

# What We Have Learned: Connecting Scientists with Students through the Use of Communications Technology

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## INTRODUCTION

In collaboration with the Center for Ocean Sciences Education Excellence California (COSEE CA), scientists at Scripps Institution of Oceanography (Scripps) have worked with a group of three middle school science teachers to teach students how marine natural products research at Scripps connects and contributes to the clinical drug discovery process. The participating San Diego Unified School District 7<sup>th</sup> grade life science teachers routinely teach a unit on drug discovery to approximately 300 students each year, and enrich the instruction by providing students the opportunity to communicate face-to-face with marine scientists through an interactive videoconference. Using SKYPE to connect the lab to the classroom, the scientists discuss their work and answer questions about their lifestyle and their path to being a researcher. In addition, the students receive a virtual lab tour and learn about the various jobs people do at the lab. The teacher/researcher team has refined this program over the last three years based on ongoing formative assessment. The team has established effective practices for both teachers and scientists interested in developing this type of program to implement lab to classroom videoconferencing more broadly.

## PROGRAM OVERVIEW

### Program Goals

- Use information and communications technology, and web-based educational technology tools to promote ocean sciences learning and scientist/educator partnerships
- Engage researchers in development of new tools/approaches
- Provide researchers with broader impact solutions that support established programs and that make effective and efficient use of their time
- Create long-term sustainable partnerships

### Designed Collaboratively with Teachers and Researchers

- Introductory meeting between teachers and scientists
- Lab tour/research introduction followed by teacher description of instructional unit provided the basis for program design
- Established an initial framework for the videoconference

### Framework for the Videoconference

- Scientists who participated are current doctoral students
- Introductory PowerPoint presentation broken into 4 sections
- Student questions after each section, both prepared and spontaneous
- Camera pan around the lab; artifacts used in describing various aspects of work; tour including view of the ocean, -25 degree C freezer, and culture lab



### Evolved over Time Based on Experience and Formative Evaluation

- **Initial Experience**
  - First videoconferencing technology choice proved to be highly limiting
  - Original implementation with multiple classrooms and various graduate students was highly impersonal
  - Interactions were stiff and self-conscious
  - Graduate student vocabulary too advanced (even after coaching)
- **Evolution**
  - Technology: Simpler is better (SKYPE); teachers and scientists comfortable with executing independently



- Current structure of the videoconference: Smaller and less formal and more touring around
- Graduate student vocabulary and descriptions much more accessible
- Students prepared questions and watched informational videos about the lab before the videoconference. Asked more spontaneous and insightful questions throughout the entire presentation and interacted more with the scientists
- Facilitation: From highly facilitated to minimally facilitated
- Today: Carried out independently without COSEE facilitation; lab tour and videoconference conducted using an iPad2

## RESULTS

### Teachers reported that the students benefitted academically from the interaction and talked about the scientists for the rest of the year

- “And you can see it in the kids, when the lights are going off and they’re making just those small little connections and you kind of know, ‘you’re getting this, you’re getting it.’ It’s becoming more personal for them . . .”
- “They can relate, that’s one thing. I know we talked about this before, they think scientists are really old people with beards, and they look at them and they’re like, wait, they’re close to our age, they’re not that older than us, and they’re doing all this stuff. They get, you know, afterwards, they want to keep in touch. They want - they tell us, okay, are we going to [name of scientist] again, are we going to talk to the other people too. And they just get connected with them.”

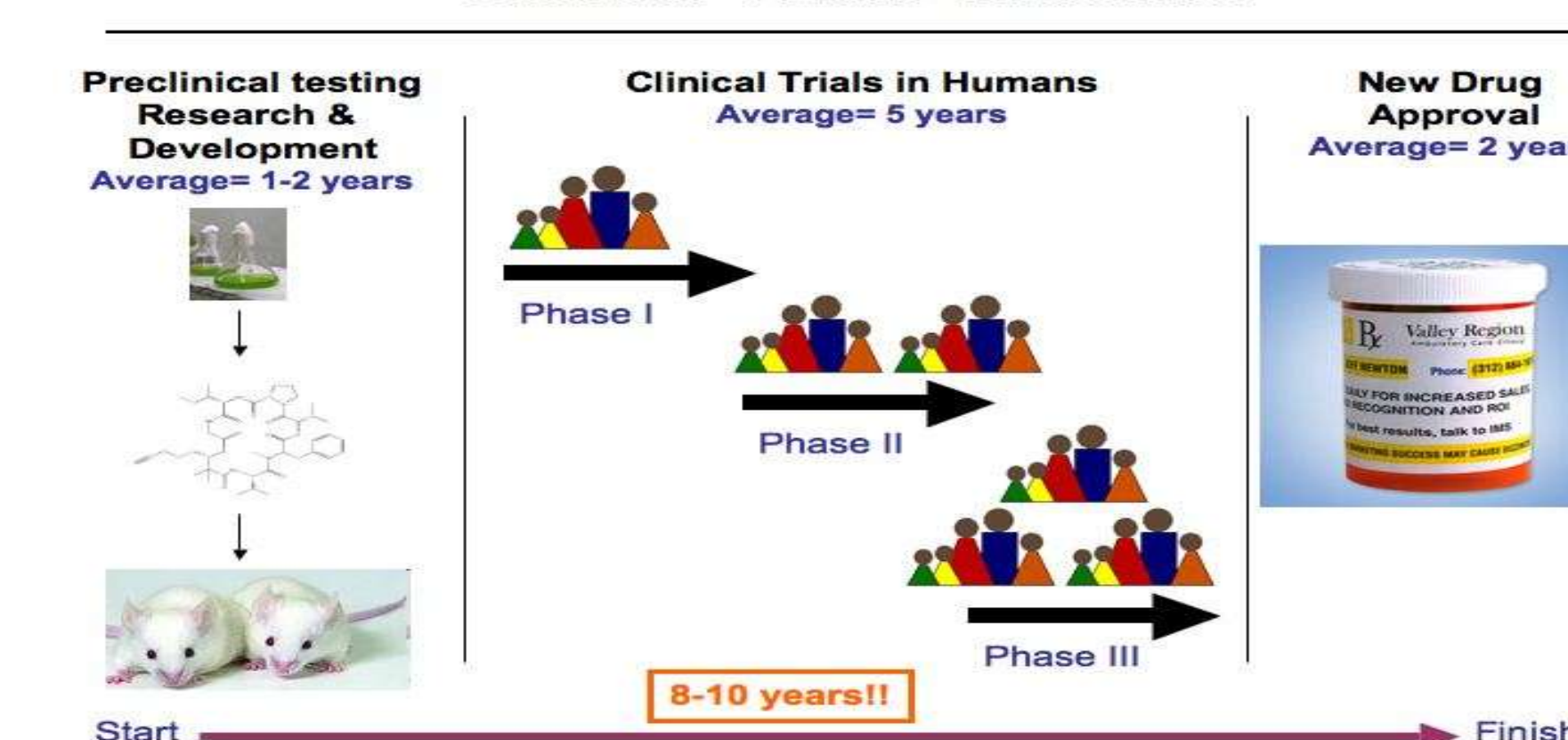
### What we see...



### Scientists found the experience was helpful for them to learn better how to communicate science material to non-science audiences, particularly school age children

- “There’s no excuse for people avoiding this [educational outreach] because it’s something that’s really important and I think that everybody should be doing this in some way and I’m excited about the fact that... there aren’t technological barriers, only time barriers, to interacting with people outside of the lab.”
- “...I think that I’m learning more and more that that’s [educational outreach] really the best way to reach out and make our science mean something. I think because you can work in a lab your entire life and publish all these papers and realize that not that many are going to read them, or you can make sure that you disseminate some of that work and information to the public and a really good way of doing that is to talk to younger kids about what we do, so that they’re educated and aware of what’s out there.”

### Clinical Trials Timeline



### COSEE outreach coordinator was a tremendous asset to the program

- Found the right match between teachers and scientists
- Helped with initial communication and brainstorming between the two groups

### The program has become more sustainable over time

- Scientists and teachers feel comfortable communicating directly with each other
  - One teacher independently contacted, interviewed, and videotaped the scientists at the lab during the summer to show the students the lab before they participated in the videoconference
- Scientists who have already participated can train new incoming graduate students
- Ongoing outreach component for the scientist’s lab to many funding agencies
- Less time is needed to prepare
  - Less meetings between the scientists and the teachers
  - Technology is easier to use so less preparation of the technology
  - Scientists presentation about the lab has already been designed

### Scientists have noticed more positive views about outreach both at a principal investigator level and at an institutional level

- One doctoral student has seen a big positive change towards outreach in the principal investigator as a result of this videoconference experience

## CONCLUSION

### Overall a positive experience for both the teachers and scientists

- A good working partnership has formed between the scientists and the teachers that is ongoing and has benefitted both groups
- “It is just such a nice partnership. It has worked, so well, every year, and it’s definitely something that has tremendous value in my classroom and with my students, and that’s probably why I would love to do more of it, it’s just, a matter of the time and the right people to find, and [the COSEE outreach coordinator] has been so seamless in that, so good at setting that up, and making it happen every year for us, but it’s I mean, this is a partnership that I want to continue for years. And expand it however it expands, or keep it the way it is, whatever we determine would work well for all of us.”

## CONTACTS

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