzano, 2001; Marzano, 2007), and meaningful group work (Coll Salvador, 1996).
- Ability to help students construct their own learning, as well as perform metacognitive reflections on the teaching learning processes (Marzano, 2007).
- Ability to cultivate a constructive relationship with students that encourages them to set high expectations for their learning (Cohen et al, 2000; Marzano, 2007; Rubie-Davis, 2007).
- Ability to improve their teaching through self-reflection (Leu, 2005; Nuthall, 1994 cited in Hunt, 2009) and collaboration with colleagues (Goe & Stickler, 2008; OECD, 2009; OECD, 2010b; Mourshed et al, 2010; Rubie-Davis, 2007).
The ESG Program focuses squarely on helping teachers and school leaders to develop these essential educational strategies.

**The PD is intensive, continuous and connected to practice.**

Research emphasizes that teachers need significant hours of professional development to change their practice and that PD is more impactful when it is delivered through continuous cycles that allow teachers to gradually implement an innovation, reflect on their practice, and continue implementing more of the innovation until they are proficient (Darling-Hammond, et al., 2009; Guskey, 2000). Additionally, studies suggest that when PD related to a specific innovation is sustained beyond one school year, they are far more likely to use that innovation in their classrooms (Desimone et al., 2000; Garet et al. 2001; Gerard et al., 2011; Ingvarson, Meiers, & Beavis, 2005; Penuel et al., 2007; Supovitz & Turner, 2000).

The ESG program offers Galapagos teachers and school leaders five years of ongoing professional development consisting of more than 130 hours/year via two Teacher Institutes, observation/feedback sessions, professional learning circles and self-guided study. Each training activity reinforces topics and practices shared in previous PD activities and each one of the PD mechanisms (Institutes, coaching and PLCs) provide opportunities for teachers to reflect on their evolving practice.

**The PD activities focus on helping teachers to strengthen their ability to teach the specific disciplines, grade levels and curriculum they are expected to teach.**

Research shows that PD is more effective when it addresses concrete, every-day challenges teachers encounter in their classrooms. Also, teachers are more likely to adopt practices that have been modeled for them and that take into consideration local resources, curriculum guidelines, etc. (Darling-Hammond, et al., 2009). The PD delivered by the ESG Program is designed and delivered by discipline and the grade groupings of Ecuador's national curriculum. During the biannual Teacher Institutes, facilitators model curriculum-based lessons and evidence-based pedagogy (with teachers playing the role of students) that teachers can later adapt for their own use. The PD also provides time for teachers to plan and model lessons and units that they will later deliver in their classrooms.
The PD focuses on helping teachers to master a toolkit of evidence-based, high-leverage instructional practices (HLPs).

Researchers have identified a series of fundamental instructional practices that can be implemented across subject areas and grade levels that help students learn important content and support their social and emotional development. These practices, which are consistent with student-centered, active learning, are referred to as “high-leverage” not only because they are important to student learning, but because they are basic for advancing skill in teaching (Teaching Works, 2009).

The nine HLPs promoted by the program are consistent with teaching strategies promoted by the Ministry of Education and are measured by the Ministry’s teacher evaluation standards. The HLPs are modeled by PD facilitators during workshops and are discussed with teachers during classroom observations and professional learning circles. Table 6 shows the sequence in which the HLPs are introduced. Appendix 2 includes a more detailed description of each practice.

The PD seeks to foster a culture of collaboration among teachers.

Research shows that collaboration within or across grade levels or among teachers schoolwide can result in improved instruction by helping teachers to build skills, strengthen their knowledge and by fostering a sense of shared purpose and collective responsibility for student learning (Darling-Hammond et al, 2009). The ESG Program promotes teacher-teacher collaboration during Teacher Institutes and facilitates ongoing Professional Learning Circles for all Galapagos teachers. We believe that establishing a strong culture of collaboration among Galapagos educators is key to sustaining improved education over time.

The PD pays attention to evidence-based approaches to adult learning.

Research shows that teachers retain more knowledge and are more likely to use new skills in their classrooms when PD engages them in discussion, planning, and practice of new ideas and skills (Garet et al., 2001; Desimone et al., 2002a). Additionally, studies stress that active learning in PD (being observed and receiving feedback, practicing in simulated situations, collaboratively developing lesson plans and reviewing student work, presenting or leading discussions, etc.) can improve PD impact on practice. (Birman et al., 2000) The ESG Program’s Institutes, coaching and PLCs encompass all these approaches.

The PD is accompanied by ongoing assessment.

Research points to the importance of incorporating evaluation methods to ensure accountability and continuous quality improvements in professional development programs (Desimone et al., 2002b; Garret et al., 2001). Participant satisfaction surveys, review of PD plans, and observations of workshop and coaching delivery have been invaluable in making ongoing adjustments to our Advisory Team and PD delivery approach. Beginning in 2019, teacher performance data will be analyzed to measure changes in teacher practice.

All these evidence approaches are measured by the program’s monitoring and evaluation plan. Additional information about our monitoring and evaluation work can be found in Appendix 3.

Table 6: High-level Instructional Practices (HLPs) introduced by the ESG Program

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Years 4-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>HLP 1. Designing single lessons and sequences of lessons to achieve specific learning objectives.</td>
<td>HLP 4. Establishing norms and routines for classroom discourse and work that are central to the content.</td>
<td>HLP 7: Selecting and using specific methods to assess students’ learning on an ongoing basis within and between lessons.</td>
<td>HLP 9: Analyzing and improving specific elements of one’s own teaching.</td>
</tr>
<tr>
<td>HLP 2. Choosing, appraising, and modifying tasks, texts, and materials for a specific learning goal.</td>
<td>HLP 5. Leading a whole-class discussion.</td>
<td>HLP 8: Composing, selecting, adapting quizzes, tests, and other methods of assessing student learning during a period of instruction.</td>
<td></td>
</tr>
<tr>
<td>HLP 3. Setting up and managing small-group work/collaborative learning groups.</td>
<td>HLP 6. Posing questions about content.</td>
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</table>

(Source: University of Michigan, 2018)
Dr. Linda Gojak, Board Member of Teachers 2 Teachers Global, works with early elementary math teachers.

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Epistemological Approach of Each Subject Area

The ESG Program provides professional development (PD) to teachers and school managers in the following areas: Educational Leadership, Natural Sciences, Mathematics, Literacy/Language Arts, Social Studies and English Language. The epistemological approach in each subject area is consistent with the philosophy and directives of Ecuador’s national curriculum and the results of research studies on adult learning and how students (children and adolescents) best learn each subject.

The work of each subject area team is influenced by constructivist and sociocultural theorists, such as Piaget (1972) and Vygotsky (1989), who hypothesize that individuals build their knowledge through meaningful experiences. When people experience something that does not fit into their existing mental framework, disequilibrium occurs, causing them to adapt by either modifying their framework or building entirely new ones.

All program areas also promote a shift in the roles of the student and teacher in the classroom, where students become responsible for engaging in the learning process and building new knowledge. The teacher, on the other hand, is no longer seen as the keeper of knowledge. Rather, he or she becomes a guide for students as they work independently or in groups. As a facilitator, the teacher moves from the role of director in the front of the classroom to the role of conductor, nudging students toward understanding and intellectual autonomy.

EDUCATIONAL LEADERSHIP

Standards and Priorities of the MinEduc

The Ministry of Education’s Standards for School Management (MinEduc, 2016) encompass the management processes and practices that establish how a school is organized and focusses on improving the quality of student learning. The standards also lay out parameters for professional development of school staff and ways that schools can optimize their offerings. School leaders are expected to be able to: analyze situations for decision-making, communicate effectively with all members of the school community, manage conflict, lead and guide staff, work as part of a team, reflect on their own practice and incorporate feedback from others, and negotiate agreements. Each educational institution is considered unique, so school leaders must be able to develop action and improvement plans based on their institution’s needs and opportunities.

Perspectives of the Educational Leadership Advisory Team

The Education Leadership Advisory Team agrees with the MinEduc that effective professional development and significant school improvements cannot be achieved and sustained without: 1) School leaders (Directors, Sub Directors, Rectors and Vice Rectors) with the vision and skills necessary to support such processes, and 2) Local instructional coaches (teachers with specialized training) able to support the continuous professional growth of their colleagues.

According to The Wallace Foundation’s work on school leadership, “effective school leadership makes a difference in improving learning (2004)”. These same sentiments are expressed in McREL’s (2005) seminal work, “Balanced Leadership: School Leadership That Works,” where the authors argue that, based on their meta-analysis on school leadership and its impact on student learning, “improving principals’ leadership abilities by one standard deviation from the 50th to the 84th percentile would lead to an increase in the average student achievement from the 50th to 60th percentile.”

The Education Leadership Advisory Team bases its professional development activities on three approaches:

1. The Balanced Leadership Framework focuses on the importance of: 1) The areas leaders focus on for school improvement efforts; 2) Building purposeful community around clear goals; 3) Understanding the implications of change efforts for stakeholders and adjusting leadership behaviors accordingly; and 4) Collective Efficacy (the belief that a group can organize and make a difference). McREL also argues that
sharing leadership with others and distributing responsibilities across a school is an important aspect of effective leadership, as is creating time for school leaders to reflect on their own practices (MCREL, 2005).

2. The Wallace Foundation's Research on Effective School Leadership which argues that school leaders influence teachers, teaching, and different elements of the organization (including vision), and it is these elements they have influence over that impact students and their learning (Hallinger & Heck, 2002). The Wallace Foundation also found that who and what educational leaders pay the most attention to within their organizations matters. Research suggests that teachers' understanding of pedagogical content knowledge and professional community among teachers are central to an effective school and high learning for teachers. Leaders whose focus is on the school's mission and goals, the school culture, teachers' participation in decision-making, and relationships with parents and the wider community are potentially powerful factors influencing student learning (Epstein, 1995).

3. Advocacy Leadership for High-Need Schools argues that school leaders have an essential role to play in working with teachers to generate authentic spaces for student learning and in guiding teachers with cognitive and non-cognitive pedagogies that are related to real life problems and issues in the students' community (Anderson, 2009). The model highlights the role of school leaders in generating safe spaces where students can develop academically and are willing to work outside of their comfort zone, taking risks to solve and seek causes to real-life problems. This model also argues that school leadership must advocate for the development of authentic connections with parents and communities.

In addition to forming effective school leaders, the ESG Program seek to form a team of local instructional coaches with the ability to observer their peers in the classrooms and provides constructive feedback and support their ongoing professional development. According to Aguilar (2003), "Coaching is an essential component of an effective professional development program. Coaching can build will, skill, knowledge, and capacity...and creates a relationship in which a teacher feels cared for and is therefore able to access and implement new knowledge. A coach can foster conditions in which deep reflection and learning can take place, where a teacher can take risks to change her practice, where powerful conversations can take place and where growth is recognized and celebrated."

Through the Education Leadership Institutes and related professional learning circles, the ESG Program helps school leaders and coaches-in-training to master a range of practical tools and skills, including: learning walks (short visits to classrooms to observe and gather information and a greater understanding of classroom learning needs and planning the following steps), looking at student work, teacher observation and effective feedback, data-based planning and decision making, and strategies for fostering effective professional communities of practice within and between schools.

NATURAL SCIENCE

The National Natural Science Curriculum


The Natural Science curriculum is also influenced by other distinguished authors and scholars, such as:

- Lakatos (1976), who defines scientific progress as a function of competing research that advance understanding through confirmation rather than refutation.
- Khun (1971), who connects sociological factors with the generation of scientific knowledge and understands "scientific truth" as a set of provisional paradigms, which can be assessed and replaced by new paradigms (Nieda & Marcelo, 1997).
- Nussbaum (1989), who includes under the term constructivist all recent models of scientific thinking that argue that knowledge cannot be confirmed nor proven; rather it is constructed by comparing and contrasting new evidence and theories with previous theories/models that seek to explain the natural world.
- Morin (2007), who believes that all knowledge
constitutes simultaneous construction and reconstruction of signals, signs and symbols, and that this type of scientific thinking could lead to the formulation of universal laws.

Ecuador’s national Natural Science curriculum prioritizes teaching learning that promotes scientific questioning; interdisciplinary approaches to research; the use of a wide range of information sources to obtain holistic results; attention to individual differences; researching phenomena; questioning situations and facts; and rigorous and appropriate methods (Pérez 1988).

**Perspectives of the Natural Science Advisory Team**

Consistent with the focus of the national curriculum, the Natural Science Advisory Team bases its activities on the philosophy that students learn science and science teachers learn to teach science through engagement in many of the same practices of professional scientists: asking questions, carrying out investigations, analyzing and interpreting data, engaging in argument from evidence, developing and using models, and communicating scientific information. In addition, trainers connect the specific science standards covered in each workshop with the big ideas of science: Patterns, cause-effect, scale-proportion-quantity, schemes and systems models, energy and matter in systems, structure and function, stability and change of systems. This approach fosters an understanding of how all the sciences connect and what scientists do as part of their professions.

The multi-year professional development plan in science merges the three dimensions of science education (science and engineering practices, core ideas and cross-cutting concepts) of the Next Generation Science Standard (National Research Council, 2012) with the learning standards (destrezas con criterio de desempeño) of Ecuador’s national Natural Science curriculum. Workshops are built around five core themes (blocks) of the Ecuadorian national curriculum: Living Things and their Environment, Human Body and Health, Matter and Energy and the Earth and the Universe and Science in Action.

For elementary and biology teachers, the Advisor Team promotes the “Five E’s” instructional model—a constructivist approach developed in the 1980s by the Biological Science Curriculum Study (BSCS), a team led by Principal Investigator, Roger Bybee (Bybee et al., 2012). Each of the Five E’s describes a phase of learning, and each phase begins with the letter “E”: Engage, Explore, Explain, Elaborate, and Evaluate. The Five E’s model allows students and teachers to experience common activities, to use and build on prior knowledge and experience, to construct meaning, and to continually assess their understanding of a concept. During the Institutes, teachers have the opportunity to develop lesson plans using this approach.

The professional development for middle school and high school chemistry and physics teachers is based on the modeling approach, which has been demonstrated to be more effective than other teaching strategies because it builds on students’ prior knowledge and experience and enables them to resolve for themselves the common naïve conceptions they bring to class.

Dr. Diego Román, Assistant Professor in Teaching and Learning at Southern Methodist University, is a native of Quito and volunteered in Galapagos before pursuing a career in education. Here he models an experiment through which students extract DNA from fruit. © Jonathan Drake/ T2T-G
During workshops teachers are immersed in the curriculum in much the same way they are expected to present it to their own students, with time set aside to debrief and discuss the implementation of this methodology (Jackson et al., 2007).

The pedagogy associated with this approach is best described as “guided inquiry” (vs. “free inquiry” or “discovery learning”), which means the instructor facilitates the development of student conceptual understanding via a well-structured series of observations of “everyday” sorts of phenomena coupled with lab activities that lead students in the construction of increasingly sophisticated models. The pedagogy is also distinctly discourse-oriented in that it makes heavy use of student whiteboard presentations and Socratic questioning so that the teacher’s role is much more about being the “guide on the side” rather than the “sage on the stage.” The modeling approach to chemistry and physics both begin with guiding questions that are followed by a story line to develop student understanding of each subject. As in the case of elementary science and middle-school and high school biology training, chemistry and physics trainers have cross-referenced the modeling curriculum with the Ecuadorian chemistry and physics curriculum and have ensured that Ministry-defined student outcomes and performance indicators are addressed.

**MATHEMATICS**

**The National Mathematics Curriculum**

The introduction to Ecuador’s national curriculum explains that the purpose of teaching mathematics is to develop students’ capacity to think, reason, communicate, and apply and evaluate relationships that exist between ideas and real phenomena. The curriculum focuses on the development of logical and critical thinking to interpret and solve problems related to everyday life. This means that student should be creative, proactive, persistent, organized, and able to work collaboratively. Mathematics is a science that applies to all other subjects. Modeling mathematical concepts through concrete representations and then graphic representations can help students to understand symbolic representations of these concepts.

Mathematics also provides a language to make science understandable and to sustain scientific thought over time. In this sense mathematics plays an important role in communicating ideas and in dialogue and feedback that results in their refinement. Mathematical understanding is deep and lasting when students can connect mathematical ideas and apply them in contexts they find interesting.

Ecuador’s mathematics curriculum is based on the emerging epistemological perspective known as...
as Pragmatic Constructivism, which synthesizes pragmatic, conventional, constructivist, anthropological, semiotic, socio-historical and naturalistic perspectives. This approach argues that students achieve significant learning by solving real-life problems and by applying different mathematical concepts and tools. Students are presented a problem or situation (with different degrees of complexity), interpret the problem through language (terms, algebraic or functional expressions, models, graphics, etc.), propose actions (techniques, algorithms) around concepts (definitions or rules), and use argumentation and properties of the concepts and actions (inductive and deductive approaches, etc.) to solve the problem, and to interpret and judge the validity of the result (MinEduc, 2016).

**Perspectives of the Mathematics Advisory Team**

The program's professional development in mathematics was designed and is implemented by Board members and collaborators of Teachers-to-Teachers Global, a US NGO dedicated to empowering teachers and students worldwide through culturally relevant STEM education (www.t2tglobal.org).

In 1989, 1991, and 2001, National Council of Teachers of Mathematics (NCTM) published documents that provided recommendations to help mathematics teachers create constructivist classrooms. In these classrooms, students build mathematical knowledge by actively participating in the instruction, solving problems through logic, conjecture, and mathematical reasoning. The teaching described in the NCTM documents is often called student-centered instruction. These classrooms provide students with opportunities to complete the mental tasks that encourage mathematical understanding (Carpenter & Lehrer, 1999) through high cognitive demand tasks (Stein, Smith, Henningsen, & Silver, 2000). This instruction occurs in classrooms that have a high press for learning (Kazami & Stipek, 2001) and establish sociomathematical norms (Yakel & Cobb, 1996) that facilitate student learning. A classroom discourse in which all students participate in learning through conversations about mathematics (Reinhart, 2000) as well as through cooperative learning groups (Slavin, 1995) is an important component of student-centered instruction in mathematics.

Connecting academic mathematics and mathematics in culture, D’Ambrosio (1985), Nunez (1993), and Powell (1997) proposed mathematical tasks derived from tasks from students’ cultures. Individuals, who experience the mathematics of their culture differently than at school, cannot thrive where mathematics is taught uniformly (Borba, 1999). Consequently, ethnic minorities in industrial countries struggle in traditional mathematics programs (Bishop, 1987). Children bring a myriad of mathematical experiences to the classroom and have developed a variety of strategies for dealing with mathematical problems that arise in their environment (D’Ambrosio, 1990). Presenting mathematics lessons that bring these experiences into the classroom will deepen that student’s mathematical understanding (Boaler, 1993; NCTM, 2001).

Workshops presented by the math team stress culturally-relevant, student-centered mathematical content. Borko, Underhill, Brown, Jones, and Agard (1992) suggest that teachers must experience challenging coursework that allows them to strengthen their core content knowledge. This strengthening occurs in mathematics tasks that provide participants opportunities to explore the material in ways that stimulate understanding. In these sessions, participants develop models of teaching when they experience instruction that demonstrates the strategies needed to support mathematical understanding (Wilson & Ball, 1996). Likewise, professional development seminars should challenge teachers’ beliefs about teaching and learning mathematics (Borko et al., 1992). Finally, exposure to discourse can change participants’ beliefs about its role in their classrooms (Blanton, 2002). In sum, experiences in these courses will allow future teachers to strengthen their pedagogical content knowledge.

Workshops also promote the use of manipulatives in mathematics instruction. Manipulatives—physical objects that be touched and manipulated—are useful tools that can help learners understand mathematical relationships. Popular math manipulatives, such as counters, pattern blocks, base 10 blocks, tangrams, Geoboards and Cuisenaire rods help students to visualize and come to understand abstract mathematical concepts. The ESG Program uses manipulatives to deepen teacher understanding of key concepts and to provide them with new teaching approaches. Particular attention is given to the use of Cuisenaire rods for working with fractions. This approach can also be applied to help middle school and high school students to understand more complex concepts through learning-by-doing.
LITERACY/LANGUAGE ARTS

National Language Arts Curriculum

The Ministry of Education’s Language Arts curriculum is based on the communicative approach to reading and writing. It emphasizes the development of skills rather than concepts, since its objective is to develop students’ ability to use oral and written language for communication, as opposed to enabling them to conceptualize and decipher different linguistic components of spoken or written language (Cassany, 2008).

The curriculum’s emphasis on the use of language, as opposed to knowledge of language, has implications for schools and classrooms. To optimize students’ development of language skills, schools need to extend learning to the surrounding community, to allow students a wide range of opportunities for using oral and written language in authentic, practical and meaningful settings. As argued by Judith Kalman (2009), language learning is directly proportional to the opportunity students have to participate in social and cultural learning environments, beyond their school.

As in other subjects, the Language Arts curriculum reflects a constructivist approach, and assumes that all students arrive at school as users of their native language with cognitive, affective and motor skills, and possess knowledge about what words can be used for, etc. This prior knowledge provides a foundation for student learning. Teaching oral and written language combines a series of proven pedagogical approaches. The key to the learning written language lies in the degree of significance and relevance that students give to reading and writing and to the process of learning these skills.

The Language Arts curriculum is flexible and views reading, writing and speaking as socio-cultural activities that can take a wide range of paths and expressions, depending on the actors, processes and intent. The curriculum proposes teaching through the use of reading and writing, in conjunction with the linguistic code and comprehension, in stimulating and interactive environments that fosters discussion and original ideas to generate critical thinking.

This approach requires teachers to redefine many of their ideas about how to teach oral and written language and to learn and employ effective methodological approaches that allow students to develop the proposed communicative skills.

Perspectives of the Language Arts Advisory Team

To help Galapagos teachers in this process, the Language Arts Advisory Team uses the Balanced Literacy approach, which is based on the belief that teachers need to develop a strong understanding of the reading and writing acquisition process. Professional development focuses on the building blocks of learning “how to read” and then “reading to learn” at all reading levels. The framework seeks to empower teachers who can design and implement their own activities, strategies and interventions to strengthen the reading and writing skills of their students (Griffo, Madda, Pearson & Raphael, 2015).

The Language Arts Institutes reflect the four key components of Balanced Literacy:

1. **Phonemic and phonological awareness** — the ability to recognize (phonemic) and manipulate (phonological) the sounds of words, and thus understand and recognize that words are formed by small units of sound (phonemes). Phonemic awareness is one of the fundamental blocks in literacy acquisition and a strong predictor of the success of the initial reader. (Orellana, 2000)

2. **Metalinguistic awareness** — the ability to think about language and talk about it. In our framework, metalinguistic awareness involves developing semantic awareness (an understanding of the meaning of words and how
they are related to each other to create messages) and syntactic awareness (the ability of students to create coherent messages and to predict during reading).

3. **Reading** — the ability to process text, understand its meaning, and to integrate it with what the reader already knows. Developing reading comprehension involves direct vocabulary instruction. Students should be exposed to vocabulary-rich contexts and actively use vocabulary words. Vocabulary instruction should not depend on a single way of teaching; in fact, the use of a variety of methods that expose students to new words has proven more effective.

4. **Writing** — In our framework, reading and writing interact with and support each other. We balance process writing (through which learners focus on the process by which they produce a written product) and product writing (where a model text is presented and analyzed, and students then construct a similar or parallel text). These two methodologies complement each other and provide students with an effective toolkit of strategies and skills (Griffo, Madda, Pearson & Raphael, 2015).

Over the course of the ESG Program, facilitators promote the following proven practices associated with Balanced Literacy:

- **Teacher Control.** An effective way for teachers to implement the balanced literacy approach is through a gradual process in which the teacher's role and responsibilities shifts to the students. The teacher provides focused mini-lessons, and guides/facilitates students' construction of meaning as they collaborate and work independently.

- **Guided Reading.** Guided reading involves a teacher working with small groups of students at similar reading levels. The teacher provides a text that students can read with support and coach learners as they use problem-solving strategies to read the text. This approach provides the teacher an opportunity to target students' needs and purposefully support them as they become independent readers.

- **Read-Aloud.** Teachers read aloud a variety of texts in whole group or small group settings. As appropriate, teachers model thinking and reading with fluency and expression, and ask questions of students. In addition, teachers find opportunities to expand vocabulary, do metalinguistic analysis, and foster students' enjoyment of reading.

- **Text Analysis.** Text analysis involves interactive reading and writing experiences in which students and teachers read and analyze rigorous texts through text-dependent questions and annotations. The practice of text analysis develops higher-level thinking skills that help students to independently tackle grade-level text.

- **Independent Reading.** Students are involved in choosing and reading material by themselves for a significant period of time. This practice promotes fluency, builds stamina, and provides opportunities for students to independently practice reading strategies and skills.

- **Independent Writing.** Students are engaged in developing written texts. This moment presents an opportunity to work on cross-curriculum activities and provides a chance for students to foster creativity and ability to compose different writing pieces.

- **Workshop Model.** The workshop model is divided into defined instructional blocks that can include word work, focus lesson, small group instruction/guided reading, independent reading, and writing. This model incorporates the essential components of the balanced literacy model, including phonics, comprehension and vocabulary, metalinguistic awareness, and writing.

- **Assessment.** In our literacy framework, assessment goes beyond the collection of data and measurement, focusing on how to interpret information to be responsive to students and to share results with students, parents, administrators, and the local community.

## SOCIAL SCIENCES

### National Social Science curriculum

The national Social Sciences curriculum consists of social studies (elementary grades) and history, civics and philosophy (middle school and high school). It explores the interrelationships of concepts such as time, space, society and thought, as well as work, culture, identity, diversity, interculturality, ethics, aesthetics, and politics. These concepts connect to the larger philosophical theories of justice and solidarity.

The epistemological approach of the Social Sciences curriculum is based on the belief that knowledge in social sciences is achieved (as it is in any scientific field) by differentiating reality from the intellectual construction of knowledge.
to understand historical narratives (which are the product of subjectivity and social interests) through research. Students should 1) compare and contrast various sources according to ethical standards, 2) use theoretical and conceptual tools, 3) compare empirical evidence with theory and reality, avoiding deception and manipulation of information, and 4) realize that there is no absolute truth (Beltrán, S.F.).

The pedagogy promoted in the national curriculum responds to the question: How do you teach and learn social sciences? (Limón & Carretero, 1997; Carter, Rosa, & González, 2006). In elementary grades, the curriculum stresses the need to match concepts of increasing levels of complexity to the cognitive development and specific learning needs of different age groups. Social sciences in the elementary grades is much more narrative in its approach than in later grades, but students are exposed to increasing levels of interdisciplinarity, conceptual abstraction, attention to processes rather than isolated occurrences, multicausality, and the role of groups of actors as opposed to individuals. As they progress, students develop a holistic view and the ability to analyze and understand social phenomena from various possible points of view.

Perspectives of the Social Sciences Advisory Team

In line with the constructivist approach of the national curriculum, the Social Sciences Advisory Team believes that learning social sciences has a clear and vital purpose: “We learn to be able to function more effectively in our world” (Savery and Duffy, 1996. p. 1-2). This requires developing an understanding of the world through mental models that allow us to comprehend our surroundings, our situation and our possible actions within a given context. The phrase “function effectively in our world” has ethical implications to consider. Specifically, what purposes, interests or social values influence how we understand, judge or act within society? The Education for Sustainability component of the ESG Program challenges students to develop skills in social studies, humanities and civics to understand specific situations and to be able to influence them and strive for balance between economic, social and natural realms.

Consistent with the focus of the national curriculum, the Social Sciences Advisory Team embraces historical thinking (Santisteban, 2010; Gómez et al., 2014) as a framework for teaching and learning. Historical thinking goes beyond the simple acquisition and repetition of information about the past, governments or the geography of a given location. Rather, it focuses on the development of skills in four areas: historical consciousness (the ability to comprehend an event with the eyes of future generations), historical representations (depictions of the past created visually or in words that create an image of things in the past), historical imagination (thinking that allows students to reconstruct the past), and historical interpretation (method of examining evidence to come to an understanding of the past). This approach also develops additional skills associated with Education for Sustainability, such as critical thinking and problem-solving ability.

The PD offered by the program promotes learning around questions, projects and cases studies linked in meaningful ways to learning objectives in the national curriculum (Savery & Duffy, 1996; Hernández & Ventura, 2005). Whenever possible, the PD prepares teachers to connect learning opportunities with Galapagos realities and the daily life of students, to ensure that learning opportunities are as authentic as possible (Perkins, 1999; Bain, 2005). Teachers learn the importance of extending learning beyond the classroom and of tapping the knowledge and experience of students and other members of the community who are willing to share.

ENGLISH LANGUAGE

National Curriculum in English Language

Ecuador’s national English curriculum advocates a communicative approach to second language education within Content and Language Integrated Learning (CLIL). The curriculum framework relies on the Common European Framework of Reference (CEFR), a carefully articulated set of international language proficiency standards which details the expectations for a spectrum of language competences from pre-basic and basic levels (pre-A1, A1, A2), through independent levels (B1, B2) to proficient levels (C1, C2). The CEFR is used worldwide in curriculum development for many world languages. It offers guidance in establishing performance indicators and appropriate assessment.

The goal of the national EGB and BGU English curriculum is to enable school children in Ecuador to progress from a pre-basic/basic user to an independent user, as informed by the CEFR.
Essentially, this requires students in the A levels, which are the focus of the elementary and middle school levels (EGB), to learn and use the social language of basic, interpersonal communication in daily school and community contexts. At the B level, which can come into play in the last year of EGB and is the focus of high school (BGU), the goal is for students to extend the basic language repertoire. As independent users of the language, students are able to speak about less immediate topics and are able to elaborate, although they will still encounter difficulties with vocabulary and certain less frequently used grammatical structures. The B1 level is considered the threshold to independent language use.

**Perspectives of the English Language Advisory Team**

The goals expressed in the English curricular description are state-of-the-art. However, implementation is challenged by a shortage of English teachers who demonstrate the English proficiency required to teach the language. According to a recent report by the British Council, less than 1% of English teachers in Ecuador have attained proficiency at the CEFR B2 level (British Council, 2015, p. 22). Furthermore, opportunities for professional development for public school English teachers in Ecuador, including in the Galapagos, have been limited (Fundación Scalesia et al, 2015).

Educational reform within Ecuador brings with it the obligation to develop the capacity of teachers to master their discipline and to strengthen their pedagogical skills. While professional development should be practical, it should be based on underlying pedagogical principles that underscore all good teaching.

To this end, the English language Institutes are informed and framed by concepts detailed in two well-regarded works in second-language curriculum design and language instruction—Curtain and Dahlberg’s Languages and Learners: Making the Match (2016) and in ensuring a high-degree of learner engagement and participation—Himmele and Himmele’s Total Participation Techniques (2017). In addition, teachers learn about and apply communicative language teaching techniques used worldwide, with a strong emphasis on basic language teaching principles that emphasize appropriate classroom management. The underlying goal is for English teachers to engage, hands-on, in the process of pedagogical planning and teaching.

Through the PD offered by the program, teachers learn to design meaningful, engaging lessons to guide learners in holistic language development. Workshop lessons that focus on explicitly on language learning for sustainability focus teachers on preparing lessons based on essential questions (Curtain & Dahlberg, 2016, ch. 2). As Curtain and Dahlberg advise, “essential questions,” such as, “How do seasons in the Galapagos differ from seasons in Canada?” open up learners at any level of development of language proficiency to explore meaningful information and to have something to say about it. Nesting language development within units centered on meaningful questions, results in “enduring understanding” (Curtain & Dahlberg, 2015), important in fulfilling the goal of the Ecuadorian Ministry of Education that learning an additional language be an important component in 1) addressing students’ cognitive and social development, and 2) focusing on language development as a whole, rather than teaching “about” language structure in a decontextualized manner.

During the Institutes, teachers learn about and practice lesson planning for communicative language teaching, with a focus on the four skills (listening, speaking, reading, and writing). They practice basic teaching techniques such as, carousel and line dialogues, language experience approach stories, role-play and variations and creating dialogues with students.

Teachers participate in Institutes in one of three groups, based on the level of instruction they most frequently teach (the equivalent of grades 1-3, 4-6, 7-9, and 10-12 in the US system). The training team uses the PPP (present, practice, produce) planning format (see Harmer, 2015). Along with this approach, teachers determined the role of the learner and the role of the teacher in the lesson, as well as the time on task for learners.

During each training institute, English teachers participate in academic excursions to practice English while learning about sustainability efforts in the community. Visits have been made to organic farms, the sustainability planning office of the local municipality, Santa Cruz’s recycling center, the Charles Darwin Research Station and the local office of the Ministry of Agriculture. During these trips, trainers model how to integrate field trips or out-of-classroom experiences. Teachers spend time identifying other potential locations in their communities, discussing and planning how they could integrate such activities into their own courses.
Progress and Lessons Learned

The following observations correspond to the first half of the five-year ESG Program.

ROLES OF ESG PROGRAM PARTNERS

Since the program’s launch in April 2016, each program partner has become more effective in its respective role:

- The Ministry of Education: reviews program materials and reports, provides technical input, approves training teams, mobilizes teachers, and records training hours of individual teachers.
- Fundación Scalesia: coordinates logistics of the Teacher and Leadership Institutes, coordinates coaching and professional learning circles, and offers the campus of its school campus (Unidad Educativa Tomas de Berlanga) as the primary PD site on Santa Cruz Island.
- Galapagos Conservancy: provides overall program leadership, coordinates the External Advisory Team and raises funds for program implementation.

During the second half of the program, an essential goal is to continue building the capacity of the Fundación Scalesia to assume greater leadership of the program and to connect teachers and schools with the local community—businesses, researchers, NGOs, government agencies and others—to enrich learning opportunities. The Fundación Scalesia will also continue to strengthen its networks with Ecuadorian and international universities with teacher education programs, to provide support to local teachers beyond year five of the program, and to provide opportunities for pre-service learning, including student-teaching, for teachers from outside of Galapagos.

PD DELIVERY

Table 7 summarizes the professional development delivered by the ESG Program through December 2018 and an estimate of additional training to be delivered by the end of March 2021.

The number of program participants has grown from about 220 teachers in April 2016 to over 390 in October 2018, due to the inclusion of non-tenured teachers, Pre-K and Kindergarten teachers and English language teachers.

In general, program staff and partners have refined the planning and logistical processes associated with the delivery of professional development by subject and grade groupings on two separate islands. Institutes run smoothly and classroom observations and Learning Circles occur according to schedules planned and communicated well in advance.

<table>
<thead>
<tr>
<th>Activity</th>
<th>PD delivered through 12/31/2018 (3 academic years)</th>
<th>Additional PD through 3/31/2021 (2 academic years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher Institutes</td>
<td>6 Institutes (five days/40 hours each)</td>
<td>4 Institutes (five, 40 hours each)</td>
</tr>
<tr>
<td>Coaching</td>
<td>863 sessions, three hours each</td>
<td>400 sessions, three hours each</td>
</tr>
<tr>
<td>Professional Learning Circles</td>
<td>679 sessions, two hours each</td>
<td>350 sessions, two hours each</td>
</tr>
<tr>
<td>Education Leadership Institutes</td>
<td>2 events, 20 hours each</td>
<td>2 events, 20 hours each</td>
</tr>
<tr>
<td>Self-guided study</td>
<td>50 hours/teacher</td>
<td>50 hours/teacher</td>
</tr>
</tbody>
</table>

MONITORING AND EVALUATION RESULTS

Ongoing monitoring and evaluation results reveal the following:

A high level of participant satisfaction. During 2018, the third year of the program, overall satisfaction of participants remained high (3.5 to 4.0 on a five-point scale) for all aspects of the program. The teacher Institutes are the most highly-rated component of the program (4.0), followed by the Educational Leadership Institutes (3.8), Coaching (3.6) and Learning Circles (3.5). While results have varied somewhat across subject area teams, individual trainers and coaches, the trend has been towards more uniform satisfaction. Individual trainers, subject area teams and coaches who have receive slightly lower results than others during a given period have generally “upped their game” in subsequent evaluation periods.

Alignment of PD with established priorities. Given the breath of the training offered (six
Quality Instruction, Teacher Motivation, and Perception of Support from the Ministry of Education. On the other hand, surveys revealed decreases in half of the constructs measured, most notably Attitudes Towards Continuous Quality Improvements, Teacher Support, and Teacher-Teacher Relationships (see Table 8). We look forward to further analyzing this data and reviewing results as the Education Leadership component of the program, implemented in June of 2018, gains traction. Positive attitude shifts in these constructs are essential to long-term program success.

Impact on teacher practice. Considerable data (pre-intervention classroom videos and teacher observations from program coaches) have been collected that will help us measure changes in teacher practice over time. However, this data has yet to be fully analyzed. Anecdotal evidence from our coaches and data collectors suggest the following:

- When they know they are going to be observed, as many as 75% of teachers demonstrate significant improvements in their teaching, using strategies and approaches shared during Institutes and coaching.
- Teachers do not necessarily apply new knowledge when they are not being observed. On several occasions our coaches have been approached by students saying something to the following effect: “We like it when you visit, because the classes are a lot more fun!”
- Many of our advisory team members report they regularly respond to inquiries from teachers seeking advice on the implementation of new strategies.
- Teachers have established Reading Corners in all lower-grade elementary classrooms on San Cristobal (where Literacy was the focus during years 1 and 2) and appear to be maintaining and using these spaces to foster students’ love of reading.
- For the first time, teachers are using rubrics for formative evaluation, fostering teacher-student reflection on what they have learned and how they have learned it.

Student perceptions of change. While not a formal part of the monitoring and evaluation plan, data collectors recently conducted focus groups to determine the extent to which students in the equivalent of 8th and 11th grades in the

<table>
<thead>
<tr>
<th>Table 8: Constructs/Attitudes Showing Greatest Changes</th>
<th>(Scale of 1 to 5, with 5 being the highest)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positive Shifts</strong></td>
<td>2016</td>
</tr>
<tr>
<td>Grit</td>
<td>2.49</td>
</tr>
<tr>
<td>Supportiveness and commitment to quality instruction</td>
<td>3.98</td>
</tr>
<tr>
<td>Teacher motivation</td>
<td>3.40</td>
</tr>
<tr>
<td>Perceptions towards the Ministry of Education</td>
<td>3.07</td>
</tr>
<tr>
<td><strong>Negative Shifts</strong></td>
<td></td>
</tr>
<tr>
<td>Attitudes toward continuous quality improvements *</td>
<td>4.53</td>
</tr>
<tr>
<td>Teacher support</td>
<td>4.23</td>
</tr>
<tr>
<td>Teacher-teacher relationships</td>
<td>4.55</td>
</tr>
</tbody>
</table>

Shifts in educator attitudes and perceptions. CORE is in the process of fully analyzing the results of annual construct/attitudinal surveys administered to teachers and school leaders since the program launch in April 2016. Initial analysis (statistical mean testing has not been completed, so these results should be viewed as general trends, as opposed to statistically-significant differences) reveals that participants currently rate all constructs relatively highly (above three on a five-point scale).

Among participants involved in all three years of the program, the largest positive shifts occurred in Grit, Supportiveness and Commitment to Quality Instruction, Teacher Motivation, and Perception of Support from the Ministry of Education. On the other hand, surveys revealed decreases in half of the constructs measured, most notably Attitudes Towards Continuous Quality Improvements, Teacher Support, and Teacher-Teacher Relationships (see Table 8). We look forward to further analyzing this data and reviewing results as the Education Leadership component of the program, implemented in June of 2018, gains traction. Positive attitude shifts in these constructs are essential to long-term program success.

Impact on teacher practice. Considerable data (pre-intervention classroom videos and teacher observations from program coaches) have been collected that will help us measure changes in teacher practice over time. However, this data has yet to be fully analyzed. Anecdotal evidence from our coaches and data collectors suggest the following:

- When they know they are going to be observed, as many as 75% of teachers demonstrate significant improvements in their teaching, using strategies and approaches shared during Institutes and coaching.
- Teachers do not necessarily apply new knowledge when they are not being observed. On several occasions our coaches have been approached by students saying something to the following effect: “We like it when you visit, because the classes are a lot more fun!”
- Many of our advisory team members report they regularly respond to inquiries from teachers seeking advice on the implementation of new strategies.
- Teachers have established Reading Corners in all lower-grade elementary classrooms on San Cristobal (where Literacy was the focus during years 1 and 2) and appear to be maintaining and using these spaces to foster students’ love of reading.
- For the first time, teachers are using rubrics for formative evaluation, fostering teacher-student reflection on what they have learned and how they have learned it.

Student perceptions of change. While not a formal part of the monitoring and evaluation plan, data collectors recently conducted focus groups to determine the extent to which students in the equivalent of 8th and 11th grades in the
US school system perceived changes in their classrooms as well as areas of perceived need. In terms of practices the ESG Program has promoted, students reported frequent group work, student collaboration, a variety of student-centered teaching approaches, and constructive student-teacher relationships. Their comments also identified areas for improvement, including the use of formative assessment, local examples in classroom learning, and classroom management strategies for dealing with student-student ridicule and excessive noise and distractions.

**RELATED RESEARCH**

Members of the Advisory Team are currently conducting research on the following subjects:

*How Intercultural Education Programs (IEPs — a priority of the Ecuadorian government) can be adapted to meet needs of unique locations such as Galapagos, while addressing the needs of the indigenous populations the programs are meant to serve.* The IEP in Galapagos serves the Salasaca population—an indigenous group that migrated to the archipelago from the Ecuadorian Andes. The study involves interviews with school leaders and members of the Salasaca community in Galapagos, classroom observations, and analysis of educational policy documents. The goal is determining the extent to which the program has been adapted to Galapagos realities and making recommendations for further development of this program and IEPs in other parts of Ecuador.

*Teacher contextualization of the Ecuadorian national curriculum to local realities.* Advisors are coding videos of teachers conducting science lessons to study the extent to which they are adapting the national curriculum to local environmental and social issues.

*Public-private partnerships in education.* Advisors from Southern Methodist University and Stanford University are writing an environmental education policy paper focused on the potential of the Education for Sustainability Program’s public-private partnership to address the long-term conservation of the Galapagos Islands via education. The paper describes how various national and international universities and organizations and the Ecuadorian Ministry of Education have agreed to provide an intensive multi-year professional development program and assesses the impact the project could have on Ecuadorian educational policy.

*Changes in teacher understanding of Education for Sustainability.* Advisory team members from North Carolina State University and Stanford University have initiated research on the extent to which our teacher training causes change in teacher understanding of sustainability and in their ability to teach sustainability.

*Effectiveness of the Modeling Approach to Physics in the Galapagos context.* An advisory team member based at Oregon State University is considering research on the effectiveness of our teacher training in Physics and Chemistry in improving teacher understanding of Physics concepts and their ability to teach these concepts. The study will use the same instruments and methodology as similar studies on the Modeling Approach that have been conducted in different parts of the world.

**REFLECTIONS FROM THE ESG PROGRAM TEAM**

Program coaches and PD facilitators agree on the following lessons learned during the first half of the ESG Program:

*Philosophical and pragmatic alignment of program partners.* Perhaps the single greatest factor enabling program progress to date is the fact that Ecuador’s Ministry of Education has a well-founded vision that is highly-consistent with evidence-based approaches to teacher PD and classroom instruction. The ESG Program would not have been possible if FS and GC sought to promote activities that were not highly-aligned with the philosophy of the MinEduc. In terms of implementation, FS, GC and MinEduc have also demonstrated a strong commitment to respecting each other’s internal processes and timeframes and finding workable solutions when these have been at odds with one another. A high level of philosophical and pragmatic alignment is essential to a true partnership approach.

*Characteristics of effective trainers.* The experience of PD facilitators varies considerably. While all members have prior experience delivering professional development, some are young educators still working in public or private schools as instructional coaches and others are university faculty members with decades of experience in designing, delivering and evaluating teacher professional development programs.
We believe that the most effective trainers have the following characteristics:

- Exceptional classroom teaching skills, to effectively model evidence-based approaches during the Institutes.
- Flexibility and a willingness to adjust one’s approach and educational philosophy to program norms and priorities.
- Ability to function effectively in a fluid environment with evolving needs and opportunities.
- A collaborative spirit that enjoys working as part of a diverse team.

In general, facilitators who are fluent in Spanish have been rated more positively by participating teachers than facilitators needing interpretation. However, several outstanding English-speaking trainers continue to play an essential role in the program and are among the most highly-rated members of our team. When interpretation is necessary, we have found it most effective when it is carried out by a bilingual educator with familiarity of the topic being presented.

**PD facilitator continuity.** There is a steep learning curve for PD facilitators in terms of aligning their thinking with program priorities, learning about planning and implementation protocols, understanding local realities and teacher needs, and gaining the trust of Galapagos educators. While monitoring and evaluation results have led us to make several changes to the PD team, we place a very high value on continued participation of effective, enthusiastic facilitators. Many of our team members have developed strong relationships with Galapagos educators and maintain contact and provide assistance throughout the year.

**Facilitator motivation.** The ESG Program requires a high level of motivation and commitment from members of its Advisory Team. PD facilitators are compensated for their involvement in the program, but most members of the Advisory Team could earn much more through other consulting opportunities. Whether a facilitator is motivated by the opportunity to conduct research, a personal interest in connection to Galapagos, or some other motivation, it is important for program leadership to do what it can to ensure that facilitator involvement is enjoyable and personally and professionally rewarding.

**Teacher motivation.** Participant enthusiasm is driven in part by the fact that the PD offered helps them meet the MinEduc’s requirements for professional advancement (330 hours every four years). Participants also like the fact that the MinEduc has created time within the school calendar for the Teacher Institutes, which means that they can meet this PD requirements without using vacation time or weekends. A key to program sustainability will be Ministry support (especially ensuring reduced teaching load) to allow coaches trained by the program to fulfill this new role. Such support is mandated in Ecuador’s Education Law, but current austerity measures may require the identification of alternative incentives.

**Geographic nodes of support.** A significant number of Advisory Team members are based in the Dallas area and most have some connection (faculty member, current or prior student, collaborator) with the Simmons School of Education and Human Development at Southern Methodist University. Facilitators from the Dallas area report that their geographic proximity and previous professional relationships have facilitated collaborative planning and a greater sense of teamwork. As a result, the program continues to promote the participation of multiple facilitators from the same home institution or geographic area.

**Challenges associated with promoting Education for Sustainability.** The ESG Program’s emphasis on student-centered active learning requires a significant change in the way Galapagos teachers approach their profession. The effective use of Education for Sustainability requires an additional shift that has proven challenging for even some of our experienced PD facilitators who did not have prior experience with Efs. During Years 1 and 2, the program encouraged simple connections between lessons and local examples. During Years 3 - 5 the program is helping teachers to develop the ability to make more sophisticated connections between the national curriculum, local examples and sustainability principles. This process has required more technical assistance - both for our PD facilitators and teachers - than we originally anticipated.

**Funding challenges.** The ESG Program was launched at a time of economic austerity in Ecuador. Most funding has been provided by generous individual donors who have visited the Galapagos Islands, with the notable exception of multi-year support from the Tinker Foundation.
and essential logistical support (including travel, food and lodging) from the Ministry of Education. Many foundations and corporations fund similar activities in the United States, but do not provide international support. The ESG Program would have benefitted from increased, multi-year funding to support 2-3 additional full-time coaches and for additional program support for internal program communications and for systematizing training materials developed by the PD facilitators.

**Activities beyond Year 5.** The ESG Program is laying the groundwork for sustained teacher professional development and school improvement initiatives. Galapagos teachers and school leaders will require continued support well beyond the end of the program to fully master the instructional practices and leadership approaches promoted by the program. In terms of new areas of focus, the program’s instructional coaches, facilitators, data collectors and Galapagos teachers and school directors have identified the following needs and opportunities: 1) Inclusion strategies, to help teachers provide meaningful opportunities for students with disabilities to learn alongside their non-disabled peers in general education classrooms, 2) Greater student and community involvement in school decision-making, and 3) Intensive use of Lesson

**Study to foster collaborative lesson planning, delivery, reflection and refinement, focused on specific student needs.**

**THE ESG PROGRAM’S VALUE AS A MODEL**

GC and FS believe that our teacher professional development model, based on in-person workshops and ongoing coaching and learning circles for an entire education community (approximately 400 educators) is highly relevant for other remote locations with limited Internet connectivity and relatively small concentrations of teachers. In May 2018, the Ministry of Education asked GC and FS to consider testing the replicability of our approach in the Ecuadorian Amazon.

We believe that it would be feasible to adapt PD materials and mobilize training teams, including Galapagos educators trained by the ESG Program, to replicate the program in other parts of Ecuador. Given the ESG Program’s focus on curriculum-independent evidence-based practices, program PD materials could also be adjusted for other countries.

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Dr. Nick Cabot (Oregon State University) and Kathryn Ribay (doctoral candidate at Stanford University) work with chemistry teachers who have developed an array of hands-on lessons that explore scientific concepts through real life problems. Examples include: soil acidification on local farms (pH), gasoline residues in Academy Bay (the structure and properties of hydrocarbons), and cell phone recycling (properties of elements). © Jonathan Drake/T2T-G
Successful replication in a location with similar characteristics would require:

- Ministry authorization, logistical support and strong, sustained commitment from national headquarters and regional and local officials.

- The ability to mobilize a suitable team of visiting PD facilitators.

- Sustained funding to implement a multi-year initiative.

- A committed, trusted local organization, similar to Fundación Scalesia, to champion the initiative and support PD activities over time.

- A skilled monitoring and evaluation team to ensure collection and dissemination of data, particularly formative and process data for continuous improvement.

Short of full replication of our model, the ESG Program is influencing teacher professional development activities elsewhere:

- Our program leader in Galapagos has presented multiple workshops on our coaching model to personnel involved in pilot projects on the mainland and is contacted regularly by educators from the national technical team of the Ministry of Education and District offices in different parts of Ecuador who are interested in our approach.

- Leaders of Ministry pilot projects on the mainland have participated in Teacher Institutes and coaching in Galapagos.

- Representatives from the Ministry of Education have studied our monitoring and evaluation plan as a model for replication on the mainland.

- Once we have tested the Education for Sustainability teacher materials we are developing in conjunction with curriculum specialists at the Ministry of Education, the Ministry plans to use those tools in other parts of the country.

Many of the underlying principles to our approach that we lay out in this document are consistent with effective larger-scale programs.

During the first half of 2019, ESG Program leaders will discuss ways in which our model could be adjusted, with the help of internet, video, published materials, etc., to serve significantly larger concentrations of teachers in less isolated locations. We will also develop a work plan to make the hundreds of workshop plans developed by the program readily available to educators in Galapagos and the Ecuadorian mainland.

In October 2018, nearly 400 educators participated in the Teacher Institute at the Tomás de Berlanga School on Santa Cruz Island. © Buró Comunicación Integral
Bibliography


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**TERMINOLOGY**

**The ESG Advisory Team** is comprised of approximately 40 PD facilitators from the US, Ecuador and other Latin American countries who participate in subject area teams in science, mathematics, language arts, social studies, English language and educational leadership.

**PD facilitators** are members of the ESG Advisory Team. Galapagos Conservancy identifies potential members of the Advisory Team based on their previous experience in PD delivery and Ecuador’s Ministry of Education approves their involvement. PD facilitators design and deliver PD workshops twice a year and occasionally travel to Galapagos to provide additional program support.

**Program coaches** are full-time program staff who live and work in Galapagos and conduct classroom observations and feedback sessions, facilitate professional learning circles, and conduct short workshops based on identified needs. Coaches conduct most of the PD between the biannual workshops.

**Coaches-in-training** are high-performing teachers who have been selected through a participatory process to develop the skills needed to serve as instructional coaches in their schools. Their training consists of four 16-hour Leadership Institutes (see below), 10 hours of additional workshops and 20 hours of shadowing program coaches.

**Teacher Institutes** are biannual week-long, in-person workshops conducted every June and October by a team of approximately 40 PD facilitators. Teacher Institutes are delivered by subject area and grade level on Santa Cruz and San Cristóbal islands.

**Leadership Institutes** are biannual two-day workshops focused on high-impact educational leadership for school leaders (directors, rectors and vice rectors) and coaches-in-training.

**Data collectors** are members of the monitoring and evaluation team who observe and collect data associated with the delivery of Teacher and Leadership Institutes, coaching and professional learning circles.

**ACRONYMS**

**CORE**: The Center on Research and Evaluation at the Simmons School of Education and Human Development at Southern Methodist University. CORE coordinates the monitoring and evaluation plan with support from Grupo Faro, a Quito-based NGO that supervises data collectors.

**CPRE**: The Consortium for Educational Policy Research. CPRE is a network of renowned researchers from universities and other institutions across the United States who study and publish on a range of topics relevant to education. CPRE designed and participated in the observation and data collection process during the early planning stages of the ESG Program.

**EfS**: Education for Sustainability, a cross-cutting theme of the ESG Program, refers to an educational approach through which core subjects are taught in the context of real-life examples and sustainability principles.

**FS**: Fundación Scalesia is a Galapagos-based Ecuadorian NGO dedicated to improving education in the Galapagos Islands. FS coordinates the logistics associated with the Teacher and Leadership Institutes and supervises program coaches. FS also provides the campus of its demonstration school, the Tomás de Berlanga School, as the primary training site on Santa Cruz.

**GC**: Galapagos Conservancy is a US-based conservation NGO authorized to operate in Ecuador. Education is one of GC’s three flagship program areas. GC provides overall program leadership and raises funds for program implementation.

**MinEduc**: Ecuador’s Ministry of Education authorizes FS and GC to implement the ESG Program and provides essential conceptual and logistical support.
EDUCATION FOR SUSTAINABILITY IN GALAPAGOS: CURRICULAR ROADMAP
K.C. Busch and Greses Perez-Joehnk

Part 1. Defining Education for Sustainability Principles

Framework of Sustainability

Sustainability refers to development efforts that "meet the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 42). Sustainability sits at the intersection of three systems: 1) environment, 2) economy, and 3) society. The Ministry of Education of Ecuador has identified 3 "Sustainability Axes" that correspond to the three spheres of sustainable development: 1) Environmental Protection - Conservation and Biodiversity Management, 2) Economic Development - Use of Natural Resources, and 3) Societal Improvement - Human Development.

In order for a process or program to be considered "sustainable," it must encompass all three systems. The overlap of these systems is such that some suggest that they are actually nested systems, in which the economy is a subset of society, which is also a subset of the environment (see Figure 1). The nested model of sustainability acknowledges that a healthy economy and a just society are dependent on environmental health.

The United Nations General Assembly has further articulated seventeen Sustainable Development Goals to be achieved by 2030 (UN, 2015). These goals include ending poverty and hunger, reducing inequality and increasing inclusivity, ensuring healthy livelihoods, improving education, and conserving environmental resources. These lofty goals are ambitious, and education has been identified as crucial for the achievement of sustainable development goals.

Education for Sustainability

The overarching, broad goal of Education for Sustainability (EfS) is to empower learners to make informed decisions and take responsible actions to maintain environmental integrity, ensure economic viability, and support a just society for present and future generations (UNESCO, 2017).

There are three types of EfS (Nolet, 2016). First, there is provision of basic education to all. By increasing the overall quality of basic education, children are provided with the knowledge and skills to better their lives. Second, there is education about sustainability, which provides knowledge about sustainability-related issues, such as climate change or water pollution. Third, there is education for sustainability, which includes knowledge about sustainability topics but also includes values and skills to enact sustainable ways to living. This proposed roadmap intends to provide a path to attain this last level of sustainability education.

Dimensions of Education for Sustainability

Education for Sustainability is multi-dimensional. The UNESCO (2017) report, "Education for Sustainable Development Goals: Learning Objectives," articulates dimensions of educational experiences that support sustainability goals include content, competencies, character, and community. Each of these dimensions are defined as follows:

1. **Concepts** – learning to know (cognitive learning objectives). Learning content, specific to issues of sustainability, should be integrated into and across the curricular subjects. Integrated learning accurately conveys the interdisciplinary nature of sustainable development.
Sustainability Principles for Students

In keeping with the nested systems view of sustainability, we suggest integrating the three spheres of sustainability and the dimensions of Education for Sustainability into interdisciplinary “Sustainability Principles.” Sustainability Principles are high-level ideas and ways-of-thinking that students could be expected to develop as they progress through their formal educational experience. These Principles also incorporate the three dimensions of Education for Sustainability described above (not including socio-emotional learning. The proposed Sustainability Principles are:

Sustainability Principle 1

- All life forms, including human life, are sustained by the stability of the biosphere on which they depend for their well-being and survival.

The “Big Ideas” about sustainability for this principle are: Equilibrium and Life. As students move through the grades, their understanding of life’s reliance on a healthy environment will be developed. In the primary grades, students will learn about the unique flora and fauna of the Galapagos. Then, students will learn about how the environment of the archipelago is responsible for these unique plants and animals. As students progress further, they will learn about threats to the plants and animals because of changes in the environment. Human health issues are also considered within this principle. This principle emphasizes Systems Thinking, which involves the ability to recognize systems as large and complex, with many components. Students are able to identify the relationships between human and natural systems and analyze how they interact.

Sustainability Principle 2

- Sustainable living relies on the interdependence of healthy social, economic, and environmental systems.

The “Big Ideas” about sustainability for this principle are: Systems and Interdependence. As students move through the grades, their understanding of life’s reliance on a healthy environment will be developed. In the primary grades, students will learn about the unique flora and fauna of the Galapagos. Then, students will learn about how the environment of the archipelago is responsible for these unique plants and animals. As students progress further, they will learn about threats to the plants and animals because of changes in the environment. Human health issues are also considered within this principle. This principle emphasizes Systems Thinking, which involves the ability to recognize systems as large and complex, with many components. Students are able to identify the relationships between human and natural systems and analyze how they interact.

Character – learning to be (socio-emotional learning objectives). Socio-emotional skills enable students to collaborate, negotiate, and communicate with others. These skills include values and attitudes that are conducive to sustainability action-taking as well as personal character development. Examples of these skills are: creativity, honesty, kindness, respect, care, equity, justice, teamwork, leadership, hope, and appreciation. (NOTE: In the present phase of the project, we are not focusing on this important aspect of Education for Sustainability).

Community – learning to live together (place-based learning objectives). Content and learning should connect across contexts, from school, to home, and to the community. Contextualizing content and learning within local settings provides personal relevance for learners.

Competencies – learning to do (behavioral learning objectives). Classroom activities should develop cross-cutting competencies for sustainable development, such as systems thinking, futures thinking, critical thinking, and problem solving. These competencies span across disciplines and encapsulate the skills and ways of thinking needed to take positive action.

a. Systems thinking involves the ability to recognize systems as large and complex, with many components. Students are able to identify the relationships between human and natural systems and analyze how they interact.

b. Futures thinking involves the ability to imagine and evaluate multiple, plausible futures. In addition, students will consider how past and current action will have foreseeable and unknown consequences for the future.

c. Solutions thinking involves the ability to apply different problem-solving frameworks to create viable and equitable solution options for complex sustainability problems. Solution actions can be considered at the individual or collective level.

d. Critical thinking involves the ability to question societal norms, practices, and opinions in order to take and justify a position on issues of sustainability.

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Community – learning to live together (place-based learning objectives). Content and learning should connect across contexts, from school, to home, and to the community. Contextualizing content and learning within local settings provides personal relevance for learners.

1 This competency is called “anticipatory competency” in UNESCO documents.

2 This competency is called “integrated problem solving” in UNESCO documents.

3 Adapted from Australian Education for Sustainability Alliance.
available to humans, such as food, soil, and water. In the late primary grades, students will learn about energy resources and climate change. This principle emphasizes Systems Thinking, which involves the ability to recognize systems as large and complex, with many components. Students are able to identify the relationships between human and natural systems and analyze how they interact.

**Sustainability Principle 3** – *Sustainability affects everyone and involves everyone's active participation. Valuing diverse perspectives and striving for social justice are necessary for achieving sustainability.*

The "Big Ideas" about sustainability for this principle are: Fairness/Equity, Diversity, and Civic participation. As students progress through the grades, they will learn about the goals of and avenues for civic participation. Civic participation is essential for successful sustainability solutions. Furthermore, this principle focuses on the role of equity, diversity, and social justice. In the primary grades, students will learn about the many different types of people that live in the Galapagos. In the later grades, students could engage in the evaluation of environmental norms within their communities and participatory decision making within their schools. This principle emphasizes Critical Thinking, which involves the ability to question societal norms, practices, and opinions in order to take and justify a position on issues of sustainability.

**Sustainability Principle 4** – *Designing solutions for sustainability requires informed individual and collective action that values local communities and future generations.*

The "Big Ideas" about sustainability for this principle are: Solutions, Community/Place, and Long Term Effects. As students progress through the grades, they will have the opportunity to investigate, evaluate and design different solutions for sustainability. In the early grades, students will learn about past strategies and evaluate their impact. In later grades, students will be able to design and test their own solutions at different scales (school campus to community). This principle emphasizes Solutions Thinking, which involves the ability to apply different problem-solving frameworks to create viable and equitable solution options for complex sustainability problems. Solution actions can be considered at the individual or collective level. This principle also emphasizes Futures Thinking, which involves the ability to imagine and evaluate multiple, plausible futures. In addition, students will consider how past and current action will have foreseeable and unknown consequences for the future.

**References**


Education for Sustainability in Galapagos Program:
High Leverage Instructional Practices to Be Introduced Over a 4-Year Period

During the first four years of the Education for Sustainability in Galapagos Program, the professional development team will provide intensive teacher professional development (intensive workshops, 1:1 coaching and instructional coaching) to all preK-12th grade teachers and school leaders in the Galapagos Islands. Training will continue for a fifth year, but with local educators playing a leading role in planning and delivery.

Over the first 4 years, the program will provide 8 week-long teacher institutes focused on helping teachers to master their content knowledge and pedagogy. The program's five subject area Advisory Teams (math, science, language arts, social studies and English language) have established a sequence of subject content and subject-specific instructional practices to be introduced in the Teacher Institutes over a period of four years.

The table on the following page shows our current proposal for implementing nine essential HLPs (some of these are very closely related) and two ESPs over the course of our eight Teacher Institutes. In most cases, practices introduced in one year will be carried over and revisited in subsequent years.

YEAR 1

ESP 1: Establishing cultural and global connections. Teachers connect lessons and units with real-life examples from Galapagos (biodiversity and sustainability issues) and the world beyond. These connections make learning more practical, relevant and meaningful for students, and which will develop a greater understanding among students of the remarkable place where they live. Training will help teachers to identify and develop such connections.

2. Help teachers extend learning beyond the classroom. There are many opportunities for students to become involved in out-of-classroom experiential and serviced-based learning. Teachers can facilitate some of this learning, while local NGOs and government programs can provide others. Training will help teachers become aware of such opportunities and to connect such learning to the learning objectives of the formal curriculum.

In addition to High Leverage Instructional Practices (HLPs), the program promotes Education for Sustainability Practices (ESPs) to which our program is firmly committed. Two priority ESPs are:

1. Help teachers establish “cultural connections” in their classrooms. This involves connecting lessons with real-life Galapagos examples (biodiversity and sustainability issues) that will make learning more practical, relevant and meaningful for students, and which will develop a greater understanding among students of the

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The ESG Program has selected nine of the HLPs described by researchers at the University of Michigan: http://www.soe.umich.edu/academics/bachelors_degree_programs/uete/uete_hlp/ and http://www.teachingworks.org/work-of-teaching/high-leverage-practices
for in-depth interaction among students and in order to teach students to work collaboratively. To use groups effectively, teachers choose tasks that require and foster collaborative work, issue clear directions that permit groups to work semi-independently, and implement mechanisms for holding students accountable for both collective and individual learning. They use their own time strategically, deliberately choosing which groups to work with, when, and on what.

**YEAR 2**

**ESP 2: Connecting classroom learning with out-of-classroom learning opportunities.** Teachers engage students in meaningful learning opportunities beyond school boundaries and are

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<th>Institute 1</th>
<th>Institute 2</th>
<th>Institute 3</th>
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<th>Institute 6</th>
<th>Institute 7</th>
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<tr>
<td>HLP 1. Designing single lessons and sequences of lessons to achieve specific learning objectives.</td>
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<td>HLP 4. Establishing norms and routines for classroom discourse and work that are central to the content.</td>
<td>HLP 4. Establishing norms and routines for classroom discourse and work that are central to the content.</td>
<td>HLP 7: Selecting and using specific methods to assess students’ learning on an ongoing basis within and between lessons.</td>
<td>HLP 7: Selecting and using specific methods to assess students’ learning on an ongoing basis within and between lessons.</td>
<td>HLP 9: Analyzing and improving specific elements of one’s own teaching.</td>
<td>HLP 9: Analyzing and improving specific elements of one’s own teaching.</td>
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<td>HLP 2. Choosing, appraising, and modifying tasks, texts, and materials for a specific learning goal.</td>
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<td>HLP 5. Leading a whole-class discussion.</td>
<td>HLP 5. Leading a whole-class discussion.</td>
<td>HLP 8: Composing, selecting, adapting quizzes, tests, and other methods of assessing student learning of a segment of instruction.</td>
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<td>ESP 1: Establishing cultural and global connections.</td>
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<td>ESP 2: Connecting classroom learning with out-of-classroom learning opportunities.</td>
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<td>ESP 3: Establishing norms and routines for classroom discourse and work that are central to the content.</td>
<td>ESP 3: Establishing norms and routines for classroom discourse and work that are central to the content.</td>
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**HLP 2. Choosing, appraising, and modifying tasks, texts, and materials for a specific learning goal.** Teachers appraise and modify curriculum materials to determine their appropriateness for helping particular students work toward specific learning goals. This involves considering students’ needs and assessing what questions and ideas particular materials will raise and the ways in which they are likely to challenge students. Teachers choose and modify material accordingly, sometimes deciding to use parts of a text or activity and not others, for example, or to combine material from more than one source.

**HLP 3. Setting up and managing small-group work/collaborative learning groups.** Teachers use small group work when instructional goals call
aware of and leverage educational opportunities, non-formal environmental education, including service-based learning, offered by local and international NGOs in Galapagos. Teachers also utilize local resources (scientists, NGO leaders, private and public sector leaders and others) to enhance learning opportunities for students both in and outside of the classroom.

**HLP 4. Establishing norms and routines for classroom discourse and work that are central to the content.** Each discipline has norms and routines that reflect the ways in which people in the field construct and share knowledge. These norms and routines vary across subjects but often include establishing hypotheses, providing evidence for claims, and showing one’s thinking in detail. Teaching students what they are, why they are important, and how to use them is crucial to building understanding and capability in a given subject. Teachers may use explicit explanation, modeling, and repeated practice to do this.

**HLP 5. Leading a whole-class discussion.** In a whole-class discussion, the teacher and all of the students work on specific content together, using one another’s ideas as resources. The purposes of a discussion are to build collective knowledge and capability in relation to specific instructional goals and to allow students to practice listening, speaking, and interpreting. In instructionally productive discussions, the teacher and a wide range of students contribute orally, listen actively, and respond to and learn from others’ contributions.

**HLP 6. Posing questions about content.** Teachers pose questions about content. To effectively pose questions, a teacher considers the core ideas related to the content at hand, and carefully phrases questions that elicit, probe, and advance students’ thinking about the content.

**YEAR 3**

**HLP 7: Selecting and using specific methods to assess students’ learning on an ongoing basis within and between lessons.** Teachers use a variety of informal but deliberate methods to assess what students are learning during and between lessons. These frequent checks provide information about students’ current level of competence and help the teacher adjust instruction during a single lesson or from one lesson to the next. They may include, for example, looking at/analyzing student work, simple questioning, short performance tasks, or journal notebook entries.

**HLP 8: Composing, selecting, adapting quizzes, tests, and other methods of assessing student learning of a chunk of instruction.** Effective summative assessments provide teachers with rich information about what students have learned and where they are struggling in relation to specific learning goals. In composing and selecting assessments, teachers consider validity, fairness, and efficiency. Effective summative assessments provide both students and teachers with useful information and help teachers evaluate and design further instruction. Teachers analyze the results of assessments carefully, looking for patterns that will guide efforts to assist specific students and inform future instruction.

**YEAR 4**

**HLP 9: Analyzing and improving specific elements of one’s own teaching.** Learning to teach is an ongoing process that requires regular analysis of instruction and its effectiveness. Teachers study their own teaching and that of their colleagues in order to improve their understanding of the complex interactions between teachers, students, and content and of the impact of particular instructional approaches. Analyzing instruction may take place individually or collectively and involves identifying salient features of the instruction and making reasoned hypotheses for how to improve.
Appendix 3

OVERVIEW OF EVALUATION FOR EDUCATION FOR SUSTAINABILITY IN GALAPAGOS 2019

EVALUATION QUESTIONS AND OVERALL APPROACH

The Center on Research and Evaluation (CORE) at Southern Methodist University (SMU) has used a combination of evaluation strategies and approaches to understand the professional development offered by Galapagos Conservancy and its partners. At the start of the program, CORE conducted a literature review to understand the most current and relevant evidence-based practices in educator professional development. Using this literature review as a starting point, CORE, Galapagos Conservancy, and its partners began developing a list of the evidence-based best practices that best fit the specific offerings that were feasible for this project. This list, appended to this document, ultimately became the basis of measuring fidelity of implementation to evidence-based best practices in professional development across multiple data sources to answer the following key process evaluation questions about each of the major components of the program:

1. Are evidence-based best practices evident in Institute workshops?
2. Are evidence-based best practices evident in coaching?
3. Are evidence-based best practices evident in professional Learning Circles?
4. Are evidence-based best practices evident in Education Leadership workshops?

Additionally, another evaluation question (as seen below) was included to measure possible changes in educators’ construct survey data as an initial step towards an outcome evaluation approach. CORE will propose additional outcome evaluation questions in the next scope of work to assess possible changes in teacher instructional practices.

5. Are educators’ attitudes and self-reported practices changing over time?

As seen in Table 1, data sources are triangulated to provide an overall rating to each of these questions. It was helpful to have multiple sources to limit bias by any one party. These data allow us to provide formative and process data back to the program to help with continuous improvement. In particular, using a formative evaluation approach, we offer these data back to Galapagos Conservancy and its partners in the form of an interactive dashboard whereby professional development providers can see the holistic view of the ratings as well as breakdowns by subject and grade level band, by coach, and even comparisons across years.

In order to provide greater insight into the process indicators beyond the quantitative data generated from surveys, observation instruments, and self-reported checklists, qualitative data is also gathered at strategic points throughout the project from different players. Qualitative data is captured through open-ended responses on observation tools, focus group and interviews of program staff, teachers, and school administrators, and student focus groups conducted by Grupo FARO.

When appropriate, CORE also utilizes a developmental evaluation approach when new parts of the program are added or evolve (e.g., offering coaching efforts for school leaders such as directors and mentors-in-training). To this end, CORE does not usually use a predetermined tool until this component of the program has become more systematized. In the meantime, we continue to collect data to try and understand what is happening and subsequently develop an appropriate measurement tool to inform us about this component in a more systemic way.

A long-term goal of this project is to measure outcomes. Please see the Outcome Model (Figure 1). First, we will try to understand if there are changes, on average, in teacher instructional practices as measured by the coaches’ observations of teachers’ instruction as well as video observations.

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1 Many additional steps are also taken to limit biases. For example, CORE has conducted interrater reliability for spot observations, fidelity checks for self-reported lesson plans, etc.

2 Video data at nearly baseline will be compared to data gathered towards the end of the project. Data on instructional practice from coaches will be understood over time as well, but with more than two data points.
### Table 1: Evaluation Questions Addressed by Data Source, 2018-19 scope of work

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Monitoring &amp; Tracking</th>
<th>Question 1: EBBPs in Institute Workshops</th>
<th>Question 2: EBBPs in Study Circles</th>
<th>Question 3: EBBPs in Coaching</th>
<th>Question 4: EBBPs in Educational Leadership</th>
<th>Question 5: Attitudes and Practices Changing</th>
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<td>Use as indicator in outcome evaluation model</td>
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<td>Doc 6: Workshop Observations</td>
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<td>Doc 7: Coaching Observations</td>
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<td>Doc 8: Coaches’ Teacher Observation Data</td>
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<td></td>
<td>Develop analysis plan</td>
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<tr>
<td>Doc 9: Coding Rubric for Teacher Video Observations (Design only)</td>
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<td>Develop analysis plan and rubric</td>
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<td>Doc 10: Construct Surveys</td>
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<td>(1) Develop outcome analysis plan, (2) simple year-to-year analysis this phase with no statistical tests</td>
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Second we will test to determine if there is a direct relation between teacher dosage (the amount of professional development teachers receive) and their instructional practice. Third, we will examine which components of the professional development have the most likely influence on outcomes. Finally, we will consider the role of teachers’ attitudes in some constructs to see if they moderate or mediate the relation between dosage and instructional practice outcomes. Initially used to provide as proximal outcomes until we had reliable and data on teacher instructional practices, construct surveys are being incorporated into the larger outcome model. Some constructs are being considered as mediators and others as moderators, depending on their likelihood of affecting change in teachers’ instructional practice.

DATA COLLECTION AND ANALYSIS

CORE is in frequent communication with program staff (at minimum every 2-3 weeks) as well as our on-the-ground data partners Grupo Faro (approximately every month during active data collection). CORE collects the majority of the program data (e.g., educator satisfaction surveys, spot observation data, facilitator self-reported lesson plans, and teacher attendance data) twice a year during the Teacher Institute workshops. The construct survey data is collected once annually with one version for teachers and another version for school administrators. Spot observation data of coaching and Learning Circles occurs throughout the year, with the goal of observing at least three classroom observations and three learning circles of each coach between each Teacher Institute. Additionally, monitoring and tracking data such as attendance in Institute workshops, frequency of coaching, number of Learning Circles is collected throughout the year. Finally, program coaches collect data on teachers’ instructional practices throughout the year; while video observation data on teachers’ instructional practices was collected shortly after the launch of the program (2016) and will be collected again at the end.

Education Leadership data is starting to be collected in a similar manner as Teacher Institute workshop data, albeit with minor modifications as necessary, as this component is continuing to evolve.

Qualitative data, such as focus group data, interview data, and open-ended responses are collected on an as-needed basis from different players, primarily for continuous improvement purposes.
REPORTING AND DISSEMINATION

CORE provides interim and annual dashboards and/or reports to Galapagos Conservancy every year. These interactive dashboards are particularly important for formative and process data purposes; but can also inform variations in some data over time. As mentioned above, these dashboards are not only provided to the program staff, but also to coaches and facilitators for continuous improvement. Furthermore, CORE takes the findings from the various data sources and synthesizes them into meaningful holistic findings. CORE also makes recommendations to the program and its partners about potential improvements.

CHARACTERISTICS OF ESG
PROGRAM PROFESSIONAL
DEVELOPMENT
(What we think training should look like/involve)

OBJECTIVE 1: PD models evidence-based, high leverage teaching practices (HLPs).

Obj. 1.1, HLP 1 (Year 1): Design single lessons or sequences of lessons to achieve specific learning objectives.
Obj. 1.2, HLP 2 (Year 1): Choose, appraise, and modify tasks, texts, and materials for a specific learning goal.
Obj. 1.3, HLP 3 (Year 1): Set up and manage small-group work/collaborative learning groups.
Obj. 1.4, HLP 4 (Year 2): Establish norms and routines for classroom discourse and work that are central to the content.
Obj. 1.5, HLP 5 (Year 2): Model how to lead whole-class discussions.
Obj. 1.6, HLP 6 (Year 2): Pose questions about content that fosters teachers’ student understanding.
Obj. 1.7, HLP 7 (Year 3): Use specific formative assessment methods to assess students’ learning on an ongoing basis within and between lessons.
Obj. 1.8, HLP 8 (Year 3): Compose, select, adapt formative/summative assessment tools, such as quizzes, tests, and other methods of assessing student learning of a chunk of instruction.
Obj. 1.9, HLP 9 (Year 4): Analyze, reflect on and improve specific elements of one’s own [teaching/leadership].
Obj. 1.10 (Year 3-4) Leaders design and develop Proyecto Educativo Institucional (PEI)s that include high leverage pedagogical practices with a focus on impact.
Obj. 1.11 (Year 4): Leaders explore and identify different forms of assessment for observing teachers.

OBJECTIVE 2: PD models key practices associated with Education for Sustainability (ESPs).

Obj. 2.1, ESP1 (Year 1): Connect national curriculum content with real-world examples (local, national, or global examples).
Obj. 2.2, ESP 2 (Year 2): Connect classroom learning with out-of-classroom learning opportunities.
Obj. 2.3 (Year 3): Model activity that connects to the standards of the national curriculum, and an “Education for Sustainability” Principle and a local example.
Obj. 2.4 (Year 3): Discuss the concept of “Education for Sustainability (EfS)” and strategies for integrating EfS into [lessons/school culture].

OBJECTIVE 3: PD is connected with the curriculum that teachers need to teach or to support concepts they teach.

Obj. 3.1 (Years 1-4): Professional development is connected in concrete, meaningful ways to the national curriculum and learning standards.
Obj. 3.2 (Year 3): Professional development is connected in concrete and meaningful ways to profile of expectations of educational leaders provided by the Ministry.

OBJECTIVE 4: PD reflects attention to proven practices associated with adult learning.

Obj. 4.1 (Years 1-4): Professional development environment is welcoming so that all learners feel safe to participate.
Obj. 4.2 (Years 1-4): Professional development involves active learning (i.e., engages participants in learning to think about what they are doing, instead of only listening to lecture and taking notes).
Obj. 4.3 (Years 1-4): Professional development is relevant to [teachers’/leaders’] perceived needs.
Obj. 4.4 (Years 1–4): Professional development is tailored to individual [teacher/leader] needs. Trainers gauge [teacher/leader] familiarity with
the professional development material through needs assessments or by probing [teachers/leaders] for their understanding of concepts and approaches, in order to link new information with existing knowledge. Obj. 4.5 (Years 1-4): Professional development fosters [teacher/leader] collaboration. Obj. 4.6 (Years 1-4): [Teachers/leaders] have opportunities to reflect on professional development delivered and to generate and share ideas about how they can use new materials/approaches effectively in their [classrooms/schools].

Obj. 4.7 (Years 1-4): The professional development allows [teachers/leaders] the time to ask questions about anything they do not understand or need additional assistance with. Obj. 4.8 (Years 1-4): Teachers are able to solicit feedback (from facilitators/coaches/colleagues) on lesson plans. Obj. 4.9 (Years 1-4): The professional development allows teachers to learn strategies for establishing a learning environment that promotes inclusion and where students feel safe and tended to, according to their needs and interests. Obj. 4.10 (Year 4) The professional development discusses strategies for how leaders establish conditions for the development of teacher capacity and the effective use of human resources (e.g., stimulate teacher motivation, growth mindset, perseverance, team is greater than individual parts, leverage human capacity to solve challenges, etc.).

Obj. 4.11 (Year 4): Professional development develops skills and ability to solicit, organize, and integrate feedback (from facilitators/coaches/colleagues) on growth plans and strategies and Proyecto Educativo Institucional (PEI) plans.

OBJECTIVE 5: Specific to Learning Circles

Obj. 5.1 (Years 1-4): Learning Circle is conducted according to a pre-established agenda. Obj. 5.2 (Years 1-4): Learning Circle reflects a collective focus on students (teachers collaborate on addressing and meeting the needs of students). Obj. 5.3 (Years 1-4): Learning Circle promotes collaboration towards a common purpose (participants arrive at a shared understanding of what teachers and students will be doing when strategies are implemented).

Obj. 5.4 (Years 1-4): Learning Circle minutes record discussions, agreements and next steps. Obj. 5.5 (Years 1-4): Learning Circle involves open and reflective problem solving focused on specific instructional concerns and resources. Obj. 5.6 (Years 1-4): Learning Circle consistently uses data, student work, curriculum documents and other resources to focus discussion. Obj. 5.7 (Years 1-4): Data is disaggregated by student performance and aligned to specific standards.

Obj. 5.8 (Years 1-4): Learning Circle establishes clear goals to improve level of student performance. Obj. 5.9 (Years 1-4): Learning Circles become a natural and regular part of teachers’ jobs, helping to identify and address individual and whole school professional learning needs. Obj. 5.10 (Years 1-4): School leaders (i.e. Director, Rector, Vicerector, etc.) and mentors-in-training are committed to Learning Circles and prioritize its development and sustainability.

Obj. 5.11 (Years 1-4): Shared/distributed leadership within the Learning Circle is an accepted practice. All members are engaged in planning/preparation and ensuring success of the Learning Circle. Obj. 5.12 (Year 3-4) The professional development share strategies that help leaders prepare and support the educational community through Learning Circles for shared decision-making practices. Obj. 5.13 (Years 3-4): The professional development models how the Learning Circles can focus on action to achieve positive impact.

OBJECTIVE 6: Specific to Coaching

Obj. 6.7 (Years 1-4): Feedback from [Coach/Ed Leadership Facilitator] is practical and allows the [teacher/leader] to make specific changes in [teaching/leadership] practice.

Obj. 6.8 (Years 1-4): [Coach/Ed Leadership Facilitator] explains the theoretical foundations of feedback offered.

Obj. 6.9 (Years 1-4): Coach provides written report (by email) and personalized professional development plans to the teacher.

Obj. 6.10 (Year 4) The professional development introduces leaders to elements of coaching/mentor responsibilities.

OBJECTIVE 7: Specific to Education Leadership

Obj. 7.1 (Year 3-4) Professional development introduces strategies for how leaders can collaborate with coaches/mentors and teachers to analyze and execute the Proyecto Educativo Institucional (PEI)s for greater impact and quality plans and strategies for greater impact in quality education.

Obj. 7.2 (Year 4): The professional development shows how collaborative partnership between director and mentor-in-training can drive effective instruction for students.

Obj. 7.3 (Year 4) The professional development offers strategies to leaders on how to plan with teachers ways to develop quality instruction and the delivery of programs.

Obj. 7.4 (Year 4) Professional development provides leaders with observation techniques and feedback strategies when assessing teachers.
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