

From Rags to Riches: a How-to Guide

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The beginnings of an idea

Four years ago I attended a teacher training workshop at Lawrence Livermore National Labs. One of the presenters, Dr. Doug Kain of Merced College, asked me what I had planned to do with what I was learning, and challenged me to take his biotechnology course. Over the following two years, as I completed an A.S. in Biotechnology, I decided to approach my district with the idea of an advanced science elective for one of our high schools. As we were opening a new high school in the fall of 2006, I asked for a meeting with our Assistant Superintendent for Curriculum and Instruction, Dave Cooper.

The viability of such a course was discussed. My thoughts were that as our area was becoming a bedroom community for the Bay Area, our students would benefit from exposure to advanced science training. This might also make them better able to compete for higher paying jobs both there and locally should the industry move in our direction.

Task Force and Advisory Created

Mr. Cooper convened a task force of educators to investigate the creation of such a program. After looking at a variety of courses throughout central California, our district leadership decided to expand our model to a four-year, career pathway. At the same time, recognizing the tremendous power of established student interest in popular TV shows such as *CSI* and *Bones*, the decision was



made to realign the focus of the program to use forensic science as the hook to engage our learners. The challenge now would be to teach valid science, aligned to state core content standards that would meet our learner's expectations and need for job skills training.

Realizing that our model would benefit from a broadened perspective, an advisory committee of stakeholders including teachers, administrators, local business people, and district officials was convened to provide input. Visitations of other schools were made during this time. Using the advisory's input and lessons learned from the visitations, the model was developed.

The model provides a first year and second year that teaches basic science math skills to the incoming ninth graders, along with Forensic fundamentals, principles from chemistry, biology, earth science and physical science. The course is advanced in 10th grade with more sophisticated and additional concepts. In 11th grade, our students learn the state aligned concepts for high school biology. The fourth year consists of ROP placement or independent study in conjunction with a local college or university. Throughout the program, students remain connected to the forensic approach through the use of established crime lab and crime scene methodology.

Board Approval a Must

With our plan in place, we approached our district administration for approval. This required us to present before our board in open session. Board members asked questions that tested our understanding of our model. It was here that the time spent in development paid off. With board support secured (one member even placed her daughter in our program) we then began to seek funding that would put our program into action.

Funding Sources Sought

By searching both online and with our contacts, we learned that there was a local source that issued \$500 grants for deserving programs. We applied and were awarded one.



At almost the same time, the California Department of Education was issuing grants for technology development through their Enhancing Education Through Technology (EETT) program. Since the focus of this award was to use technology to engage students, we sought to use the money to purchase a spectrophotometer. We applied and received \$3000.

An online search revealed other funding sources through the state. A short time later, an announcement came in of a Specialized Secondary Program (SSP) funding opportunity. These monies, which amounted to \$250,000 over three years, would provide the seed funding that we needed to develop our program. Realizing that this would only provide the start, the team met with and secured involvement by our Regional Occupational Program (ROP) director. We applied for the SSP grant and were assisted by members of our advisory and the contacts we had made. Our application was approved for the full amount.

Don't Forget the Equipment

We found numerous sources of new and used lab equipment within less than two hours drive of our school. Over the past three years, our teachers have attended more than 14 lab give-a-ways acquiring well over \$73,000 worth of lab equipment.

One of our contacts linked us to Bio-Link, an national NSF-funded biotechnology teacher training organization. This led directly to our program being given an additional \$150,000 worth of donated surplus equipment. Along with the other lab give-a-ways, we received micropipettors, several thermalcyclers, and numerous cases of lab consumables including Falcon tubes, beakers, flasks, water baths, ovens, centrifuges, gel boxes and power supplies. Upon hearing of our efforts, a local food processor even gave us two carloads of labware including microscopes, glassware, and balances. Some items were new, most all serviceable.

Teacher Training

The shift from a biotechnology focus to a forensic one required some new skills and resources be brought to the table. There were no forensic programs in our area. I was the only teacher trained in

biotechnology at that time. Researching training opportunities, we found San Jose State University had an established Forensic teacher training program and they worked hand in glove with the Santa Clara County Biotechnology Education Partnership. We were included in their sessions. We used a portion of our SSP grant for travel expenses to their trainings held at San Jose State, Silver Creek High School in San Jose, as well as those at Templeton High School in Templeton, CA.

We also became aware of the Biotech program at UC Davis. Its director, Dr. Judy Kjelstrom and arranged for our participation in a week-long Bioinformatics training. Bio-Link provided two week-long summer fellowships at University of California, Berkeley to train our teachers.

Build it and they will come

Once all was in place, we listed our course of study on the ballots 8th graders fill out in the spring of each year. To support and inform the public, we held two evening informational meetings at local schools. When the ballots were returned, 138 students applied for our program. This included more than two dozen from other districts or other high school areas. We increased the number of sections offered to four, and the number of teachers to two.

The program debuted in late August 2006, to much fanfare including local print and TV media. Visitors to the campus including former board members, politicians, visiting superintendents and teachers. Parent interest is high. Student retention has been excellent with a non-relocation loss of less than 1% in the first 14 weeks of the program.

What we have learned

The development of our program has taught us several things: First, in order to meet the interest of today's millennial generation in forensic science, we needed to design a program that promises them realistic experiences. This requires a substantial investment of background research, teacher training, equipment, and additional staff.

District support is vital at all levels.

Adequate funding must be secured, and can come from a variety of sources. Our district had curriculum development funds that assisted in the early stages for release days, substitute costs, and travel expenses. If you're thinking of starting a program like ours, and your program is going to be included in a new school's offering, there will most likely be some startup costs. If your program is correctly focused on job skills development, ROP, state, and local workforce development monies may be available to you.

Your state Department of Education may also have funds targeted for technology assistance that



fits well into the teaching of forensic science. Interested teachers should make a survey of local laboratories and food production facilities. We have driven as far as 90 minutes to participate in lab give-a-ways organized by the labs and the nearby colleges, community colleges and universities. If you make your program known to these institutions, you stand a much better chance of being included on their mailing lists when they are getting rid of outdated but usable equipment.

Finally, in order for the program to be adopted, alignment to state standards is vital. In the world of No Child Left Behind, test score accountability has become important. In our case we are aligned to the Integrated Science Test in years one and two, and the biology standards test in year three.

We are confident that given a strong commitment, a team of dedicated staff and teachers, you can develop a Forensics program that will meet your students' needs and make a fine addition to your school's course of study. If you have comments or questions please contact us at

1. Get district administration to see the benefits of your program
2. Make sure your science meets state standards; being able to demonstrate your program provides job preparation
3. Involve stakeholders in the planning
4. Get board support and approval
5. Find funding. Apply for grants, use district contacts for foundations, accept used equipment, repair if necessary
6. Explore all options, including networking, to find and send teachers to training
7. Recruit students

