

The Regents of the University of California

**COMMITTEE ON EDUCATIONAL POLICY**

January 16, 2013

The Committee on Educational Policy met on the above date at UCSF–Mission Bay Conference Center, San Francisco.

Members present: Regents Gould, Island, Kieffer, Lozano, Newsom, Reiss, Rubenstein, and Stein; Ex officio members Brown, Lansing, and Yudof; Advisory members Feingold, Flores, and Jacob; Staff Advisors Barton and Smith

In attendance: Regents Blum, De La Peña, Makarechian, Mendelson, Pattiz, Ruiz, Schilling, Varner, Wachter, and Zettel, Regent-designate Schultz, Faculty Representative Powell, Secretary and Chief of Staff Kelman, Associate Secretary Shaw, General Counsel Robinson, Chief Investment Officer Berggren, Chief Compliance and Audit Officer Vacca, Provost Dorr, Executive Vice President Brostrom, Chief Financial Officer Taylor, Senior Vice Presidents Dooley and Stobo, Vice Presidents Allen-Diaz, Beckwith, Lenz, Mara, and Sakaki, Chancellors Block, Blumenthal, Desmond-Hellmann, Katehi, Khosla, Leland, and Yang, Acting Chancellor Conoley, and Recording Secretary McCarthy

The meeting convened at 9:15 a.m. with Committee Chair Reiss presiding.

President Yudof introduced University of California Student Association (UCSA) president Raquel Morales, a senior at UC San Diego.

Ms. Morales stated that, following years of State budget cuts to UC and tuition increases, students were pleased that Governor Brown has made the University a high priority in his budget and was committed to work with students to ensure the affordability, accessibility, and excellence of the UC system. Students were particularly pleased that there would be no undergraduate tuition increase in 2013-14. Nonetheless, UC has suffered from years of deep cuts in class offerings, departments, faculty, staff, and student services that need to be restored.

Ms. Morales reported that UCSA favors the immediate prioritization of support for UC's graduate students in the 2013-14 budget. She urged the Regents to work with students to advocate for sufficient State or other funding to avoid any increase in professional degree supplemental tuition.

UCSA supports finding a long-term dedicated funding solution for the University, such as an oil severance tax, to reestablish a fully funded University that would carry out the California Master Plan for Higher Education. Students would maintain their advocacy in Sacramento. Ms. Morales stated that UCSA also favors refocusing the University's resources on its core mission. She thanked Governor Brown for his interest and engagement on these issues and for his openness to student input.

Ms. Morales stated that UCSA supports online education as long as it would be used to supplement and not replace traditional courses, and if there is clear evidence that online courses would not diminish the quality of UC students' educational experience. UCSA supports pilot online education programs, but Ms. Morales emphasized the importance of student input and evidence-based decisions. UCSA does not support the use of UC online education courses to gain revenue from non-UC students. She expressed UCSA's concern about the effect of online courses on UC's teaching assistants and the possibility of higher student technology fees.

Ms. Morales stated that UCSA supports sustainability as a high priority for the University, since UC is one of the state's largest employers and landowners, with a large effect on the environment and economy. UCSA urges UC to continue efforts to increase sustainability, including recycling, no-waste events, environmentally friendly construction, and higher standards for energy efficiency.

Ms. Morales expressed UCSA's concern about UC's level of faculty diversity. The University exists in one of the most diverse places in the world and as a public university has a special mission to serve the whole population of California. UC's faculty should reflect the diversity of California. UCSA supports increased disaggregation of data regarding faculty diversity, both by more specific ethnic groups and by campus. UCSA also supports clear goals for faculty diversity, particularly for women and underrepresented minorities, along with realistic plans to achieve those goals. She conveyed UCSA's concern that so little progress in increasing Chicano/Latino faculty had been made in the past five years.

**1. APPROVAL OF MINUTES OF PREVIOUS MEETING**

Upon motion duly made and seconded, the minutes of the meeting of November 14, 2012 were approved.

**2. ANNUAL ACCOUNTABILITY SUB-REPORT ON DIVERSITY AT THE UNIVERSITY OF CALIFORNIA**

[Background material was mailed to Regents in advance of the meeting, and a copy is on file in the Office of the Secretary and Chief of Staff.]

Committee Chair Reiss affirmed the commitment of the Regents, the President, and the chancellors to increasing the diversity of UC's students and faculty. She stressed the importance of determining which programs have been most effective in this effort so that strategic decisions can be most productive.

Provost Dorr stated that her office shared the Regents' desire to increase faculty diversity and find the best means to do so. She noted that this annual report on diversity at the University would focus on faculty diversity. She reminded the Regents that the University of California 2012 Accountability Report contains much relevant information about diversity. She noted the contributions of Interim Diversity Coordinator Jesse Bernal and UC Office of the President (UCOP) institutional research and academic personnel staff to this report and to the University's efforts to increase diversity.

Ms. Dorr displayed a slide showing UC's ladder- and equivalent-rank faculty diversity in the fall of 2011 and that of UC's Comparison Eight universities. UC's percentages of self-identified underrepresented minority and women ladder- and equivalent-rank faculty were higher than the averages of this comparison group, and second highest in both categories. While these results were good, Ms. Dorr acknowledged that the data were not outstanding, either for the Comparison Eight group or for UC, who all need to do more to diversify the pool of Ph.D. students. UC and similar research institutions search nationally and internationally, competing for the same candidates who must be outstanding in research, teaching, professional activity, and service. If every institution increased the diversity of its Ph.D. candidates, it would help all research universities increase their faculty diversity by expanding the pool of candidates. Ms. Dorr expressed her view that UC had particular advantages that it should accentuate in recruiting diverse faculty. For instance, UC campuses are located in places with very diverse populations and lifestyles, excellent weather, and many opportunities for a satisfying personal life.

Ms. Dorr displayed another slide indicating how UC ladder- and equivalent-rank faculty self-identified in race, ethnicity, and gender, and by domestic and international categories. The criteria used to identify international faculty have shifted. The previous criteria, which were used for the current report, resulted in an unrealistic count of only 50 international faculty systemwide. The criterion was changed to the faculty members' current citizenship: United States citizens are considered domestic; citizens of all other countries are considered international. Results using this criterion are viewed as being more realistic, with approximately one-quarter of the faculty being labeled international. In general, the proportion of international to domestic faculty in all ethnic and gender groups is roughly one to four, with the exception of the Asian/Asian-American ethnic group, which is approximately 60/40 domestic to international, with a tendency to be in academic areas like engineering.

Ms. Dorr stated that, while it was possible to take the position that UC is doing well in increasing faculty diversity by race and ethnicity, creating a diverse faculty is a challenge for research universities nationally, including UC. Ms. Dorr emphasized that UC can do better and pointed to some evidence showing that UC is doing better presently than it had in the past. The percentage of underrepresented minority ladder- and equivalent-rank faculty among new hires in 2011-12 was greater than the five-year average percentage, and both of those percentages were notably larger than the percentage in the ladder- and equivalent-rank faculty as a whole. Ms. Dorr noted that faculty turnover is small; most stay at UC a long time, many for 30 to 40 years. So UC's hiring practices 30 years ago still affect the diversity of the overall faculty population. The diversity data regarding more recent hires indicate that over time UC's faculty diversity will increase, even if UC's hiring practices continue as they are presently. Improved hiring practices would increase the rate of change. The percentages of women ladder- and equivalent-rank faculty in 2011-12 new hires and in the five-year average of new hires from 2007-11 were roughly the same, although both were higher than the percentage of women among all UC ladder- and equivalent-rank faculty. Ms. Dorr summarized that data demonstrated that UC had made progress toward achieving its goal of increasing the diversity of UC's faculty, although there remains much to be done.

Vice Provost Susan Carlson highlighted four major approaches UC currently uses to attempt to increase faculty diversity: academic personnel policies that support and reward diversity efforts; the collection of diversity information in faculty recruitment and hiring data; the President's Postdoctoral Fellowship Program (PPFP); and focused efforts to build a diverse faculty in science, technology, engineering, and mathematics (STEM) fields.

Since 1984, the PPFP has supported new scholars whose teaching, research, and service will contribute to UC's mission to serve an increasingly diverse state, nation, and world. About 500 scholars apply each year for a one- to two-year postdoctoral fellowship with a UC faculty member; fewer than 20 are selected. Most who complete the program go on to a faculty position at some institution of higher education, many at UC. The program provides an incentive for UC departments to hire these scholars; a significant portion of the scholars' salaries and benefits is paid for the first five years of their faculty appointments at UC campuses. PPFP fellows accounted for 12 percent of all underrepresented minority faculty UC hires since 2003. Of the new PPFP hires at UC, 87 percent were people of color, 58 percent were underrepresented minorities, and 73 percent were women. Ms. Carlson said the PPFP has been successful in both establishing a national pipeline from which diverse faculty can be hired and in increasing UC faculty diversity. The program has also strengthened UC's research and teaching profile.

Ms. Carlson noted that, while the percentage of PPFP fellows among new faculty hires who self-identified as being from underrepresented minority groups decreased from 30.8 percent in 2010-11 to just over eight percent in 2011-12, the number of new faculty hires from underrepresented minority groups rose, with 51 new hires from underrepresented minority groups systemwide in 2011-12, compared with 25 in 2010-11.

Ms. Carlson then discussed a program called UC Advance. In 2010 the Office of the President received funding from the National Science Foundation (NSF) to provide educational roundtables for administrators and faculty at UC's ten campuses to share information and best practices on topics such as recruiting underrepresented minority women into STEM fields and supporting Latina STEM faculty. Several UC campuses have been awarded NSF and National Institutes of Health funding to support similar targeted initiatives. Ms. Carlson said that campus efforts are essential in increasing faculty diversity; systemwide efforts can make a difference only if enhanced and driven by campus action.

Regent Makarechian asked why only one campus from the State University of New York (SUNY) was in the Comparison Eight group, rather than the whole SUNY system. Ms. Dorr replied that the Comparison Eight were chosen to show a range of institutions that would compare reasonably to the range of UC campuses. Ms. Carlson added that the Comparison Eight are research institutions like all the UC campuses; some campuses in the SUNY system are not research institutions.

Regent Kieffer asked for information about the pool of available women and underrepresented minority faculty candidates, and how UC's hiring can be evaluated in relation to that available pool. Ms. Dorr replied that national availability analyses for assistant professor positions were based on the proportion of women and underrepresented minorities among Ph.D. graduates over the past five years, from a larger group of schools than just UC's main competitors. UC's hiring would be compared with the proportions in this available pool. The most recent data indicate that UC hired above the proportions in the availability pools of underrepresented minorities in five of seven fields. For women faculty, UC hired above the proportions of women in the availability pools in two of the seven fields.

Ms. Dorr expressed her view that UC should be doing more to increase the diversity of its faculty, particularly since the California and the UC undergraduate populations are so diverse. She noted that student diversity at UC declines at the graduate level; the diversity of the undergraduate student body is much higher than that of Ph.D. students. She emphasized the importance of maximizing the programs that have been demonstrated to be effective in increasing diversity.

Regent Lozano expressed her view that the Regents should be provided faculty diversity data by campus, not just systemwide. She noted that having diverse faculty attracts additional diverse faculty and postdoctoral scholars interested in diverse disciplines, and improves campus climate and student experiences on campus, factors that cannot always be described by data alone.

In response to a question from Regent Lozano, Ms. Dorr explained the data in a chart of systemwide new ladder- and equivalent-rank domestic faculty hires by race and ethnicity. Although the rates of new faculty hires in underrepresented minority groups have been higher in recent years than those groups' proportions in the overall faculty, their proportion in the overall faculty still lags. Progress is being made through new hires, but change in the composition of the overall faculty is much slower.

Regent Lozano expressed appreciation for the Provost's efforts to increase faculty diversity, although she expressed impatience at the pace of change. Ms. Dorr said she would provide the Regents faculty diversity data by campus and would examine non-numerical information as well.

Regent Ruiz noted that diversity is an important issue in his home area in the Central Valley. He stated that Dinuba High School had no Hispanic faculty 15 years prior, even though its student population was 80 percent Hispanic, a situation he described as common in the Central Valley. District leadership in Dinuba had made hiring a more diverse faculty a priority; currently Dinuba High School has a much more diverse faculty with enormous benefits for its students and the community.

Regent Ruiz expressed his view that UC is failing at increasing its faculty diversity sufficiently, and urged substantive leadership from the faculty and Academic Senate in this effort. He emphasized how important increasing faculty diversity is to the success of

the University and the state. He noted that the anticipated large number of approaching UC faculty retirements would offer an important opportunity to improve faculty diversity. In order to take advantage of this window, programs that have proven to be effective such as the PFP should be expanded. He encouraged the University to hire more of its own graduate students to increase faculty diversity. Regent Ruiz stated that the situation revealed by the faculty diversity data in the current report are disappointing and unacceptable.

Committee Chair Reiss recommended developing a roadmap in conjunction with faculty at the campus level detailing practical plans for increasing faculty diversity, perhaps by increasing support to effective programs.

Regent Island recalled that he had served on the Regents' Study Group on University Diversity with Regent Ruiz and others, and underscored Regent Ruiz's comments. He expressed his view that the Study Group's conclusion five years prior that change in faculty diversity was needed had apparently not been expressed with sufficient urgency, since so little change had been made since that time. Regent Island welcomed the small signs of change, such as the collection of data on diversity, which was unavailable to the Study Group in 2007. However, Regent Island expressed his view that the data show that change in faculty diversity has been slow and almost inconsequential. To have a UC faculty that is five percent Chicano/Latino in California when almost 50 percent of high school graduates are Chicano/Latino is unacceptable. The change in California's demographics has already occurred and should give UC a sense of urgency about improving its faculty diversity. Regent Island stated that, although UC has an excellent diversity statement, it has not produced the needed results. He noted that it would be inappropriate for the Regents to dictate specific goals to the campuses or to the Office of the President; he wondered how to incentivize the University to make the necessary changes and asked how much longer it would take. He emphasized the UC is a public, taxpayer-supported institution, and expressed his frustration at finding ways to lead this change effectively.

Ms. Dorr responded that she shared the frustrations expressed. She noted that improving faculty diversity was difficult and slow, and that factors influencing improving diversity and barriers to that goal are complex. She agreed that more could be done to arrive at reasonable expectations of achievable results. She noted that all research on the subject has shown the importance of leadership in these efforts, and complimented President Yudof for his leadership in increasing diversity. She reported that discussions have been underway to determine whether campuses could do more to use the successful PFP program to increase hiring of UC graduate students. She reiterated that since faculty often remain at UC for a long time, the rate of progress is slow.

Regent-designate Flores acknowledged that the data show that UC had done relatively well in hiring women faculty in engineering and education. She asked why UC lagged in overall hiring of women faculty, as its recent hires were only 40 percent women, although the national applicant pool contained 50 percent women. She agreed with Regent Lozano that it was important to have faculty diversity data by campus. Regent-designate Flores

stated that her work with underrepresented minority high school students showed her that achieving diversity involves both recruiting and retention. She asked whether data about retention of diverse faculty would be included in the future reports on faculty diversity.

Ms. Carlson responded that women and underrepresented minority faculty were retained at higher rates than UC faculty at large. Regarding hiring of women faculty, she noted that it is particularly difficult in some fields. For instance, in STEM fields, women comprise far less than 50 percent of the applicant pool.

Regent Pattiz stated that demographic changes have occurred and expressed his view that the University needs to embrace these changes or it will be severely negatively affected. He said the University must determine practically what is needed to accomplish its goals in faculty diversity. Concrete plans to effect the necessary change should not come from the Regents, but rather from the faculty and the administration.

Regent Stein expressed his view that UC's faculty diversity is unacceptably low. He noted that faculty serve as role models for UC students. When students do not see UC faculty ethnically similar to themselves, they would be disinclined to pursue careers in academia. He expressed support for aggressive action to increase faculty diversity. Regent Stein asked whether data are available for faculty who would self-identify as lesbian, gay, bisexual, and transgender (LGBT). Ms. Dorr agreed that such data would be important, but said she was not aware of any data collection system for that information. She added that the campus climate survey asked people to self-identify in a number of areas, but it was an ongoing challenge to identify and keep track of all aspects of diversity that are important. She cautioned that a large number of faculty do not want to self-identify in some ways. Mr. Bernal added that the prior year President Yudof had formed a systemwide task force on LGBT climate, including faculty, staff, and students.

Faculty Representative Jacob expressed the faculty's deep concern about diversity. In the past two decades, UC and the California State University have been involved in developing programs to attract diverse students into the teaching profession in K-12 and in STEM disciplines. He noted that the Academic Senate has a committee on diversity that has worked with the administration. Active discussions have been held on the importance of defining hiring priorities broadly so that a larger pool of applicants would be eligible. Mr. Jacob stated that attracting and retaining diverse postdoctoral scholars must be supported, since these positions were usually necessary in addition to a Ph.D. to be hired as UC faculty. He supported expansion of the PFP. He added that mentorship was also a priority, both of new and tenured faculty. In addition to the excellent leadership of President Yudof, leadership from the deans at the campus level is extremely important.

Governor Brown stated that concerns about diversity are sensitive, strongly felt, and complicated. He added that diversity concerns extend far beyond the University to the state and the nation. For instance, half of California high school students are currently classified by some measure as being from low-income families; more than one out of five do not speak English as their first language. Issues of the growing economic inequality

and stratification of the state's population underlie issues of diversity. As long as the society has an increasing separation based on income that can be attached to issues of ethnicity and race, the problem of faculty diversity at UC will continue to be difficult to solve, although the Governor said progress can be made. The societal problems must also be addressed. Programs that send UC students to work in local high schools in low-income areas are beneficial. An expansion of online education courses could extend into high schools to give more opportunity to students in schools that do not offer many advanced placement classes. Since UC is the leading institution of learning, it could lead in increasing diversity as well. Ultimately, however, if economic policies encourage increased divergence between privileged and underprivileged members of society, UC's ability to have its faculty reflect the diversity of the state's population would be limited. Governor Brown cautioned that there can be unintended negative consequences of labeling individuals with too many categories and then trying to balance all those categories. Since global issues affect the opportunities of various population groups, he stated that he would like to be part of the discussion of ways to increase faculty diversity. Certain aspects are within the University's control, but others are more political and economic, and can be affected more by the Governor and the State Legislature. All elements of society must contribute to solving the larger problems that contribute to inequality of opportunity.

Committee Chair Reiss said the Committee would like reports from all campuses detailing specific plans to increase faculty diversity.

Ms. Dorr reported that, of the nine general UC campuses, eight have a larger percentage of both women and underrepresented minority faculty than the average of the Comparison Eight institutions.

Chairman Lansing noted the support among the Regents for finding ways to improve the diversity of the UC faculty, in accord with UC's mission.

### 3. **ONLINE EDUCATION AT THE UNIVERSITY OF CALIFORNIA**

[Background material was mailed to Regents in advance of the meeting, and a copy is on file in the Office of the Secretary and Chief of Staff.]

Committee Chair Reiss reaffirmed the Regents' and chancellors' commitment to maintaining the educational excellence, accessibility, and affordability of UC, as demonstrated by its return-to-aid model. She expressed enthusiasm for finding ways in which online education could help UC meet its goals. She stated that UC should be at the forefront of the online education movement in order to help shape it. She expressed appreciation for Governor Brown's encouragement and support for UC's online education program.

President Yudof stated that the finances no longer exist to support UC's old model of instruction and that Governor Brown recognizes that reality. The President thanked the Governor particularly for identifying \$10 million in the budget to support UC's online

education. UC is in the process of navigating these new fiscal and pedagogical landscapes. President Yudof expressed his view that higher student-faculty ratios would probably be necessary for a long time. The challenge is to find ways to move beyond the traditional classroom experience and thrive within the new fiscal and pedagogical realities. While living in a time of constrained resources, UC must ensure three things. First, UC must preserve the quality of a UC education, including having professors who participate in the discovery of knowledge rather than just its transmission. A high-quality education must involve development of problem-solving and cognitive skills, not only rote memorization. President Yudof expressed his view that it is imperative to avoid the commodification of knowledge. Students must engage with their coursework as critical thinkers. Second, UC must maintain its impressive graduation and time-to-degree rates. UC has very high graduation rates and its average time-to-degree is 4.2 years, when only 45 percent of the nation's public university students earn degrees within six years. Third, as a public university, nurtured and supported for more than 100 years by the people of California, UC has a responsibility to broaden access to more students.

With these goals in mind, President Yudof said he would pursue a number of initiatives. Within the upcoming two months, the President would announce a new incentive program for faculty to develop additional online courses. The program would focus on gateway and other high-enrollment, high-demand courses. This program would enhance cooperation among faculty across UC campuses and importantly pair UC faculty with instructional designers. UC's main concern is with its own students, not with recruitment of non-UC students to take these courses.

President Yudof stated that the infrastructure for online courses would be very important. He stated that currently it is possible but surprisingly difficult for a UC student to get credit for a course taken at another UC campus as an undergraduate; the student must obtain multiple permissions. UC currently has 170 online courses offered by various campuses, but it is very difficult for students at other UC campuses to take the courses, even though the courses are online. By the fall, for the first time, UC would have a foundational infrastructure to enable UC students to take courses offered by other UC campuses, approved for systemwide credit. President Yudof expressed his view that in five to ten years perhaps ten to 15 percent of a UC student's undergraduate courses would be taken online, giving UC the opportunity to educate more students more efficiently. He said there would still be a need for UC's teaching assistants to support these classes.

President Yudof stated that the goals of UC's online education program should be to increase access, lower marginal costs to enable the University to live within its increasingly limited means, keep tuition as reasonable as possible, live with the reality of a higher student-faculty ratio, and admit more students to UC. He noted that UCLA had almost 100,000 applicants for 2013-14, an increase of eight percent over the prior year.

The President stated that UC should maintain its commitment to accept transfers from community colleges, consistent with the California Master Plan for Higher Education. He expressed his view that similar transfer opportunities could be made available for matriculants who have taken online courses from UC's own faculty, thus creating another

entry point to the University. Problems such as pricing, registration, faculty approval, and transfer process would have to be solved. An all-UC summit with the Academic Senate would be held in the spring. Much of the work in developing the online program would be on the campuses, which have already been productive in this effort. The process would demand care, thoughtfulness, and respect for UC's constituents, graduate students, faculty, and students. President Yudof expressed optimism that development of online education would be successful. The program could eventually be broadened and the online courses could be offered to community college and high school students. In time, programs could be marketed to gain new revenue streams for the University. President Yudof expressed his view that it would be impossible under current financial conditions to expand access to UC through traditional brick and mortar methods.

Chairman Lansing thanked President Yudof, the faculty, and staff who worked on the bold initiatives regarding online education. Proposition 30 provided capital to support UC's efforts and she thanked Governor Brown for allocating \$10 million to support further development of UC's online education program. Chairman Lansing said online education could provide a way for UC to educate more students, but emphasized that the quality of online courses must be equal to traditional UC courses. She expressed support for encouraging UC faculty to develop online courses and for finding ways for UC students to take online courses across the system. Online education would also give UC the opportunity to offer online courses to the community colleges or high schools, some of which might otherwise be unable to offer students sufficient courses that satisfy the "a-g" subject requirements for UC admittance. These efforts would increase access and diversity. Chairman Lansing gave her assurance that the online education program would be constantly reevaluated.

Regent Newsom expressed appreciation for the President's candid and clear remarks. He said a major question would be to determine the appropriate model for online education from possibilities such as non-profit or private sector models supported through means such as venture capital. He asked what collaborative framework already existed at the campuses or at other systems such as California State University (CSU), which recently announced an agreement with Udacity. Regent Newsom stated that the next generation will not be educated the same way his generation was. Advances in technology will affect higher education profoundly and UC must embrace this change thoughtfully and strategically.

Provost Dorr provided an overview of the current status of online education at UC campuses. She acknowledged the contributions of many at UC, including faculty, Academic Senate leadership, chancellors and other campus administrators, and UCOP staff, particularly in the UC Online Education (UCOE) and institutional research groups.

Ms. Dorr reported that UC currently offered 325 online for-credit courses for undergraduate and graduate students, including 225 for undergraduates, and three online graduate degree programs. She defined an online course as one in which everything occurs online, except perhaps examinations which might be taken in person. Online courses have a wide range of implementation and characteristics. She defined for-credit

as meaning that an enrolled undergraduate or graduate student would be granted unit credit toward degree requirements. She cited reports that the campuses have extensive engagement with technology-enhanced education. UC campus faculty have offered or will soon offer 21 massive open online courses (MOOCs).

Ms. Dorr displayed a chart showing the number of different online undergraduate for-credit courses offered at UC from fall 2011 through fall 2012. UC's current effort would focus on undergraduate courses that would satisfy general education, pre-major preparation, or major requirements. These courses would typically be entry-level, early requirements that would normally have large enrollments, where over-enrollment can sometimes delay students' progress. Focusing on these courses would provide the greatest benefit to the largest number of students. Some of the existing online courses were produced on the campuses, some with sponsorship from UCOE, and are available during the academic year and the summer. Enrolled students can take these courses without additional charges and the courses would ordinarily count toward degree requirements. Other online courses give unit credit but are less likely to provide credit toward particular requirements and are offered with an additional fee, such as courses offered in the summer session and University Extension (UNEX) courses. Unlike the academic year courses, both summer courses and UNEX courses are open to UC students from other campuses and non-matriculated students. Ms. Dorr stated that UC's current efforts would focus on increasing the number of academic year online courses.

Ms. Dorr cited three examples of existing UC online courses and introduced the faculty members who created and offer the courses. In UC Riverside Professor Jacqueline Shea Murphy's "Dance 7: Cultures and Contexts" online course, students view short lectures from the professor, read about dance interpretation, interpret a variety of dances from various cultures, discuss and debate in order to create group answers to questions related to dance interpretation, and create blogs that illustrate interpretive techniques, all done asynchronously, meaning the students do not have to be online at the same time. The class also has an online synchronous weekly discussion section.

UC Davis Professor Elizabeth Applegate annually teaches more than 2,000 students "Nutrition 10: Discoveries and Concepts in Nutrition" in a traditional class. During the past summer, she taught an online version of the course simultaneously with the traditional course. Online students could view the class lectures synchronously and ask questions of teaching assistants. Lecture videos remained available for three days to the online students. Extra credit incentives were offered to increase engagement. Online students had access to synchronous office hours prior to exams.

UCLA Professor Susanne Lohmann developed and teaches the online course "Political Science 115D: Diversity, Disagreement, and Democracy," in which students play online games and analyze their performance. The games were created to involve ethical and cultural dilemmas; students play anonymously. Game data are analyzed by the students using prompts and assigned readings. Reports are written and graded about each of ten weekly sessions of game playing.

Ms. Dorr summarized that, in these UC-created online courses, each professor used her preferred approaches, taking advantage of online possibilities, along with advice from online developers about what would be effective.

Ms. Dorr showed a slide highlighting examples of efforts on four UC campuses to stimulate online course development, to offer online courses during the summer, to help students satisfy degree requirements, and to establish campus-wide planning and oversight systems. She introduced UC Berkeley Professor Armando Fox, academic director of the Berkeley Resource Center for Online Education, who teaches online courses.

Ms. Dorr summarized information she had received from campuses regarding their online education operations and planning. All ten campuses have completed or are developing strategic plans for online education. She said that the fact that seven campuses report they have adequate staff and resources for the current demand indicates that a strong base exists on the campuses for moving forward more aggressively.

Ms. Dorr turned to an update on UCOE, the online education initiative, which she said has remained true to its original vision of producing high-quality, for-credit undergraduate online courses. Its original plan targeted 35 courses, all of which would be completed within the upcoming six months. Ms. Dorr emphasized that, while the course development is supported by UCOE funds and instructional designers, the courses are otherwise developed through traditional campus processes. Each course is developed by a campus professor, in conjunction with a department that wants the course, and the course is approved on the campus; often the campus' own instructional designers and facilities are used as well. Ms. Dorr expressed her view that UCOE has been a very positive enterprise. While its progress has been slower than anticipated, UCOE's foundational work has put the University in a good position to move forward. UCOE has produced courses, developed a flexible learning platform, assisted campuses and faculty in their efforts, motivated faculty to examine criteria to approve online courses for credit, built an infrastructure for student recruitment, enrollment, and support that would also work for non-matriculated students, and developed an online student information hub.

Chairman Lansing asked how many students have taken UC's online courses and how many high school students have taken UC online courses for high school students. Ms. Dorr replied that 1,700 students have taken UCOE courses in the past year; close to 10,000 students have taken a UC online course, including UCOE and UNEX courses, summer courses, and academic year courses. Lynda Rogers, Dean of UC Santa Cruz Extension, reported that more than 5,000 high school students have taken UC's online courses offered by the UC Scout program; she anticipates that the program will serve more than 10,000 students in the upcoming one to three years.

President Yudof asked how many core administrative staff work in UCOE. Interim Director of UCOE Keith Williams replied that UCOE has nine staff, four of whom are instructional designers, two in southern California and two in northern California. UCOE is currently searching for a fifth instructional designer. Ms. Dorr expressed her view that

UCOE is currently understaffed. Committee Chair Reiss observed that campuses develop much online content independently from UCOE. Chairman Lansing pointed out that when UCOE was started three years prior there was very little funding available to support it. With the passage of Proposition 30 and Governor Brown's designation of \$10 million to support UC online education, the program could be expanded.

Regent Varner asked what was being done to make the technology necessary for accessing the online courses available to low-income students, a component he characterized as critical. Ms. Dorr commented that no provision currently existed for providing technology to off-campus students taking online courses. She acknowledged the importance of this issue, as the online courses usually require better computer systems than students would typically have available, such as high-capacity computers, greater internet connection capacity, and certain kinds of software. Regent Varner stated that the availability of this technology and appropriate training, particularly for low-income students, must be part of the continuing effort. Ms. Dorr agreed that UC must ensure that students intending to take the online classes have adequate access to the necessary equipment. She pointed out that students who are off-campus would not have to own the equipment; it could be available in community technology centers or libraries. Committee Chair Reiss suggested that assistance for technology could be considered as part of aid under the Blue and Gold Opportunity Plan. Chairman Lansing stated that various options could be considered should this become necessary in the future.

Regent Lozano stated that, although there has been much important activity around online education, she would like to see a strategic framework for the development of online education. If, as Ms. Dorr had stated earlier, the focus of the current effort would be to provide undergraduate, for-credit, gateway courses, Regent Lozano asked how that would be accomplished strategically. A strategic framework should describe how UC would achieve its goal of providing high-quality undergraduate online education five years from now, including plans for what portion of a student's education would be online. Ms. Dorr responded that only a general framework existed currently and it was clear that the concentration of effort should be in lower-division gateway and general education courses to achieve the most effective results. A working meeting has been planned for this spring to develop an agreement that would bring faculty, campus administrators, students, and staff from the Office of the President together to create goals, and plans for division of work and support resources. She anticipated that the work would be accomplished both at the Office of the President and on the campuses, but with a central organization. Ms. Dorr expressed her view that a plausible framework would be that a student entering UC as a freshman would take eight to ten percent of his or her coursework online, mostly during the student's first two years, although a student could take more. That scenario would lead to a need for 137 online courses that would satisfy these criteria. Ms. Dorr projected that these courses could be developed on the campuses within two years and UCOE would continue its current involvement. Later efforts would be less focused on development of new courses, with more emphasis on updating course content.

Regent Lozano stated that these goals would come from the working groups. While she acknowledged that this kind of change is challenging for an institution, she expressed her view that this effort was not progressing fast enough and encouraged an increased pace of development.

Chairman Lansing stated that, when President Yudof introduced this effort, the goal had been set that students would be encouraged to take ten percent of their courses online during their first two years. Eventually, another goal could be to have the entire first two years of undergraduate courses available online to offer another UC entry point and allow admission of more students to UC. Chairman Lansing suggested that Ms. Dorr update the Committee regularly on progress being made.

President Yudof stated that these efforts would have to be adapted as they progress. While there is much enthusiasm and publicity about online education, business plans for online education have not been worked out. Existing online course offerings that have generated much publicity are generally free and offer no credit. He expressed his view that ideally a certain percentage of online courses would be taken by students voluntarily for reasons of preference or scheduling. There could also be a larger group of people admitted to the University but not to a traditional physical campus; they would be admitted to an online education of a certain duration with the possibility of transferring to a physical campus. Predicting exact numbers in these scenarios is not possible.

President Yudof cautioned that it could be possible to expand online education and gain no cost savings. Different types of courses would have different levels of savings. The President expressed his concern that this online revolution could occur and not solve the University's core problem of being unable to afford the personnel to fill traditional teaching roles.

Regent Pattiz expressed his view that a great deal more information needs to be gathered. He noted that the financial structure would be important, since there had to be funds to support the operation. He questioned whether adding online course offerings, but still connecting them to a degree from a physical campus would solve UC's financial challenges, since far more people would seek admission. Regent Pattiz said he would welcome the upcoming presentations from heads of existing online education companies and was particularly interested in learning whether they would envision maintaining their separate structure, or if they could work with UC to develop a parallel completely online alternative.

Regent Island stated that it was difficult to evaluate the effort UC should be making to develop online education in the absence of an overall goal. Ms. Dorr expressed her view that it was possible to know how UCOE has performed and also to evaluate the work performed on the campuses. As part of their budgets, campuses have instructional funds. Online courses can be more expensive than traditional courses to develop in that they require personnel with particular skills such as programming and course design that most faculty members would not possess. However, if many more students can enroll in an online course, it could eventually be less expensive on a per user basis. Also, if online

offerings enable students to progress through the University more quickly, the overall cost of the students' education could be less. These factors must be evaluated as part of developing a business model. Ms. Dorr stated that the upcoming work would involve evaluation of courses and collection of data about the cost and benefits of online education, along with constant reexamination so that the program can change directions when appropriate.

Regent Makarechian asked why only ten percent of UC's nearly 2,600 online courses are for credit. Ms. Dorr responded that UC students can take 225 online courses for credit, but many of those courses would not fulfill a general education or pre-major requirement. Mr. Williams added that of the total 2,600 online courses, the vast majority are University Extension courses not designed for undergraduate education.

Regent Makarechian asked why some online courses had been approved for credit during summer sessions, but are not offered during the regular academic year. Ms. Dorr replied that online courses offered for credit during summer sessions are developed and approved by faculty. She said her office is currently exploring whether these courses could be offered during the academic year. She explained that summer is an extra session for which students pay extra fees. Summer enrollment generates income to cover the cost of the course and typically some revenue that goes back to the department offering the course. Regent Makarechian expressed his view that if the course has been approved for credit, students should be able to take it at any time.

Regent Makarechian stated that a considerable amount of the total \$6.9 million spent to develop the online education program had been spent on marketing the courses. He said that the fee for UC's online pre-calculus course was relatively expensive, when some other online courses offer a certificate of completion for \$100. It was reported in the media that only one international student enrolled for UC's pre-calculus course. Ms. Dorr explained that UCOE was conceived primarily with the goal of educating enrolled UC students. However, in creating the financial model, a possible revenue generator was that the courses would be open to non-matriculated students who were not paying UC tuition. The course fee was set at the equivalent of an enrolled student's tuition. She noted that funds for marketing were spent on developing an infrastructure to handle many student services such as enrollment. Regent Makarechian said he found it difficult to reconcile the high cost of the online course with the goals of increasing access and affordability.

President Yudof clarified that the decision had been made with the faculty to focus the online education program on UC-matriculated students. Funds had been spent to establish an internal platform for UC students. The policy decision was made that it was most important to serve UC students. Once a catalogue of courses has been developed, then marketing to outside students might be appropriate. President Yudof stated that startup costs are high for online courses and the required infrastructure. He had hoped to have 30 courses in important areas developed under the program, but progress has been slower than he anticipated. President Yudof stated that, following a faculty grant competition, faculty submitted applications to develop online courses, and are creating the courses. A

secondary effort was to create the platform, which was focused on UC-matriculated students.

Regent Kieffer noted his early support for this initiative, but also offered some caveats. He observed that the world of post-secondary education is changing rapidly; whereas universities have had a monopoly for a few hundred years, new competition has emerged and UC will be part of this new environment. He expressed his view that the meaning of a UC degree and the role of the University within this new context would be critical to determine. Regent Kieffer said that online classes offered by the community colleges, CSU, and UC ought to be transferable. He spoke against UC exceptionalism, both in the development of online content and the online courses' transferability systemwide, and with CSU and the community colleges. He stated that it could be beneficial for UC to work with outside providers with access to capital in developing online courses. If outside providers are engaged, it should be on a systemwide basis, and the work should be transferrable and adaptable among UC campuses, CSU, and the community colleges. Regent Kieffer emphasized that it is as important to develop online education well, as it is to do it quickly.

Regent Stein stated that, while this conversation had emphasized that students are ready to learn in new ways, no one had asked students if they are interested in online education. He reported that he and Regent-designate Flores have consulted with students across all UC campuses and those students would view a plan to have the first two years of a UC education be fully online as a degradation of their education. It is unknown whether students can effectively learn two years worth of curriculum online and extracurricular activities, from which students learn so much outside of the classroom, would be impossible. Regent Stein stated that students would likely support the development of online courses used to supplement their traditional education.

Regent Stein asked Ms. Dorr whether data had been collected for UC's existing 27 academic year online classes developed by the campuses and UCOE that would indicate whether teaching assistants and graduate students were used to the same extent they are in traditional classes. He also asked whether cost savings or the promise of cost savings have been achieved in those 27 classes, given the high startup costs. He cautioned that online courses can require a large amount of feedback to students from faculty and graduate students, as well as a great deal of time from faculty and developers to create. Regent Stein said he has not seen convincing data to indicate that this initiative would engender short- or intermediate-term cost savings, and long-term cost savings are speculative. Committee Chair Reiss responded that the goals of the online education program would have to be clarified.

Chairman Lansing stated that the current initiative was to explore the option of online education, and to gather and evaluate information. Students would not be obligated to take online courses.

Governor Brown stated that UC must be realistic when he has proposed a five percent State funding increase to UC and the University has requested an 11.6 percent increase.

The gap between these amounts must be made up somehow, by student tuition increases, a change in faculty responsibilities, a different cost and revenue model, or an increased investment by the people of California in higher education. The University does not have the luxury of staying in its present trajectory. Students could accept ever-increasing tuition and student debt. Governor Brown commended the Regents and University administration for their efforts to deal with these difficult and important questions. He expressed hope that UC can lead the way in exciting and important changes.

Regent Blum congratulated Berkeley Law Dean Christopher Edley for his work on the online education initiative. Regent Blum noted that developing online courses would improve the sharing of courses and credit across UC campuses. He encouraged continuing efforts to increase the University's operational efficiency; he also spoke in favor of examining faculty teaching responsibilities. Regent Blum reported that two courses taught by outstanding faculty at the Blum Center for Developing Economies at UC Berkeley were online in a hybrid form, with both online content and synchronous discussion sessions. Online courses could be a way to have courses taught by the most talented UC faculty in various departments shared across campuses, to reduce duplication of effort.

Regent Gould expressed support for the progress being made, and said it was important to establish goals and a vision for the online program, against which progress can be evaluated, even though those goals may evolve and change in the future. He agreed with Governor Brown about the importance of addressing the budget gap. While online education might prove in the long term to be a tool to help reduce costs, Regent Gould urged the Regents to keep in mind other major sources of possible savings such as improving the transfer process for community college students to UC, improving curriculum review on campuses, and reducing the cost of degrees by facilitating students' progress through the required curriculum.

Regent Varner asked whether UC was cooperating and collaborating with CSU in their online education initiative. Ms. Dorr said there was collaboration, but that more could be done in that area.

Mr. Edley said that the budget gap to which Governor Brown referred was very important. Mr. Edley said that he first become involved with the initiative for online education three and a half years ago because of his desire to increase access to the University, since UC was unable to serve all the Californians who could benefit from its high-quality education. He agreed with President Yudof that it would be impossible under current conditions to accommodate demand for UC at its physical campuses.

Mr. Edley said that his observations during his work on this initiative have led him to wonder whether UC's system of governance is well-suited to helping UC be a leader in online education. He reported that he sees daily accounts of other institutions being bolder and more innovative than UC. In some ways, the excellence of the UC system makes it more conservative. He urged the Regents to consult with the leaders of CSU and the community colleges regarding their initiatives to create new models. Mr. Edley

expressed confidence that innovation would occur naturally on UC campuses, without prodding from the Regents or the Office of the President. He stated that the most challenging aspect would be to develop a way to serve non-matriculated students, those applicants who could not find a place on a UC campus. Campuses were already facing challenges educating their existing students. Rather than view online education as a way to save money on the campuses, Mr. Edley saw it as an opportunity for increasing revenue by serving new non-matriculated students with a robust transfer curriculum as President Yudof described. Large-enrollment, lower-division courses could be marketed to qualified Californians as well as other qualified students. These new revenue possibilities could be used to subsidize UC's traditional campus delivery of courses, serve more Californians, expand the faculty, hold tuition down, and increase the number of doctoral students.

In response to Regent Lozano and Regent Island's earlier questions about a strategic plan, Mr. Edley said his recommendation would be to build from UCOE to create a charter UC campus focused on online delivery, with faculty as quality control for excellence, with innovation and evaluation as centerpieces. He spoke in favor of clarifying the goals of the online program and focusing on those goals. If either UC or CSU would lead in establishing a charter online campus, many secondary benefits such as lower marginal costs, reduced time to degree, and innovation would follow naturally.

Mr. Edley recalled that President Yudof had asked him almost four years prior to lead an intersegmental group to work on transfer issues. That group received reports of the thousands of UC-eligible students finishing their lower division work at community colleges, who, while eligible to transfer to UC, decided instead to go the University of Phoenix or elsewhere, paying more money for a less valuable credential. These students were disproportionately African-American and Latino. Mr. Edley stated that there are people who deserve UC quality but for whom the current UC model of education does not work.

President Yudof addressed possible student concerns by emphasizing that no UC undergraduate student would be required to take online courses. The important question was how to serve the tens of thousands of students to whom Mr. Edley referred.

Ms. Dorr introduced three leaders in online education to make presentations about their companies. Daphne Koller is co-founder and Chief Executive Officer (CEO) of Coursera, a for-profit education company founded approximately one year prior by her and another Stanford professor. Ms. Dorr mentioned that Ms. Koller had been in UC's President's Postdoctoral Fellowship Program (PPFP) at Berkeley in computer science. Coursera currently offers 212 courses from 33 university partners, including UCSF and UC Irvine. Sebastian Thrun, co-founder and CEO of Udacity, also a for-profit company that began one year prior, co-taught the first major MOOC, "Introduction to Artificial Intelligence" taken by thousands of students. Udacity currently offers 19 courses, one taught by a UC Davis faculty member. Anant Agarwal is president of edX, a year-old, not-for-profit company founded by the Massachusetts Institute of Technology (MIT) and Harvard University. Mr. Agarwal is an MIT professor and former director of MIT's computer

science and artificial intelligence laboratory. UC Berkeley was the first university to join edX after MIT and Harvard; edX currently offers 23 courses, ten from UC Berkeley.

Ms. Koller said that her two years in the PFP at UC Berkeley were two of the most formative of her life. She reported that Coursera currently offers 212 courses to 2.3 million students. Coursera works with 33 universities, including two UC campuses, Stanford University, Princeton University, the University of Pennsylvania, the University of Michigan, Columbia University, Johns Hopkins University, the California Institute of Technology, and eight international institutions. Coursera offers courses across the disciplines, in the humanities, sciences, engineering, business, medicine, and many others; 64 new courses will be launched in the upcoming two months. Ms. Koller mentioned an international student who received a Fulbright Scholarship as a result of taking Coursera classes and another student who founded a non-governmental organization as a result of taking a Coursera sociology class. She noted the value of online education for some disabled students. Students with autism can be particularly well-suited for online learning. She cited the case of a young man with severe autism who had never spoken, but who was an outstanding student in Coursera's "Modern Poetry" class.

Ms. Koller discussed some of the components of Coursera's online classes. Videos are used, in shorter modules than the traditional classroom lecture, allowing more flexibility. A more important component is the integration of exercises and interaction as an intrinsic component of the curriculum. Interaction is built into the lecture videos: the video pauses, students type an answer to a question, and receive immediate feedback. Ms. Koller compared this with a traditional lecture where, with the exception of classes that use clicker technology, only a few students would respond to a question before the professor continued. Ms. Koller stated that many studies have demonstrated that this increased interaction provides a better learning experience.

Ms. Koller added that the most important learning takes place in the students' homework. Artificial technology is used to correct homework, allowing immediate feedback to students, an important element in helping students achieve mastery. Peer grading is used for assignments with more open-ended questions that require critical thinking. Students, using a grading rubric constructed by the instructor, critically assess the work of other students. Evaluating other students' work tests students' critical thinking, specifically how to critique a scientific paper in their discipline. Essays and design questions are also peer-graded. Ms. Koller displayed a slide with results of a Princeton University study showing a strong correlation between peer grades and those of traditional teaching assistants for the midterm and final examinations of a Coursera Princeton University introductory sociology class.

A third component of Coursera's online courses involves interaction among students through discussion forums, where larger class sizes actually lead to quicker response times to students' questions by other students. This helps to eliminate the potential bottleneck of online classes where instructors have to answer students' questions individually.

Ms. Koller stated that Coursera's access to an automated platform enables a rapid improvement cycle of content and teaching. She cited a 1984 study by Benjamin Bloom, which showed that students taught in a mastery learning format in which they were required to demonstrate mastery of one topic before moving on to the next, yielded achievement scores a full standard deviation higher than those learning from lectures. The online classroom lends itself to mastery learning. Coursera's experience has shown that students naturally gravitate to resubmitting the same assignment until they achieve mastery; those who do achieve mastery perform better on the next assignment than students who continue on without achieving mastery, after calibrating for baseline performance. The immediate feedback provided to students in the online setting is valuable to them in achieving mastery. Ms. Koller acknowledged that personalizing the online learning experience for students was still a challenge that Coursera was exploring.

Ms. Koller expressed her view that campus instructors spend too much of their time in classes conveying content that could be as well or perhaps even better conveyed online, and that it would be more valuable to spend time engaging with students in a meaningful dialogue, building up critical thinking skills, and exciting students' imagination. Studies have demonstrated that classrooms structured with more interaction among students and with the instructor lead to greatly improved learning outcomes.

Udacity CEO Mr. Thrun stated that Udacity's and Coursera's platforms were somewhat similar, but the companies were exploring different directions. Udacity was investigating ways to assist California students and has built a liaison among government, the Chancellor of CSU, and San Jose State University to conduct experiments to determine whether Udacity can reach non-matriculated students, specifically high school students, to help them become better prepared for college. He noted that the CSU system has the fundamental problem, different from problems facing UC, that 58 percent of its entering students require remedial classes, for which students pay full tuition. Mr. Thrun also said that the CSU graduation rate is low, with a six-year average time-to-degree, and that California community colleges currently have large wait lists. Mr. Thrun stated that Udacity pilot programs were being conducted to determine whether it could reach non-matriculated students, including high school students, particularly those in schools in low-income areas, military personnel, and motivated college students who want to reduce their time-to-degree. Udacity's larger plan was to examine lower-division, remedial classes, and classes in science, technology, engineering, and mathematics (STEM) fields, and make these classes not only as good as UC classes, but much better. Mr. Thrun stated that Udacity's current prices were from \$30 to \$50 per credit. He expressed his belief that online education could be profitable and could offer the same or better support to students than they currently receive in UC classes.

Mr. Thrun emphasized that Udacity's program was in its pilot phase with much work remaining to be done. The only way the program can be made successful is through exploration, experimentation, innovation, failure, and learning. Failures would be important, as there can be no innovation without risks. The pilot is limited in scope. Udacity is working with a number of institutions, including the Western Association of Schools and Colleges, the National Science Foundation (NSF), the American Council on

Education (ACE), and organizations funded by the Bill and Melinda Gates Foundation to understand the effectiveness of the pilot program. Mr. Thrun cited examples of students who he said would normally be outside the reach of UC who had successfully completed Udacity courses, some in a very short time. He expressed his hope that online education would be made significantly better and less expensive.

Mr. Thrun turned to the pedagogical implications of online education. Pedagogical methods for online courses were different from those for traditional classes; online classes that attempt to replicate traditional classes would be worse and more expensive. Online courses must exploit the unique benefits of the online experience to innovate and make the medium a productive part of higher education. Mr. Thrun expressed his view that this is a time of experimentation and innovation; pedagogical techniques that would affect people's lives have not even been discovered yet. He stated that CSU had taken a risk in its agreement with Udacity announced the prior day. He expressed hope that the UC system would be as open.

Regarding the role of UC instructors in creating online courses, Mr. Thrun said that Udacity's experience has shown that traditional classroom instructors do not usually make good online instructors. Creating an online class requires refocusing from a lecture format to creating exercises that will make students think. Mr. Thrun expressed his view that students learn better through thinking and problem solving. Udacity currently has 20 instructional designers who work to help instructors transform their content to an online medium. Mr. Thrun stated that online education should be viewed as a path or journey and should be explored by academics with the same creativity and curiosity as they explore any other subject. He expressed pride that the NSF had provided funding to support Udacity's research. Mr. Thrun stated that Udacity's pedagogy emphasized challenge-driven learning, continual data-driven improvement, self-paced mastery, and a strong peer learning community.

Mr. Thrun expressed his view that the most important aspect of online education was student learning outcomes. He noted that Udacity had conducted a study with San Jose State University on the effectiveness of MOOCs. One major negative is that the MOOC dropout rate is extremely high, even though Udacity's top classes have graduated more than 50,000 students. Completion rates are often around ten percent. A new model being tested with San Jose State University would combine MOOC technology with a fleet of human instructors and mentors who would provide the same amount or more mentoring than these students would receive in a traditional class.

Mr. Agarwal of edX stated that educators should embrace, rather than fight, students' comfort with modern technology. Classrooms and teaching methods have not changed to keep up with changes in technology. The advanced research taking place at the nation's best universities has not been applied to higher education and learning. He stated that edX is a non-profit venture created by Harvard and MIT, which each committed \$30 million. As a non-profit, edX would put principle over profit, with the goal of marrying innovation and cutting edge technology with top-notch people on a non-profit mission.

EdX uses an open-source platform, which is available for collaboration among the entire community. For example, UC Berkeley contributed a new discussion forum when it began collaborating with edX. The platform edX had been using was based on an older model and the new version was better. If edX's platform had not been open-source, this level of collaboration would have been impossible. A number of other institutions are contributing technology to edX, enabling rapid evolution of the technology. EdX has a number of partner institutions who offer courses under their brand, such as UC Berkeley, Wellesley, and the entire University of Texas system; for example, UC Berkeley offers courses as Berkeleyx. University of Texas at Austin will offer nine courses through UTx in the coming spring.

Mr. Agarwal said that edX focuses on the efficiency of education, rather than the cost of education. He said that studies show that the quality of education could be substantially improved. EdX was developed out of a campus setting and cares deeply about university campuses.

Mr. Agarwal discussed results from the MITx "Circuits and Electronics" course. Even though the course was advertised straightforwardly as being difficult, requiring knowledge of differential equations, it was taken by 155,000 students; 7,157 students passed this very difficult course. Mr. Agarwal said that the same staff resources used for a traditional 150-person on-campus course could support a course of this size.

Six months prior, edX offered the MITx "Circuits and Electronics" course at San Jose State University in a blended model, where 84 students were randomly selected to take the edX version from the 168 in the class. Outside of class, the selected students would watch video lectures, do online interactive exercises and online virtual laboratories, which he said were unique to the edX platform. These same students would also come to class, interact with and ask questions of the professor during the first 15 minutes of class, then break into groups of three to solve problems in class with help from the instructor and two teaching assistants. Mr. Agarwal characterized the results of this pilot study as staggering. Students who had taken the traditional course at San Jose State University the prior year had a 40 percent retake rate, meaning students who failed the course and had to retake it. In comparison, the San Jose State University students who took the edX version of the class had a retake rate of only eight percent. San Jose State University wants to introduce more edX courses this spring, as do other CSU campuses. Mr. Agarwal stated that online courses would improve learning on campuses by improving the quality of the education through the use of these interactive learning technologies. Laboratories that are like video games can be used to teach students design.

Committee Chair Reiss stated that the presentations demonstrated that online education would create a different way to educate students.

President Yudof asked Mr. Agarwal for his interpretation of the difference between the 95 percent incompleteness rate for students taking the edX "Circuits and Electronics" course, and only an eight percent failure rate in the same course offered at San Jose State University. Mr. Agarwal explained that for the MOOC course 154,763 students from

around the world registered for the course. Of those, only 26,349 attempted the first problem set; many people might register just to see what the course is like, with no intention of completing the course. Later, more might drop out because they lacked the necessary background. Significantly, San Jose State University offered the course as part of a blended model of learning, which he saw as appropriate for its use in universities. Online learning would be augmented with help from professors and teaching assistants. Ms. Koller stated that Coursera's data showed a 30 to 40 percent dropout rate between students who attempt the first and the last homework. She added that many registered students are adults with many other responsibilities. Mr. Agarwal pointed out that for the Berkeley class "Software as a Service Part Two" the retention rate was much higher, since the students had to have passed the prerequisite Part One class. Mr. Thrun said that Udacity's retention data was similar and that he viewed retention as a major problem. He expressed his concern that MOOCs would not be a sustainable solution if the problem of students with low motivation is not addressed. He stated that adding human services such as instructors and mentors increases completion rates dramatically. He agreed that the blended classroom is most effective because the class is for credit, the students paid for the course, and because there are live, on-site instructors and mentors.

Committee Chair Reiss asked the presenters to clarify their target audience and the cost of their classes. Mr. Agarwal stated that edX has a variety of models. Generally, 45 percent of edX students are from 18 to 25 years old, or college-aged; five percent are high school students; the remaining 50 percent are over 25, or continuing learners. EdX gives a mastery certificate for free, and offers a proctored examination certificate for \$95.

Ms. Koller said that the Coursera population mix was very similar in age to edX's, and added that two-thirds are from outside the United States; three-quarters of Coursera's students have at least one college degree. She believes that this skew in population is caused largely by the fact that there is currently no consistent way for college students to get credit for the classes. In light of this problem, Coursera has an agreement with the ACE, to assess a small set of Coursera's classes for credit equivalency so that students who complete these courses would have the opportunity to have the credits transferred into one of the more than 2,000 academic institutions that accept ACE credit recommendations. The credit would not be given by the institution that offered the Coursera course or by Coursera, but rather by the institution that had accepted the students as matriculated students. She predicted that once the courses are accredited by ACE, a much larger portion of Coursera students would be college-aged because they would be able to get the tangible benefit of having transferrable credit that would help them progress toward their degrees. Coursera courses could then help students avoid the current stumbling blocks of overenrolled general education and gateway courses.

Committee Chair Reiss asked Mr. Thrun whether Udacity's arrangement with CSU was different from his other online education work. She asked whether, for example, UC Berkeley would be paid for courses it had developed. Mr. Thrun responded that Udacity receives revenue from various sources. Private companies pay Udacity to develop relevant courses for their workforces. Paying a fee for proctored Udacity exams had been available since April, but had not proven to be a major revenue source. In the newer

Udacity model, a fee would be charged for the services associated with teaching the classes, but the content would be free. He added that Udacity is currently striving to make its model work for low-motivation students, and low-income, inner-city students. A large number of high school students, largely from the United States, are currently involved. High schools have sporadically accepted Udacity courses for credit, with a large effect on the retention and completion rates, which have been surprisingly high.

Mr. Agarwal stated that edX is pursuing two different models. In its MOOC model, a course from a university such as UC Berkeley is offered to students around the world. Honor code certificates are free and proctored exams are offered for a fee. Under a different blended model, edX courses are offered at San Jose State University and a number of community colleges in Massachusetts. EdX has a large award from the Bill and Melinda Gates Foundation to fund experimentation with this model. Currently some of these programs are free pilots, but edX is discussing a sustainable revenue model, under which the university that hosts the course would pay a small fee to edX; edX would share that fee with the partner institution that produced the course.

Ms. Koller said that under Coursera's model, MOOCs are free with a small fee for a proctored exam; Coursera is also working with a number of institutions around the United States that would use Coursera courses in a blended format.

Mr. Thrun stated that Udacity would not license content to other entities, but aspires to have the learning be entirely online, including all exams, so that the courses can be taken by students around the world. He stated that San Jose State University could earn substantial revenue through tuition fees. This model would also allow Udacity to devote a good deal of funding to instructional design.

Regent Pattiz stated that his business background in streaming online content in the entertainment area had led him to consider the large potential audience for online education. He identified this as an opportunity for the University to distribute its high-quality content and generate revenue to help fill its budget gap. He expressed misgivings about the idea of the University being used as a client by for-profit online education providers. He noted that the presenters' business models indicate that they are in the start-up phase. While the mission of educating more people was shared by both the presenters and UC, Regent Pattiz stated that the presenters may be interested in ways in which UC's interest in their products could provide revenue for their companies, but he was interested in how online education could provide revenue for the University.

Mr. Thrun expressed his view that the business model for Udacity's agreement with San Jose State University would be viable. Excellent online education services could be rendered for about \$150 per student. This model would be tested under the current pilot program. He expressed his view that gateway classes could be brought to many students, including high school students who wish to improve their qualifications for college admission, as summer courses. He noted that Udacity also receives job recruitment fees and had placed 7,000 people in jobs.

Governor Brown asked whether it would be possible to have advertising appear in online courses, or if that would be objectionable. He asked Regent Pattiz if he was considering that possibility. Regent Pattiz said he was referring to the tradeoff between charging tuition or making the content available for a very low fee or for free, and using a commercial advertising model. Mr. Thrun stated that he had examined this model and concluded that advertising would not support the type of service Udacity wanted to provide. Udacity would have to cut back on services and return to the basic MOOC, which he thought was undesirable because learning outcomes would suffer. He also saw a conflict in mixing distracting advertisements with serious educational content.

Chairman Lansing stated that Udacity's model charges users differently from the models of the other two presenters. She stated that she did not understand why UC would pay Udacity to develop courses; Udacity should pay the University since UC faculty has intellectual content without which Udacity would not attract students. UC has the best intellectual content, backed by the reputation of the UC brand. Mr. Thrun stated that CSU pays no money to Udacity. Chairman Lansing proposed a business model under which Udacity would pay UC, help develop the online courses, and share the resulting revenue stream with UC. Mr. Agarwal stated that UC could put a course on edX for free. Ms. Koller stated that Coursera's business model is the same as the one proposed by Chairman Lansing.

Committee Chair Reiss thanked the presenters and stated that the Committee looked forward to exploring this initiative further.

The meeting adjourned at 1:15 p.m.

Attest:

Secretary and Chief of Staff