2015-2016
Annual Report-Education Lab

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The need for the Education lab is inspired by two core aspects. In the current scenario, these two aspects culminate in the lack of innovation for developmental issues. This also has repercussions on the opportunities for entrepreneurship and employment in the social sector.

1. Lack of critical thinking and innovation in learning: The methods of learning and teaching today are unable to clearly establish a connection between the subjects being taught and their relevance to the current issues affecting the local community. In addition, restrictions laid on young students attempting to explore problems on their own often culminate in a lack of enthusiasm from the student’s perspective.

2. Apathy towards Sustainability and Developmental issues: Due to a disconnect between subjects being taught and the issues in the local community, students often view issues surrounding sustainability, food-water-energy and development as global problems with no local significance. Their inability to fully resolve issues in their local community often results in rural youth feeling a sense of hopelessness about local conditions and opportunities (reference). On the other hand, the urban middle class youth lack sensitivity and are almost disinterested in the conditions of their rural counterparts.

Put together, this problem could spell disaster in the development trajectory of a country with a significant percentage of its population under 25 years of age.
SELCO Foundation identifies a need to create modules that incorporate aspects of innovation, sustainability and active learning techniques to help students (at school and university level) get a holistic understanding of the needs and challenges in creating solutions for the poor.
EDUCATION LAB

PHASES OF INTERVENTION

DISCOVER
explore and understand topics + issues
Discover key topics like sustainability, systems and community.
Identify relevant sustainability issues like water, energy, waste, livelihoods etc through a local lens.

UNDERSTAND
introduce local issues
Understand chosen local issues by applying sustainability/systems or community learnings.
Combined with relevant aspects of existing curriculum.

LOCAL->GLOBAL
introduce chosen issues as global problems
While students understand the issue, reveal similar solutions/issues.
Through exposure visits, audio visual aids, conversations with experts etc.

PLAN+BUILD
now, how would you solve it?
Encourage students to start thinking about how they would solve the issue locally.
Students come up with solutions at various levels.

CATEGORIZE
analyze solutions
Through the program X% (19%-29%) - usual copy paste solutions
Y% (69%-79%) - tweaked and customized solutions
Z% (1%-2%) - truly innovative inventions

CONNECT
what next?
Connect feasible student solutions (depending on age group) to appropriate mentors, organizations, competitions or entities.
<table>
<thead>
<tr>
<th>Program</th>
<th>Metrics</th>
<th>Targets</th>
<th>Actuals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials for Engagement</td>
<td>Number of new student engagement modules developed</td>
<td>4</td>
<td>4</td>
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<td>Student projects and pilot implementation or external connections</td>
<td>Number of solutions, projects worked on by students</td>
<td>50</td>
<td>80</td>
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<td>Student projects and pilot implementation or external connections</td>
<td>Number of student projects piloted or taken to the next level (eg: competition entries)</td>
<td>10</td>
<td>15</td>
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<td>Student Innovations</td>
<td>Number of innovative solutions from students (truly unique)</td>
<td>1</td>
<td>3</td>
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<tr>
<td>Capacity building</td>
<td>Number of Training workshops</td>
<td>6</td>
<td>13</td>
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<td>Capacity building</td>
<td>Number of teachers or facilitators attending training (footfall)</td>
<td>30</td>
<td>90</td>
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<td>University and School relationships</td>
<td>Capacity Building with Students on Innovation</td>
<td>800</td>
<td>1518</td>
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<tr>
<td>University and School relationships</td>
<td>Internships and Fellowships</td>
<td>13</td>
<td>42</td>
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<tr>
<td>Institutional partnerships</td>
<td>Number of educational institutions- Schools + university streams (cumulative)</td>
<td>20</td>
<td>15+24</td>
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<td>Institutional partnerships</td>
<td>Number of Other Partnerships (content, technical, NGOs etc.)</td>
<td>2</td>
<td>3</td>
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<tr>
<td>Documentation</td>
<td>Process documentation</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Impact in terms of Direct target group</td>
<td>Champion teachers or facilitators (of those attending the training)</td>
<td>2</td>
<td>0</td>
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<td>Students Impacted(direct)</td>
<td></td>
<td></td>
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<tr>
<td>K-12 Level</td>
<td></td>
<td>1300</td>
<td>1500</td>
</tr>
<tr>
<td>University Level</td>
<td></td>
<td>8000</td>
<td>2400</td>
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## Student Categories and Learning Forms

<table>
<thead>
<tr>
<th>Student Categories</th>
<th>Content</th>
<th>Active Learning and Building</th>
</tr>
</thead>
</table>
| **BASIC** (typically Grades 1-6) | - Facets of nature, local resources  
- Basic concepts of sustainability, their relevance  
- Thinking skills  
Delivery: Cartoons, Illustrative Books, Short films | - Theatre activities, role play, dialogue class, puppet shows flipped classroom, story telling  
- Creation of inventive play kits, toy making  
- Games (indoor and outdoor) and extra-curricular activities such as nature walks  
- Inquiry based learning  
- Short exploration projects |
| **Intermediate** (typically Grades 7-12) | - Critical sustainability concerns  
- Existing solutions  
- Concepts of social, physical, natural and material sciences relevant to the solutions  
- Basics of analysis, innovation and problem solving  
Delivery: Facilitated discussions in class and outside, Informative videos, Illustrative textbooks, Demonstrations | - Needs assessment toolkits and learning toolkits (relevant to locally available materials)  
- Miniature models and small scale implementation of solutions  
- Peer to peer learning and discussions  
- Learn by teaching, meet people on field (farmers, constructors, potters etc, scientists etc)  
- Deductive methods  
- Model sustainability lab at school level  
- Sustainability concept in traditional art, dance, theatre |
| **Advanced** (typically Bachelors, Masters- University level) | - Analysis of development, global scenarios, sustainability, social businesses and impact  
- Innovation and holistic approaches in Engineering, Product design, Business management, Policy  
Delivery: Structured courses, Case studies, Informative, Inspirational talks and videos from practitioners, Brainstorming sessions | - Workshops and Exposure visits  
- Challenges to seek out new ideas  
- Internship opportunities  
- Academic projects that include implementation  
Sustainability lab or society that facilitates greater learning, incubation and implementation of feasible and practical ideas |
OVERVIEW : INVENTION AND SUSTAINABILITY EDUCATION

Through facilitators who facilitate classes on a weekly basis with students of Grades 6-9, the goal is to inculcate hands on learning on aspects of science, environment, local livelihoods and so on. Existing school teachers are also being brought into classes from a long term sustainability point of view.

Progress:
- 5 more schools were added to the Invention and sustainability education program this year, taking the total to 15 impacting over 1300 students.
- In all 13 inventions and 2 sustainability activities resulted from these. 15 inventions were nominated in competitions and won 7 awards (6 in Jignyasa 2016 and 1 in Design For Change competitions).
- A student innovation lab using low cost science models was set up in 2 schools reaching 143 children.
- In total 85+ number of teachers were trained across 3 sessions in September (Yadgir-45) and December (Chikkaballapur, Muthur-40 and Ujire-2) to use these models as part of their classroom teaching strategies.

Next Steps:
- In the coming year Invention and sustainability education will expand to 16 more schools, reaching 31 schools in total across urban, rural and tribal geographies.
- 4 models schools will also be set up (3 in underserved urban communities of Bangalore and one in tribal community at Odisha).
- Key partnerships both in terms of on-ground community organisations and content providers are being finalised.
- Through teacher training and discussions with the Education department, attempts will be made to institutionalize the Innovation and Sustainability project within school curriculum.

The Background:
Invention and sustainability education addresses the lack of critical thinking, innovation in learning and apathy towards sustainability and developmental issues. It does so with a three pronged approach of innovation, focus on sustainability and use of active learning methodologies.

The Solution:
In order to address this apathy and lack of interactive learning in rural schools, the Invention and Sustainability program has been launched.
The goal of invention education program is to introduce the concept of invention to the children of rural underserved communities and mentor them throughout their schooling to address their issues through invention. The program will not only inspire children, who are the future contributors to the rural communities but will also facilitate invention among them by guiding them to identify issues in their communities and solve the issues through invention. The whole program is based on the belief that underserved communities need to be empowered to solve their issues in their community.

The programe will consist of three important phases:
- Phase one - Strengthening of science concepts
- Phase two - Introduction to invention through stories on inventions and inventors
- Phase three – Identification of problems in the village and build innovative solutions

The invention education program aligns with the Foundation’s overall strategy in following ways:
- Develop the ability to empathize with their issues and inculcate the solution-oriented thinking among the students.
- Strengthen science concepts among the students.
- Encourage students to work hand on.
- Facilitate technological inventions.

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**EDUCATION LAB : PROGRAMMES**

**INVENTION EDUCATION**

**Pre innovation**
- Needs assessment
- Problem solving techniques
- Conceptual and Contextual clarity

**Innovation**
- Plan and development
- Viability determination
- Pilot implementation

**Post innovation**
- Incubation
- Replication of solution
- Scale up
The goal/objectives of the Sustainable Science Lab are:

- Students and teachers have a greater awareness about environmental issues and sustainability.
- Students question the current practices, analyse and understand alternatives that would be sustainable in the long-run.
- Sustainable living practices are implemented in the schools.
- Energy needs are met through alternative energy solutions, when economically feasible.
- These students in turn share their knowledge with community members for greater impact.

A long-term engagement with students, teachers and community is required to improve their understanding of sustainability. These projects in turn will support the larger interest of SELCO because:

- SELCO’s projects become more holistic when its beneficiaries are conscious about sustainability.
- Awareness of future generations on sustainability is a long-term investment that supports the ecosystem for clean energy access.
An integrated curriculum combining the concepts and learnings of Invention Education and Sustainable Science Labs was developed to envision the creation and development of scientifically literate productive members of the society who manifest skills as informed decision makers, critical problems solvers, innovators, responsible stewards of nature and effective communicators who work on providing sustainable solutions to the prevailing problems of the society.

The goal is to enable the students to develop capabilities in 6 areas:

- Conceptual understanding
- Clarity of thought
- Identifying root causes of problems
- Thinking about solutions
- Empathy
- Communication and collaboration
- Leadership and advocacy for improvement of human conditions

Invention and sustainability education emphasizes nurturing the clarity of thought, understanding of concepts associated with various topics and applying to solve real-life problems rather than just memorizing the facts and failing to apply the knowledge in real life. The need for invention in creating sustainable solutions is paramount given the dynamic changes in society and new problems arising at every front.
Focus on 6 themes - Physical world, life science, material world, earth science, Imbalance.
Sustainability is the central theme that is blended across all the themes.
Understanding the various concepts through active learning methodologies.
Provides opportunities for children to work on issues related to sustainability with innovation being the centre piece.
Encourages challenging the current practices, seeing issues as opportunities for development.
Look at sustainability through the lens of social, economic and environmental perspectives.
Spiral curriculum enables the students to revisit the concepts and themes in the higher grades with increase in complexity and reinforcement of previous knowledge.
Encourages challenging the current practices, seeing issues as opportunities for development.
Formative assessments to test students learning.
Some approaches
Activity based learning and Inquiry based learning

Using Analogies to explain the content

MORE CURRENT

LESS CURRENT

Introducing the concept of take home book instead of workbooks

FUN FACT
In 1752, Benjamin Franklin experimented with electricity in a famous experiment, using a kite, key and a Leiden jar (two containers separated by an insulator). If a device for creating static electricity (a machine that produces static charges) was attached to the key, a stream of negatively charged particles (frictional charges) would flow through the wire on the key to the key. When the Leiden jar was grounded, Franklin himself was shocked from the electricity, holding the key at the top of the kite. But not directly to the earth. Or when Franklin touched the key, he got a static shock. DO NOT TRY THIS AT HOME - many people have died trying it. In 1752, Franklin developed the lightning rod which prevents buildings and structures from being damaged by lightning as it takes the lightning charge and it is the around.

ELECTRON and PROTON
All matter is made up of positive charges and negative charges. The protons are hard and heavy and then are not usually free to move. The electrons are lighter and are free to move. Negative charges are attracted to positive charges; the same way iron are attracted to cheese.

RESISTANCE
When the electric current flows through a wire it experiences some stopping force, that is called the resistance.

VOLTAGE
Voltage V
Voltage difference across two terminals in a circuit illustrated.
In order to move charge from point A to point B, work must be done.
*For potential energy at a higher level
Let voltage be the voltage difference between the two points
Let vbe the higher potential voltage terminal
Then voltage across the terminals is the work done required to move a positive charge from A to B.
Using storytelling by introducing characters they can relate to

Activity based learning - indoor

Introducing new assessment techniques
ISEC: TEACHING LEARNING STRATEGIES

PEDAGOGIES

- Experiential learning
- Activity based
- Socrates methods - Inquiry learning
- Blended Learning
- Flipped Classroom
- Learning by teaching
- Story telling
- Project based
- Cooperative learning
- Scenario based learning
- Contextual learning
- Game and game design

METHODOLOGIES

- Peer instructions
- Inductive learning
- Deductive methods
- Outdoor games
- Puppet shows
- Toy making
- Nature walks
- Physical movement based
- Involvement
- Memory games
- Board games
- Interviews
- Question boards
- Analogies
- Reading sessions
- Radio clubs
- Newsletters
- Journal writing
- Talking pages
- Pictorial Learning
- Graphical learning
- Audio Visual
- Flash cards
- Role plays
- Audio tapes
- Dialogue classes
- Converting lessons in songs
- Resource book
- Scrap box
Field visit interactions

The students were taken on numerous field visits in the areas surrounding their schools and homes to provide opportunities to the students to directly interact with the environment around them and observe the processes closely.
INVENTION AND SUSTAINABILITY EDUCATION:

Processes

Grow your own food – Kitchen Gardens

The students were encouraged to pursue growing kitchen gardens to understand the concept of sustenance, obtain a better understanding of nutrition and varieties of vegetables, different agricultural practices, work towards effective utilisation of resources such as water, keep a check on the nature/amount of chemicals used for cultivation and also experience the need to modify unused spaces in the school productively.
INVENTION AND SUSTAINABILITY EDUCATION: PROCESSES

Invitation of speakers into classrooms

Guest speakers such as agricultural scientists, university professors, framers, potters etc. were invited to the classrooms (esp. when the field visits could not be facilitated sometimes). These speakers shared their knowledge and field practices + challenges with the students and motivated them to work towards solutions. They also served as role models for some students by giving them proper guidance.
Usage of active teaching learning strategies

As mentioned earlier, a number of experiential teaching learning strategies were used inside and outside of the classrooms to generate interest of the children and also to promote conceptual understanding and clarity of thought.
Regular teacher trainings in collaboration with the BRC were conducted. The objective of these trainings was to introduce the Government school teachers to the concepts of Invention and Sustainability Education, active learning methodologies and conceptual understand through low cost models using locally available materials.

Such trainings will help in the creation of champion teachers who will be able to take forward the Invention and Sustainability education after its institutionalization.
Community engagement programmes

In order to better improve the participation of the community members (parents and other families) in the school programmes, school SDMC Meetings - Samudayadatta Shale were arranged by the GOVT. department of public instruction at school level. This opportunity was used to update the participants about the progress on the Invention and Sustainability education implementation.
Life Labs

Life Labs are low cost science labs designed specifically for low income Govt. schools. They are self-sustainable activity-based science resource labs in schools, fully governed, facilitated and run by students. These life labs have around 80 working models of Scientific experiments. These experiments illustrate the scientific principles of the concepts introduced in the class and enable the students to go beyond simply appreciating creation(model) to actually studying it. The students are also introduced to lab procedures, lab safety, use of equipment, data gathering and measurements, graphing and charting of data, calculations to determine physical relationships, how to use logic to devise experiments and interpret results, and integrity in reporting results. A portion of the course thus enabling the students to go beyond simply appreciating creation(model) to actually studying it.
INVENTION AND SUSTAINABILITY EDUCATION : PROCESSES

Facilitator trainings

Frequent facilitator trainings and peer discussions were conducted for the facilitators to introduce them to effective teaching methodologies, improve their conceptual understanding, strategies to motivate and engage the students, helping the students to identify the issues and design solutions accordingly, approaches to mentor and guide the students in problem solving.

Best practises and challenges were also shared between the facilitators.
INVENTION AND SUSTAINABILITY EDUCATION: PROCESSES

Winter Camp

During the vacation period in the month of October 2015, a residential Winter camp was conducted for the students of various schools in Belthangady. The objective of this camp was to encourage the students to do innovations by drawing inspiration from their surroundings, develop life skills, participate in extra-curricular activities, interact with students of other schools, adapt oneself to different environments etc. The students participated in all the activities and enjoyed the camp. The students and their parents requested to conduct the camp again in the next year. The camp was organized with support from Rotary club @ Belathangady, SDMIT, Degree & PU college and Ratthnamanasa @ Ujire.
The students organized sustainability awareness campaign in the intervention schools. They also wanted to spread their learnings to the community people through songs, poems, slogans etc..
INVENTION AND SUSTAINABILITY EDUCATION:
STUDENT INVENTIONS
Note: More student innovations are included in the report “Invention Fair report”
Invention Fair

Invention Fair is an end-of-year showcase of the student learnings from the Invention and Sustainability education. The students from intervention schools displayed 80 different innovations and solutions to address the issues related to Agriculture, water, waste management, energy, environment, utility items etc. Along with their innovations, the students explained the issues that they tried to resolve through their inventions and also explained the process through which they were able to arrive at the solution. This year, in the Invention Fair, the students displayed around 80 innovations that they created and around 700 students from the other schools attended this event.

Please refer to the document "Invention Fair Report" in the Annexure which lists all the innovation created by the students.
Invention Fair - The secretary of SDM Educational Trust, Dr. B. Yashovarma observing and giving feedback to the waste water management model.
Competitions for students: Design for Change

DESIGN FOR CHANGE is the largest global movement designed to give children an opportunity to express their own ideas for a better world and put them into action through “I Can” attitude and four steps of “Feel, Imagine, Do and Share”.

In this competition, the students have submitted their ideas and a project called “Aiding the farmer” got selected in top 100 category. In this project the students collected samples from the farmers’ fields, conducted soil testing on it and provided an explanation and report to the local farmers stating the soil composition, present fertility status, alternate organic fertilizers and suggested measures for yielding better crops.
Competitions for students: Jignyasa @Hubli

Jignyasa is a national level science model making competition. This is a great opportunity for the students. 6 of the student models were shortlisted for the competition and bagged the “Best innovator” prize.
Print media coverage of the student work

Summary of the article - Design For change Competition, Ahmedabad- Students from Mutthur, Shidlagatta district actively conducted soil testing for farmers in their region. They did many experiments on the collected soil samples in their science lab and shared the results with the farmers. They also spread awareness on soil testing, its use and importance Their efforts were appreciated by DFC.
Summary of the article- As a part of Invention education, students of GUPS Barengaya, Belthangady taluk took part in agriculture field visits. These visits were supported by the Agriculture department and SELCO Foundation. Through this, students gained practical knowledge on agricultural practices and procedures. The resource person from Agriculture department, Mr. Chidanand Hugar provided information on agriculture to the students.
Summary of the article- Jignyasa-National level science model making competition-The students of Invention Education program from Belthangady and Yadgir participated in this competition. They were awarded best innovator award for their innovations namely the mosquito trap, PCB drill machine and digital microscope.

Summary of the article- SELCO Foundation and rotary club organized Winter camp “Raja with Maja” for the selected students of Belthangady taluk. Around 32 students participated. It is a seven day residential camp. In which various sessions and activates on low cost model making, science experiments, logical thinking, art, life skills were conducted.
Summary of the article- The Education team of SELCO Foundation organized “Invention Fair” on 28th Feb 2016 at Ujire. This is a platform for the students of “Invention education program” to exhibit their talents. Around 88 models were exhibited in this fair, which was made by Belthangady taluk and Yadgir school students. The students identified issues in their communities and built solutions. The models were low cost and are made using locally available materials – By Major Gen. M.V.Bhatt, President, Rotary Club, Ujire
Assessments

Baseline, Midline and Endline assessments were conducted to gauge and track the students' performance over the academic year. The students were tested on the following parameters:

- Ability to follow experimental instructions
- Ability to think critically – Observation
- Ability to think critically – Inference
- Ability to think critically – Analysis
- Design a test
- Problem solving
- Design skills
- Awareness on the concept of sustainability
- Ability to understand the concept of the system
- Ability to understand and assess the neighbourhood/community
- Identify issues and think critically about them
- Ability to develop and execute solutions

The students showed increased performance over these parameters through the year.
INVENTION AND SUSTAINABILITY EDUCATION : PROCESSES

Participation in external events
The students actively participated in external events such as Rotary Clun RCC meeting, Republic day rally, Lakshadeepotsava etc. to showcase their learnings and innovation in front of the audience. These events also provided them with exposure and motivation to improve the existing prototypes. These events also helped to build local partnerships.
OTHER EDUCATIONAL ACTIVITIES

Light For Education (LFE) Impact assessment

LFE Impact assessment was conducted in 15 schools and hostels in the areas of Chitragurga, Gadag, Hassan, Tumkur and Hosangara to assess the impact and effectiveness of the programme.

Note: Refer to the document “Light for Education Impact assessment report” in the Annexure for the observations and analysis from the Impact assessment conducted.

Digital Education programme (DEP) case study

A case study for Digital Education programme was written

Note: Refer to the document “Digital education programme case study” in the Annexure
OVERVIEW: UNIVERSITY ENGAGEMENT PROGRAMME

The Background:
The flaws within the current education system in the country are primarily defined by a lack of exploration and innovation in learning. This includes facets such as restrictions to student exploration of problems and solutions, disconnect between subject and its relevance to students. The other issue plaguing the student community today is an apathy towards sustainability and developmental issues in general. Often, urban middle class youth are disconnected from the conditions of their rural counterparts. This results in a limited number of young minds considering the development sector as a career or even incorporating holistic approaches, innovative thinking to their areas of work.

The Solution:
The university engagement program at SELCO harnesses the potential of students to engage, grow and learn by partnering with communities and working on global development issues. The program comprises of workshops, internships and fellowships with exposure to field realities and exercises that require a learning of other models in the space and iterating to improve solutions. Innovation and user centric approaches are introduced across various disciplines - engineering, product design, economics and public policy, architecture and so on- as an attempt to incorporate these approaches into any type of solution design.

With specific reference to students of product design, a project called Inventing Green was introduced to increase thinking around the embodied energy and efficiency of components of a Renewable Energy system- thus aiming towards greater environmental sustainability while using clean energy solutions.

Progress:
- This year 6 new modules: Community mapping & profiling, Financial Sustainability, Built Environment, Holistic Approach and Human Centric Design, Policy processes and Replication were added to the university program curriculum.
- Inventing Green program was launched with Undergraduate students at Srishti, India and MIT, USA. It resulted in development of 7 prototypes in India and 3 concepts in MIT, USA for renewable energy components with lower embodied energy along with course curriculum developed at both schools.
- Engineering for social innovation and sustainability for BMS students: A 2 credit course, planned for implementation during June-July 2016 during summer vacations, 35 hours/2-3 week program with 3 hours daily (min).
- Overall the program reached out to 260 university students by way of internships (39), workshops (11) and fellowships (2).

Next Steps:
- Further detailing of the new modules and building at least 2 new university partnerships for the same.
- Inventing Green curriculum after refinement will be appropriately packaged and shared online like an open-source repository. At least 2 more universities will be identified for replication of this course. Prototypes developed by Srishti students will be tested in multiple community locations and will enter product development phase depending upon feasibility, viability and appropriateness of their design.
- Create champions among teachers and students who can build these aspects into existing classroom learning.
The Need: A sense of apathy in urban towards development issues in general. An inability to connect what’s being taught in class to the numerous issues they see around them- be it poverty, lack of education, livelihood opportunities etc. for the marginalized.

Context: Education lab partnered with Prof. Fred Rose and Ms. Aruna Raman to design an engagement for their students. The idea was to sensitize the designers of future towards fellow human beings across sociocultural contexts and environment at large. A plan was drawn up to expose the students to the realities of unserved and underserved communities as follows-

**Process:**
- SELCO conducts Social Innovation and Community mapping workshop,
- Explaining the need for community participation
- Introducing the participatory tools
- Community visit with a human centric design lens for unmet needs identification
- Unpacking the visit
  - Articulating problem statements,
  - Brainstorming approaches and
  - Potential solutions, presentations

**Result:** The two day workshop was able to result a lot of ideas that could be implemented going forward in the respective communities. Several questions asked by the students to SELCO’s team about approaches of the existing interventions, helped SELCO the revisit and question its own thought process in a new light. Seeing the response from students, faculty members thought, next time around there is a scope for a deeper engagement augmenting the two day workshop.
The Need: There is a need for the students and faculty of various disciplines to understand how technology can improve the society and the world and also to engage and understand the implementation and practice of sustainability in well defined and structured way.

Context: Education lab partnered with the Department of Electrical and Electronics and invited professors from various branches (ECE, EEE, TCE, Civil, Chemical, Mechanical, Physics etc.) of BMS Engineering college to introduce the concepts of Social Innovation and Sustainability through a one-day workshop under the “Renewable and Sustainable Development” project. The idea was to create a few champion teachers who can inculcate the above mentioned concepts in their pedagogy and provide ideas for students to identify problem statements for their project work. Another objective was also to develop application of design thinking and innovation skills through community engagement that can be blended into the engineering curriculum.

Process:
- Introducing the participants to the issues in underserved communities through role play
- Identification and framing of problem statements
- Unpacking several of SELCO’s values such as poor are not a market, customization of both technology and finance as a key to meet underserved communities etc. through project examples
- Introducing Human Centric Design concepts for problem solving
- Brainstorming on the approaches and Potential solutions, presentations
- Encouraging the faculty to apply design thinking in Education

Result: Some professors showed an interest in taking their learnings into the present curriculum. A 2 credit course called “Engineering for social innovation and sustainability” was designed and it is planned for implementation this academic year. The duration of this course is 35 hours/2-3 week program with 3 hours daily (min).
Srishti School of Art, Design and Technology (India)

Workshop #1- 19 & 20 August 2015-Participants: 19 students +2 faculty

The Need: A sense of apathy in urban towards development issues in general. An inability to connect what’s being taught in class to the numerous issues they see around them- be it poverty, lack of education, livelihood opportunities etc for the marginalised.

Context: Education lab partnered with Prof. Arvind Venkatadri and Prof. Farhat Hamid of Foundation year (1st year), undergraduate design program at Srishti school to design an engagement for their students. The ideas was to sensitize the designers of future towards fellow human beings across sociocultural contexts and environment at large. A plan was drawn up to expose the students to the realities of unserved and underserved communities as follows-

Process:
- Assigning reading materials
- Discussing texts in class
- SELCO conducts Social Innovation and Community mapping workshop,
- Community visit with a human centric design lens for unmet needs identification
- Unpacking the visit
  - Articulating problem statements,
  - Brainstorming approaches and
  - Potential solutions, presentations

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Process:

Assigning reading materials
Discussing texts in class
SELCO conducts Social Innovation and Community mapping workshop,
Community visit with a human centric design lens for unmet needs identification
Unpacking the visit
Articulating problem statements, brainstorming approaches and potential solutions, presentations
Using PRA tools
The students returned to the communities for 3 subsequent weekends and used several Participatory and rapid appraisal tools to engage deeper with the communities to understand their issues
Exhibition
The students shared their findings with the entire school in form of an exhibition using poems, visual journals, skits, diaries, posters, songs

Result: Both students and faculty members appreciated this deeper engagement and further modules for university engagement program were developed in consultation with several faculty members across colleges. These programs include modules on social innovations, holistic approach, sustainability (social, financial, technological), community mapping and profiling, policy processes, replication and so on. This engagement further paved the way for education lab to look at how to develop such modules so that they may act as sensitization workshops for students as well as plug the critical missing gap of practitioner perspective and hands-on learning in the existing curriculum across disciplines of business management, engineering, social work etc.
COMPOSTING INITIATIVE

The initiative is aimed at promoting composting as a sustainable way to manage organic waste.

The initiative will be implemented by involving residents and local businesses in the process.

The initiative will also include educational workshops to raise awareness about the benefits of composting.

The initiative will be monitored and evaluated to assess its impact on the community.
Azim Premji University (India)

Workshop #1 - 19th and 24th October, 2015

The Need: Adding the practitioner perspective to development courses that focuses not only on theory but important aspects such as on-ground implementation of interventions, operational issues, feasibility, impact measurements including metrics etc.

Context: Education lab partnered with Prof. Manu Mathai of Azim Premji University (APU) to augment the course Energy, Environment and Social Change taught (part of M.A Development, specialization sustainability) to add exposure to project level innovations and interventions in the sustainable energy-society space. The ideas was to expose students to design and implementation of sustainable energy projects that are not just about putting up RE infrastructure, but are significantly also about working with communities in terms of needs assessments at the innovation and design stage and then proceeding onward to financing, implementation and follow-up.

Process:

- Look at the existing course outline. Check whether inputs can be added and how
- Discuss inputs with course facilitators. Work with him/her to identify students' interest areas, doubts, questions
- Make a list of all inputs to curriculum, students’ questions. Categorise it in terms of technology, sustainability (social, technical, financial), operational issues, entrepreneurship, business development etc.
- Meet with the students/instructor for a sensitization and orientation workshop to plan for a community visit. Dos and don'ts to be communicated, engaging with all five senses to be communicated
- Planning the post-visit unpacking session
  Ensure multiple people from the organisation can engage with the students through a panel discussion, during unpacking session.
- Community visit
  Letting the students, observe, engage with the community to ask questions. Nudging them to dig deeper where required
- Unpacking session
  Students discuss findings, unmet needs identified in the community and potential solutions. Students also ask questions to the various teams at SELCO to deepen their understanding.

Result: This program has cemented SELCO’s relationship with APU and resulted in APU approaching SELCO for internships and during campus placements.
The Need: Adding the practitioner perspective to development courses that focuses not only on theory but important aspects such as on-ground implementation of interventions, operational issues, feasibility, impact measurements including metrics etc.

Context: Education lab partnered with Prof. Janaki Chundi of Christ University to augment the course on Urban and Rural studies taught (part of 6 month semester program, taught to exchange students from abroad) to add exposure to on ground realities both in urban and rural marginalised communities. This was undertaken through an explanation of the SELCO concept and various examples from SELCO’s on-ground implementations.

Process:
- Ask students before hand to outline their interests and questions they may have.
- Discuss inputs with course facilitators. Work with him/her to identify appropriate module to be taken up as part of the workshop.
- Unpack several of SELCO’s values such as poor are not a market, customisation of both technology and finance as a key to meet unserved communities etc through project examples.
- Share projects as processes, that a student could replicate in another geography, domain or sector. Ex: Learnings from energy sector in India can be applied to African context after appropriate contextualisation.
- Encourage students to continue engagement via a collaborative project / internship etc.

Result: Prof. Chundi showed an interest in making this a part of her curriculum each year. One of the students (Humbolt University) has returned to SELCO as an Outreach and Communication intern in July 2016.
BMS College of Engineering (India)

A workshop on Microgrids was conducted for BMS Engineering College professors to explore the potential aspects of Micro grids and to understand the technical, financial and social implications from an ecosystem and context/ end user perspective.
A workshop on “Sustainability and Innovation” was conducted for the students of St. Joseph’s college on 27 December 2015.

Around 120 Students from both the science and the arts streams participated in the workshop. The students were introduced to the various problems of the underserved communities such as unavailability of clean energy, lack of alternate livelihoods, housing, sanitation, inaccessible financial models etc. The various opportunities to introduce mechanisms for access to renewable energy were discussed. Entrepreneurial opportunities Students interacted by asking a lot of questions and discussing scenarios.

Interested students enquired about internship opportunities.
National Law School of India University, Bangalore intended to conduct an interactive session with the MPP students who would be taking a course called “Policy Analysis and Clinic” in their second trimester (Nov 2015 - Jan 2016). As part of this course, the students would look at how solutions are generated for a problem and how one solution is picked up (out of many possible solutions) for a problem.

The Management wanted SELLOO Foundation to facilitate this through SELCO’s approach of providing solutions and projects. The Policy processes (esp. policies around Renewable energy and rural electrification), analysis, ecosystem approach, cross sectoral linkages and initiatives in in sustainable and equitable society - energy relationship were some concepts that were discussed as a part of the workshop.

This workshop also gave an opportunity for students to anticipate the kind of work at a SELCO internship.

Outcome: Interested students applied for one month internship with SELCO Foundation’s Policy team.
CHALLENGES AND KEY LEARNINGS

Challenges:

- **Absenteeism of children from the schools most of the time**: Most of the children are help their parents in their fields in Agriculture. As a result, the students remain absent from the classes most of the time.
- **Too many unplanned leaves at schools**: this obstructs the effective learning time available for the student at school.
- **Poor literacy levels**: Some students find it hard to read and write given their low literacy levels. Hence they are unable to read the assessment papers. Extra attention and alternate activities must be given to these children.
- **Creation of champion teachers**: is a time consuming process.
- Team coordination becomes difficult especially when the team members are placed in 4 different locations.

Learnings:

- **Partnerships**: Identification of the right partners for both implementation and influencing larger stakeholders will help in the effective implementation of the programmes.
- **Incubating student ideas and the ways of doing that effectively must be researched.**
WAY FORWARD

In the coming year, Education Lab seeks to implement Invention and Sustainability Education in more number of schools, and focus primarily on:

- Replicate and share knowledge
- Provide more support in terms of training and handholding for the teachers.
- Relook at the University strategy for creating partnerships that have a tangible and impactful outcome that would come out of the collaboration.

Note: Refer to the document “University engagement strategy pipeline”

- Work on the concept of Model schools
- Work on education outreach activities
Partnerships (Organizations that support in Content creation, Delivery)

E D U C A T I O N

S E L C O

Branch

Rural Labs
- Government schools and Hostels
- Schools for promotion of traditional art
- ITIs and RSETIs
- Bachelors and Masters colleges

Urban Labs
- Government schools, Tent schools, Day care centers
- Orphanages and Charitable institutions
- Vocational training institutes
- Urban colleges

Tribal Labs
- Government primary, medium, high schools
- Residential/ashram school for special categories
- Informal tuition centers and schools run by NGOs
- ITI and private vocational training institutes

Incubation
Innovative solutions created here can be incubated, making entrepreneurship and development sector employment possible

Model replication and Capacity building
Center for Innovation for the Poor- through existing organizations in the Education sector in India and abroad; Teacher training workshops

Policy inputs
For State education departments and central Ministry of Human Resource Development