

*Promising Practices Brief:*

# Flipping the Classroom

## Austin Community College's Blended, Interactive Approach to Strengthening Student Progression

### Introduction

This *Promising Practices* brief is one of a series of reports jointly published by the Aspen Institute Workforce Strategies Initiative (AspenWSI) and Achieving the Dream based on cases from a U.S. Department of Labor Trade Adjustment Assistance Community College and Career Training grant consortium. Led by Northern Virginia Community College, the consortium includes seven colleges. This report describes how Austin Community College (ACC) focused on teaching and learning by flipping the classroom to strengthen student progression into health science programs of study.

AspenWSI and Achieving the Dream chose the topics of these reports based on our observations as managers of the consortium's peer learning community. Earlier versions of the reports, based on interviews, data, and document reviews at each site, were used as learning cases to benefit grant project leaders and staff within the consortium. Aspen WSI and Achieving the Dream are publishing the revised reports as examples of the innovative capacity development initiatives that better serve more students as a result of a major, multiyear investment.

### Austin's Twin Challenges of Addressing Employer Demand for Skilled Workers and Providing Wider Opportunities for More Students

The growing health care sector in Austin, Texas, has attracted many recent high school graduates and working-age adults interested in careers in nursing and allied health, and many have entered Austin Community College as a result. Often, however, these new students do not complete their desired health science program or enter their chosen career fields—mirroring nationwide trends in low persistence and completion among community college students. Many ACC students have struggled with completing prerequisite courses, keeping them from entering and completing degree programs. Others have retaken biology

prerequisite courses multiple times to earn an A or B and improve their chances of getting accepted into highly selective health science programs. This duplication of effort wastes students' time and money and leaves unmet the workforce needs of local health care employers.

### Overview of Austin Community College's Flipped Classrooms

Seeking to boost student success in health sciences, the Biology Department set out to fundamentally change how students master course material. Faculty members redesigned three courses—Biology Fundamentals, Introduction to Anatomy and Physiology, and Human Anatomy—by introducing web-based modules and coupling them with class sessions devoted primarily to student-led, small-group activities. This blended, interactive “flipped” course format—coined as the Biology Innovation Lab (BIL)—all but eliminated class time for lectures, which faculty members' experiences and the low course success rates suggested were ineffective and inefficient in helping some students master course content. Students also had access to new open computer labs where they could access the online course content with instructors and tutors available to assist them.

For the BIL Biology Fundamentals course, students meet for 160 minutes each week, either in one session or divided into two sessions, during the 16-week semester. In the two lab courses, Introduction to Anatomy and Physiology and Human Anatomy, BIL sections meet for 160 minutes per week for lab plus 160 minutes per week for class time.

### Major Features of The Biology Innovation Lab

**Interactive Online Lecture Modules:** Lecture modules, posted using Blackboard online classroom software, are accessible to students via laptops, iPads, Android tablets, or mobile devices. Each module enables students to review

and master material through engaging, media-rich content built around specific course learning objectives. *Before* attending any class in a course, students study and master the modules at their own pace and at the time of their choosing. This encourages ownership and accountability for learning. Guided notes help students develop note-taking skills and reinforce learning.

**Targeted Group-learning Activities:** Students work in groups to solve case studies, perform hands-on activities, complete worksheets, and apply information. Collaboration through peer learning creates meaning within the course materials in a supportive learning environment.

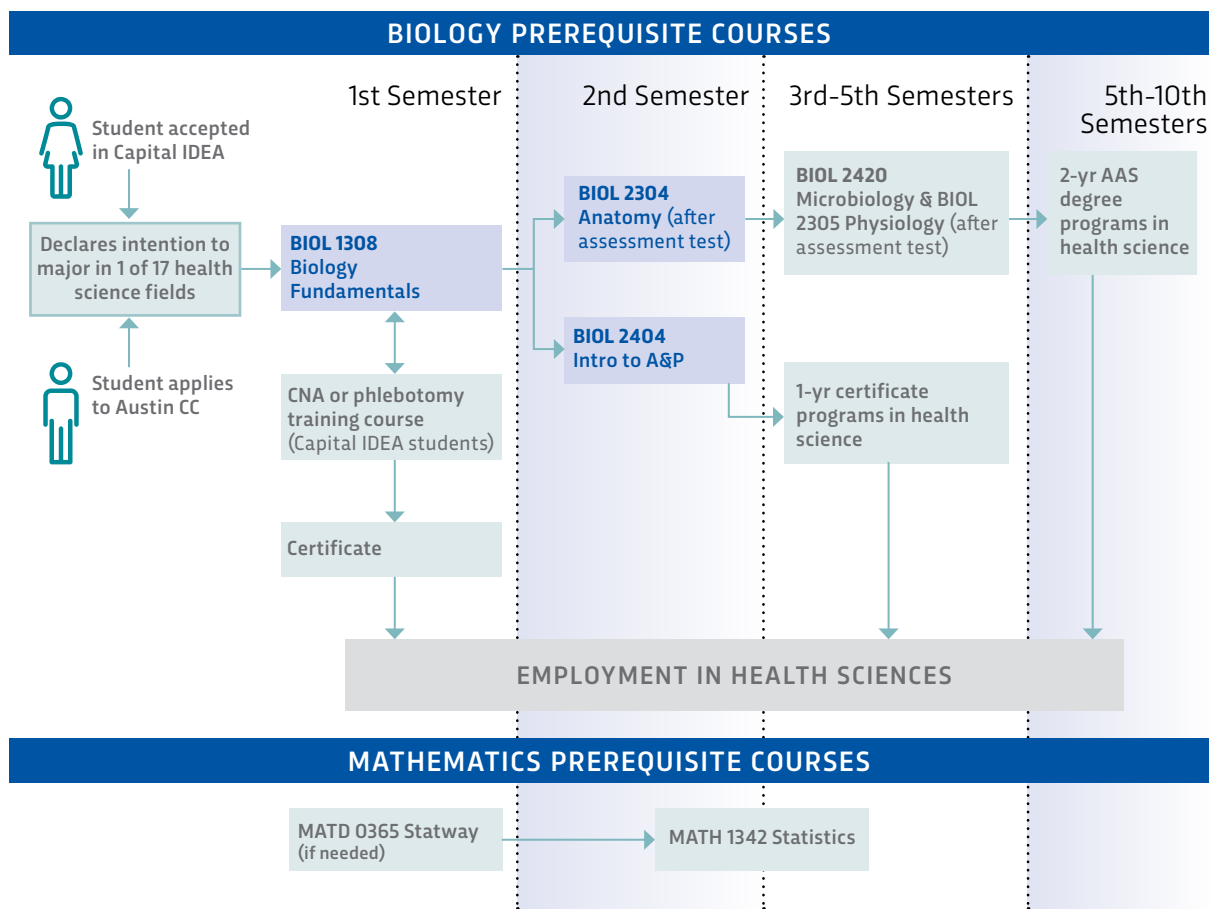
**Formative Assessment with Real-time Feedback:** Multiple diagnostic assessments (e.g., in-module comprehension questions, online quizzes, class activities, and tests) provide instant feedback to the student and the instructor on student comprehension and learning bottlenecks. Instructors then address specific learning issues in short lectures at the beginning of classes and during tutoring sessions during either class time or faculty office hours.

**Enhanced Interaction with Instructors, Tutors, and Peers:** Outside of class time, instructors and tutors are readily accessible during open labs.

**Technology-supported Learning Environment:** Students use state-of-the-art technology to complete assignments, communicate, and track progress. Using computers in the classroom, students engage in interactive learning activities.

ACC continues to offer traditional, lecture-style sections of Biology Fundamentals (BIOL 1308), Introduction to Anatomy and Physiology (BIOL 2404), and Human Anatomy (BIOL 2304), but the BIL versions are becoming more popular with students and appear to be more successful as well. The impact has been most evident for students in Biology Fundamentals, the first course redesigned and delivered in the flipped format. Although ACC does not require Biology Fundamentals for health sciences students, it strongly encourages them to take it to prepare for the assessment exam they must pass before enrolling in Human Anatomy (See Figure 1, the career pathway map for ACC health sciences programs).

**Figure 1: Pathways to Austin’s Healthcare Careers**



Source: Austin Community College Biology Department

**Table 1. Number of BIL and Non-BIL Sections, Fall 2013-Spring 2015**

	BIOLOGY FUNDAMENTALS		HUMAN ANATOMY		INTRO TO ANATOMY & PHYSIOLOGY	
	BIL	Non-BIL	BIL	Non-BIL	BIL	Non-BIL
Fall 2013	5	15				
Spring 2014	7	14	5	24		
Fall 2014	9	12	5	24		
Spring 2015	10	12	10	20	4	22
Fall 2015	9	12	13	11	4	19

Source: Austin Community College Biology Department

### Flipped Classrooms Show Success

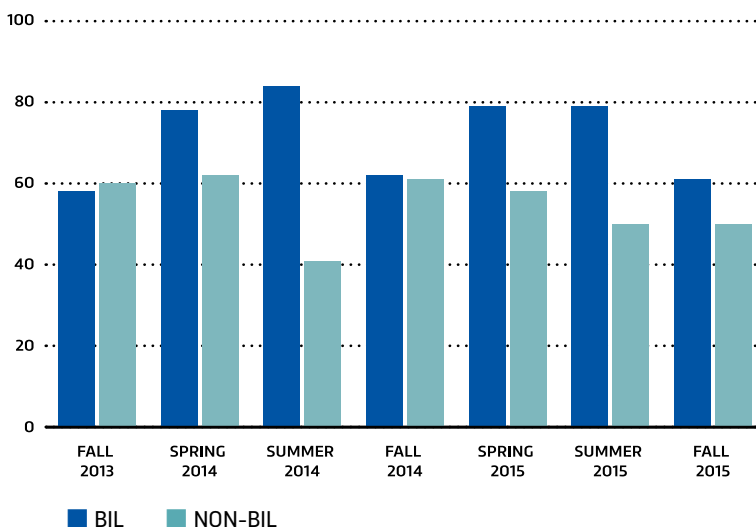
Between the fall 2013 semester and the spring 2015 semester, ACC enrolled more than a thousand students in about 80 sections of the flipped BIL courses (see Table 1). During this timeframe, each of the BIL (flipped) courses enrolled an increasing proportion of students.

ACC is collecting evidence about the success of the flipped classroom and has documented promising results in terms of the proportion of students earning A or B grades in courses employing this model (see Figure 2). ACC compared the grades for students in the BIL Biology Fundamentals course with the grades of students in a sample of non-BIL Biology Fundamentals courses, matching campuses and times at which it offered courses. For example, the college offered the BIL course of Biology Fundamentals in five sections of up to 32 students each, meeting twice a week. It offered the non-BIL Biology Fundamentals in 13 sections at five other ACC campuses; each section had up to 32 students and met twice a week. Over the seven terms from fall 2013 to fall 2015, the college reported grades for 754 students in BIL Biology Fundamentals courses and 519 students in the matched, non-BIL Biology Fundamentals samples. Over the seven terms beginning in fall 2013 and ending in fall 2015, students in the BIL Biology Fundamentals course earned A or B grades at a higher

proportion than their peers in the non-flipped version of the course. The college considers earning an A or B as a good indicator of students' future success at moving their health science career education forward.

Student feedback suggests that the flipped classroom approach is especially valuable for low-income, older students returning to school. For example, about 10 percent of BIL students receive tuition assistance and wraparound case management through Capital IDEA, the community-based organization that is ACC's TAACCCT grant partner. In interviews, these students said the modules, in-class activities, and supplementary tutoring have made it easier for them to learn course concepts compared with learning through lectures and reading textbooks. Students and several BIL instructors noted that the BIL format instilled a certain amount of peer

**Figure 2: Percentage of Students Earning Grade A or B in Biology Fundamentals**



Source: Austin Community College Biology Department

pressure to complete the assigned modules prior to class rather than face the discomfort of answering class polling questions incorrectly and being unprepared for group work.

## How ACC Flipped the Classroom

The promising performance of students enrolled in Biology Innovation Lab courses stems from more than two years of work to adapt curricula to the flipped classroom approach—first by flipping Biology Fundamentals for the fall 2013 term, then Human Anatomy for spring 2014 and Introduction of Anatomy and Physiology for spring 2015. The dean of math and science charged a senior biology faculty member (who is now the department chair) with assembling a group of about 10 faculty members to redesign the three courses. This team transformed lecture presentations into interactive online modules (for example, 23 modules for Biology Fundamentals), planned small-group activities, and wrote uniform notes, quizzes, and tests. Ultimately, they taught the courses as well. Due to time pressures on the use of the grant funds, the BIL team developed the modules, in-class activities, and assessments for Biology Fundamentals during the first semester it was offered, while they redesigned Human Anatomy and Introduction to Anatomy and Physiology before offering those courses. Team members also embraced the mantra of continuous improvement: they responded to faculty and student feedback by refining modules and activities in subsequent terms.

Faculty received grant-funded paid release time to undertake the work, although team members indicated that they logged far more hours than compensated. Early on, the team met weekly to divide the work (for instance, deciding who would draft which modules), review and revise drafts, and chart next steps. For each module, the team crafted comprehension questions and provided explanations for each incorrect answer. The team initially intended to outsource the migration of content into online modules but concluded that doing so would cost too much, take too long, and give up too much control over content. Instead, two faculty members built the modules themselves via Lectora's online e-learning authoring tools. They faced a steep learning curve but persevered. After the faculty team flipped Biology Fundamentals for the fall 2013 term, ACC's instructional designer joined them to aid in developing the modules and provided guidance on how each module and activity could—and should—align with the broader learning objectives of each course.

## Advantages of the Flipped Classroom

ACC faculty members reported several advantages of the flipped classroom approach.

**Improved Student Learning:** To develop the flipped classroom, faculty members combined research on adult learning with tools that provide skills-based learning in workforce education. In addition to the evidence of student success noted above, the faculty members indicated that they see greater student engagement with the material as a result. One faculty member attributed this to a safer, more collaborative learning environment in the flipped classroom, where students spend two-thirds of the class time on non-lecture activities. Students can practice new material in the group before engaging with an instructor. Students who require extra time to master material can receive individualized assistance from an instructor during the latter part of a class. Consistent with student feedback gathered by Capital IDEA, faculty describe this combination of self-paced initial learning, group work, and individual attention as particularly effective for returning adult learners.

**Universality:** The members of the BIL faculty team believe that flipped classrooms can be applied to any course of study as long as the initial learning takes place before class and the face-to-face classroom time is devoted to reviewing the material and for reinforcing activities.

**Flexibility:** Although ACC set up all three courses in an exclusively flipped classroom format, faculty members believe that flipping the classroom need not be an all-or-nothing proposition. Flipping just one or two difficult topics in a course can improve a student's understanding and retention of the material. This flexible approach to flipping classes supports the instructor's expertise in the course subject.

**Consistency and Collaboration:** The process at ACC empowered instructors to collaborate in the curricular redesign. At the same time, it produced greater consistency in course pedagogy and assessments. All students in a BIL course engage in the same modules, group activities, and tests, no matter who the instructor is.

## Next Steps

TAACCCT funding ended in spring 2016. At the time this publication was written, the ACC Biology Department was exploring ways to expand the number of Biology Innovation Lab offerings by increasing the number of BIL sections and offering the BIL classes on all ACC campuses by 2017. Toward expansion, it also started to provide faculty training workshops in January 2016.

In the future, the Biology Department may offer shorter and wholly online versions of the BIL courses for students seeking an accelerated path to completing prerequisite courses. As an alternative to the traditional 16-week semester, it may offer BIL courses in 8-week formats so that students can complete two in one term. The department already offers an abbreviated 12-week Biology Fundamentals course, which gives students enough time to take and pass the end-of-course assessment and qualify to enroll in Human Anatomy the following semester.

Finally, depending on available funds, the Biology Department may develop flipped versions of other health science prerequisites, such as microbiology and physiology.

## Keys to Success

Community colleges interested in flipping courses should consider these actions to improve likelihood of success offered by Austin Community College's Biology Department.

- ▶ **Choose a senior faculty member to lead and champion the cause.** ACC's dean of math and science assigned a seasoned faculty member who could empower and motivate faculty, troubleshoot problems, and make final decisions.
- ▶ **Be deliberate in assembling the team to redesign and teach flipped courses.** ACC's project leader handpicked faculty members who could work well together and who demonstrated a commitment to helping students succeed, had an acumen for technology, and an eagerness to forego traditional lecturing and lesson plans and embrace the flipped approach.
- ▶ **Engage an instructional designer early in the design process.** ACC faculty members recommend bringing in an instructional designer

at the beginning to take the lead in developing the online modules.

- ▶ **Provide ample time to flip the course design before teaching it.** ACC faculty members recommend embarking on the redesign process at least one semester before teaching a course to ensure that instructors have time to prepare well. Due to time pressures with grant funds, the BIL team developed the modules, in-class activities, and assessments for Biology Fundamentals during the semester that it was first offered.
- ▶ **Commit to continuous improvement.** At the conclusion of each semester, the ACC faculty team reviewed student and faculty feedback and addressed concerns by revising and refining the modules and other course elements. On the other hand, the team members report they learned to recognize when flipped components were good enough to be considered final.
- ▶ **Provide paid release time for faculty team members and reassign their teaching responsibilities as needed.** Even with an instructional designer on board, it is important to give faculty members time off their regular duties when they are developing the content for modules and class sessions.

## Public Access to BIL Modules

Austin Community College will provide public access to all Biology Innovation Lab modules developed with TAACCCT grant funding from the U.S. Department of Labor. When the modules are considered final, ACC will post them to

module, see: . For a sample

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