

Santa Monica College

Case Study

Study Specifics

School Name:
Santa Monica College

Course Name:
Bio 2 Human Biology

Program:
Connect Master: Why Biology?

Educator:
Thomas Chen

Enrollment:
30 students per term, on average

Delivery:
Fully online; asynchronous with a scheduled exam

Duration:
16 weeks

Setting

Santa Monica College is a public two-year institution located in Santa Monica, California. According to US News and World Report, total enrollment is 28,880 and is comprised of 11,035 full-time and 17,765 part-time students. The ethnic makeup of the student population is 40% Hispanic/Latino/a, 26% White, 10% Non-Resident Alien, 9% Asian, 9% Black or African American, and 6% two or more races or ethnicity unknown. Males make up 46% of the population and females 54%. The age distribution is 4% under 18, 65% 18-24, 30% 25-64, and 1% over 65.

Implementation

According to Dr. Thomas Chen, non-majors Biology materials are often very technical and abstract, which presents a challenge for both instructors and students. He believes that students often feel disconnected to the content and unsure as to how it relates to their own lives. When he began teaching Bio 2 in fall of 2019, Dr. Chen sought course materials that directly addressed these challenges. He found that Connect Master: Why Biology? effectively connected real world examples to the biological concepts, and presented the content in a way that he believed better met the needs of the current generation of students.

Having participated in a Why Biology? focus group, Dr. Chen embraced the theme-based approach and adopted it for his Human Biology course at Santa Monica College. According to Dr. Chen “this textbook has been my dream of how biology should be taught since the 1990’s, but no theme-based or problem-solving-based textbooks were available.” He covers content from the Influenza A, Energy Drinks, Cancer, Fitness Trackers, Sickle Cell Disease, Climate Change, and GMO units in his one-semester course.

Students in this course are typically not science majors and are using the class to fulfill a general education requirement or are pre-health/nursing students taking the course to prepare for Anatomy & Physiology. With that in mind, Dr. Chen assigns: Adaptive Learning Assignments for each unit (11.7% of overall grade); eBook readings; Connect Question Bank Practice Quizzes (17.5% of overall grade); and an exam (29.2% of overall grade).

Additionally, Dr. Chen utilizes the Learning Management System (LMS) discussion board to collect feedback from students which has been overwhelmingly positive. It is his belief that “students are interested in learning science, they relate and share their own experiences on various subject matters the textbook addresses, they discover new information that they care about, and exchange ideas about future trends on major issues. As an instructor, I also get to offer my view and clarify misconceptions.”



Broader Implications (by Why Biology? architect Michael Windelspecht)

There is an additional aspect to Dr. Chen’s research. Historically, there has been concern that relevancy-based materials, since they typically do not cover content in detail, would limit students’ ability to critically analyze data and draw conclusions. In additional studies, Dr. Chen (and others) have shown that this is not the case. Students in Dr. Chen’s class were able to critically examine COVID-19 data and make sound conclusions about the need for booster shots to increase population immunity. Similar results have been observed with regard to modules such as GMOs, Energy Drinks, and Fitness Trackers. If the goal is to develop general education courses that increase an appreciation for science and scientific literacy overall, then studies such as those presented here by Dr. Chen indicate that students respond to a relevancy-based approach.



Tom Chen’s Teaching Philosophy and Goals

- Cater to what students want to know, dive deeper, and encourage them to become lifelong learners.
- Grab students’ attention and maintain sustainable engagement throughout the course.
- Empower students to think, talk, and act like a scientist.

Best Practices

- Launch selected units to match concurrent events such as flu season, Earth Day, or Cancer Awareness Month. Because of the modular nature of the digital platform and the way important concepts are presented, it is easy to do.
- Encourage student engagement in an online discussion utilizing relevancy focused content in Why Biology?. Require students to substantiate any claims with proper source citations.
- Utilize the Why Biology? ancillary resources. They offer a rich source of cases, videos, and lab exercises from which you can select supplemental exercises and assessments.
- Help students build scientific literacy skills by having them interpret, analyze, and evaluate data related to the unit they are studying.
- Capitalize on students’ interest in what they’re learning. When content is relevant, the enthusiasm becomes contagious and synergistic. This translates into better performance and ultimately benefits both students and instructors.

Results Achieved

Dr. Chen has been surveying his students at the end of each term since he began teaching with Why Biology? in 2019. A total of 443 students were tasked with comparing Why Biology? to a traditional chapter-based textbook in four general areas from 2019 to spring of 2022 (Figure 1). They were asked:

- Which approach made them more curious to learn the content?
- Which of the two relates more to everyday life?
- Which leads to greater understanding of the concepts taught?
- To declare a preference

Conclusion

Over his teaching career, Dr. Chen has faced the challenge of delivering overly technical course materials to students who were not science majors and who struggled to understand the content. In his opinion, this caused students to feel disconnected with the content and uncertain of its value and importance.

As Dr. Chen points out in this case study, students do have an interest in learning science when that content is relevant to their lives or to events that they are exposed to in the media. Because Why Biology? centers biology concepts around a central, real-world theme, the result is a text that

truly speaks to the current generation of students. According to the data, his students seem to agree, as they overwhelmingly preferred learning thematically over a more traditional approach

Implementing the theme-based approach has allowed Dr. Chen to not only reinvent his course in a way that better engages his students but to also develop a series of new teaching strategies and identify best practices (see inset). He has shared his experience utilizing a relevancy-based approach with colleagues at both Santa Monica College and nationally. This type of simultaneous reform of both the content and the teaching philosophy of instructors is showing an early positive influence on student engagement with science.

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Figure 1:

Question	Themes (Why Biology?)	Traditional Text	Both are Equal
More curious to learn content	76.3%	9.3%	14.5%
Relates more to everyday life	81.5%	7.2%	11.3%
Better understanding of the material	68.6%	16.0%	15.4%
Preference	84.9%	15.1%	NA

In the same survey, students were also asked if they were comfortable with a digital-only text delivery. Out of 416 responses, 91.4% said “yes” and 8.6% said “no”.