



eMentoring Report

Aug to
Nov 2020



This document reports the details of Teach To Learn's eMentoring program, its design, implementation, outcome and learnings.

Background and Purpose

The eMentoring implementation happened during the months of August till November 2020. Prior to the pandemic our Mentors visited rural schools to provide hands-on training to high school students. From mid-March 2020 however, schools closed indefinitely owing to the pandemic, so our Mentors could not continue the school visits. In June 2020, with lockdown in place and with mounting uncertainties about when schools will re-open, we had to rethink our strategy on how to reach the students. Going with the current universal method of teaching and learning, we also decided to engage in online mentoring. With the realisation that online learning would not be the same as hands-on learning in person, we tried to make the learning experience as effective as possible. Considering the anxieties related to school, cancellation of exams, lockdown, spread of the virus, loss of jobs etc, the main purpose of eMentoring was mainly to motivate the young minds and give opportunities to learn even during this difficult time.

Key Considerations

The program structure was designed after taking input from school teachers who were part of our earlier programs. They were able to give us a clear picture of the possibilities.

Some of the main considerations were:

1. Are the students reachable? Do they have access to mobile phones or laptop?
2. Can the students afford to learn online?
3. How many students can be accommodated in each session?
4. How many sessions are possible in a week?
5. How long should each session be?
6. How many months should the sessions be planned for?
7. Will the teacher coordinate with the students and monitor their presence?
8. Graduate student Mentors with mixed up academic schedules, who had to leave research experiments and go home without a certain date to return were also anxious and some were in hard-to-reach areas. Will they be able to engage in online mentoring and commit to a schedule?
9. What content can be covered through online teaching?
10. Will the students need training in using mobile apps prior to the sessions?

Program Objective

The main objectives of the eMentoring program were

1. To engage the students academically
2. To provide learning possibility during lockdown
3. To keep their academic motivation up
4. To enable the students to share their learnings with their peers/juniors when school re-opens.

Participants

In July 2020, we approached the schools in our 1lab-1School database. More than 50% of teachers said they didn't have contact numbers of their students. Some teachers were themselves not in a position to facilitate meetings. Many students did not have access to mobile phones. We conducted a similar survey with the Mentors from our database regarding their availability, connectivity and willingness to participate. When we got positive confirmation from few teachers and Mentors, we were able to devise a tentative plan and initiate a pilot plan in early August involving 4 schools and 10 Mentors. We also reached out to our implementation partner SRFF to check the situation with the participating C minus 4 schools. Subsequently, government started giving out textbooks and schools were able to connect with the students during the book distribution. By end of August, 12 more schools and 28 Mentors were able to join the program. In total 16 schools participated in the program. From these schools, 66 high school students were mentored by 36 Graduate Students from IIT Madras and 14 Teachers attended the sessions.

Program Design

Ten of the participating schools were part of the 1Lab-1School program and the remaining 6 were part of the 'C minus 4' program. As the participating schools were from 2 different programs, the online sessions were structured around the core of these two program models. Since it would be a first experience for online teaching and learning, content familiarity helped in constructing a viable design.



1Lab-1School

The following details pertain to the 1Lab-1School online sessions.

Objectives

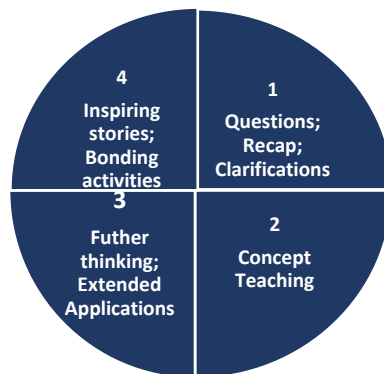
1. To teach STEM related content.
2. To explore the extent to which hands-on learning and demonstrations are possible using the online learning platform.
3. To deliver the content in an engaging manner so as to, encourage, motivate and inspire the students during this period of uncertainty.
4. To encourage them to ask 'why', believe in self and to dream big

Overall Structure

Learning Platform	Google Meet
Total number of schools	10
Total number of students	55
Total number of Mentors	34
Total number of Teachers	10
Total number of sessions	8
Number of sessions per week	1
Number of hours per session	1hr
Number of participants	5 to 7 students per school; 1 to 3 active Mentors per session; 1 school Teacher
Content	4 Tell Me Why Questions; 1 Mathematics Topic, 1 Technical session related to online App (Google Slides), 1 Device and 1 session for the students to demonstrate their learning (enabling them to confidently share their learning with peers after school re-opens).

Session Structure:

Each session was broken to 4 quarters.



First Quarter: This was primarily for answering curious general questions raised by the students, reviewing any concept or homework assigned during the previous sessions and for clarifying questions on concepts taught.

Second Quarter: This was for teaching the chosen concept for the day using videos, animations, PPT presentations. Since hands-on learning was not possible, teaching was driven more towards the science behind the principle and mechanism of the device rather than dismantle and assembly.

Third Quarter: This is where the Mentors and Students discussed the extended applications, inventions and other information related to the topic taught. During this discussion Mentors encouraged the students to think beyond the text book.

Fourth Quarter: This was for telling inspiring stories, playing fun games, assigning homework and for other bonding activities.

The students had very short attention span, and learning remotely was a challenge. The quarter method helped to break monotony, bring variety, give opportunity for learning academic concepts as well as to engage in relationship building activities.

Participation Report

Mentees

58% of the school students attended all 8 sessions; 22% attended 6 out of 8 sessions; 20% attended less than 4 sessions. Even though many of the students logged in from an environment which was not conducive for learning, they participated with interest, interacted with the mentors and finished their homework on time. It was noted that a recap of concepts was always necessary. Primary reasons for absence were either poor network connection, students could not afford recharge of data pack, phone not available or went out with family.

Mentors

All Mentors were interested, prepared well and carried out the sessions successfully. Except for 5 Mentors who taught for the first time, the others had prior teaching experience and had regularly visited schools. Most of the mentors initiated their sessions, planned in advance and uploaded the session recordings after every session. Around 30% Mentors needed reminders to schedule a session and do the necessary updates and uploads after each session. But all of them successfully completed all tasks.

Teachers

Teacher contribution was satisfactory and 9 out of 10 teachers attended the sessions. Most teachers, maintained a record of what happened in each class. Between sessions, some encouraged the students to ask questions, prepare presentations and so on. Some teachers even actively participated during the sessions.

Content

Mentors were given access to all the material from the repository which contained presentations, documents and teachings aids for *Everyday Science* questions and *Everyday Devices* (mechanical devices such as Bicycle Bell, Electric Calling Bell, Alarm Clock, Sphygmomanometer etc). As the contents were originally designed for in-person hands-on teaching during school visits, the Mentors reworked to make them suitable for online teaching. Animations and videos were added to make online learning effective. The COVID-19 related presentation was built from scratch to raise awareness among students about how virus spreads, the science behind viral infections and what precautions can one take to prevent the spread of the virus.

Sample Everyday Science Tell Me Why Questions:

1. Why do stars twinkle?
2. Why does milk rise when boiled?
3. Why do onions make us cry?
4. Are world maps wrong?
5. Why oil spills affect aquatic life?
6. Why is Covid-19 a pandemic?

To enable learning mathematics in a hands-on manner, the Mentor recorded a video of how by simply folding paper, geometric properties could be learnt. Using that video and by having the students each bring a paper to the session, properties of parallelogram was taught in an interactive, interesting and hands-on manner. After this session, students not only understood the concepts, but also seemed interested to learn mathematics in general. Geometry through paper-folding and 'Sum of n numbers' were the topics covered during the Math session.

In the technical session, the Mentors taught the students to make slides using Google Slides App; Present information using slides and make a presentation on Google Meet. This was done in a hands-on manner by having the students make the slides during the session and share it on screen such that the Mentors could give feedback and guide the Mentees.

Delivery

Mentor

Delivery of content by Mentors was successful and complete in all sessions. Many students faced connectivity issues, sometimes even Mentors faced network problems. A WhatsApp group was formed including the Mentors, Mentees and the Teachers where, the Mentor and Students communicated between sessions. Recording of the session; PPT used in class; questions from students; reminder for class; and homework were posted in this group. The group was used effectively. When students had network problems and could not attend a class fully or when they needed guidance to complete an assigned task, Mentors were able to guide them and connect with the students in this group.

Mentee

Students were asked to present a topic of their choice on the last day of the program. They were informed ahead of time and were encouraged to make presentations using the skills taught during the program. More than 50% of the students made impressive presentations. They made slides using Google Slides App, collected information by themselves, decided how much information to share in the given 10mins and confidently presented in class.

Mentor Feedback

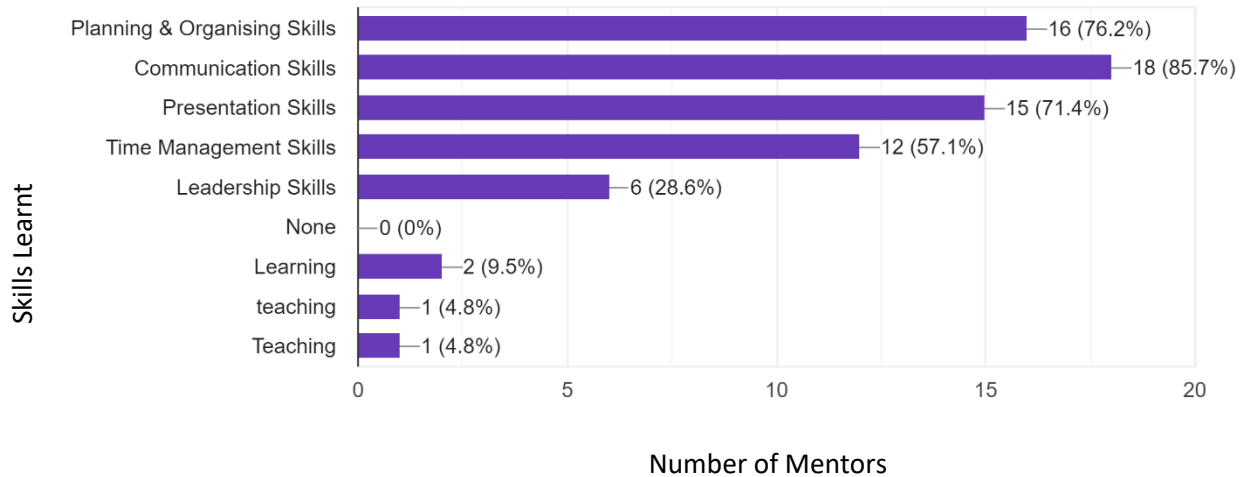
Mentors filled a session log after each session and a feedback form at the end of the 8 sessions. From their responses we identified the following three things:

a. Overall Experience

- All Mentors felt a certain happiness, joy or satisfaction from being part of this program.
- Felt a positive engagement during this period of lockdown and uncertainties.
- Although hands-on learning was more effective in person, online teaching was also satisfactory and successful to a large extent.
- Expressed gratitude for the opportunity to help and give back to the society.

b. Personal Learnings

Each Mentor identified areas of their learning during this experience. The following graph highlights these skills in a consolidated manner.



c. Collective Suggestions

- More number of sessions can be planned
- Session duration can be increased by another 30mins
- Students’ network and mobile access could be better

d. Mentor Testimonials

“I am immensely happy to contribute to this noble cause....as part of this program, I learnt to make attractive PPT slides, plan and manage my time well. The opportunity significantly improved my teaching skills... I feel satisfied that I am giving something back to the society...”

- Hariharan V S, PhD Scholar, Dept of Metallurgical and Materials Engineering

“...it was exciting to be part of the program... during every visit, students asked exciting questions which made me see things differently...my presentations style changed and delivery of content improved significantly.

- Divagar Murugan, DST-INSPIRE Senior Research Fellow, Dept of Biotechnology, IIT Madras

“I would like to thank the ‘Teach to Learn’ team for giving me the opportunity to be part of this wonderful program. I have improved my skills in teaching (going to the level of the student) and there is a sense of satisfaction that I cannot put in words...”

-Anusha S B, PhD Scholar, Dept of Civil Engineering

“...During the online teaching sessions, my time management definitely got better. Spending time to mentor the students taught me a lot of patience. It gave me a sense of happiness that I learnt about a different approach to teach Mathematics...”

- Sushmitha P, PhD Scholar, Department of Mathematics

Student Feedback

a. Academic Motivation

At the end of the 8 sessions, the Mentees were asked to rate their academic motivation level on a scale of 1 to 5 where 5 was 'highly motivated' and 1 was 'not motivated'. From the responses it was noted that, more than 57% felt highly motivated, around 38% felt motivated, close to 5% felt neutral and zero percent who expressed they were not motivated. It is important to note that when the same rating was asked at the beginning of the eMentoring program, 5% of these Mentees stated they were not academically motivated.

b. Collective Primary Take Away

Students filled a feedback form at the end of the 8 sessions. From their responses we identified the following four things:

- Learnt lot of general information
- Gained knowledge in science
- Feel confident to ask more questions
- Learnt to make Google Slides

Testimonials from Teachers

"...this program has shaped our students to get a new experience. They are encouraged to think deeper in a new dimension. Mentors guided the students to use multimedia tools in an effective manner. I learnt how to plan an effective online session. I am now able to organise online classes to teach other students with the help of these 5 students who participated in the online classes. I engage them to take online classes for their peer group..."

Mrs. Sumathi, Teacher GGSS Perambakkam

"...Mentors interaction with our students is very friendly and effective. The simple concepts motivated our students' scientific temper and they enjoyed all the sessions. Network problem, and mobile unavailability inconvenienced the class to some extent. We regret the inconvenience and appreciate your planning and the way you executed..."

Mrs. Barathi, Teacher GHSS Ponneri

"...The programme was very useful. Live classes are more effective than e- learning classes only because of the limitations related to remote learning. The Mentors were very friendly with the students and all the classes were very interesting..."

Mrs. Prabha, Teacher, GHSS Thirunindravur

Our Learnings

1. Few more students could be accommodated in each session.
2. A recap of lessons taught seemed necessary as the students were unable to retain all information. This could also be due to the fact that no study material was provided. However, the Mentors always assigned an activity or homework for further thinking between sessions.
3. Online teaching of working mechanism of a device and experiment-based activities were not easy. Even though the Mentors video recorded the dismantling process and explained it using the video, hands-on learning of devices is definitely more effective in person.
4. We are now familiar with effective approach and teaching style for online teaching.

- For the first time we introduced Mathematics in our sessions. Though learning mathematics from blackboard and practicing using pen and paper is popular and generally accepted, students learnt it in hands-on manner during these sessions, which we found to be interesting and successful.
- To motivate and engage the students each school needed different approach. Mentors used different strategies like games, quiz and stories to connect with the students. This seemed to work well.

C minus 4

The following details pertain to the C minus 4 online sessions.

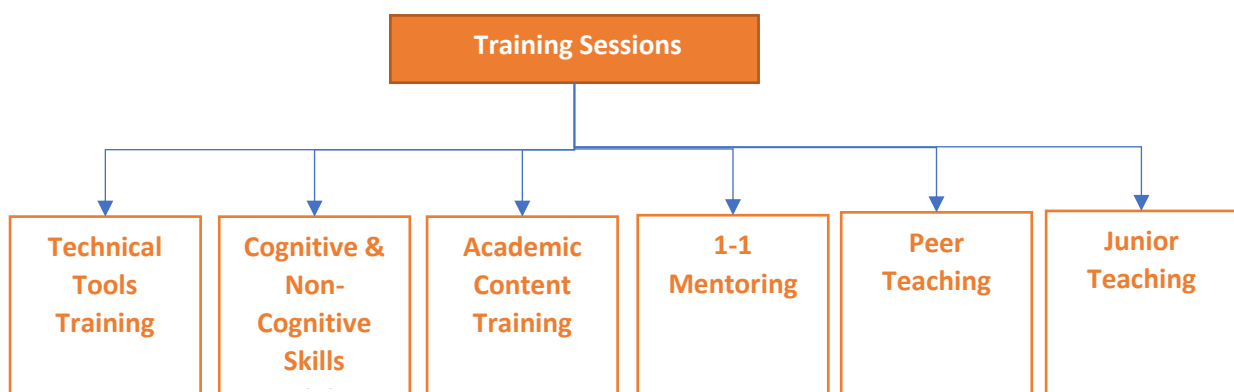
Objectives

- To train the C students to teach using online platform.
- To train the C students in the technical tools required for online teaching.

Over all Structure

Learning Platform	Google Meet
Total number of schools	6
Total number of students	12 (1 student dropped out after 2 sessions due to sickness)
Total number of Mentors	6
Total number of Teachers	5
Total number of sessions	32 (Inclusive Orientation and Closure)
Number of sessions per week	2
Number of hours per session	1hr
Number of participants	2 students and 1 teacher per school; 3 professionals, 6 Mentors

Session Structure





Teach To Learn Outreach Report during the Pandemic



Technical Sessions

These sessions were conducted by a professionally trained teacher. The main components of this training was:

- Difference between classroom teaching and online teaching
- How to use Google meet for teaching
- How to make slides using Google Slides and present on Google Meet

Cognitive & Non-Cognitive Skills Training

These sessions were also provided by experienced, trained professional teachers. The main components of this training were:

- How to make a Lesson Plan
- How to Make a Delivery Plan
- How to use communication and presentation skills to deliver the planned lessons effectively

Academic Content Training

These sessions were provided by the Graduate Students of IIT Madras. The main topics were:

- The Science behind Covid-19
- Cryptography in WhatsApp encryption
- Science behind the working of a bicycle bell
- Science behind why milk rises when boiled
- Science behind why stars appear to twinkle
- Science behind the working of a Stethoscope

1-1 Mentoring

During these sessions 1 Mentor was assigned to 1 school. The two students from the school were exclusively trained and guided by the Mentor. From teaching the content, to preparing their own presentation, the Mentor facilitated learning. At the end of these sessions, it was expected that the Mentees will be able to confidently deliver the content using slides prepared by themselves.

Peer Teaching

At the end of the training and mentoring sessions, the Mentees taught using google meet, their classmates who were not part of this online program. SRFF, our implementation partner organised this teaching session. This small group teaching experience gave the opportunity for the C students to answer questions and teach in an interactive manner.

Junior Teaching

After teaching peers, the trained C students conducted online teaching session for their juniors (class 7). Over 20 juniors attended these sessions. C students were able to successfully and effectively teach their juniors. Though success was not statistically measured, we observed from the interactions, questions asked and answered, and noted evidence of effective learning.

Collective Students Take Away

Students filled an online survey form at the end of the program. Below is the consolidated take away mentioned in the feedback.

1. Learnt Technical skills
2. Gained Science knowledge
3. Feel Motivated
4. Learnt to ask questions without fear
5. Exclusive time with Mentors was useful

Mentor Testimonial

“...this was a completely new experience for me. I have learned a lot from this experience: to structure a class, to understand the level of details that needs to be specified while teaching a concept, to manage my time properly, and most important of all, I have learnt patience. I have also come to cherish the fruits of teaching someone and see them succeed at that...”

Sriram Krishnamurthy, PhD Scholar, Dept of Chemical Engineering

“...this experience helped me gain more knowledge, to simplify things and deliver it in a better way. Although there were hiccups in between, the overall experience was satisfying when you see how the kids transitioned...”

-Gayathri G, PhD Scholar, Dept of Biotechnology, IIT Madras

“...I learnt how to convey in a simple manner. I also realised the importance of planning and managing time...”

Raja Murugan, PhD Scholar, Department of Biotechnology, IIT Madras

“...The 'C minus 4' project turned out to be my favourite! This was more of mentoring than just teaching. I learnt a lot by way of teaching, and felt content in helping rural school kids...”

-Venkataraman N V, Project Officer, Dept of Chemical Engineering, IIT Madras

Teacher Feedback

“...C minus 4 programme structure was quite well. The Mentors and trainers put in their best efforts in the technical content. I really appreciate the overall efforts by Mentors. Students did a neat job, used their time constructively and mentors communicated well with children...”

-Mrs. Charumathi, Teacher, GBHSS Nandhivaram

“... The C-minus 4 program is interesting and interactive. . The training was effective and efficient. Excellent team guidance. Mentors from IIT have done their work with involvement and enthusiasm. The students learnt many things from this online program. Thank you very much for giving me the opportunity to participate in this program in the Pandemic Situation...”

-Mrs. Sumathi, Teacher, GHSS Kandigai

Notes and Observations

- The Project Team attended all the sessions, kept track of the progress and gave feedback whenever needed. The Team organised orientation meeting for all the participants; Mentor meetings were conducted to help the Mentors choose a topic, customise the content to suit online teaching. On few instances, the Team even pitched in to help with the training.
- Every once in a while, few students needed to be reminded of the class either by the SRFF team or by the Project Team. Reasons for not attending were usually - not having phone, didn't top up data pack, poor network connection and so on.
- The assigned number of 1-1 sessions was not sufficient as students needed extra sessions to prepare. Few mentors followed up with the students on WhatsApp to get the desired result. Mentors tried to understand the strengths and weaknesses of students, and considerable amount of time was spent in making them understand the content thoroughly. This left insufficient time for cross content teaching. Therefore, within the stipulated number of sessions, each pair of students from a school ended up teaching only 1 topic.
- Delivery was more than satisfactory; few students did an excellent job. During large group teaching, some C Students were more interactive, which was taking away time. So, the Mentors had to intervene and redirect those students. In general session management by the students was well done.
- Almost all Mentors provided mentoring using online platform for the first time. Though it took them a session to settle down and reconcile to the challenge of teaching from a remote location, the Mentors soon found ways to check for understanding and engage the students throughout the session.

Conclusion

We consider the eMentoring program a success. The realisation that, online learning can never effectively replace hands-on in person learning, helped us plan and design a program that had reasonable expectations. The fact that, despite the various hiccups, all sessions were conducted as planned, gives us confidence and encourages us to consider similar implementations in future also. Knowledge gain among students was evident in the manner in which the students asked questions and interacted in class. It was quite impressive to see the students learn to make slides using a mobile phone to present and teach with confidence. Even though the Mentors had academic commitments, and the students had network issues, both participated enthusiastically and completed the program as scheduled. Students were given certificates by the Project Team. Mentors were provided with letters of appreciation.