

# **Effective teaching in rural schools: examining local knowledge, sustainable development, and scientific agency within a multi-national curricular program**

Elena Dúran-López  
Rebecca Shareff  
Emily Lample

# Panel overview

“The power that can ultimately raise humanity from its present condition is the power of knowledge” (Arbab, 2000)

Humanity must participate in the generation and application of knowledge.

“Sister programs” of  
FUNDAEC (Colombia):

*Sistema de Aprendizaje  
Tutorial* (Tutorial Learning  
System or SAT)

Preparation for Social  
Action (PSA)

# What makes SAT innovative?

- Interdisciplinary curriculum focused on “capability areas”
  - Science, technology, mathematics, language and communication, community service
  - Experiential/applied focus
- System of tutor recruitment, training, professional development/support
- Use of semi-scripted curriculum and student workbooks
- Partnership between Secretary of Education and NGO (in Honduras, Asociación Bayan)

# Impact Evaluation of SAT program, 2007-2010, 2016 (our findings today)

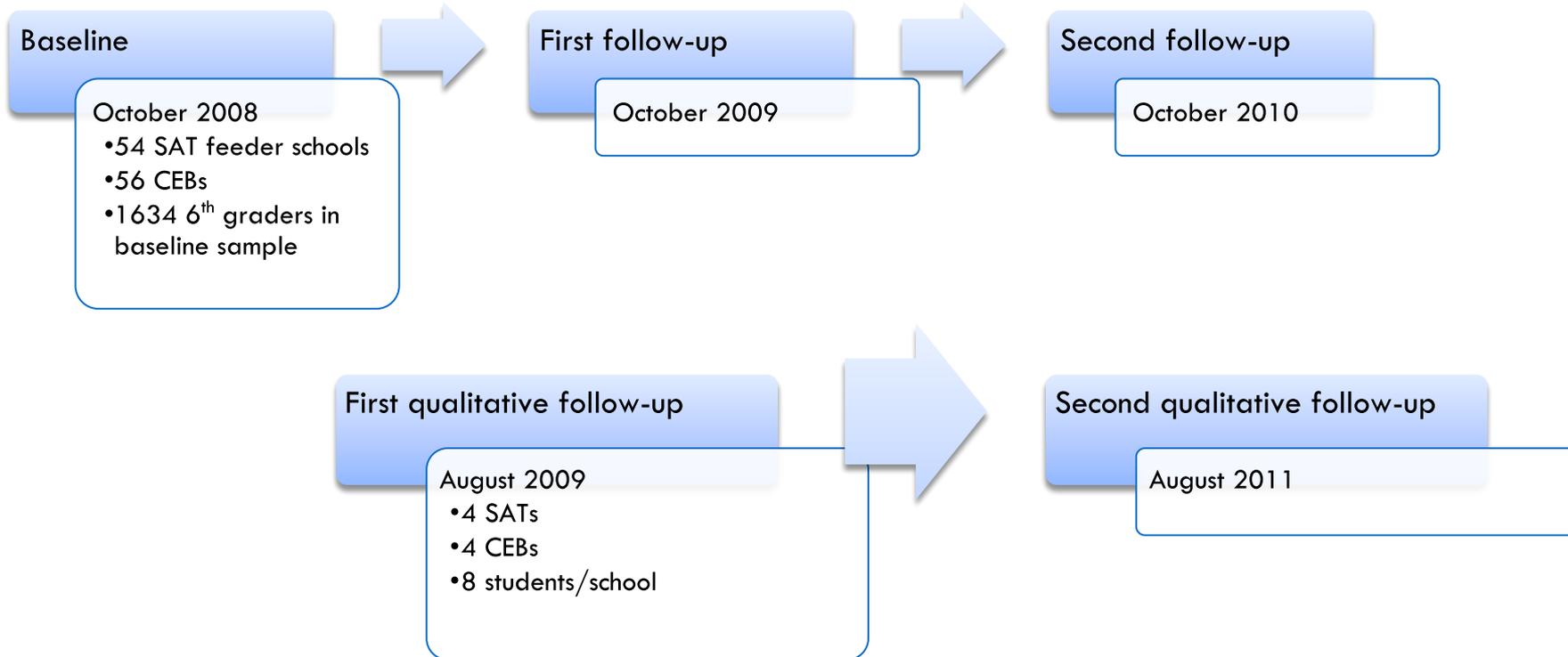
## Comparison of two systems of rural education:

- *Sistema de Aprendizaje Tutorial (S.A.T.)*
  - Guided, participatory textbooks; work facilitated by tutor
  - Tutor has secondary degree; in-service training from Bayan
  - Single tutor per cohort
  - Tutor testing, monitoring, accountability
  
- *Centro de Educación Básica (C.E.B.)*
  - Standard textbooks and lectures; less student participation in lessons
  - Teacher usually has university degree; mixed in-service training
  - Multiple teachers per cohort
  - No teacher testing, mixed monitoring, little accountability

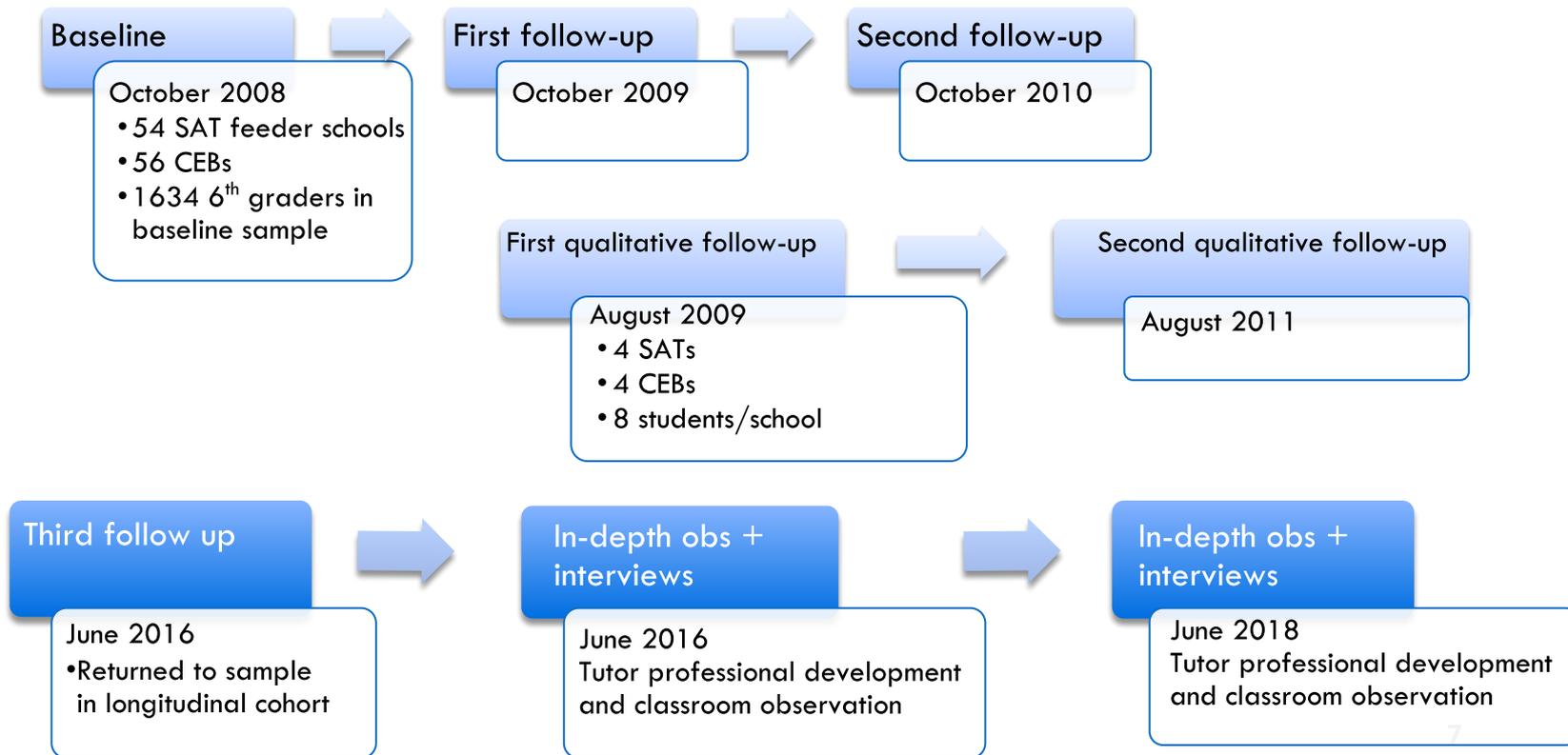
# Impact evaluation: methodology

- Quasi experiment:
  - Matched sample of SAT “feeder” primary schools and CEBs
  - Baseline survey/assessment of 6<sup>th</sup> grade graduates in 2008 (prior to treatment)
  - Follow-up of 2008 cohort, regardless of enrollment in 2009, 2010
  - In-depth qualitative research in 8 communities (4 SAT, 4 CEB)

# Data collection: First Phase



# Data collection: Second Phase



# Summary of main findings in 2010

- One-third of eligible students do not enroll in any school; correlated with baseline achievement and wealth proxies.
- Offer of SAT, relative to CEB
  - 0.21 s.d. increase in composite test scores by second year (45% increase in the rate of learning)
  - Estimated cost 18% lower in SAT
- Inputs/processes
  - More instructional materials and days, different pedagogy
  - SAT teachers have more and more-structured in-service training, higher teaching self-efficacy

# Increased interest in SAT as model for quality secondary school in rural areas

- Brookings Millions Learning Case Study

*“As global problems continue to grow more complex and indiscriminate about geography, this kind of transformative learning model will be ever more relevant in mobilizing rural youth in the creation of more sustainable communities.”*



# Findings from impact evaluation motivate current focus on quality

- ESRC/DFID Raising Learning Outcomes (RLO)
- *What system-wide features of the SAT program explain the quality outcomes?*
- *What are the effects of quality education as youth transition to adulthood?*

# Data collection in 2016

- Returned to same 47 pairs of CEB and SAT villages
- Extensive survey of youth (now average age 20) (education, work, demographic outcomes, civic participation, friends, gender attitudes).
- Assessments in Spanish, vocabulary and mathematics
- Qualitative interviews in 8 communities
- In-depth observation of tutor training, classroom observation

# Response rates 2016

	N	%
In-person survey	1041	73%
Short, phone version survey	257	18%
<b>TOTAL COMPLETED</b>	<b>1298</b>	<b>91%</b>

	N	%
Non-viable (death, prison)	12	.8%
Declined to participate	15	1.1%
No contact information	64	4.5%
No contact (en route to USA or Europe)	37	2.6%
<b>Total non-response</b>	<b>128</b>	<b>9%</b>

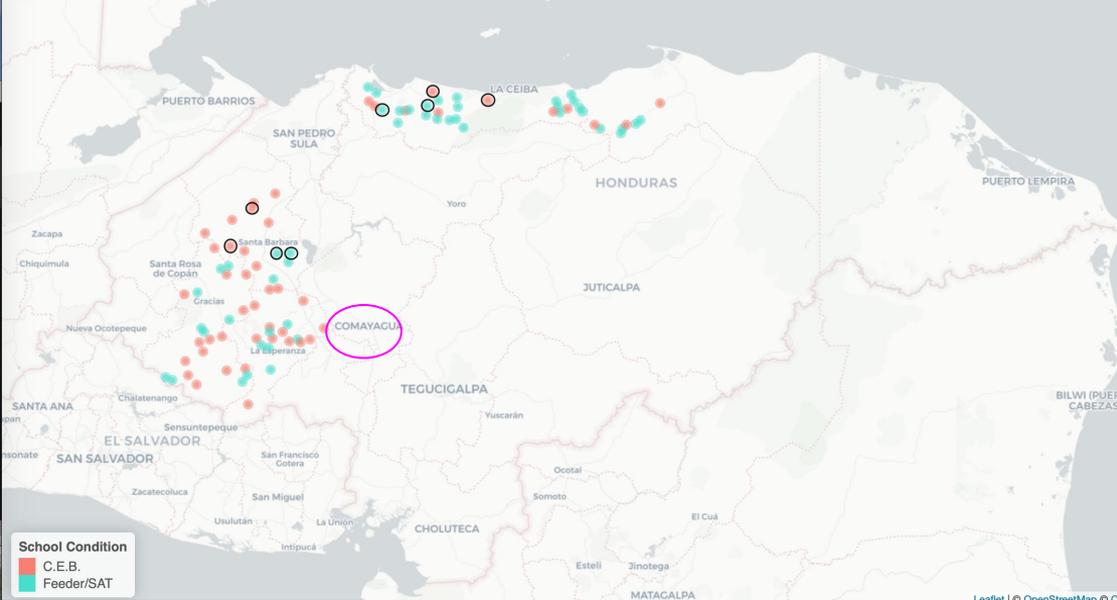
# 2016 round of data collection

- Allows us to examine *why* the SAT model improves learning outcomes
  - Focus on science/mathematics teaching
- Today, one slice of our overall study findings, a “deep dive” into what we learn from this mixed-methods longitudinal research project about the features of SAT that support improved learning outcomes

Study sites:

Communities

Training center

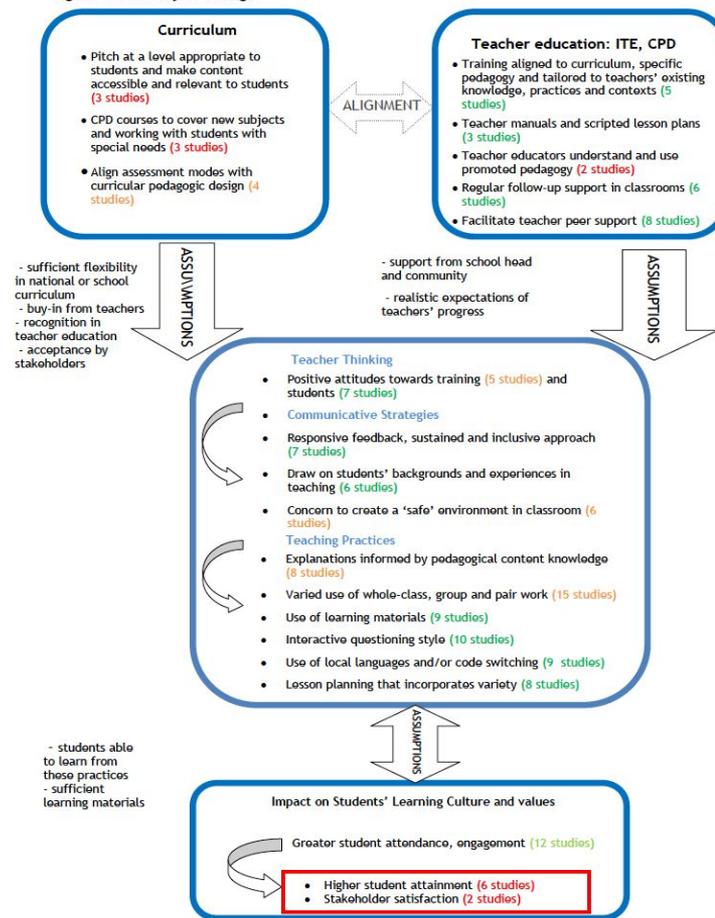


# Theoretical Framework

## Effective Teaching

What is the evidence on the effectiveness of pedagogical practices, in what conditions, and with what population of learners?

Figure 4.1 Theory of Change



# Theoretical Framework

## Teaching for Robust Understanding

(TRU Framework)

### The Five Dimensions of Powerful Mathematics Classrooms

The Mathematics	Cognitive Demand	Equitable Access to Content	Agency, Authority, and Identity	Uses of Assessment
<i>The extent to which the mathematical content in which students engage represents our best current disciplinary understandings related to mathematical thinking, learning, and problem solving. Students should have opportunities to learn important content and practices, and to develop productive disciplinary habits of mind.</i>	<i>The extent to which classroom interactions create and maintain an environment of productive intellectual challenge conducive to students' disciplinary development. There is a happy medium between spoon-feeding content in bite-sized pieces and having the challenges so large that students are lost at sea.</i>	<i>The extent to which classroom activity structures invite and support the active engagement of all of the students in the classroom with the core content being addressed by the class. No matter how rich the content being discussed, a classroom in which a small number of students get most of the "air time" is not equitable.</i>	<i>The extent to which students have opportunities to "walk the walk and talk the talk," building on each other's ideas, in ways that contribute to their development of agency (the capacity and willingness to engage) and authority (recognition for being a good thinker), resulting in positive identities as thinkers and learners.</i>	<i>The extent to which the teacher solicits student thinking and subsequent instruction responds to those ideas, by building on productive beginnings or addressing emerging misunderstandings. Powerful instruction "meets students where they are" and gives them opportunities to move forward.</i>

# Training and teaching for inclusive development: Combining community knowledge and science content in rural Honduras

Elena Durán López  
Rebecca Shareff  
UC Berkeley  
Graduate School of Education

## Research Question (overarching):

How, if at all, does SAT offer insights to effective teaching in low-income, rural communities?

# Data

- Interviews (2009)

CEB	
Code	Teachers
<b>School A</b>	x3
<b>School B</b>	x3
<b>School C</b>	x3
<b>School D</b>	x4

SAT	
Code	Tutors
<b>School W</b>	x1
<b>School X</b>	x1
<b>School Y</b>	x1
<b>School Z</b>	x1

# Data Analysis

- Analysis based on grounded coding.
  - Chunking [\* researcher ignores the affiliation of the interviewees]
  - Summarization of chunks [\* researcher ignores the affiliation of the interviewees]
  - Grouping and defining *categories*
  - Defining broader *themes*
  - Generating *summary tables* for CEB and SAT
    - Unit of analysis → educational institution
  - Comparing CEB and SAT *summary tables*
- Several cycles of fine-tuning categories and themes.

# Findings - Themes

- Learning happens through conversations and engagement with the texts
- Learning happens beyond the classroom
- Learning happens through relationships (work in progress)

## Learning happens through conversations and engagement with the texts

# Findings

### - Curriculum (in)Stability

#### CEB

- Curriculum instability
- Uncertainty on who should define the textbooks (i.e., teacher, school, government)

"For example, they started [with some] textbooks, [and] we learned the topics from start to end. [...] then the 'Escuela Morazánica' started, some little fascicles that came with some questions ... Okay. Now, we have some [new] books [and] it seems they are a copy from Mexico"

School D - CEB Teacher

#### SAT

- Well established syllabus
- Textbooks are one of the pillars of SAT

All tutors have continuous professional development trainings where they learn about the SAT curriculum.

# Learning happens through conversations and engagement with the texts

## SAT PD

### - Curriculum Stability

Tutors are trained in one complete unit at a time, with opportunities to ask questions, practice teaching, and receive feedback from their peers and instructors.

They complete 3 training cycles each year, with about four units per training.

They progress with their community of tutors throughout the whole sequence (grades 7 - 12), eventually being trained in all units in the curricular program.

LIBROS SAT_AÑO 2018		
Tercer Ciclo		
Grado	Parcial	Libros
Séptimo	I	Brisas de Confirmación
		Pensemos en los Números
		Sembrando Cultivos
		Cartilla Complementaria Séptimo Grado
	II	Inglés I: Leaves of One Tree
		Propiedades
		Aprender Sobre la Excelencia
		Describiendo el Mundo
	III	Caminando por el Sendero Recto
		Clasificación
		Calentamiento y Enfriamiento de la Materia
		El poder de la palabra
IV	Enunciados Numéricos	
	Suma y Resta	
	Salud, un Aspecto del Bienestar	
	Lotes DAE	
Octavo	I	Cartilla Complementaria Octavo Grado
		Sistemas y Procesos
		Inglés II: Leaves of One Tree
		Multiplicación y División
	II	Crecimiento de las Plantas
		La Concordancia en la Expresión
		Aritmética en la Investigación Científica
		Transición a la Agricultura
	III	Fotosíntesis
		Sumeria
		Fraciones y Porcentajes, y Sus Aplicaciones
		Cria de Especies Pecuarías Menores
IV	Ecosistemas	
	Cartilla Complementaria Noveno Grado	
	Inglés III: Wings of Humamity	
	Números, Expresiones y Ecuaciones	
Noveno	I	Maderas
		Mundo Interior y la Familia
		Temas Medioambientales
		Curvas Normales

BTP en Desarrollo Sostenible		
Grado	Semestre	Libros
Décimo	I	Lecturas I: Conozcamos la Realidad del mundo
		Inglés 4:
		Medidas del Espacio
		El Movimiento
		Cartilla Complementaria I, Semestre I
		Cartilla Complementaria II, Semestre II
	II	El Contexto de las Descripciones
		Inglés II:
		Funciones Polinómicas
		Concepto de Fuerza
		Trabajo y Energía, Parte I
		Cartilla Complementaria III, Semestre II
Cartilla Complementaria IV, Semestre II		
Bachillerato en Desarrollo Sostenible		
Grado	Bloque	Libros
Undécimo	I	Polinomios
		Movimiento I
		Manejo de la Diversidad de Especies
		Movimiento II
	II	Relaciones
		El Manejo del Dinero
		Inglés 5:
		Destrezas Algebraicas en la Vida Rural
	III	Concepto de Fuerza
		El Lenguaje Científico
		Educación
		Las Medidas del Espacio
Duodécimo	I	Trabajo y Energía
		Sistemas Sostenibles de Producción Campesina
		El Mundo de Sofía
		Funciones Polinómicas
	II	Máquinas
		El Mundo de Sofía
		El Mundo de Sofía
		Fundamentos de Liderazgo
	III	Inglés 6:

# Learning happens through conversations and engagement with the texts

## Findings

### - Curriculum (un)Suitability

#### CEB

- Available textbooks are inadequate for rural communities

*"[we should] prioritize issues that are much more important [...] in the villages of rural areas [...] because, speaking critically ... [at the beginning] the texts were not texts from Honduras but they were from Mexico [...] then we do not know the geography of our country because we have to learn the one from another country."*

School B - CEB Teacher

#### SAT

- SAT curriculum was created for the context of rural communities in Latin America

*"[talking about the technology textbooks] how we integrate the community with a technology project. We talk to them [students] about things they know, it adapts to the reality in which they live"*

School Z - SAT Tutor

# Learning happens through conversations and engagement with the texts

## SAT PD

### - Curriculum Suitability

Teachers take student perspectives while teaching to identify potential challenges with learning content or strategies to problem solving

- *"We're not confused about this, but a student might be" (referencing negative acceleration)*

Tutors generate local examples to problems in the text to create more community relevance.

- Food web activity adapted to use animals in local ecosystems



## Learning happens through conversations and engagement with the texts

# Findings

### - Textbooks (un)Availability

#### CEB

Lack of textbooks for some subjects.

*"[When asked about resources available] Textbooks, but only for the teacher, not for the students"*

School D - CEB Teacher

*"That book helps them a lot. Do you know why? Because in the class they how everything is in the book... the rules and everything, they can study and revise at home to have a clearer concept. While in the other classes no. Only with what one explains to them gives them the knowledge because they don't have a book"*

School D - CEB Teacher

#### SAT

SAT students are required to have textbooks

# Learning happens through conversations and engagement with the texts

## Findings

- Textbooks (un)Availability - Implications

### CEB

- Lack of textbooks encourages dictation, and summarizing the content

"the topics are sometimes very extensive [...] well, sometimes we use the dictation technique [...] because the children do not have their own materials. If the student had his material, his working text [...] I think [we] would [make more] progress."

School D - CEB Teacher

### SAT

- 'Lectura comentada': class discussion after a student reads a portion of the text.

"... we try to use 'commented reading'. A student reads, we discuss what s/he read, what each one understood, we expand a little, then another student reads and at the end of it, the exercises of 'ampliación' are made individually and then we discuss them together"

School Y - SAT Tutor

# Learning happens through conversations and engagement with the texts

## Findings

### - Curriculum Implementation and Fidelity

#### CEB

- Summarizing content
- Not finishing the textbooks before moving on to the next topic/textbook

*"Well, sometimes we do finish the content with the students [...] but sometimes time is an issue and the subjects are very extensive."*

School A - CEB Teacher

#### SAT

- Always finish a textbook before moving on to the next one
- Weekend classes, when needed

**Interviewer:** In general, do the students complete the textbooks before continuing with the next one? Why?

**Tutor:** Because if they are not complete, we cannot move on to the next ones."

School X - SAT Tutor

# Learning happens through conversations and engagement with the texts

## Findings

### - Curriculum Quality

#### CEB

- Errors found in some textbooks.

"[...] in terms of materials for rural areas [...] there are no didactic books. [...] when they gave me the math ones they were very poor, incomplete problems, many errors. So what did I do? Buy Santillana's book."

School A - CEB Teacher

#### SAT

- Tutors praised the interdisciplinary of the textbooks, and their connection with spirituality and human values.

"[...] the *Brisas de Confirmación* stories [and] '*Caminando por el Sendero Recto*' talk about: reaching dreams, not giving up, that although sometimes they have economic problems [they should not] stop studying but make an effort. [...] if they try hard there will always be [open] doors [...] achieving good things [is hard] but it can be done. There is no impossible [task]."

School Y - SAT Tutor

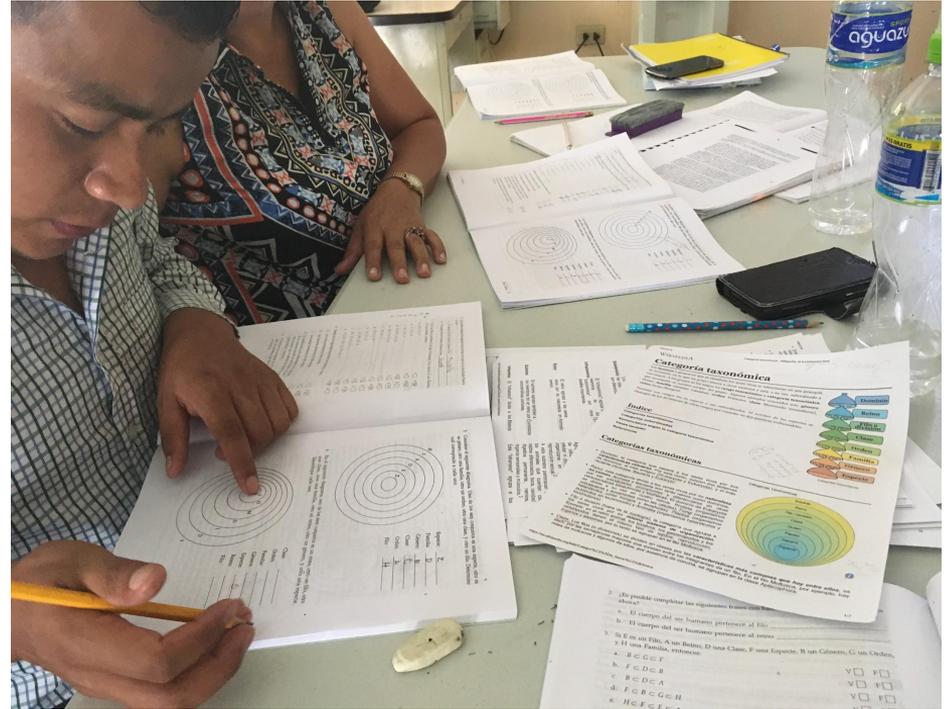
# Learning happens through conversations and engagement with the texts

## SAT PD

- Curriculum Quality

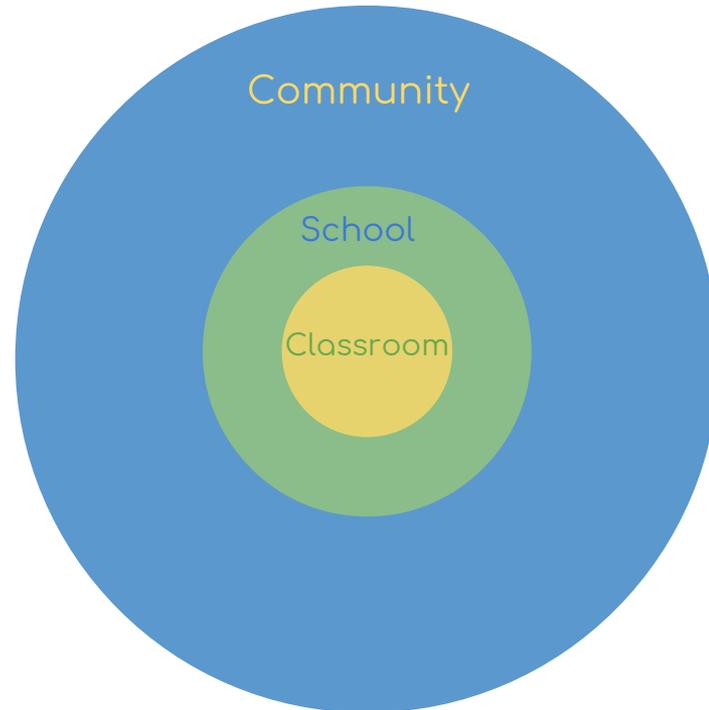
Trainings take place in areas with access to the internet, and are supplemented by other materials that develop tutors' content knowledge.

Work time can include researching concepts, vocabulary, and finding other teaching materials online.



Learning happens beyond the classroom

# Findings



## Learning happens beyond the classroom

# Findings

### - Academic Activities

#### CEB

- Few academic activities happening outside the classroom.

"for example, when we learn about ecosystems, what abiotic and biotic factors are (the ones that have life and those that do not), they [the students] have to go to a ravine, or go to a river to observe"

School D - CEB Teacher

#### SAT

Most commonly, students:

- conduct surveys and interviews with community members
- Work on agricultural projects

"with the technology text [...] it depends on the class, if it says it's a subsystem then, we have to sow. It is very nice because they [students] learn to work in the field."

School X - SAT Tutor

## Learning happens beyond the classroom

# Findings

- Academic Activities connected to Community Service

### SAT

All SAT tutors reported various academic activities that occur outside the classroom. Most commonly, students conduct surveys and interviews with community members, and also work on agricultural projects.

*"For example, the surveys [related to the] barns... They [students] have to go to and observe the barns. [to put into practice [the] theory [...] given that we are not going to make a barn, they have to go to observe already existing barns in the villages, write down their observations ... see if they adequate with what we have learned in the text, or if there is something that they lack ... Or what they could suggest to the owners if there is something that could affect them ..."*

School W - SAT Tutor

## Learning happens beyond the classroom

# SAT PD

Ecosystems training involved many outdoor dynamic practices, demonstrating the type of engagement tutors are expected to model with their students

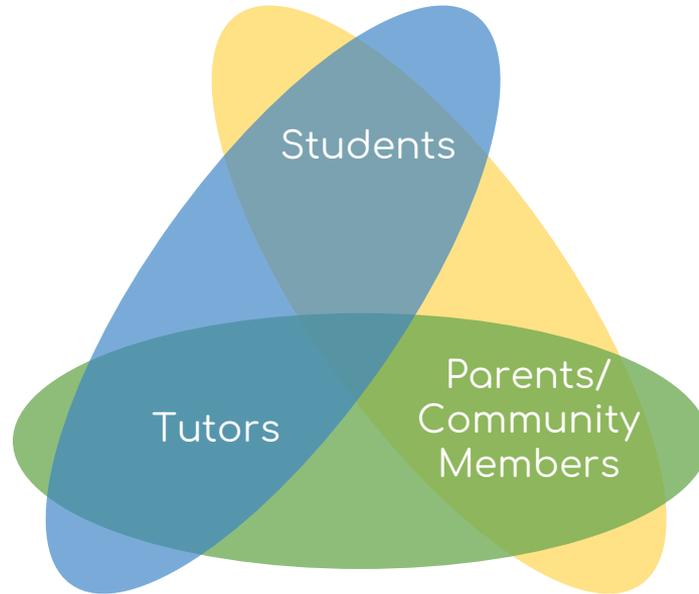
Community engagement and inquiry projects (**Field work**) are the final component of each chapter in the text.



## Learning happens through relationships

# Findings

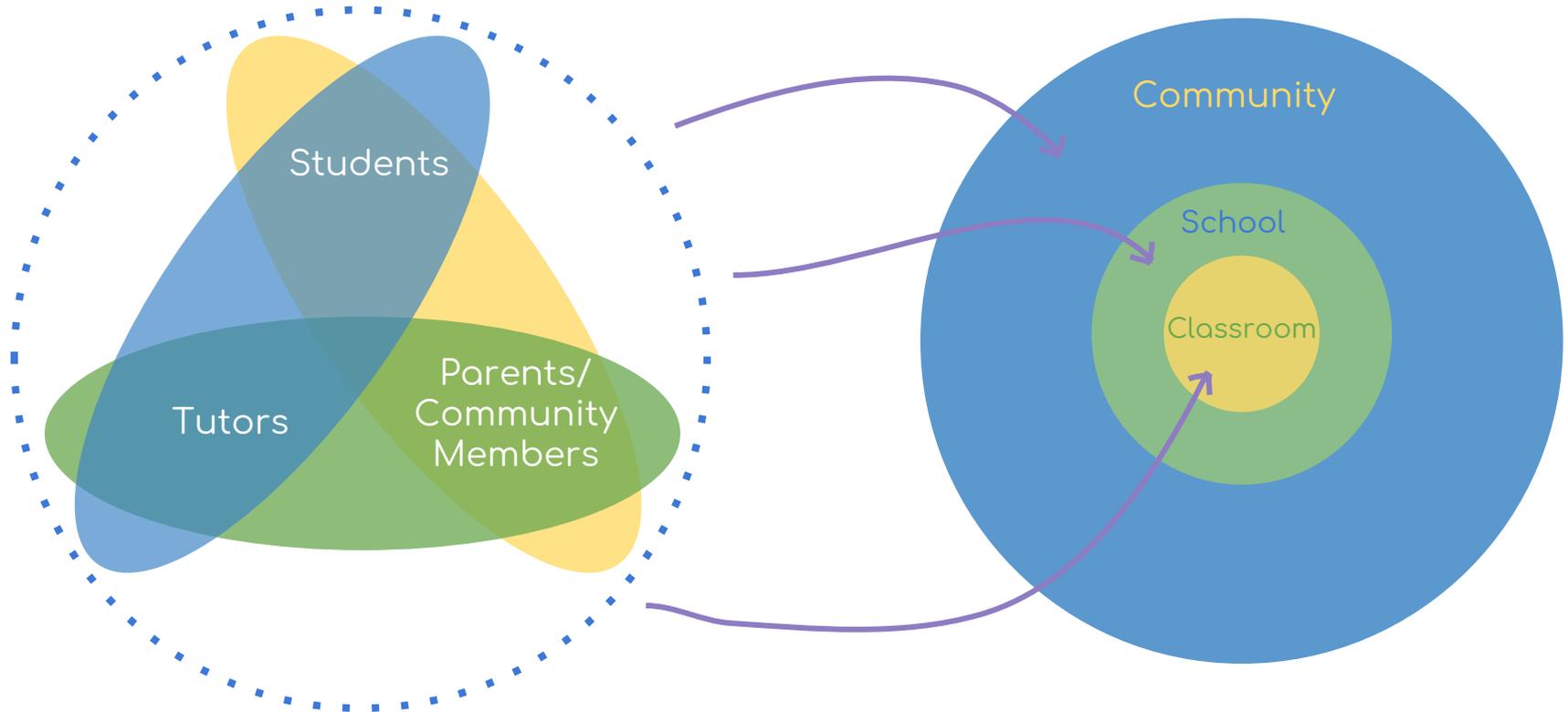
(work in progress)



# Learning happens through relationships

## Findings

(work in progress)



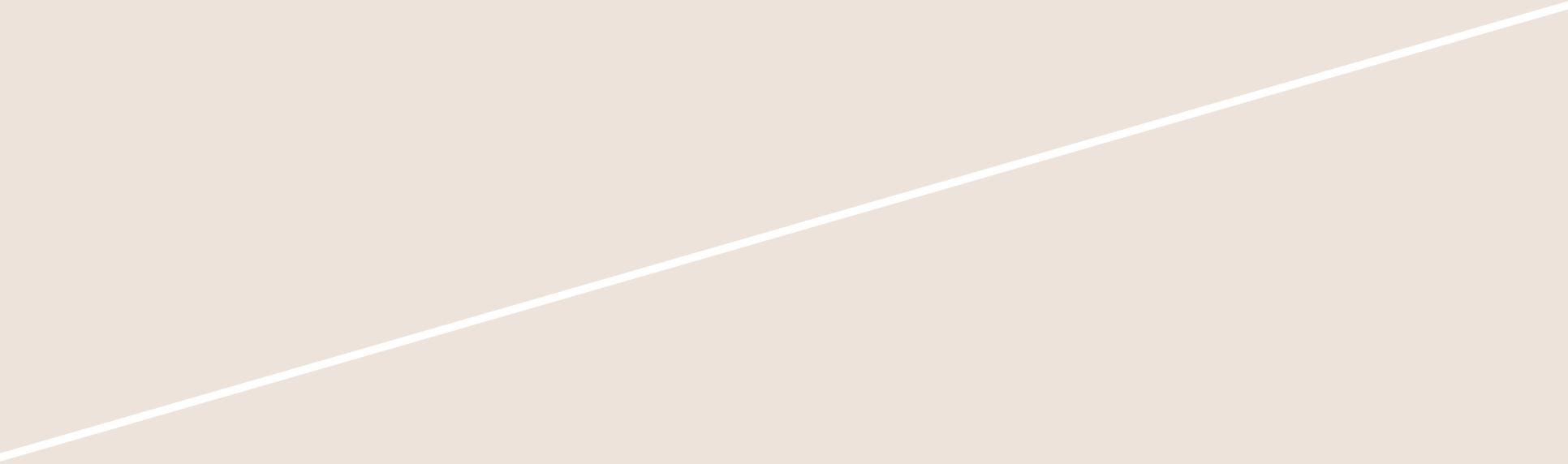
# Contribution

## *Findings + Contributions to theory*

(How if at all SAT offers insights to effective teaching in low income settings, broader theory)

- Through engagement in ag production can have a meaningful space outside of the classroom
  - Vs. CEB, going outside of class to do fundraisers, events, (no learning happening)
  - In SAT< taking learning outside, opportunity to use ag as a hands on learning, that might not exist in urban context.
  - Also in rural ag context, community members' roles are more likely directly connected to the projects that are happening at school
  - (These are findings we're not seeing represented in the framework that aren't captured in TRU or the other framework that we think are important)

Thank you!



## Learning happens beyond the classroom

# Findings

### - Social and Cultural Activities

#### CEB

Social activities fall under the following categories: cultural (e.g., typical food, dances, theater) and sports (e.g., soccer).

*"for example ... for the day of the sportsman [we have] games"*

School C - CEB Teacher

*[...] excursions, soccer matches [...] parties for socialization [where] the young people of the community [participate].*

School D - CEB Teacher

#### SAT

- Tutors from two institutions mentioned social and cultural activities.
- Fundraising activities.

*"We celebrated the day of the student [...] we hired a bus, we went to the Colprosumah ... they had fun there. We were taking care of them and ... .. Well, they bathed in the swimming pools, played with a ball and they jumped there, all day."*

School Z - SAT Tutor

## Learning happens beyond the classroom

# Findings

### - Community Service

#### CEB

- School improvement & community infrastructure
- Health campaigns (e.g., mosquitos and vaccination)

"when it is in holy week, cleaning. [Also some students] are going to do social projects, they are going to reforest some basins. They are the most common activities that are done for the community. [...] it is a requirement to graduate [...] they have to do a project." School D - CEB Teacher

#### SAT

- Community cleaning
- School improvement & community infrastructure
- Health campaigns

"Yes, sometimes, there are cleaning campaigns. [...] sometimes [...] they [students] have to go to survey people [and they need to] work with the leaders of the community."

School X - SAT Tutor

# A network of development: A comparative study of agro-science units in a rural Honduran secondary curriculum

Rebecca Shareff  
UC Berkeley  
Graduate School of Education



# Overview

## SAT

multi-national curricular program

## Honduras

nationally implemented as alternative curriculum for rural students

## Technology

one of the five curricular units



# Overview

## SAT

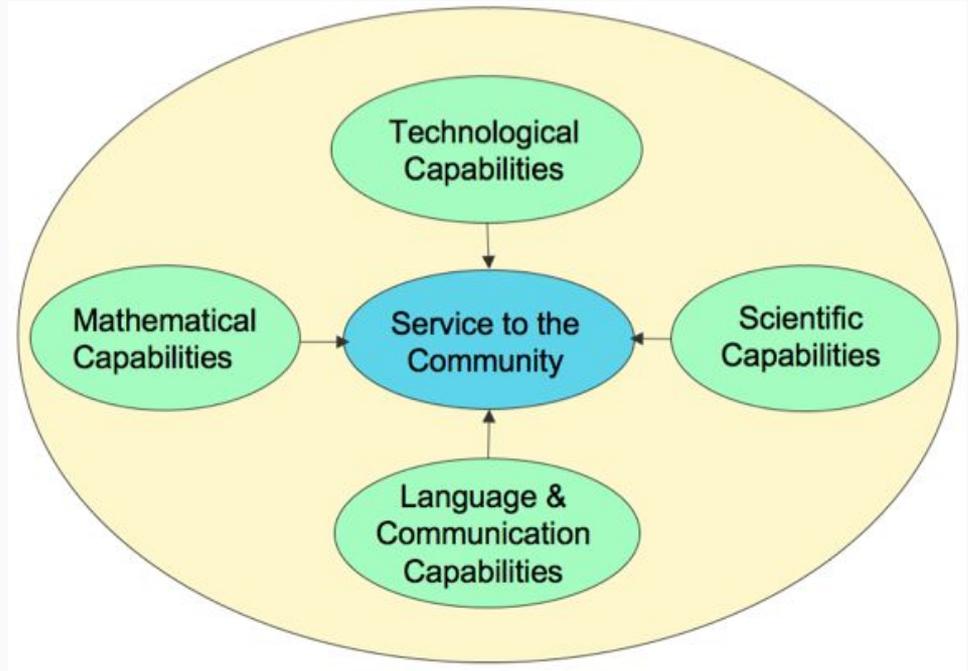
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## Honduras

nationally implemented as alternative curriculum for rural students

## Technology

one of the five curricular units



# Theoretical Framework

Within ESD, SES models address complex *human-environmental interactions*, *culture*, and *institutional* components.

Hybridized **Social Ecological Systems + Activity Theory** model analyzes how education programs are enacted and shape their local environments, specifically capacity building.

## Social-Ecological System (SES) Framework

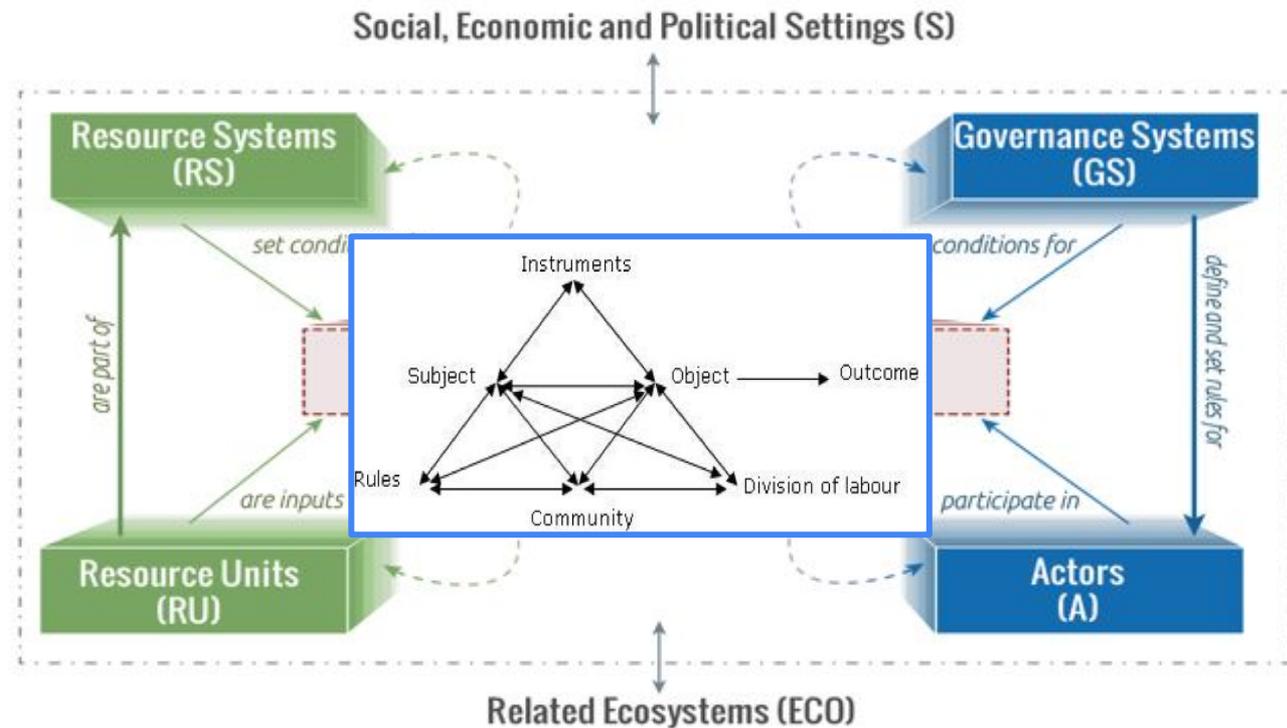
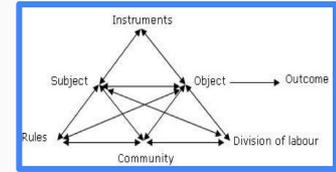


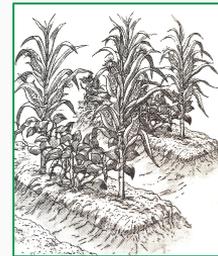
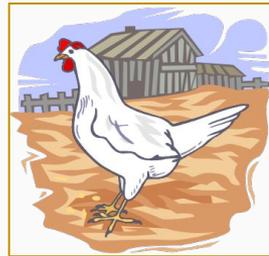
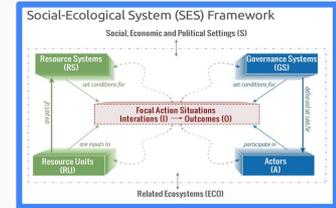
Illustration of the SES adapted from figure 2 and accompanying descriptive text in McGinnis, M., and E. Ostrom. 2012. "SES Framework: Initial Changes and Continuing Challenges." Working Paper W11-6 The Vincent and Elinor Ostrom Workshop in Political Theory and Policy Analysis: online: [http://www.indiana.edu/~workshop/publications/materials/W11-6\\_McGinnisEO.pdf](http://www.indiana.edu/~workshop/publications/materials/W11-6_McGinnisEO.pdf)

# Research Questions

(1) *What individual (student) capacities for supporting community development emerge from the enactment of Technological SAT units?*

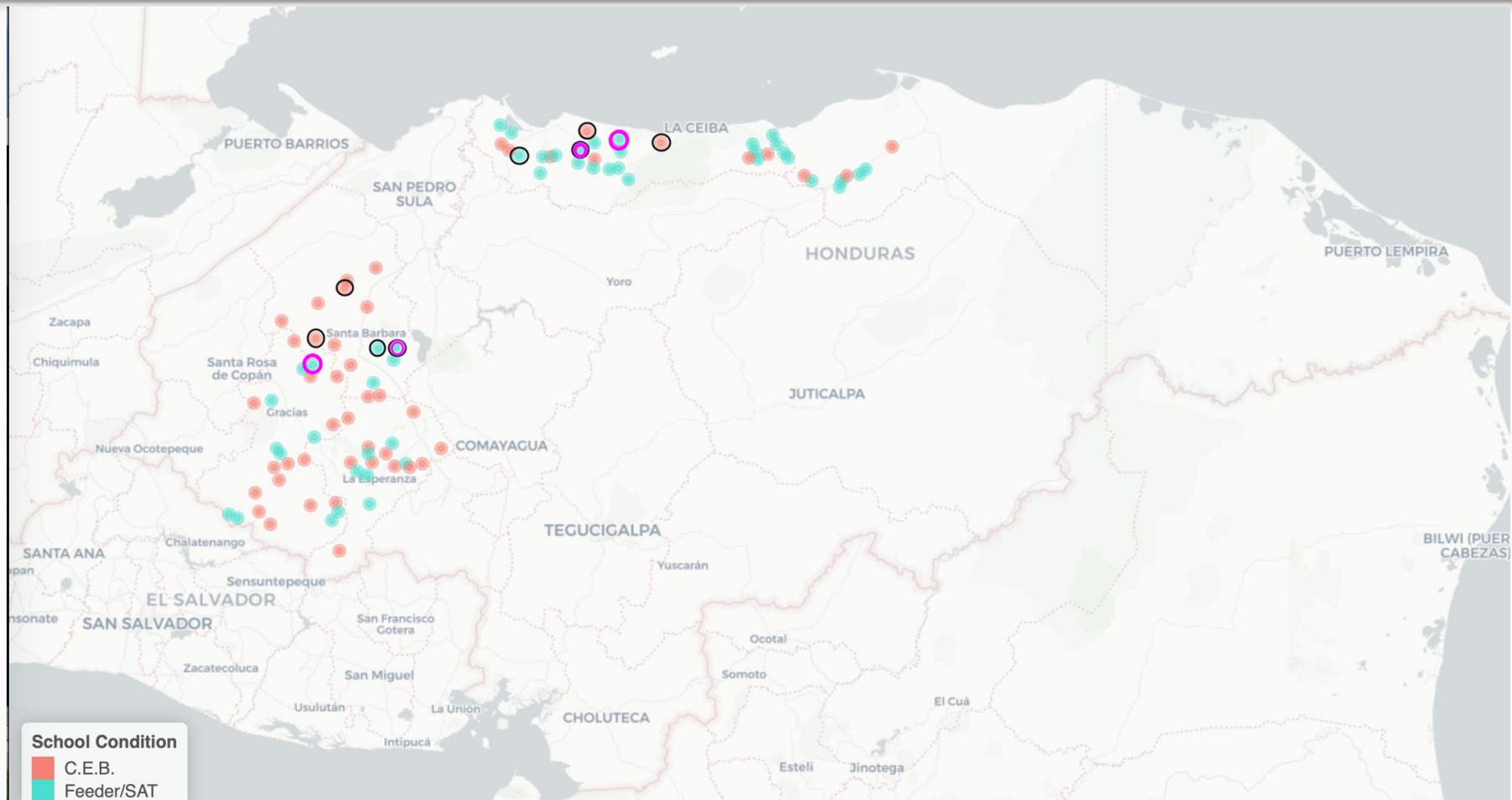


(2) *How does the enactment of the focal curricular units include the social, environmental, and economic development of SAT communities?*



- 4-week field study in June 2016
- Visited four SAT communities and one regional training center
- Conducted interviews
  - Administrator
  - Tutor-trainer
  - Tutors
  - Students
- Workbook Analysis

# Data Collection



# Data Analysis



Cria de Pollos



Sembrando  
Cultivos

# Data Analysis



Cria de Pollos



Sembrando  
Cultivos

**Resource System**  
**Resource Units**  
**Governance Systems**  
**Actors/Subjects**  
*Rules*  
*Community*  
*Division of Labor*  
*Instruments*  
*Object → Outcome*



**SES**    *AT*

# Data Analysis



Cria de Pollos



Sembrando  
Cultivos

**Resource System**  
**Resource Units**  
**Governance Systems**  
**Actors/Subjects**  
*Rules*  
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*Object → Outcome*



Textbook Curricular Guides

Environmental & Economic Impact

Local Knowledge Generation

**SES**    *AT*

# Data Analysis



Cria de Pollos



Sembrando  
Cultivos

**Resource System**  
**Resource Units**  
**Governance Systems**  
**Actors/Subjects**  
*Rules*  
*Community*  
*Division of Labor*  
*Instruments*  
*Object → Outcome*



**SES**    *AT*

Textbook Curricular Guides

- Rich content
- Culturally - relevant instruction

Environmental & Economic Impact

- Economic resource
- Ecological resource

Local Knowledge Generation

- Diverse perspectives
- Tensions between ideology and practice

*What does a comparison of the units help illuminate?*

**Sembrando Cultivos (Planting crops)** has a focus on long-term conceptual change and shifts in practices, as compared to the immediacy of economic relevance for **Cria de Pollos (Raising chickens)**.

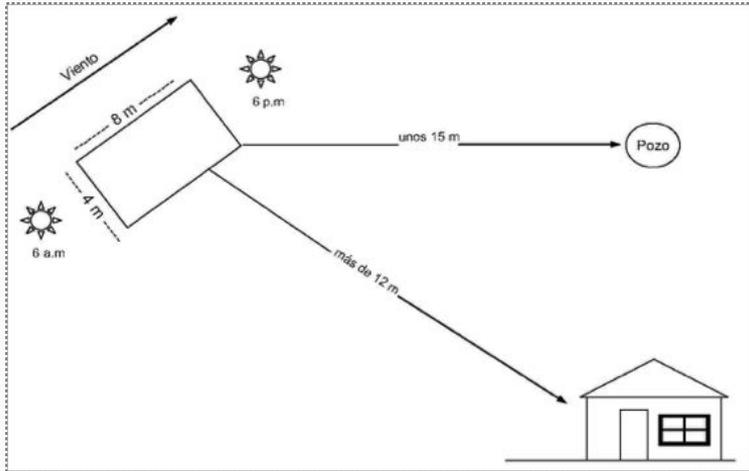
**Sembrando Cultivos** invokes analysis of many environmental conditions, and local practices over time and across history. **Cria de Pollos** has a tightly scripted start and end point, with little disruption to traditional knowledge.

# Curricular Analysis: Finding 1



## Cria de Pollos

**Applicability of technical content** to broad goals and management strategies

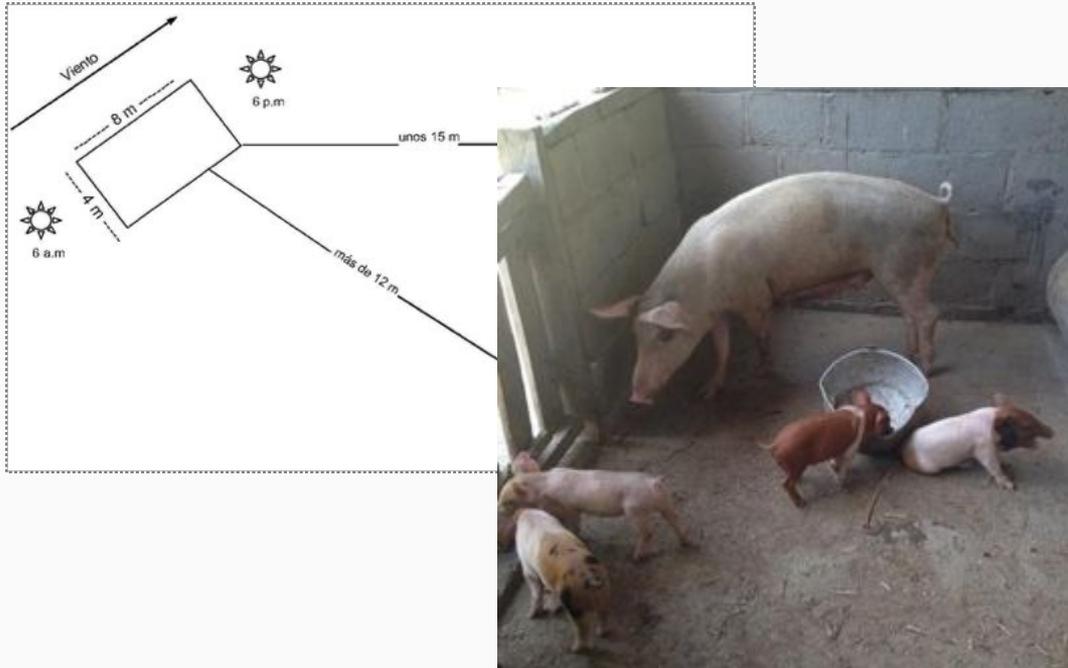


# Curricular Analysis: Finding 1



## Cria de Pollos

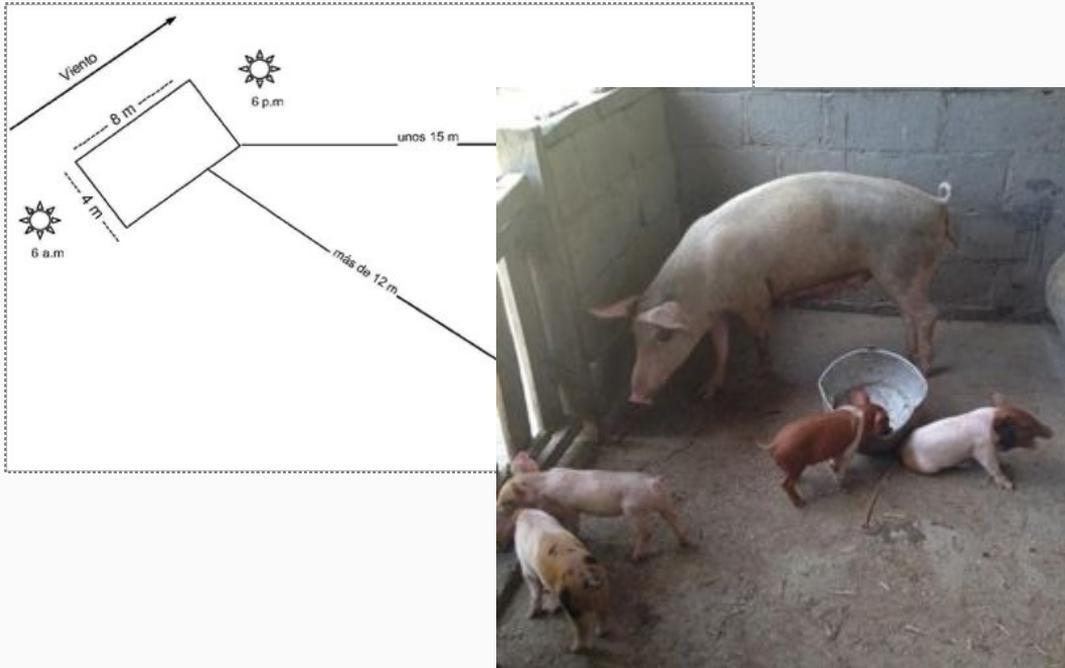
**Applicability of technical content to broad goals and management strategies**





## Cria de Pollos

**Applicability of technical content to broad goals and management strategies**



*“All of this they will see in reality, not just theoretically; before in mathematics they had seen this efficiency rate of conversion. They had been discussing mathematics, but right now, we are applying it to real life.” - Tutor*

# Curricular Analysis: Finding 2



## Cria de Pollos

**Direct support** of the livelihood of the wider community

Familia \_\_\_\_\_ Lugar \_\_\_\_\_

		SI	No	Recomendación
Sitio	¿El terreno es seco?			
	¿Tiene una pequeña pendiente?			
	¿Se facilitó el drenaje?			
	¿Está a más de 12 metros de la casa?			
	¿Está cerca del pozo?			
Orientación	¿El eje de longitud del techo está en el sentido del viento?			
	¿Tiene el doble de largo que de ancho?			
Tamaño	¿Hay un metro cuadrado para cada diez pollos?			
	¿Las paredes tienen la altura adecuada?			
	50 cm en clima cálido 80 cm. en clima frío			

# Curricular Analysis: Finding 2



## Cria de Pollos

**Direct support** of the livelihood of the wider community

Familia _____		Lugar _____		
		Si	No	Recomendación
Sitio	¿El terreno es seco?			
	¿Tiene una pequeña pendiente?			
	¿Se facilitó el drenaje?			
Orientación	¿Está a más de 12 metros de la casa?			
	¿Está cerca del pozo?			
	¿El eje de longitud del terreno coincide con el sentido del viento?			
	¿Tiene el doble de largo que de ancho?			
Tamaño	¿Hay un metro cuadrado por pollo?			
	¿Las paredes tienen la altura adecuada?			
	50 cm en clima cálido 80 cm. en clima frío			



# Curricular Analysis: Finding 2



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Tamaño	¿Tiene el doble de largo que de ancho?			
	¿Hay un metro cuadrado por pollo?			
	¿Las paredes tienen la altura adecuada? 50 cm en clima cálido 80 cm. en clima frío			



*“So, we sold the meat, the liver, the gizzards, the feet, and that generated profits. And with those funds, we also have the manure as fertilizer, all of this money is used for the celebration, or to fix the infrastructure of the school.”*

- Tutor



## Cria de Pollos

**Variation in perspectives** between ‘**system support model**’ and ‘**profitable training manual**’

### Workbook

*“It is necessary to insist that the objective of this unit is not to train the student to establish or direct a business of raising chickens; this possibility they can do much later. The goal, no less important, is to train them to share their knowledge and help their neighbors improve their microbusinesses of raising chickens.”*



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*“This will benefit me greatly; we’re going to have more knowledge, and the teacher has talked to us about this and says that when we are bigger, we could own a microbusiness. Anyone that wants to raise chickens, will already have the knowledge [to do so]. -Student*



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*“This is the objective of teaching them to cultivate, of teaching them to do the chicken breeding projects, to see themselves instead of being employees, they can be employers, and thus generate work for the community, without needing to emigrate to the city.” -Tutor*



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*“Whenever we do a practice, there is a stigma too, that is, ‘If I do this practice, I expect money.’ Let's say if we go with the chickens; then they say, ‘The chickens didn't serve me because there was no profitability, there was no payment, then it was not successful.’ So we said no matter, from this we somehow learned a lot, so then what happened? -Trainer*

# Curricular Analysis: Finding 3



## Cria de Pollos

Variation in perspectives between 'system support model' and 'profitable training manual'

### Workbook

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## Sembrando Cultivos

**Activities explicitly relate to established community agriculture practices**

1. Look for channels on the surface of exposed soil. These are created by streams of runoff and can vary in width and depth from just a few centimeters to several meters.
2. Look along fences for accumulated soil that has been moved by the wind. On paved surfaces, like roads, you may be able to find soil deposited by water. Soil carried by runoff also collects at the bases of slopes.
3. If you find soil splashed on walls or windows by the rain, this is an indication that the impact of the raindrops is moving soil particles.



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Activities explicitly relate to established community agriculture practices



1. Look for channels on the surface of soil. These are created by runoff and can vary in width from just a few centimeters to meters.
2. Look along fences for accumulation. If soil has been moved by the wind, on flat surfaces, like roads, you may be able to find soil deposited by water. Soil carried by runoff also collects at the bases of slopes.
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# Curricular Analysis: Finding 5



## Sembrando Cultivos

**Environmental conservation is positioned as a greater priority than immediate economic results.**





## Sembrando Cultivos

**Environmental conservation is positioned as a greater priority than immediate economic results.**



*Why do you think it is important to learn ways to fertilize your plants?*

***(Student)** "Because when we grow up, when we are older, we can harvest and sell so that we can maintain our farms... but people choose the one [non-organic] because it is easier and grows the plant faster and think that this organic fertilizer, will not grow, will not fertilize anything, so people do not choose this."*



### Sembrando Cultivos

**Tensions exist between technological knowledge and local knowledge across all levels of stakeholders.**

#### Workbook

*“New knowledge is generated from the interaction between the traditional knowledge system and technology, which can then be applied to the problems of everyday life.”*



## Sembrando Cultivos

**Tensions exist between technological knowledge and local knowledge across all levels of stakeholders.**

Student

*“Maybe they think that the organic fertilizer is slower, and fertilizer than... **Buying from the agro-farm store is easier**, just take it out and it is all ready to go. The one they buy, that one costs money, and in this one [organic compost], **you don't spend anything, only time.**”*

Workbook

*“New knowledge is generated from the interaction between the traditional knowledge system and technology, which can then be applied to the problems of everyday life.”*



### Sembrando Cultivos

**Tensions exist between technological knowledge and local knowledge across all levels of stakeholders.**

#### Workbook

*“New knowledge is generated from the interaction between the traditional knowledge system and technology, which can then be applied to the problems of everyday life.”*

#### Tutor

*“Students bring [to the lesson], let's say, things that their ancestors did, such as burning, things that do not go well with agriculture and soil health, **practices that are not appropriate**. Then, knowing that, the student tries to raise the awareness of his dad and his neighbor, that this practice is not correct, and to **instead do what the texts suggest** to them.”*



## Sembrando Cultivos

**Tensions exist between technological knowledge and local knowledge across all levels of stakeholders.**

### Workbook

*“New knowledge is generated from the interaction between the traditional knowledge system and technology, which can then be applied to the problems of everyday life.”*

### Tutor-trainer

*“If we know how to focus, there have been many young people who begin to **promote those activities that he does with his dad, but with a different vision.** Let's say, we are going to have a little coffee farm, but more orderly, with certain technical principles of organic fertilizer, some biological control and all that **line of reasoning** that we want to develop.”*

*(1) What individual (student) capacities for supporting community development emerge from the enactment of Technological SAT units?*



### Cria de Pollos

- Mathematics, engineering, and biological concepts integrated
- Consider relational as well as informational strategies to assess and improve community members' structures for chickens
- Workbook seen as 'training manual' for running a micro-business

# Summary of Findings

*(1) What individual (student) capacities for supporting community development emerge from the enactment of Technological SAT units?*



## Cria de Pollos

- Mathematics, engineering, and biological concepts integrated
- Consider relational as well as informational strategies to assess and improve community members' structures for chickens
- Workbook seen as 'training manual' for running a micro-business



## Sembrando Cultivos

- Engage with rich scientific knowledge about soil ecology
- Develop new practices to share with families about incorporating techniques into large-scale agriculture
  - Organic compost piles , terraced planting, organic pest management

*(2) How does the enactment of the focal curricular units include the social, environmental, and economic development of SAT communities?*



### Cria de Pollos

- Environmental assessment limited to micro-habitat of the chickens
- Social and economic development largely visible with community celebration and fundraising to support infrastructure
  - Can lead to over-reliance on profit as metric of success

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## Sembrando Cultivos

- Students investigate soil, air, and water quality of whole region
- Confront conventional agricultural practices alongside family members
- Emphasis on improving sustainability of natural resources, and by proxy, community health. Economics present, but secondary.

*What does a comparison of the units help illuminate?*

**Sembrando Cultivos (Planting crops)** has a focus on long-term conceptual change and shifts in practices, as compared to the immediacy of economic relevance for **Cria de Pollos (Raising chickens)**.

**Sembrando Cultivos** invokes analysis of many environmental conditions, and local practices over time and across history. **Cria de Pollos** has a tightly scripted start and end point, with little disruption to traditional knowledge.

Ample opportunities for rich content and culturally relevant instruction elevate different key resources from the social-ecological system.

- Balance immediate success and support with slow shift of norms

Knowledge development is distributed; carefully described and facilitated with family and community members

- Reflective practices, perspective taking, and student-tutor relationship valued
- Consider student 'gains' to include an increase in their capacity for supporting community resources

## References

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# Thank you!

	<b>Sembrando Cultivos (Planting Crops)</b>	<b>Cria de Pollos (Raising Chickens)</b>
<b>Resource Systems</b>	Multi-acre agricultural plots within a rural Honduran village	A 4 x 10 m <sup>2</sup> region of a rural Honduran village
<b>Resource Units</b>	Topsoil, watershed, trees, air quality	Wind and sun directionality, temperature
<b>Governance Systems</b>	Local and national control over access to water, forest; market forces driving use of agriculture, corporations that could be land proprietors.	Agro-businesses selling chickens, veterinary clinics selling vaccines, electricity companies, economic market for cost of meat.
<b>Actors/Subject</b>	SAT students, tutors, family members, farmers	SAT students, tutors, agro-business owners, truckers, hardware store owners
<i>Rules</i>	Utilize fertilizer-making strategies outlined in the workbook. This might have been tradition once, but has fallen out of favor due to globalization of agriculture and economic forces.	Regimented procedure of daily check-ins on chickens. Added rules around the data collection and economic investment required. Traditional meal a concluding part of the unit.
<i>Community</i>	Network between students and tutors (class plots), and family members (donating land, building a small bed at their homes). Interviewing local farmers.	Network between students and tutors (scenarios and technical knowledge) and families (current chicken-raisers and local agro-business owners)
<i>Division of Labor</i>	Tutors lead scientific investigation, moderate conversations in a structured setting. Students might take more responsibility in initiating conversations about organic fertilizer with their family members. Family members help to build the beds.	Students and tutors monitor the food intake, weights, and vaccination of the birds. Families shares in the sourcing of materials and building of the enclosure, monitoring of the space, as well as in preparing the birds for a meal. Students also tasked to seek community members raising chickens and advise them on their structures, processes, and economic choices.
<i>Instruments</i>	Pick-axe, shovel, hoe, garden fork, rake, chisel plow, seed drill, A-frame clinometer/ level, worm box, grains/ products for seed storage pest resilience	Wood, wire, drill, chicken feed, scale, paper chart, syringes, vaccines, knives, cooking supplies
<i>Object à Outcome</i>	A small scale organic garden, generated by a compost pile àIncreased knowledge around soil life, examples of how to build organic compost. Vegetable gardens at home, worm compost at school	Chicken care from birth to deathàAbility to advise neighbors on the practices that best support healthy, energy-efficient chicken raising.