May 2013

The Right to Educational Access:

USING ONLINE EDUCATION TO ADDRESS BOTTLENECK COURSES IN CALIFORNIA

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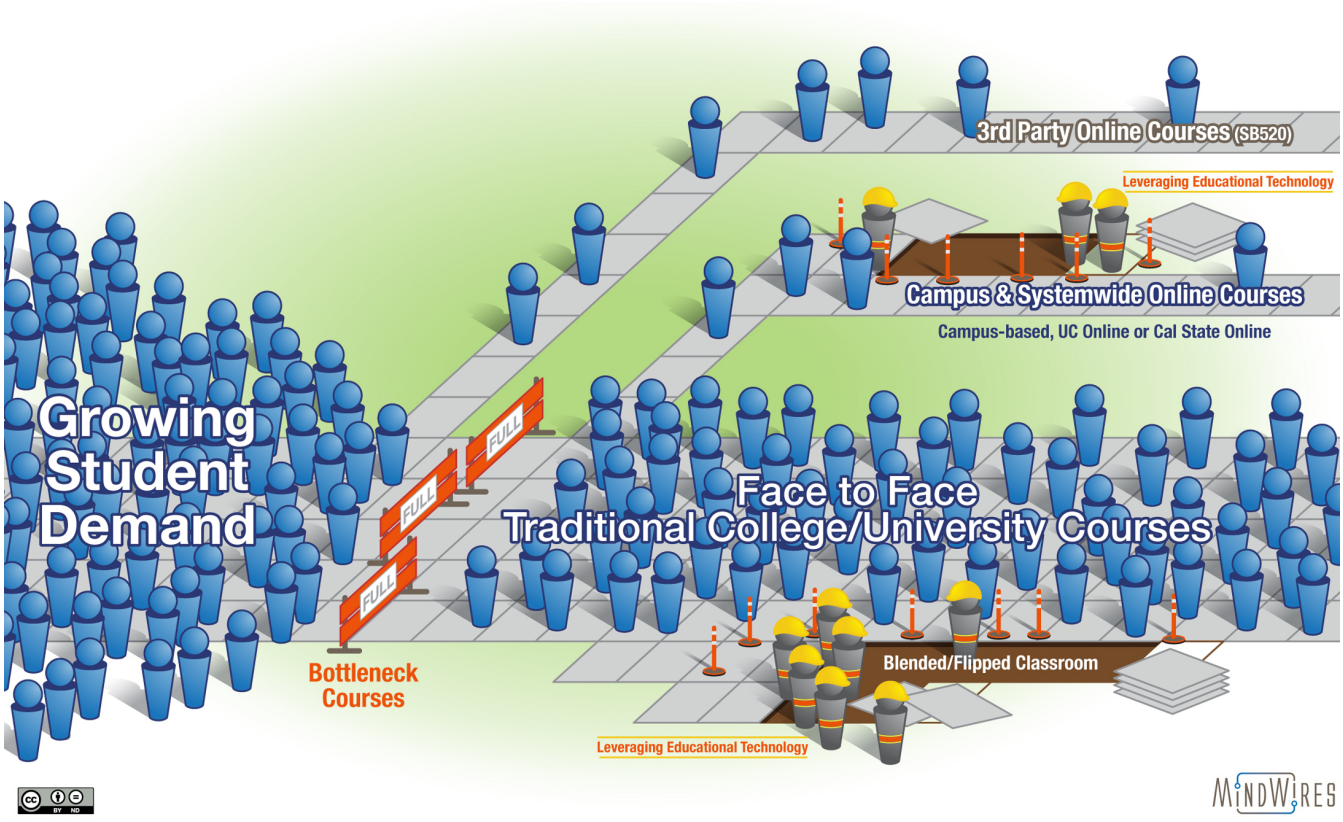
TWENTY MILLION MINDS FOUNDATION



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INTRODUCTION

When the Master Plan was adopted in California starting in 1960, the basic premise was to guarantee students a place within one of the three public systems based on their high school record. It was assumed that by having a place in a public institution, the student would have access to needed courses[1].

For various reasons, this assumption is no longer valid.

Both the Governor and the California State Senate have identified the problem of bottleneck courses as a serious problem that harms both students in the California public college and university systems and California taxpayers.

A **bottleneck course** is one that students are required to take in order to graduate but are overenrolled or unavailable during a reasonable schedule, and therefore, not available to the students when they need the courses.[2]

The consequences of such a bottleneck are varied and serious:

- Students who are not able to get into the course must stay in school an extra semester or more.
- Because financial aid often depends on a full course load, students will often take not just one extra class but a full semester of extra classes.
- Taking a full load of classes for an extra semester often means that students are prevented from entering the workforce and earning a full-time income for another semester.
- Students can be frustrated at the lack of course access and lack of progress and drop out.
- Tuition for in-state student is subsidized by the state; therefore, every student who stays an extra semester because of a bottleneck course problem costs the state taxpayers money.
- To the degree that the student's college costs are further subsidized by Federal financial aid, college-specific scholarships, or other public sources of money, the student adds further cost to taxpayers.
- To the degree that the student's college costs are covered by loans, the student goes further into debt.
- Students who do not graduate in a reasonable amount of time have a lower chance of graduating at all.
- Meanwhile, students who are slower to graduate means that there are fewer spaces available for students who want to get into college.

In short, bottleneck courses cost students money, drive them further into debt, and lower their chances of graduation. Bottleneck courses also force state and federal taxpayers to subsidize those students taking not one but multiple courses, most of which they do not need or want to take. And this problem prevents other students from being able to start their college education while doing so.

How big of an issue is the bottleneck course problem? While we do not have the data necessary to quantify it exactly, consider the following:

- As of 2010, 34.8% of students graduate California public baccalaureate colleges in four years, while 65.1% graduate within six years[3].
- As of 2010, only 25.3% of California community college students graduated within three years[4].
- Also in 2010, a survey of California community college students found that 20% reported difficulty in gaining access to required courses, while in 2012, as many as 80% of California community colleges reported wait lists for some classes[5].
- Programmatic funding per student in the 2012 California state budget is $5,447 for the community colleges, $12,729 for Cal State, and

$24,909 for UC[6]. The delay in student graduation adds to the state-subsidized costs of education.

- California colleges and universities currently have an average of 7,000 students on their waiting lists[7]. It is clear that the state systems are not meeting student demand.

These data points strongly suggest that bottleneck courses pose a serious moral and fiscal challenge that is worthy of the attention of the Governor and State Legislature.

The Nature of the Problem and the Role of Online Education

At its heart, the bottleneck course is the problem and online education presents an opportunity to address the problem - but it is not the only opportunity. As the bottleneck course is a resourcing problem, there are any number of non-technological solutions that could be adopted in addition to the application of online education. Several non-technological approaches to address the bottleneck course problem include increased state funding, re-allocation of faculty to focus more on lower-division courses, increased revenue from tuition increases, and broader articulation agreements to support concurrent enrollment and credit transfers.

That said, both the Governor and the Legislature have expressed an interest in exploring the degree to which educational technology in general and online learning in particular can be employed as a tool to address the bottleneck course problem.

The intention of this paper is to make recommendations for educational technology-enabled solutions as viable options without dismissing other approaches. To the contrary, our view is that any statewide framework for a solution should provide a mandate for the student right to educational access and a set of tools to help meet the mandate, while still empowering individual colleges and universities, as well as individual faculty members, to solve the bottleneck course problems in the ways that best suit their local needs.

Scope of Paper

While there are other potential benefits of online education - including expanding the number of students served and increasing revenue - we believe the state should focus on the bottleneck course problem first and ensure our public higher education systems serve matriculated students.

Educational initiatives should focus on the student, not the institution, and specifically on admitted students. Admitted students should have the right to get the lower-division courses they need, and if the school cannot provide the courses, there should be statewide access to either face-to-face or online courses to fill the same need.

This paper will focus on the application of state-driven online education initiatives to address the bottleneck course problem at the three public systems in California - California Community Colleges (CCC), California State University (CSU) and the University of California (UC).

Current Initiatives From Three Systems

California colleges and universities are no strangers to online education, at least at the individual campus level. While campus-based online education can be a valuable service for students, institutional collaboration across the state offers the greatest opportunity for addressing bottleneck courses[8].

While the following data points are based on distance education, note that approximately 9 out of 10 distance education courses are delivered online, via the Internet. These data points combine online courses offered to students off campus and on campus.

- Per the Chancellor's Office Distance Education (DE) Fact Sheet[9], approximately 28% of CCC students take at least one distance education course and 18% of all CCC courses are offered by distance education. This equates to roughly 41,000 DE course sessions within a calendar year. Of the

three systems, CCC has the greatest usage of online education at the campus level.

- Per the Katz and Associates study "Distance and Online Education in the CSU"[10], approximately 9% of all CSU for-credit courses are offered as distance education (combining full-time students with extended studies and continuing education). This includes 63 fully-online or hybrid programs (19 baccalaureate and 44 masters).
- Per the January 2013 Regents meeting[11], the ten UC campuses offer more than 2,500 online courses, but the vast majority are through extension programs for non-matriculated students. Approximately 114 online courses are offered for credit for matriculated undergraduate students, but of these, only 27 are available during the academic year.

Prior to 2010, all of the California efforts were based on campus or district-wide programs - there simply were not any online courses designed to be available outside of a home campus other than through the transfer process.

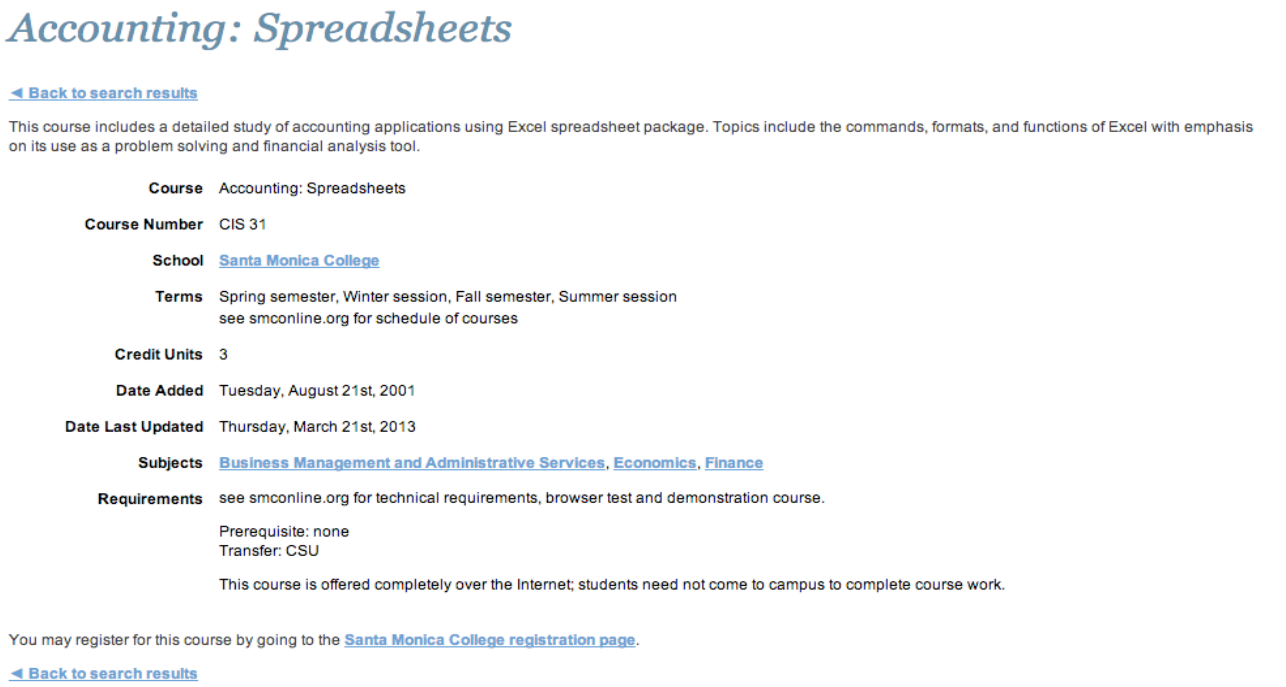
A key question to address, therefore, is: what online initiatives are the three systems (CCC, CSU, UC) providing and how do these initiatives address the challenge of bottleneck courses?

California Virtual Campus

The California Virtual Campus (CVC) was established in 1999[12] "to support development and delivery of online learning in California community colleges" at the individual college level. Over time, the mission of CVC has expanded to include system-wide products and services, and in 2009, the CVC mission further expanded to cover the CSU, UC and independent/private California colleges.

Today the online course portal - the CVC Catalog - forms the core of CVC's mission, and it "serves as a clearinghouse for information about distance education programs and courses". Prospective or current students can search for individual courses by keyword, college, subject area, and academic term.

There is no aggregation of data, however - the results are listed as specific courses offered by specific colleges or



Accounting: Spreadsheets

◄ Back to search results

This course includes a detailed study of accounting applications using Excel spreadsheet package. Topics include the commands, formats, and functions of Excel with emphasis on its use as a problem solving and financial analysis tool.

Course	Accounting: Spreadsheets
Course Number	CIS 31
School	Santa Monica College
Terms	Spring semester, Winter session, Fall semester, Summer session see smconline.org for schedule of courses
Credit Units	3
Date Added	Tuesday, August 21st, 2001
Date Last Updated	Thursday, March 21st, 2013
Subjects	Business Management and Administrative Services, Economics, Finance
Requirements	see smconline.org for technical requirements, browser test and demonstration course. Prerequisite: none Transfer: CSU This course is offered completely over the Internet; students need not come to campus to complete course work.

You may register for this course by going to the Santa Monica College registration page.

◄ Back to search results

Fig 1. Screenshot from CVC Catalog portal

universities - and there is no direct link to the course within the campus student information system. The results include a summary description of the course and schedule as shown in figure 1 above. The links do not take you to the specific course, just to the registration page of the appropriate college, and there is no process to streamline or support concurrent enrollment or ability to transfer course credits between colleges.

Cal State Online

In 2011 the Technology Steering Committee (TSC), comprised of campus presidents and Chancellor's Office staff, proposed the initiative that became CSU Online (since renamed Cal State Online). Cal State Online was operationally established later that year with the hiring of an executive director and the selection (in 2012) of Pearson as a services partner[13].

Based on the Sep 2012 board of trustees presentation[14] the mission of Cal State Online is to:

- Increase student access to CSU Programs;
- Facilitate success by leveraging technology;
- Centralize marketing and outreach efforts to make sure that students know about CSU-wide online options;
- Provide additional revenue for the campuses that can be used to support campus programs and priorities;
- Offer a central unit that powers outreach, marketing and technology support for online degree programs;
- Herald the University's name, reputation and quality programming in places well beyond the reach of the traditional campuses;
- Redefine and greatly expand the University's outreach and connection to its community;
- Centrally address the need for quality education online for students unable or unwilling to be in residence;
- Centralize and expand the University's position as a leading provider of superior online programs; and
- Future proof the CSU.

The initial and current focus is to leverage perceived strengths of CSU, including:

- The 50+ fully online self-support programs that currently exist; and
- The undergraduate degree completion program options which are focused on returning students and welcoming back students with strong CSU campus connections.

For the Spring 2013 term Cal State Online provided initial support of two baccalaureate degree completion programs (where the student needs to transfer in with 60 credits and then complete the degree online) and five master's level fully-online programs. Each program is offered and developed by a specific campus - Cal State Online plays the role of supporting the campus with appropriate services.

By Fall 2013, Cal State Online plans to have five baccalaureate degree completion programs and six master's programs[15].

None of these courses are available for students outside the host campus program - they are intended for students entering a fully-online program at a specific campus.

Course fees are based on $500 per credit hour, leading to a cost of $6,000 per semester for students in a fully-online program.

UC Online

UC Online (also known as UCOE for University of California Online Education) was created in 2010 with the

goal of expanding access to UC courses and creating new revenue for the system. The idea was to offer courses with the same quality standards as applied on UC campuses to new students, addressing the enrollment and revenue gaps due to state funding decreases.

UC Online also seeks to increase online offerings by specific campuses, thus helping time-to-degree for students at a particular campus.

Prospective UC students can take UC Online classes, and if admitted to a UC campus, have the credits accepted by the campus. These students form the basis of the mission to expand enrollment and revenue.

UC Online sought to fund itself primarily through external grants, but those grants have not materialized, leading UC Online to take out a $6.9 million loan from the UC system. Further plans for funding are based on revenue from non-UC students, and these plans include a $4.3 million investment in marketing[16].

However, as of Spring 2013, UC Online offered 14 courses, with 11 non-UC students registered for a course. As described by the Chronicle of Higher Education in October 2012[17], UC Online "needs to attract at least 3,000 non-UC students this year [2012-2013] and add 1,000 more each year until it reaches 7,000 non-UC students to pay back its loan on time, said DoQuyen Tran-Taylor, project manager for UC Online."

UC Online originally planned to offer 25 - 40 high-demand courses and allow UC students to take these for credit at their institution. Based on the current course catalog, there were only three courses listed for spring 2013 with seven courses proposed and awaiting faculty approval for future terms. Approximately 1,700 UC students have taken UC Online courses[18], primarily as offerings from their home campus.

According to the January 2013 Regents meeting, "21 additional UCOE supported courses are in development and 12 of their courses are the only online systemwide courses currently approved to be offered to all UC undergraduates". This information is not reflected on the UC Online website and its upcoming courses page[19].

From the Regents meeting:

> *"The Academic Senate is slated to consider an inter-UC articulation process patterned after the system already in place for course articulation between UC campuses and the California Community Colleges. Such a system would leave approval of courses in the hands of the home campus faculty for major or GE requirements when students take them from other UC campuses and would generate a searchable database of pre-approved courses linked to major or GE requirements so that the current staff- and time-intensive approval process could be replaced with a more efficient system. This* process *could apply to any systemwide course, including campus-developed online courses and offerings from systemwide programs.*
>
> *Finally, the infrastructure and processes needed to recruit, enroll, and support eligible non-UC students in for-credit UC courses have been developed by UCOE in partnership with Blackboard Services. The system is supported by UC Merced to provide enrollment and support services. Winter/spring 2013 will be the first major test of the marketability of approved systemwide courses to non-UC students. The infrastructure and processes developed for non-UC students provide the foundation for the systems and services needed to support UC student enrollment across campuses; e.g., the systemwide catalogue, cross-campus data transfers, and support services."*

These are noble goals, but the ability of UC Online to deliver is in question - particularly in terms of developing courses and cross-campus enrollment.

UC Online documents (official web site and discussion document for Regents' meeting) call out the problem.

- Web site: "While UC students have the opportunity to enroll in any UC course offered by another campus through the simultaneous enrollment process, access through this procedure will likely be very limited for UC Online courses during 2012-13. We hope to have alternative methods for enrollment in UC Online courses originating from other UCs available by fall, 2013."
- Regents meeting: "It is clear now that both the campuses and UCOE would benefit from an infusion of funding on a temporary basis to facilitate continued development. The cross-campus hub needs to be developed, and there is currently no budgeted fund source."[20]

Course fees range from $1,400 - $2,100 per course.

Summary

As currently designed, CVC and Cal State Online do not address the problem of bottleneck courses, while UC Online has yet to prove that it can hit its planned targets and become self-sustaining. In sum, initiatives at all three systems fall short of solving the access problem for bottleck courses.

- **California Virtual Campus (CVC)** is the statewide initiative originally formed to serve the CCC system. This initiative makes it easier for a student to find individual online courses at each campus, but the portal merely gives visibility across systems, it does not provide for the aggregation of course offerings or a centralized registration system . The only route for a student to benefit from the discovery of an online course at a different campus is through the transfer process.
- **Cal State Online** was formed by CSU, and targets full-online degree completion programs at the baccalaureate level and fully-online master's programs, for students who cannot or do not desire to attend classes on campus. There is no expressed intention from Cal State Online, based on official documents, to allow admitted CSU students to take these courses unless the students enter a fully-online program.
- **UC Online** was formed by UC, and is the only systemwide initiative designed to allow students to take online courses offered from another campus and help shorten time-to-degree, at least based on program plans. The problem with this initiative is that it has failed to meet its targets, and there are serious questions about the ability to become self-sustaining and deliver on the mission.

The state of California needs to be very targeted in its investments into online education to ensure that these investments address the problem of bottleneck courses.

Three Basic Approaches

By its very nature, the problem of bottleneck courses is centered on access and scale. Students need *access* to courses which tend to be in high demand and are overenrolled. These high-demand lower-division courses imply the ability to *scale* the course in a cost-effective manner, to meet the realities of budget and enrollment demands.

Face-to-face education has relied on large lecture courses, often with hundreds of students enrolled, to try and address this problem. Despite the prevalence of large lecture courses, this approach has proven inadequate, however, as a general solution to scale and access.

For the past century in higher education, the core concept of course design is that an individual faculty member, or occasionally a small team of faculty members, designs and delivers each course. There may be some guidelines and

policies from the institution, but after initial review of the course objectives and design, the course belongs to the faculty designing and teaching it. While there are many benefits to this model, there is a key challenge to consider.

How do you cost-effectively scale the course or program to provide greater access to more students given the explicit connection between course and faculty? There are three basic approaches to consider for California's three public systems, as depicted in figure 2 below.

1) Leveraging educational technology to increase capacity in traditional courses;

2) Using internal online providers to help scale across campuses at each system; and

3) Using 3rd-party online course providers to provide a safety valve.

In addition to the three basic approaches described above, there is a future consideration of promoting competency-based education and prior learning assessments.

Adjustment to Team Course Design

In many instances of at-scale online and blended education, a course gets replicated into multiple, relatively consistent sections in a repeatable manner. In this approach, instructional design teams – typically including multi-media experts, quality assurance people and instructional designers – work with faculty members and / or subject matter experts to design a master course. Once designed, the master course is replicated in multiple sections that can be taught or facilitated by multiple instructors, typically adjunct faculty. The faculty members that are part of the design can also be instructors for a couple of sections, but by-and-large the sections are taught by instructors who were not part of the design team.

This concept changes the assumptions on who owns the course, and it leads to different processes to design, deliver and update courses that just don't exist in traditional education. The implications of this approach or concept are significant. Because of these differences, there is in reality

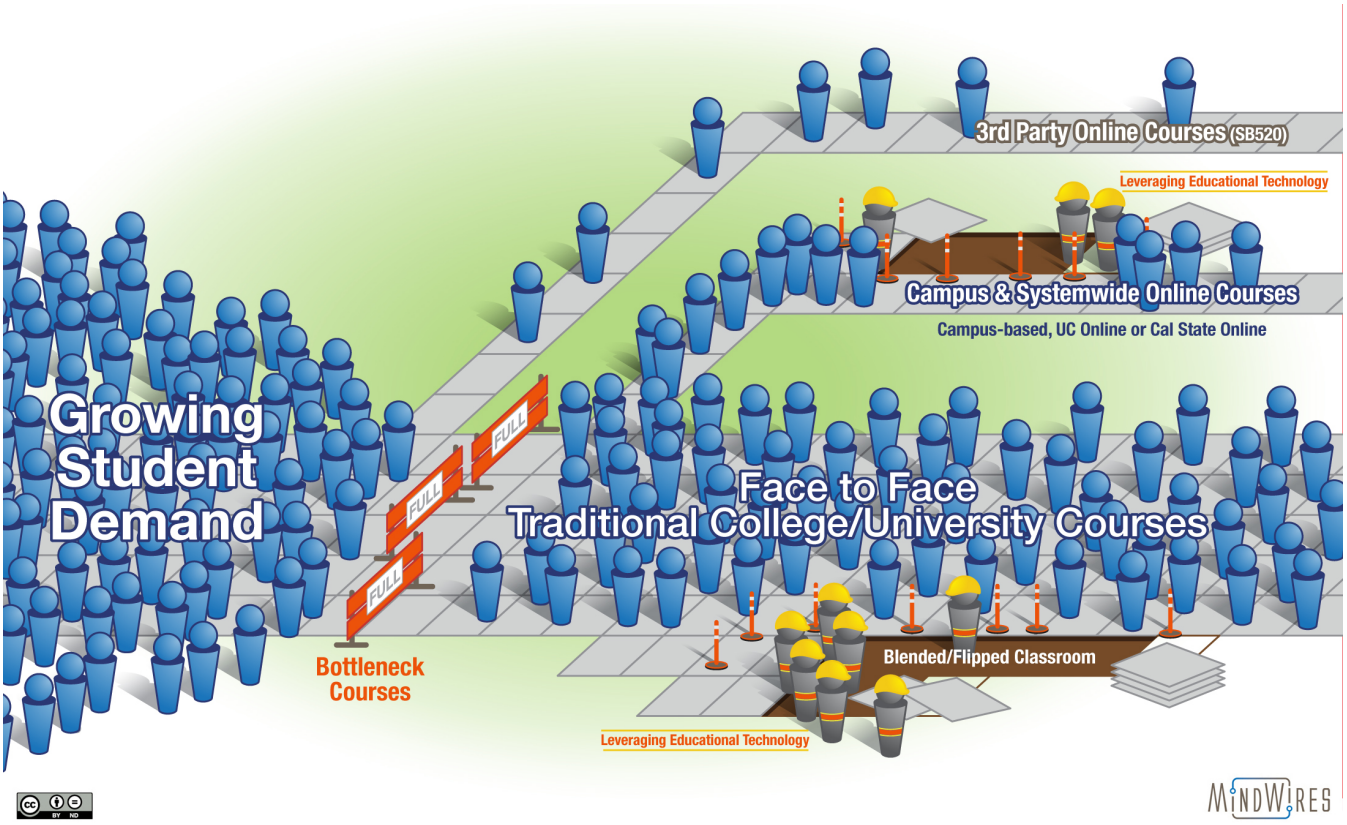


Fig 2. Providing multiple paths to help students

an institutional barrier that makes it difficult for institutions to cross without deliberate strategies.

It will be difficult for many faculty to adapt to this new paradigm. For those faculty wishing to participate in a team-based course design, they will need support. For those faculty not participating, we should expect some discomfort and pushback from the concept. In both cases, there should be deliberate support for faculty to understand the online education concepts, to allow them to engage in the conversations about future directions, and direct professional development for those faculty developing and instructing online and blended courses.

Increasing Capacity in Traditional Courses

The most promising usage of online educational technology that could increase the capacity of traditional face-to-face courses is to develop blended-learning approaches that combine the best of online and the best of face-to-face within a course.

Blended or hybrid courses, including the recent push for flipped classrooms, combine online and face-to-face class time in a structured manner. Although there are varying mixtures of content delivery and interactive activities in this approach, the logical extension is something called the "flipped classroom." The flipped classroom model involves courses that move the traditional lecture, or content dissemination, away from face-to-face hours and into online delivery outside of class time. The face-to-face class time is used for practice and actual application rather than for introducing the content being studied. The instructor then has time to help students face-to-face with specific problems. Flipped classrooms have been in existence since around 2000, but they have recently been gaining popularity in both higher education and K-12 institutions.

The common theme is to make face-to-face class time more effective, using it to provide much of the instructor feedback and interactive skills portion of a class while pushing content delivery into more-efficient online tools.

San José State University has made significant advances in blended courses based on their partnerhip with edX. Based on this success, the school announced the creation of the Center for Excellence in Adaptive and Blended Learning, the first project of which will be to teach faculty at 11 other CSU campuses how to use an edX course on circuits and electronics as the basis for a flipped class. As described in the LA Times[21], "early results found students in this blended class setting passed at a rate of 91%, compared to a 55% pass rate for students in the conventional class."

Beyond California, the National Center of Academic Transformation[22] led an effort for Program Course Redesign from 1999 - 2003 that worked with thirty institutions to demonstrate "how colleges and universities can redesign their instructional approaches using technology to achieve cost savings as well as quality enhancements". The redesign projects focused on high-demand, lower-division courses, "which have the potential of impacting significant student numbers and generating substantial cost savings".

The outcomes of this program were documented at EDUCAUSE Review in an article by Carol Twigg[23], citing several key findings:

- "Preliminary results show that all thirty institutions reduced costs by about 40 percent on average, with a range of 20 percent to 84 percent"; and
- "Consistent content coverage means that all students have the same kinds of learning experiences, resulting in significant improvements in course coherence and quality control".

More recently, the Open Learning Initiative through Carnegie Mellon University conducted a 2007 study looking at introductory statistic courses, replacing the traditional model with a blended approach. Based on an independent review by ITHAKA[24], they found that students

in the OLI classes "performed as well or better than students in traditional instructor-lead classes".

It's a short step from training faculty on how to flip a class using outside content to a "distributed flip," where those faculty members are sharing best practices with each other as they teach the same class using the same class using the same materials, and having their students interact with each other on the online discussion board.

Internal Online Providers for Statewide System

Given the faculty- and department-driven nature of many U.S. postsecondary institutions, the creation of **campus-based online courses and programs** is not at all surprising. Due to this often ad hoc nature, there are also myriad reasons for the online courses and programs, ranging from faculty exploration of the new medium to the specific needs of particular programs.

Faculty members teaching campus-based online courses are one of the most important yet overlooked sources of knowledge and experience regarding online education. Although ad hoc online courses and programs blazed the trail in what is possible, they are not typically designed to address bottleneck courses, as they are not designed for scale in terms of numbers of sections or students.

CCC in particular is a system with plenty of campus-based online courses - and in fact over one in four CCC students take at least one online course[25].

The non-profit organizations that have delivered online programs at scale have tended to be **entirely new organizations within a higher education system**. These new online organizations fit within the overall system governance, but the operations, budgets and academic oversight are typically provided by these unique organizations. Examples include Rio Salado College, University of Maryland University College, Colorado Community College Online, and Penn State World Campus.

One example of this approach is to partner with another organization who already has experience and capabilities to implement online courses at scale and the associated operations, while providing these courses through the traditional institution.

There is a burgeoning industry built around outsourced, for-profit service providers – companies that can outsource the adminitstrative, marketing, support and even instructional design services for an online program. The institution selects which services are most appropriate for the outside vendor to provide and which services should remain with the institution.

Recently **UC Online and Cal State Online** have been created, but as discussed in an earlier section they are not currently addressing bottleneck courses. There is no reason, however, that these organizations could not be re-purposed to directly target solutions for bottleneck courses, and this is one option to consider.

3rd Party Providers (Safety Valve)

The most common method over the past decade or two for institutions looking to increase scale and access has been to use separate organizations that will implement the online program. There is a rich history, dating from the late 1990s of outsourced organizations providing such programs.

With this history comes uneven success. The state of California and its higher education systems have been proud of the academic quality provided, and care should be taken that any outside organizations are chosen carefully for their quality standards and ability to work with the three public systems.

Perhaps the type of scaled course that is generating the most interest lately has been the Massive Open Online Course (MOOC). In one version – typified by edX, Coursera and Udacity – the course itself is scaled to enable thousands of students to take the course from the faculty members who both design and lead the course. This design process can include a full instructional design team, but

without the need to simply duplicate the course section itself multiple times.

The challenge for this 3rd party online provider approach is to ensure instructor - student interaction and support services that will help students succeed.

Rather than directly address the institutions and how they operate, a promising concept for 3rd-party online courses is Senate Bill 520 (SB 520) - the proposed legislation in California that would identify and approve a set of up to 50 online courses that the three public systems would accept as credit. This approach focuses on the student and (if successful), this approach will change the conversation. Admitted students would have the right to get the lower-division courses they need, and if the school cannot provide the courses, there will be a safety valve of online courses that the schools will accept for credit.

Recently, the SB 520 bill has been amended[26] to incorporate feedback from faculty groups wishing to improve the quality assurance aspects that are important to the state. The themes of the amendments are to:

- shift the approval of the pool of online courses from the California Open Access Resources Council (COERC) to the administration and faculty senates of the three systems (University of California, California State University, and California Community Colleges);
- tie the administration of the program to the California Virtual Campus;
- restrict each course to matriculated California public higher education and qualifying K-12 students;
- tie the provisions of the bill to funding in the Annual Budget Act; and
- focus quality approval processes through academic senates of the three systems.

This approach, while not directly addressing what any individual college or university should do, does change the risk / reward structure. It is well-known that high-enrollment lower-division courses are in fact some of the biggest money-makers for a campus. By having the availability of 3rd-party online courses, it is likely that campuses would eventually have greater motivation to expand access internally and provide the courses for more students who need them, as a method of retaining revenue.

If a school chooses to cut the seats available for these critical courses, there would be a financial cost to their decision in a way that does not exist currently. Right now, once the enrollment is set, the schools gets the same state revenue regardless of whether they provide courses or not.

There is a little-discussed issue in public higher education. Are public institutions offering the right mix of courses and programs based on student needs? The bottleneck course problem is not as simple as a course problem – it's also a curriculum problem.

The challenge, however, is to spark change in our higher education system without having outside parties (such as state government, accrediting agencies, online providers) micromanage what is essentially an academic-led decision on curriculum.

The goal behind the proposal of SB 520 is to provide an incentive system that avoids micromanagement – let the academic bodies lead curriculum decisions – but provides a risk / reward structure to help ensure student needs come first. Should schools decide to essentially outsource part of the lower-division curriculum while providing other courses not in such high demand? Yes, there are reasons to do so in many cases, and this should be a local campus decision. But if a school decides to use its resources this way, having a safety valve would reduce the likelihood that admitted students would be short-changed.

Prior Learning Assessment

Competency-Based Education

Both Prior Learning Assessments (PLA) and Competency-Based Education (CBE) are based on the notion of moving beyond using seat time as the foundation of college credit, and both are biased towards non-traditional working adults.

With the goal of improving time-to-graduation and ensuring students get the courses they need, one important approach is to eliminate the need for certain students who already have the requisite knowledge and skills from needing to take the class in the first place.

Prior Learning Assessment, or PLA, is a little-discussed strategy to facilitate time-to-degree, particularly for non-traditional students. The concept is to set up the structure and processes to evaluate corporate training from employment, military training, civic responsibilities, travel, and independent study and award academic credit from these out-of-the-classroom learning situations. As the higher education population diversifies with much higher percentages of working adults, PLA can be an important factor in reducing total cost and time-to-degree.

In 2010 the Council For Adult & Experiential Learning (CAEL) published a study[27] that was funded by the Lumina Foundation. One of the key findings was that "PLA students had better academic outcomes, particularly in terms of graduation rates and persistence, than other adult students", and that "Many PLA students also shortened the time required to earn a degree, depending on the number of PLA credits earned".

And for this same student population - primarily working-age adults with prior working experience -there are similar methods to fill in the holes of a program where they do not have the requisite knowledge and skills. This is the role of Competency-Based Education.

Competency-based education is based on the broader concept of Outcomes-based education (OBE), one that is familiar to many postsecondary institutions and one that forms the basis of many current instructional design methods. OBE works backwards within a course, starting with the desired outcomes (often defined through a learning objectives taxonomy) and relevant assessments, and then moving to the learning experiences that should lead students to the outcomes. Typically there is a desire to include flexible pathways for the student to achieve the outcomes.

OBE can be implemented in various modalities, including face-to-face, online and hybrid models.

Competency-based education is a narrower concept, a subset or instance of OBE, where the outcomes are more closely tied to job skills or employment needs, and the methods are typically self-paced. There are explicit learning outcomes with respect to the required skills and knowledge (standards for assessment), and adaptable programs to enable learners different paths to achieve the required outcomes.

For these self-paced CBE initiatives, which are the subject of recent growth in adoption, the current implementations of CBE tend to be[28]:

- Fully-online;
- Self-paced;
- Flexible to allow for retaking of assessments until competency demonstrated; and
- Flexible to allow passing of assessments up front and not even need instruction / activities, thus allowing credit for life experiences or prior learning assessments (PLA).

Both of these interdependent concepts are excellent approaches to improving time-to-degree for non-traditional working-age students.

Focus on Student Rights and Perspectives

Given these four approaches that California's public higher education systems have available to address bottleneck courses, where should the state begin? There are important questions or organizational priorities for the three systems as well as faculty autonomy to consider. Unfortunately, much of the public discussion of online education issues has tended to focus on organizational needs or advocacy for the power of technology. Often what is lost in the shuffle is the perspective from those who are most impacted - the students.

The key to addressing bottleneck course problems is to consider a new right for admitted students to have access to the courses they need. Rather than starting from the institutions and how they operate, the opportunity California higher education leaders and state government leaders have is to start from the perspective of the student's rights and needs and then define institutional incentives to ensure those rights are preserved.

The Right to Access

Students enrolled in California public colleges and universities should be guaranteed timely access to the core courses that they are required to take in order to graduate. Given that there are a variety of ways in which the institutions could meet this obligation, the state should avoid being overly prescriptive about the method. Rather, it should supply the mandate for educational access, support institutions in meeting this mandate, and provide a safety valve to ensure the mandate's right is preserved.

Regarding support for the mandate, the state can provide faculty and institutions with funding, training, and other resources for helping them solve the bottleneck problem locally and organically. We will make recommendations in this regard later in this paper.

The safety valve should be a mechanism consistent with the broad goals of California SB 520. If a school fails to support the student right of timely access to crucial required courses, then the students should have the right to take courses from a state-approved third party and receive credit for that course. And the burden of paying any extra costs involved should fall to the institution rather than the student.

Given the mandate to support a student right to educational access and support for that mandate, institutions and statewide systems can and should play a central role in applying their considerable experience and creativity to craft solutions based on local needs and diverse student populations. Despite some of the public rhetoric, no realistic solution to bottleneck courses should bypass the local faculty and their knowledge of student needs.

At the same time, the local politics of the individual institutions should not be allowed to take precedence over the students' right to access. For this reason, the support of local solutions and the administration of the safety valve provision must be treated differently from each other. The support of local solutions, which should always be the preferred approach, should focus on providing campuses with maximum support and autonomy to meet access goals. The safety valve, which is the solution of last resort, should ensure that students are guaranteed access to courses regardless of campus limitations or local politics.

Beyond Access: The Right to Quality

It is important to remember the real goal of using online education to address bottleneck courses here. It is not to offer students seats in courses. It is to get students to complete those courses successfully so that they can complete their programs more quickly. While California cannot guarantee student success, the state can put in place provisions that guarantee students access to the kinds of support that are known to increase the likelihood of student success. This includes taking care to preserve existing campus support networks when bringing in new solutions —particularly solutions implemented by third parties—as well as taking care to provide students with extra support when it is needed. These considerations are important for

locally developed solutions, but they are especially important for safety valve solutions where some of the traditional campus support and quality control mechanisms may be circumvented to achieve greater accessibility.

Targeting appropriate students for online solutions

Online education classes typically require more self-discipline, better reading skills, and better awareness of when to seek help than traditional classes do. Offering an online class to a student who otherwise would be shut out altogether is often better than nothing. But we need to recognize that we are already starting with a solution that has its challenges for achieving a goal of high completion rates, even if everything else is equal. Not all students are equally well-prepared for online learning, and pushing students who are likely to fail into an online course may, in fact, be worse than the status quo. Online courses are not a panacea. Students will need help in evaluating whether online is appropriate for them. And if it is not, those students should be given priority access to the traditional on-campus or blended courses.

Wisconsin's eCampus provides a valuable model in their approach to informing students about the online course options in a neutral manner[29] - seeking to inform and qualify students rather than purely marketing the online courses. This type of qualification approach is crucial to student retention, and it is the basis for the New America Foundation recommendation[30] to "Institutions and state systems should provide support and retention efforts given the attrition problems that can occur with online course-taking".

Preserving the campus support network

In a traditional course, faculty on campus are able to talk to each other and to support staff such as student advisors in order to best meet the needs of particular students. This can happen with online courses too; many fully online programs include online advising and even provide Customer Relationship Management (CRM) software so that all of the staff who interact with a given student can share insights and keep track of is working with the student on what. However, once third-party course vendors are brought into the picture, it is easy for this support network to be severed. Any legislation supporting the use of third-party vendors should account for the fact that support of student success goes beyond the work of individual faculty members behind closed classroom doors and take steps to ensure that the students' support network in their home institutions are able to continue providing students with the support they need. This is a complex problem, since it can potentially involve sharing private student data with the private corporations that are providing the courses. A balance will need to be struck between privacy and support for success. But at the very least, the students' home institution should have timely access to information about their progress during the course, as well as early warning of any problems that might result in the student failing or dropping the course.

Timely course access

A third issue is primarily relevant to the safety valve provisions. According to the early drafts of SB 520, students are only eligible for third-party courses once it is determined that no such courses are available on their home campus. But the bill is unclear about when the determination of eligibility would be made. Every week of class that the student misses while waiting for the question to be resolved lowers the student's chances of passing the course. Likewise, every week that goes by before financial aid, which is determined in part by course load, can be distributed, may be a week when students cannot afford to buy the textbooks and therefore lowers their chances of success. More generally, the workflow for the students—from deciding that they need to take a special course to determining whether those courses are appropriate to registering and receiving financial aid for those courses—must be addressed. Courses that are theoretically available but practically inaccessible are not consistent with supporting the students' right to access.

Metrics - How Will We Know?

For any state government investment and attempt to influence public higher education, it is critical to get beyond the level of hype and platitudes. The state needs changes that are effective, and there should be a systemic capability to learn which efforts are working, which are not, and which adjustments are warranted. There should be a reasonable set of top-level metrics to inform this process.

Before going too far, however, it is also important to apply metrics with care. There are hard and soft measurements for any strategic initiative not everything can adequately be measured with hard data. In particular, student learning is difficult to measure with simple metrics. The state should take care and apply metrics judiciously and appropriately.

Focus on Student Outcomes

The problem at hand is bottleneck courses and their impact on student degree completion. The key metrics should be based on desired student outcomes. Did they successfully complete the bottleneck course? How many courses are overenrolled and unavailable to students? Are the online initiatives impacting student time-to-degree or time-to-transfer?

There are new efforts nationwide[31] and statewide based on a scorecard approach - making information on institutional performance for student completion available and accessible online. CCC has just released its statewide scorecard[32]. There is much to commend in these efforts, particularly in their transparency, ease of access for each institution, and breakdown along demographic lines (ethnicity, full-time or part-time, and remedial status). The data for this last item - remedial status of students - is crucial, given the number of unprepared students entering college in California.

However, the measurements in the CCC scorecard have some flaws. Why are measurements based on 6-year completion rates for degrees or transfers at the community college level? While it would be naive to pretend that all students see community college as a 2-year degree or transfer, measuring only 6-year data is an acceptance of the status quo.

Short term, higher education institutions and systems should collect 2-year, 4-year and 6-year data for community colleges (2-year only for full-time students), and 4-year and 6-year for CSU and UC undergraduates. Long term, there should be a shift to collect information from students on their desired goals: 2-year degree, 4-year transfer, unknown, 5-year degree, etc. These student records would be easy to add to student information systems and could be updated annually by students. This method would allow a more direct measurement of how well our public institutions enable students to meet their educational goals.

Additional Considerations

When getting into the world of online education, particularly for open education models such as MOOCs, there are additional dynamics at play. Namely, it is not safe to assume that all students have the same goals. In fact, there appears to be five different student types emerging within MOOCs[33] and open online courses: No-Shows, Observers, Drop-Ins, Passive Participants and Active Participants. This variety of student types is a strength, not a weakness, of open education.

The subset of online students of particular interest to this report are Active Participants - those who desire to complete the course and receive credit. Online providers planning to work with the state should collect and publicly share this information.

Since the problem is bottleneck courses, per se, and not online education (the means to an end), there is a parallel need to collect and report on the same data for face-to-face bottleneck courses.

Key Metrics to Collect

The recommended metrics to measure progress on bottleneck courses include the following:

- Waitlist data (number of students per course and per institution) for high-enrollment lower-division courses
- Completion rates for all bottleneck courses, both for face-to-face and online versions, normalized for demographics such as remedial status and student preparation
- Degree-completion rates for 2-year, 4-year and 6-year periods for CCC, 4-year and 6-year for CSU and UC
- Transfer rates for 2-year, 4-year and 6-year periods for CCC
- Degree and transfer completion against student goals

RECOMMENDATIONS

The scope of this position paper is an analysis and set of recommendations on the "application of state-driven online education initiatives to address the bottleneck course problem at the three public systems in California". In particular, we should address the question of of how the state could most effectively invest the proposed $37 million in funding, above and beyond the increased general funding to the three systems[34].

The key aspect for increased online education is to create and support a new right - for matriculated students to have access to the courses they need to complete their degrees.

Towards achieving that goal, we recommend the following:

General Issues

1) **Maintain Focus -** The state government should remain in a supporting role - provide funding, provide incentives, and require accountability from the systems on use of funding. The additional funding and public pressure do not replace the general budget funding, and it should be used selectively to maintain the greatest effect. While there are other laudable goals for online education options in public higher education systems, the state should invest additional funds to support only those online programs that measurably address bottleneck course problems.

2) **Develop measurable goals -** Measuring both the size and the impact of bottleneck courses can be difficult, but it is also essential to ensuring that the state's investment pays off. Likewise, it will be important to measure student completion and other success measures for any non-traditional solutions to bottleneck course problems, including but not limited to safety valve programs. The state should work with the systems to identify a small number of practical success measures and then provide funding necessary to implement the data collection to track these measures.

3) **Ensure that students have access to support services and academic mentoring -** As described by the multiple studies[35][36][37], a crucial aspect of successful online programs is to provide support and retention services for students taking online courses. This is especially important for any systemwide initiatives where the student's home institution may not have the knowledge or resources to help the student taking a course originating outside the institution. For example, campus advisors should receive alerts when their advisees sign up for third-party courses as well as when those students are in danger of failing to complete those courses.

Increasing Capacity in Traditional Courses

4) **Foster a culture of experimentation and craft among faculty -** Campus faculty should be encouraged to learn about how they can incorporate technology to solve educational problems and be empowered to develop their own solutions for their campus' bottleneck course problems. To this end, the state should fund a broad grant

program in which faculty develop pilot bottleneck course solutions. Participants should be led through a development process using educational technologies that exposes them to a range of technology-supported course design options.

5) **Encourage the implementation, dissemination and broader adoption of faculty-developed solutions -** When good bottleneck solutions are developed by faculty, either through the grant program or through other means, every effort should be made to see that they are implemented locally and adopted broadly. Knowledge of and experience with solutions developed to teach with quality at scale should be recognized as an essential part of California faculty's professional development.

Internal Online Providers for Statewide Systems

6) **Avoid the trap of treating all three systems with the same solution -** Each of the three systems has a distinct mission and student population, and care should be taken to craft different solutions based on the systems' needs.

7) **Identify and support an organization to share best practices at California Community Colleges.** While CCC has expanded its use of online education already, there is little support for the campuses to share best practices in course design. The state should consider a model similar to Tennessee's Regents Online Campus Collaborative (ROCC)[38], which provides peer review of onine courses and dissemination of best practices[39]. CVC seems the most likely organization to provide these services, but its charter and organization would have to adapt to the new mission.

8) **Review the missions of CVC, Cal State Online and UC Online -** CCC, CSU and UCleaders, with the encouragement of the state, should consider adjusting the CVC and Cal State Online missions to directly focus on the bottleneck course problem. For CVC, there would need to be expansion of services beyond a catalog to include transfer articulation agreements and cross-campus registration of common courses. For Cal State Online, there would need to be a change in model to support the provision of online courses that are not necessarily part of a fully-online program. UC Online would need to shift its priorities to accelerate the development of lower-division courses.

3rd Party Providers (Safety Valve)

9) **Provide a "safety valve" of outside provision of credit-bearing, transferable online courses** by filling gaps to allow SB 520 to succeed. To achieve the key balance we envision - enabling and supporting faculty to create local solutions while keeping in mind the student right to have access to needed courses, there is an implied two-tiered course selection system.

10) **Provide a multi-level course approval process for SB 520 -** Whenever possible, faculty should retain oversight of quality. The initial list of approved safety valve courses should therefore be reviewed by a faculty-driven mechanism, which can be set up through the academic senates. However, since access should be a student right, there must always be some safety valve option. Therefore, in the event that the faculty-driven process is not able to recommend adequate provisions, an administrative body should review any gaps in the list and ,where solutions are inadequate, either fund development or partnership to provide the necessary courses or select contingency solutions until such time as a faculty-approved alternative can be provided.

11) **Reduce the bottleneck course problem by reducing the number of students who need to take bottleneck courses -** The state should support individual campuses experimenting with competency-based education or prior learning assessments. We are not yet in a position to leverage successful pilot programs in this area, so the focus should be on supporting local innovation. At the statewide level, New York's Empire State College has been a leader in developing this model, leading to the SUNY REAL (Recognition of Experiential and Academic Learning)[40] program.

Funding and Sustainability

12) We also believe, however, that the three public systems need to take a longer-term perspective and establish organizational models to encourage effective use of online education. California is behind other states, but there is no reason we cannot learn from others and harness the resources of the state to once again take a leadership position on this important subject. Therefore, beyond the recommendations provided here for short-term action, we strongly believe that California should **study other established statewide models for online** such as New York's Open SUNY[41], Penn State's World Campus[42] and Tennessee's ROCC[43]. All three examples provide viable models to foster collaboration in online and blended learning, including key issues such as course discovery and transferability. California should form a group to study these models, including in-person meetings, and make recommendations for California adoption.

13) **Provide adequate funding** - The Governor's budget proposes $37 million for additional support of online education. It is worth considering whether this amount is proportionate to the need given the recommendations of this paper. We believe that the amount is roughly appropriate to fund the first stages of the safety valve provisions alone, the bulk of which would go to developing a state-wide registration system and building capabilities for campus support networks to receive information relevant to student success from third-party course providers. (The capacity built in these areas will also be useful for supporting students taking bottleneck courses from other California state schools, whether online or on campus.) For building campus capacity, appropriate additional funding would be in the range of $20 million to $25 million, the majority of which would go to providing Phase 1 grants for development of hybrid of fully-online courses by campus faculty and a smaller number of larger Phase 2 grants for adoption of courses across multiple campuses. The cost for building system- or statewide capacity to address bottleneck courses through programs such as UC Online, Cal State Online, or California Virtual Campus is likely also somewhere in the $20 million to $40 million range. However, it is also much further than the other two from being "shovel-ready." For the current budget year, we recommend sufficient funding to study state-wide programs in other states and propose a plan. The budget for this first step is more likely to be in the hundreds of thousands of dollars rather than in the millions.

Conclusion

We believe that California has a real problem with bottleneck courses and a real opportunity to address the problem. Matriculated students in our public higher education systems should have the right to access courses needed to complete their degrees, and accessible, scalable online education - when properly designed and supported - can be an important component in the state's ability to deliver on its promises. The recommendations in this paper are meant to help pave a path forward with changes that can impact students in the next few years.

What we hope to have provided is a framework that addresses the bottleneck course problem at several levels. This framework acknowledges the need to expand access at the local college and course level and at the systemwide level, while providing a safety valve of 3rd party online courses to ensure that students have the right to access needed courses.

Notes

1 As described in http://ucfuture.universityofcalifornia.edu/documents/ca_masterplan_summary.pdf, the Master Plan created the framework of the three systems with interdependent missions, and established the principle of universal access based on high school graduation rankings.

2 Another type of bottleneck course is based on high-enrollment with low pass rates, but we are focusing on the course availability issue in this paper.

3 See The Chronicle of Higher Education's college completion data: http://collegecompletion.chronicle.com/state/#state=CA&sector=public_four

4 See The Chronicle of Higher Education's college completion data: http://collegecompletion.chronicle.com/state/#state=CA&sector=public_two

5 Key statistics provided to media during introduction of SB 520, such as seen in this Times Herald article: http://www.timesheraldonline.com/news/ci_22787735/more-online-college-courses-would-break-bottleneck-senate

6 See the Legislative Analyst's report on the 2013-2014 California higher education budget: http://www.lao.ca.gov/analysis/2013/highered/higher-education-021213.pdf

7 Key statistics provided to media during introduction of SB 520, such as seen in this Times Herald article: http://www.timesheraldonline.com/news/ci_22787735/more-online-college-courses-would-break-bottleneck-senate

8 The New America Foundation report summarizes a key trend in getting campuses within a system to collaborate on online programs: http://www.newamerica.net/sites/newamerica.net/files/policydocs/FINAL_FOR_RELEASE_STATE_U_ONLINE.pdf p 8

9This Chancellor's Office fact sheet provides useful statistics on CCC: http://californiacommunitycolleges.cccco.edu/Portals/0/KeyFacts/FACT_SHEET_DistanceEducation_FINAL_030513.pdf

10 Katz and Associates was chosen as a consultant for CSU during the research and setup of the Cal State Online program, and this is one of their delivered reports: http://panopticon.csustan.edu/CalStateOnline/CSU%20History%20of%20Online%20Learning%20at%20CSU.pdf

11 This document provided background for the January 16, 2013 regents meeting: http://regents.universityofcalifornia.edu/regmeet/jan13/e2.pdf

12 This flyer from the California Educational Technology Collaborative summarizes the services of CVC: http://cccetc.org/documents/take_ones/cvc.pdf

13 See the Pearson press release http://www.pearson.com/news/2012/august/california-state-university-selects-pearson-to-launch-cal-state-.html

14 See Cal State Online presentation to Board of Trustees Sep 2012

15 See Cal State Online Program Launch Report

16 This article from the San Francisco Chronicle from February 2013 describes the poor results of UC Online in terms of recruiting non-UC students: http://www.sfgate.com/education/article/UC-online-courses-fail-to-lure-outsiders-4173639.php

17 This article from the Chronicle of Higher Education from October 2012 describes the poor results of UC Online in terms of recruiting non-UC students: http://chronicle.com/article/UC-Online-Faces-Challenges-in/134778/

18 From University of California Office of the President site as of January 2013: http://www.ucop.edu/uconline/_files/uc_online_fact_sheet.pdf

19 From a live web site (may change without notice): http://www.uconline.edu/upcoming-courses/

20 This document provided background for the January 16, 2013 regents meeting: http://regents.universityofcalifornia.edu/regmeet/jan13/e2.pdf

21 This article in the LA Times from April 2013 describes a press event from SJSU and their expansion of the edX pilot project: http://articles.latimes.com/2013/apr/10/local/la-me-ln-college-online-20130410

22 NCAT studies from 2005 summarizing their work with online and hybrid courses http://www.thencat.org/PCR/Proj_Model.htm

23 In the October 2003 issue of EDUCAUSE Review, NCAT director Carol Twigg described the project work and its promising results http://net.educause.edu/ir/library/pdf/erm0352.pdf

24 OLI website data summarizing results of their research into designed hybrid courses http://oli.cmu.edu/get-to-know-oli/see-our-proven-results/

25 Key fact "Nearly 27 percent of all California community college students will take a class offered through distance education this year, up from 12.5 percent in 2005-2006" from http://californiacommunitycolleges.cccco.edu/Portals/0/KeyFacts/FACT_SHEET_DistanceEducation_FINAL_030513.pdf "

26 See http://mfeldstein.com/amendments-of-california-sb520-bill-for-online-courses/ for summary of changes and specific edits to SB 520 as of April 2013.

27 This CAEL report is the most concise summary of research and issues into competency-based education and prior learning assessments, focused on adult learners: http://www.cael.org/pdfs/PLA_Executive-Summary

28 See description, much of it based on work by SPT Malan, in http://mfeldstein.com/competency-based-education-a-primer-for-todays-online-market/

29 Summary on live website of eCampus program support http://ecampus.wisconsin.edu/getting-started/online-education-advisor.aspx

30 See p 24 of http://newamerica.net/sites/newamerica.net/files/policydocs/FINAL_FOR_RELEASE_STATE_U_ONLINE.pdf

31 The most recent and public of the efforts for a scorecard approach came from the White House in early 2013 http://www.whitehouse.gov/issues/education/higher-education/college-score-card

32 This public scorecard from CCC was released in April 2013 http://scorecard.cccco.edu/scorecard.aspx

33 In this blog post, the author describes a new typology of students within open education courses: http://mfeldstein.com/emerging-student-patterns-in-moocs-a-revised-graphical-view/

34 See pp 38-39 of: http://www.ebudget.ca.gov/2013-14/pdf/BudgetSummary/HigherEducation.pdf

35 The Community College Research Center (CCRC) has been studying issues such as online education for two-year colleges: http://ccrc.tc.columbia.edu/media/k2/attachments/online-learning-help-students.pdf

36 The New America Foundation report from April 2013 describes a framework for statewide collaboration in public higher education systems to achieve online education efficiencies and student outcomes: http://www.newamerica.net/sites/newamerica.net/files/policydocs/FINAL_FOR_RELEASE_STATE_U_ONLINE.pdf

37 This qualitative study used a modified three-round qualitative Delphi technique to explore needs of online students to improve retention: http://www.westga.edu/~distance/ojdla/winter134/heyman134.html

38 Live website of Tennessee's Regents Online Campus Collaborative (ROCC): http://www.rodp.org/

39 The New America Foundation report from April 2013 describes a framework for statewide collaboration in public higher education systems to achieve online education efficiencies and student outcomes: http://www.newamerica.net/sites/newamerica.net/files/policydocs/FINAL_FOR_RELEASE_STATE_U_ONLINE.pdf pp 31-33

40 This press release from Empire State College describes the $500k award from the Lumina Foundation: http://www.esc.edu/news/releases/2012/lumina-500k.html

41 For a more thorough description of the Open SUNY initiative and statewide system support, see http://mfeldstein.com/open-suny-a-game-changer-in-the-making/

42 Live website of Penn State's World Campus program: http://worldcampus.psu.edu/

43 Live website of Tennessee's Regents Online Campus Collaborative (ROCC): http://www.rodp.org/