CAL POLY

2014-15 Academic Plan Report: Analysis of Cal Poly's Future Leadership Opportunities and Preliminary Recommendations

DRAFT Executive Summary, *Revised September 4, 2015*

Cal Poly's Academic Plan focuses on Cal Poly's future leadership role as a premier, comprehensive polytechnic university. Elaborating on the values in the University's Vision 2022, the academic plan addresses the overall character of the University as an inclusive academic community, its Learn-by-Doing educational philosophy, the academic programs it offers, its commitment to student success, and its approach to scholarship and creative activity. The plan then lays out the implications for future enrollment, and teaching and learning space. The following paragraphs summarize the direction in the plan based on a year of strategic thinking, discussion and analysis.

University Character and Academic Plan Themes

After studying trends in higher education and future forecasts, Cal Poly has identified two major themes:

(1) *Cal Poly's Identity as a Premier Undergraduate Residential, Learn-by-Doing Campus of the 21st Century,* and
(2) *Cal Poly's Opportunity for More Visible and Expansive Educational Leadership as a Model*.

Strategic planning discussions throughout 2014-15 recognized that the first goal is central to Cal Poly's future – but not sufficient. As knowledge expands in many fields, a baccalaureate education will no longer suffice for even entry-level work, and there is already a demand for the kind and quality of education Cal Poly offers that extends well beyond the traditional professional undergraduate degree.

Cal Poly can remain predominantly undergraduate and residential, and still pursue innovative initiatives in post-baccalaureate and alternative programs that expand on the University's mission and expertise, particularly Learn-by-Doing and the Teacher-Scholar model. Indeed, such initiatives can build on the central identity of the University by recognizing areas of excellence and opportunities for experimentation that are more challenging to incorporate in traditional undergraduate programs governed by state regulations and regional accreditation requirements.

A key advantage of Cal Poly's continuing residential emphasis is that it contributes to a holistic, interdisciplinary educational experience with other students as well as faculty and staff mentors. At the same time, the University is taking significant steps to improve the overall campus climate for students, faculty and staff – particularly to support a more culturally and ethnically diverse community.

The Co-Curriculum, Residential Community and Student Success

Cal Poly's academic plan explicitly recognizes that "learning occurs everywhere." National research has demonstrated that undergraduate student success depends upon engagement with activities and

support systems that complement and extend the formal curriculum. They include relatively traditional individual and group projects outside the classroom or lab as well as internships, service learning, field work and travel study. Faculty members actively sponsor many of these activities, some of which are discipline-specific and others interdisciplinary – for example, the Center for Innovation and Entrepreneurship is cross-disciplinary; and music, theatre and debate at Cal Poly involve students from all colleges. Traditional-age undergraduates also are involved in intercollegiate athletics, recreational sports, and student government.

In addition to these academic and co-curricular activities, Cal Poly has found that living on campus for at least the first two years is a major factor in student retention, and ultimate degree completion. Thus, the academic plan calls for enhancing the residential learning community as a central component of undergraduate education.

Research, Creative Activity and the Teacher-Scholar Model

In 2011 the Cal Poly Academic Senate adopted a resolution adopting the Teacher-Scholar model with an eloquent discussion of the meaning of this model for Cal Poly (AS-725-11). During academic planning discussions in 2014-15, a number of faculty members explicitly noted that they see the Teacher-Scholar model and Learn-by-Doing as reinforcing one another. Both involve just the kind of applied research and scholarship that fits well with the Cal Poly mission.

Cal Poly faculty noted that the University has much to gain – indeed much to offer – by being at the forefront in addressing global and regional trends. In order for Cal Poly to take advantage of these research and development opportunities and to pursue emerging fields, Cal Poly will need to be able to encourage scholarship, professional development and creative activity in these areas.

Implications for Future Enrollment

The final portion of the academic plan sets the stage for further analysis of the of the plan's enrollment implications. Two key considerations are the future size of Cal Poly, and the future composition of the University – particularly which academic programs will meet future societal needs and serve changing student demographics. The following summary is derived from the work of the Provost's Task Force on Enrollment, which met intensively during the winter and spring terms of 2015.

Enrollment Scenarios

Discussions of future enrollment need not just focus on growth, or the size of the University. Instead, we can think of different scenarios as both qualitative and quantitative, as follows.

(1) Academic Quality (independent of enrollment growth)
   • Restore and enhance academic quality (faculty, staff, campus climate, student success, services, facilities, technology) – The task force members recommended that Cal Poly prepare a revenue enhancement plan that addresses both operating and capital budgets that can be implemented in advance of or along with any enrollment growth scenario.

(2) University Size (both the timing and extent of growth)
- Define steady state – Perhaps, in the short-run, the University might not grow, and manage its enrollment very closely, especially before new student housing is available.
- Continue recent trends and adjust student mix (e.g., increase non-resident and post-baccalaureate enrollment) – For the purposes of the new physical master plan, a scenario extending recent trends leads to a future fall headcount of 25,000 students.

(3) Alternative Approaches to Enrollment Management (with or without growth)
- Accommodate alternative curriculum and scheduling strategies (e.g., Architecture fourth-year study away programs) – This scenario recognizes creative ways to expand and enhance student experience within the existing physical capacity of the campus.
- Explore integrated year-round operations (at a future time) – The task force identified a list of considerations that would need to be addressed in detail in order to meet the University's goals, and recommended further study.

Academic Program Composition

In considering the future mix of academic programs, the task force assumed that any new program or existing program seeking to increase its enrollment would demonstrate that it meets basic University expectations and recommended a set of criteria for review.

- Vision – program content and pedagogy designed to meet future societal needs
- Mission – premier, comprehensive, polytechnic
- Collaboration across disciplines
- University Learning Objectives
- Excellence
- Student level and composition – diversity, very broadly defined
- Student success
- Demand
  - Applicant pool (size, quality, yield)
  - Future prospects for graduates
- Sufficient cohort size (critical mass)
- Faculty and institutional support
- Resource requirements
  - Sustainable budget plan
  - Ability to attract and retain faculty and staff
  - Implications for University services beyond the unit offering the program
  - Facilities and technology
- Administrative requirements

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Drafted by Linda C. Dalton, PhD, FAICP, Interim University Planning Officer, Revised September 4, 2015

Introduction

Cal Poly's Vision 2022, adopted in May 2014, set the framework for more focused planning to follow.[1] The Academic Plan establishes the direction for Cal Poly's future leadership as the premier, comprehensive polytechnic university. The new Master Plan will translate the academic and programmatic requirements into the physical design of the campus.

This report begins with a brief discussion of the strategic planning context at Cal Poly and describes the planning process during the 2014-15 academic year. The next section summarizes the analysis completed during fall and winter terms, primarily by the University's academic department heads and chairs. It examines the factors affecting higher education, demographic forecasts, and other global and regional forces as applied to Cal Poly. The report then explores what these trends mean for future careers, and the kinds of knowledge and skills future students will need. The next portion of the report addresses implications for teaching, learning, scholarship and creative activity – and future learning environments. The analysis concludes with the ramifications for faculty and the Teacher-Scholar model.

The final portion of this report identifies two major themes and two areas for additional analysis, drawing from the analysis from fall and winter and from the work of the Provost's Task Force on Enrollment that met during the winter and spring terms.

Themes
- Cal Poly's Identity as a Premier Undergraduate, Residential, Learn-by-Doing Campus of the 21st Century – recognizing the continuing demand for the kind and quality of Cal Poly's residential educational experience.
- Cal Poly's Opportunity for More Visible and Expansive Educational Leadership as a Model – broadening Cal Poly's influence as a premier comprehensive polytechnic university.

Enrollment Implications
- Enrollment Scenarios – including quality restoration and enhancement, potential growth and options involving the student and/or program mix, and/or year-round operations.
- Future Academic Program Composition – applying a set of criteria for deciding which programs to add and/or expand based on the University's mission and vision for the future.

Next Steps – 2015-16

The two themes represent the general consensus of the 2014-15 discussions (although the second was less explicit than the first). Analysis of enrollment implications involves further deliberation by the academic community in order to refine the set of criteria for adding and/or expanding academic programs.

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[1] http://www.president.calpoly.edu/vision2022/

The Planning Context at Cal Poly

The diagram below illustrates how each level of planning guides the level below as it both builds on the past and extends into the future. The University's strategic planning, shown at the top, dates back to the early 1980's under President Warren Baker, with a major innovation in 1995 when the first campus-based fee was introduced (known as the Cal Poly Plan). Additional updates occurred in the first decade of the new century, followed by the development of Vision 2022 under the leadership of President Jeffrey Armstrong.

In the late 1990's the University developed an Enrollment Growth Plan, which provided direction for the physical Master Plan adopted in 2001. Now, the new Academic Plan applies the principles in Vision 2022 and guides the next physical Master Plan.

Both academic planning and master planning extend beyond the year 2022 because the principles in the vision statement will carry forward well into the future just as they have built on Cal Poly's foundation. While some of the goals in Vision 2022 can and will be accomplished in a shorter period of time, academic planning must prepare for the next generation of students, faculty and staff; and physical planning takes time to implement. Thus, the present planning initiatives are expected to guide the University for the next twenty years and beyond.

Concurrent Academic and Master Planning – A Brief Chronology

Throughout 2014-15, and into the following academic year, the academic and master planning processes have been running concurrently, so that the analysis and insights from each can inform the other.

During fall 2014, a series of academic planning workshops and department discussions explored future opportunities that build on the University's academic strengths. At the same time, the master plan process was exploring assumptions and constraints about the physical environment on and around the campus, and reaching out to engage the campus and broader community through presentations, open houses, and advisory committees. The President's Council of Advisers from the professions and industries that Cal Poly serves also weighed in with their thoughts about future forces affecting the University during their fall meeting; and the President held a leadership workshop in December to set high-level priorities. Associated Students, Inc. followed up with an open house in January.

During winter 2015, the academic colleges continued their work with a discussion of emerging approaches to teaching and learning, which they then translated into implications for effective learning environments. In addition, the academic and physical planning analysis were brought together during the winter and spring of 2015 under the guidance of the Provost's Task Force on Enrollment to inform the University and the community about the potential future capacity of the campus. This discussion will, in turn, guide future enrollment overall and by discipline, and the physical development needed to accommodate instruction, information systems, other academic activities, support programs, student housing, and the necessary infrastructure.

In 2015-16, the master plan process will continue, as the specific elements are drafted, followed by a full review of impacts on and off campus, as required under the California Environmental Quality Act (CEQA). The University expects to complete the new master plan during 2016 for submittal to the California State University Board of Trustees for approval the following spring (2017).

Analysis of Cal Poly's Future Leadership Opportunities[2]

As a premier comprehensive polytechnic university, Cal Poly sees its future as one of opportunity – to anticipate – and even more to shape – development in existing and emerging fields and cross-disciplinary applications. With this in mind, the academic planning process conducted an environmental scan to bring the factors that could affect the University's future to the forefront. As a framework for this analysis, Cal Poly adapted the concept of "Planning from the Future Backward" from Donald Norris and colleagues.[3] Participants drew upon the general literature as well as information specific to their fields in thinking about future forces and the implications for Cal Poly. The work was organized in three tiers, as follows:

Tier 1 – Higher Education Today and in the Future

Tier 2 – Projections to 2030
- Demographic Trends and Student Expectations
- Global and Regional Trends
- Implications for Future Careers
- Future Knowledge and Skills
- Emerging Fields and Integrated Learning

Tier 3 – Implications for Curriculum, Pedagogy and Space
- Teaching, Learning and Scholarship
- Learning Environments

After an opening session in October 2014, Tier 1 and Tier 2 were completed during the Fall Quarter and Tier 3 during Winter Quarter 2015. The initial analysis for all three tiers occurred at the academic program level, aggregated by college, and then synthesized for the University. The discussion below represents the highlights – both of the common findings across the University, as well as examples of important distinctions at the college and/or program level.

Tier 1 – Higher Education Today and in the Future

The Cal Poly community easily identified the primary challenges affecting higher education that are highly likely to continue into the future:

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[2] This effort was supported by the Office of Academic Programs and Planning. The Academic Planning website contains a full record of the work sessions, materials, and reports submitted during the 2014-15 academic year. See http://guides.lib.calpoly.edu/planningresources

[3] Donald Norris *et al.* (2013), Transforming in an Age of Disruptive Change: Part 2: Getting Started, Getting it Done, *Planning for Higher Education*, 41:2, Figure 7.

- Declining public funds*[4]
- Increasing dependence on private sources of funding*
- Increasing public frustration with and political intrusion in higher education*
- Student debt

They also underscored how California State University system policies and practices often constrain Cal Poly; and noted that the legislature has now enabled community colleges to offer four-year degrees in selected fields. Faculty in the College of Science and Math and the College of Agriculture, Food, and Environmental Science also commented that reductions in federal grant funding affect their research opportunities. The faculty recognized the importance of increasing student debt in general, even though tuition and fees in the CSU remain modest compared with other public universities.

Implications for Cal Poly. During the discussions, faculty and other leaders thought a lot about the implications of the general trends in higher education, emphasizing the importance of differentiating Cal Poly. In particular, they stressed that Cal Poly provides a distinctive learning experience for students that will continue to have a market. They recognized that Learn-by-Doing is more expensive because it involves smaller classes and labs in hands-on learning activities. At the same time, they argued, these features are what make a Cal Poly education so effective, especially when coupled with a holistic residential experience.[5]

Tier 2 – Projections to 2030

a. Demographic Trends and Student Expectations

Major demographic trends and changes in the college-going population are likely to affect Cal Poly in different ways.

- Increasingly diverse population (broadly defined)*
- Expanding demand for student support services*
- Uneven preparation of students by the K-12 system*
- Changing expectations about how students learn*

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[4] During a retreat in December 2014, Cal Poly leadership considered the topics marked with an asterisk to be among the top ten factors in importance (and over which Cal Poly has relatively little influence).
[5] While much of the popular literature conflates all aspects of higher education – criticizing tuition increases, student debt, poor graduation rates, limited learning and weak employment propsects – the more analytical studies stress that higher education is not a homogeneous commodity. Consequently, the future prospects differ significantly based on institutional mission and niche. See, for example, the highly cited book by Clayton M. Christensen and Henry J. Eyring, *The Innovative University: Changing the DNA of Higher Education from the Inside Out* (San Francisco: Jossey-Bass, 2011); as well as work such as Michael Barber, Katelyn Donnelly, and Saad Rizvi, *An avalanche is coming: Higher education and the revolution ahead* (London: Institute for Public Policy Research, 2013) and Tom Kennie and Ilfryn Price, *Disruptive innovation and the higher education ecosystem post-2012* (London: Leadership foundation for Higher Education, 2012) – as compared with journalist Jeffrey J. Selingo, *College (Un)bound: The Future of Higher Education and What It Means for Students* (Las Vegas: Amazon, 2013).

- Decreasing birth rate and number of students graduating from high school

First, the University community is very aware of the changing population in California and beyond, and committed to increasing student, faculty and staff diversity – particularly in the STEM fields. In addition, Cal Poly may be serving more students who enter as junior transfers, as well as post-baccalaureate and international students. The campus recognizes that student success in the future may require a wider variety of services than in the past – starting with housing, financial aid and counselling, and potentially covering physical and mental health and wellness.

As stated at one workshop, Cal Poly sees "… a strong opportunity to become a site for preparing [a more diverse population] for the work force. It presents the increased opportunity for transfer and non-traditional student pipelines, 1st Gen services, and curriculum that connects to that population's identity and harnesses their potential."

At the same time, the University community is concerned about student preparation in the K-12 system. While there is hope that the Common Core and Next Generation Science Standards will improve students' backgrounds in science and math, the campus recognizes that the ability to deliver on these standards varies significantly among school districts across the state. In addition, faculty in the College of Liberal Arts, in particular, are concerned that students are entering college with weaker critical thinking and writing skills than in the past.

The University is very interested in following research on how students learn – and the implications for how Cal Poly can personalize education and accommodate different learning styles. Future generations of students are likely to have become used to unfiltered access to information and to many digital devices, yet faculty and information technology staff question whether they will really be "tech literate" and able to handle digital distractions. And some university leaders think that the increasing use of technology may mean that students' social and interpersonal skills may be less sophisticated.

Implications for Cal Poly. The final population trend listed above, decreasing birth rate, was not considered among the top ten for Cal Poly because of the University's high demand and selective admissions. Nonetheless, the University community is aware that it is important to follow this trend as competition increases nationwide for highly qualified students.

b. Global and Regional Trends

Members of the community and industry advisers identified many global forces that will affect Cal Poly in the future. While some impose difficult challenges, the University's response was optimistic, seeing significant opportunities to expand curricula and assume leadership in higher education.

- Globalization*
- Climate change and other environmental factors*
- Technology*

Cal Poly faculty felt that globalization will continue to expand markets for graduates in many fields, spurring innovation and product development. This underscored the need for more educational

opportunities for experience aboard, learning languages, and increasing facility for working with people from other cultures. At the same time, some faculty and industry advisers warned about political uncertainties and security risks – but even addressing them creates research and education opportunities for some Cal Poly fields.

Implications for Cal Poly. Environmental factors also generate both issues and opportunities. Resource limitations (e.g., water) and natural hazards (e.g., earthquakes) directly affect university operations and the lives of students, faculty, and staff. They also lend themselves to academic study and development of professional best practices in several Cal Poly colleges and for cross-disciplinary work. Similarly, faculty members recognize that technological change can be a source of consternation when one is trying to stay abreast of new developments. Yet, Cal Poly faculty, students and graduates often work at the forefront in inventing these very same technologies.

c. Future Careers

The analysis of institutional, demographic, and global forces leads directly to thinking about what the future careers of Cal Poly graduates will be like. Cal Poly faculty, staff, industry advisers, and students tend to agree with more general futurist thinking about how career trajectories are changing – e.g., multiple, sequential careers with different organizations and/or independent work.[6] Most importantly, Cal Poly graduates will help meet the demand for a highly-educated workforce that is adaptable to new opportunities (or, indeed, creates such opportunities as leaders).

d. Future Knowledge and Skills

Cal Poly's discussions of the kinds of knowledge and skills future graduates will need were very consistent with what employers seek in terms of general competencies: oral and written communication, working with others, ethical judgment, critical thinking, ability to apply knowledge to real-world settings, addressing complex problems, working with multiple information sources, being innovative and creative, and possessing global awareness and cultural competence, etc.[7]

Implications for Cal Poly. Cal Poly faculty went further, though, and added specific attributes to some of these competencies. For example, they expected students to acquire competency in graphic or visual communication, sensitivity about social equity and justice, leadership skills, and the ability to handle uncertainty and ambiguity and manage change. Cal Poly faculty also stressed the importance of what they term "life skills" – reflection, self-direction, work-life balance, work ethic, professional conduct, accountability for personal behavior, and responsiveness to clients/customers, employers and community.

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[6] See, for example, annual forecasts from the World Future Society – www.**wfs**.org

[7] Hart Research Associates, *Falling Short? College Learning and Career Success: Selected Findings from Online Surveys of Employers and College Students* (Conducted on behalf of the Association of American Colleges & Universities, January 20, 2015).

Then, for each college, faculty stressed areas of mastery for each discipline – building on foundational theory and rigorous training to apply their emerging knowledge and skills to contemporary situations in their respective fields. For example, Architecture and Environmental Design spoke to life cycle design; Agriculture, Food and Environmental Science recognized the transition from production to service in their industries; Engineering stressed the importance of application to whole industries; Liberal Arts emphasized how its fields must continue to value the human condition as we encounter new situations; Science and Math underscored the significance of discovery; and the Orfalea College of Business highlighted entrepreneurship and risk management.

Faculty in all six colleges anticipated that the baccalaureate degree will be supplanted by the master's and/or additional post-baccalaureate certification as the minimum qualification for professional success. Thus, offering more advanced degrees and credentials is an opportunity for program development.

e. Emerging Fields and Integrated Learning

The discussion of emerging fields elicited some of the most far-reaching thinking, with faculty from all colleges seeing significant opportunities for research and applications that cut across traditional disciplines. For example:

- Business and industry
- Data analytics, data management, data science – "big data"
- Entrepreneurship
- Environment and sustainability
- Health and well-being
- Product design
- Science, technology and society

One comment suggested that integrated learning beyond traditional disciplines "could be the General Education of tomorrow." While faculty identified many challenges to achieving true cross-disciplinary work, they also proposed a number of creative forms, consistent with Cal Poly's tradition – such as interdisciplinary senior projects or other collaborative applied projects.

Tier 3 – Learning, Pedagogy, and Space

During the Winter Quarter 2015, the academic programs focused on two questions: (a) emerging approaches to teaching and learning (including ramifications for the teacher-scholar model), and (b) implications for learning environments. Concurrently, the master plan advisory committee on academic and instructional space explored the same topics.

The following general themes about student learning emerged:

- Learning occurs everywhere, both within and outside structured learning environments.
- Learning engages faculty and students beyond the classroom.
- Learning involves social and collaborative interaction.

- Learning and creativity require individual reflection and thought.
- Learning is active and experiential (Learn-by-Doing, problem/project-based).
- Learning happens when students are empowered.
- Learning crosses disciplines.[8]

Following these themes, implications emerged for spaces and facilities that can accommodate informal learning as well as more formal, structured teaching.

Formal, structured learning continues to occur in the classroom and laboratory, even as pedagogical techniques have changed to increase engagement and empowerment. Examples include multi-mode and hybrid instruction and "flipped" classes for a wide range of topics, and problem-based/ project-based, Learn-by-Doing laboratories. Structured and engaged learning is very familiar for the professional colleges, particularly CAED with the studio tradition in design, CAFES with experiential courses, and CENG with vertically-integrated projects. The College of Science and Math introduced "studio labs" during the 1990s to integrate lecture and lab seamlessly in courses involving students actively in science experiments. Disciplines in the College of Liberal Arts highlight sensitivity to the social/cultural context their projects, and the Orfalea College of Business aspires to be "the undisputed leader in experiential business education." While some disciplines require specialized equipment and fixed configurations, most seek flexible, adaptable space and furniture, so that the instructor can deploy different teaching methods across the term and sometimes even within a single class session.

Informal, structured learning takes place in experiential and co-curricular settings outside the classroom in which the learning outcomes and experience are managed by an instructor, coach, or adviser; and sometimes leads to regular academic course credit. Examples range from internships, service-learning, field work and travel study that are directly connected with a student's major to formally organized co-curricular activities such as athletics, recreational sports and student government. Some discipline-specific and inter-disciplinary examples include enterprise projects in agriculture; competitions in architecture and engineering; music, theatre, and debate activities organized through the College of Liberal Arts that engage students across the University; and activities sponsored by the Center for Innovation and Entrepreneurship. Specific facility needs vary significantly based on the specific activity – e.g., "messy" project space for engineering, interior and exterior demonstration areas for architectural projects, research and performance facilities for music and theatre – yet all share a common need for flexible collaboration space.

Informal, less-structured learning also happens when students work on campus, participate in clubs and organizations, and study together. The Teacher-Scholar model also offers opportunities for students to learn alongside faculty conducting research and participating in projects through informal mentoring, role modeling, conference participation, and other serendipitous activities. All colleges sponsor disciplinary and/or theme-based clubs – and typically encounter challenges finding appropriate (dedicated) space for ongoing activities. Similarly, faculty members in all colleges involve students in research projects and need informal space for small group interaction – as well as specific facility

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[8] Cal Poly Master Plan Advisory Committee on Academic and Instructional Space, major themes (March 2015).

requirements depending upon the nature of the research activity. In many instances, faculty and students use teaching labs during the summer to conduct research.

All forms of learning – formal and informal, structured and less-structured – depend on ubiquitous connectivity, indoors and outside, throughout the campus and with off-campus locations in San Luis Obispo and beyond. Most equipment has an information technology component. Obsolescence and costs are universal challenges.

Another cross-cutting theme is balancing access with security and safety. Faculty members want students to be exposed to challenging problems, explore new ideas and techniques, and take risks, but these experiences need to be "calculated" – that is, conducted within learning environments where experimentation can be managed, and faculty and students can assess and reflect on the consequences of failure. Some faculty members feel that risk-averse institutional policies over-protect students and consequently limit learning opportunities.

Ramifications for Faculty and the Teacher-Scholar Model

In 2011 the Cal Poly Academic Senate adopted a resolution adopting the Teacher-Scholar model with an eloquent discussion of the meaning of this model for Cal Poly (AS-725-11). While the academic planning discussion above has focused on student learning, it is laced with references to the work of faculty, particularly in their role as teachers. This section reverses that emphasis on faculty as teachers to concentrate on faculty involvement in scholarship and creative activity. The Academic Senate resolution and a number of the departmental narratives in fall 2014 and winter 2015 referred to the need to remove impediments as well as provide resources to support the Teacher-Scholar model.

Tier 1 – Higher Education Today and in the Future: Funding uncertainties directly affect faculty as compensation has not kept pace with competitive salaries in many disciplines and the cost of living in the San Luis Obispo area. This affects the ability of the University to recruit and retain faculty of the caliber demanded by a premier comprehensive polytechnic university – and in the fields most likely to develop and expand in the future. Further, as already noted above, reductions in federal grant funding affect research support, particularly problematic at a time when more research and analysis is needed in emerging fields. Funding limitations also affect the University's ability to adjust faculty workloads to balance teaching with scholarly and creative activities.

Faculty members in Agriculture, Food and Environmental Science, Engineering, and Science and Math see the potential for private funding to support research and development – particularly when partnerships between Cal Poly and the sponsoring organization can be formed to benefit both. On the other hand, faculty members in a number of fields expressed concern about intellectual property as well as what avenues of research are supported by corporate and private non-profit sponsors.

Tier 2 – Projections to 2030: Cal Poly faculty noted that the University has much to gain – indeed much to offer – by being at the forefront in addressing global and regional trends. In order for Cal Poly to take advantage of these research and development opportunities and to pursue emerging fields, Cal Poly will

need to be able to encourage the scholarships of "discovery, application, and integration" in these areas.[9] This implies providing support for professional development as appropriate to each field – including, but not limited to, visiting positions at Cal Poly, exchanges with employers, and team research and demonstration projections with professionals elsewhere as well as traditional research, fieldwork, publication, creative activity, conference participation and sabbatical study.

<u>Tier 3 – Learning, Pedagogy, and Space</u>: Faculty members in several colleges explicitly noted that they see the Teacher-Scholar model and Learn-by-Doing as reinforcing one another. Indeed, both involve just the kind of applied research and scholarship that fits well with the Cal Poly (and California State University) mission. Further, this close relationship brings to bear Boyer's fourth form of scholarship – the scholarship of pedagogy – which encompasses an understanding of how students learn.

A number of the departmental narratives noted implications of the Teacher-Scholar model for facilities. Dedicated space *per se* for research and creative activity is required first and foremost (as appropriate to the discipline), and visiting scholars or professionals require office as well as research accommodation. Further, consistent with Cal Poly's emphasis on student engagement, faculty members seek space to collaborate – with students and with one another in their scholarship and creative activity.

Most faculty offices accommodate only one or two guests. While projections emphasize that the work space of the future may de-emphasize individual offices and enclosed work areas, faculty and students need privacy for mentoring. Moreover, much research still requires fixed facilities or consistent locations. Faculty in the College of Science and Math, for example, commented on the value of long-term research projects that involve successive generations of students (and sometimes faculty) in studying a phenomenon or succession of events.

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[9] Ernest L. Boyer, *Scholarship Reconsidered: Priorities of the Professoriate* (Princeton, NJ: The Carnegie Foundation for the Advancement of Teaching, 1990).

Major Themes and Additional Analysis

Two major themes emerge from the academic planning process to date. Both address the continuing nature of Cal Poly itself, drawing from the analysis and reflections that occurred throughout the 2014-15 academic year. These two themes then lead to the need for additional analysis, focused directly on enrollment – both the size of the University and the future composition of academic programs.

Themes

I. Cal Poly's Identity as a Premier Undergraduate, Residential, Learn-by-Doing Campus of the 21st Century

The research regarding higher education and the deliberations of Cal Poly's department heads, chairs and other leadership during the 2014-15 year suggest, first, that the University needs to underscore its distinctive role in higher education as a premier, comprehensive polytechnic university. A baccalaureate degree from Cal Poly is special; a Cal Poly graduate is better prepared for the future – even though state requirements and accreditation standards ensure some degree of consistency at the baccalaureate level across institutions.

Despite popular journalism and commentary to the contrary, students, their families, and employers (as well as colleagues at other universities) know that higher education is not homogeneous – institutions have particular missions and serve different student and societal needs. There are very few polytechnic universities; and Cal Poly is one of very few public polytechnic universities in the United States. As a result, Cal Poly's education is more affordable than that provided by sister polytechnics that are private.

Cal Poly must continue to hone what this means. Vision 2022 emphasizes the importance of excellence, student success, and inclusivity. These are vital, but not sufficient to distinguish Cal Poly and secure the University's financial future. Learn-by-Doing, of course, is at the core.

The University's master planning process to date has renewed the campus community's understanding of the importance of location and the quality of physical space. While the University recognizes that learning can occur anywhere, it is not equally effective everywhere. For example, seating arrangements, lighting, air quality, and acoustics affect learning in the classroom and lab as well as in more informal settings. Data show that students who live on campus in our residential communities for a minimum of two years are more successful than those who move off campus for their second year.

The Cal Poly community understands that some Learn-by-Doing activities can, and should, occur virtually and digitally – for example, experimentation with risky chemicals or accessing huge, international data bases. Yet, a synonym for Learn-by-Doing at Cal Poly is "hands on learning" – there is nothing like working on a solar car, studying how a crop matures, analyzing ocean currents, simulating a new built environment, learning a spoken language, or practicing music together in real time.

In sum, the research conducted as part of the academic planning process shows that Cal Poly needs to demonstrate how the residential, Learn-by-Doing campus of the future builds on the University's rich

and successful history and can extend these benefits to the next generations of students and graduates who will serve the State of California and beyond.

For example,

- Residential students can focus on their education – whereas in the past this tended to detach them from urban and global concerns, technology can now keep students in touch with the world outside.
- Faculty who teach in a rural setting tended to be isolated from their colleagues, but are now part of their global scholarly communities.
- Staff development was limited to opportunities nearby, or occasional training scheduled away from campus, while now a much broader range of resources can be accessed online.
- Learn-by-Doing used to be constrained by the land, facilities and equipment at hand. Now it can take advantage of concurrent work and draw upon comparative data collected elsewhere.
- Formerly, students in small towns were separated from their families and cultural communities, limiting student diversity; now they can stay connected with their support systems.
- Students and faculty depended on conferences, field trips, travel study, and internships to expand their horizons. While these remain important direct experiences, they can be supplemented by virtual means.
- The residential campus of the past sent students home or to work for the summer. Now the University has the flexibility to explore educational and internship opportunities year-round because students (and faculty) who are away at any time can remain connected as well.

In other words, the premier comprehensive polytechnic university uses 21st century technologies to expand on its effective learning tradition. The University community expects the demand for a Cal Poly education to continue to grow – because students and their families understand what they will be able to learn by attending and because employers appreciate the kind of preparation Cal Poly provides for life, leadership, and careers.

II.   Cal Poly's Opportunity for More Visible and Expansive Educational Leadership as a Model

The first theme addresses Cal Poly's traditional strength in higher education and focuses on its transformation in the 21st century. The strategic planning discussions throughout 2014-15 recognized that this is central to Cal Poly's future – but not sufficient. Thus, a second theme emerged around opportunities for Cal Poly to lead in areas of education beyond the traditional undergraduate degree. For example, department heads and chairs in all colleges noted that many fields are starting to require education beyond the baccalaureate degree because of the expanding (often multi-disciplinary) knowledge and skills involved – even for entry-level work. Professional development, particularly in rapidly-changing areas, is also critical to meeting future workforce expectations. These needs for post-baccalaureate education can be met by offering certificates and other kinds of credentials as well as full graduate degrees.

Cal Poly already has many areas of excellence and pockets of experimentation – in its academic departments, in research centers and institutes (such as the Irrigation Training and Research Center), in International, Graduate and Extended Education, in the Active Learning Lab in the Kennedy Library, in the Center for Innovation and Entrepreneurship, and in the Tech Park. Yet they tend to be overshadowed by state-supported undergraduate education. The University needs to elevate these activities to a higher level of importance and visibility for four reasons:

- Cal Poly's faculty and staff have extensive expertise that can contribute to meeting societal needs beyond undergraduate education.
- Innovative programs can deliver education in multiple ways, reaching out to the University's own graduates as well as other professionals.
- Research, professional development and extended learning activities can generate and experiment with knowledge, techniques, and educational practices that can feed back into undergraduate education in the future.
- Non-traditional activities can be designed to share expenses and generate revenues that can support residential, Learn-by-Doing education.

Cal Poly can remain predominantly undergraduate and residential, and still pursue these kinds of initiatives because they build on the University's mission, particularly Learn-by-Doing and the Teacher-Scholar model – and reinforce it by providing opportunities for experimentation and innovation that are more challenging to incorporate in traditional undergraduate programs governed by state regulations and regional accreditation requirements.

Enrollment Implications

<u>Alternative Enrollment Scenarios</u>

During Winter Quarter 2015, the Provost's Task Force on Enrollment[10] focused initially on the future size of Cal Poly and potential revenues and costs associated with current enrollment or future growth. To do so, the task force gathered input from university and community constituencies, primarily through the academic and master planning processes already underway, regarding the topics that should be considered.[11]

The task force identified the following range of scenarios or options. As they are <u>not</u> mutually exclusive, the task force anticipated that elements of several could be incorporated eventually in an enrollment plan for the future.[12]

A. Enhancement of Academic Quality and enrollment changes characterized by an increase in diversity and measures of student success (such as better retention rates), made possible by increased in support and funding.

B. University Size

- Current Situation – Steady state (no growth in enrollment or revenues; no changes other than continued aging of all resources).

- Recent Trends – Changes in enrollment and revenues based on continuation of recent trends, including marginal additions to enrollment driven by CSU funding, with no other additional revenues.

- Student and/or Program Composition – Changes in the number or proportion of students by geographical origin and/or level as well as changes in the academic program mix.

C. Enrollment Management Approaches

- Curriculum and Scheduling Strategies – Designing curricula with planned study abroad/study away terms, which both enhances the student learning experience and allows for operational efficiencies in facility scheduling (such as the fourth year in Architecture)

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[10] Members: from Academic Affairs: Linda Dalton (convener). Annie Holmes, Kimi Ikeda, Johanna Madjedi, Jim Maraviglia, Mary Pedersen; Deans: Scott Dawson (associate dean Kevin Lertwachara), Douglas Epperson, Debra Larson; Graduate Programs: Richard Savage; Administration and Finance: Victor Brancart, Joel Neel, Julie Moloney; Student Affairs: Keith Humphrey, Preston Allen; University Advancement (communications): Chris Murphy; Constituencies: Joan Kennedy (staff), Gary Laver (Academic Senate), Jacob Rogers (ASI student government).

[11] Deliberations were also guided by remarks made by Provost Kathleen Enz Finken's to "Good Morning, SLO" on January 22, 2015 and by President Jeffrey Armstrong to the Cabinet local economic development committee, master plan advisory committees, faculty and student leadership, and other community and campus constituents on February 13, 2015.

[12] The text that follows has reorganized the task force's summary of enrollment scenarios.

- Integrated Year-Round Operations – Enrollment changes and potential operational flexibility and efficiency driven by incorporating summer quarter as an integral aspect of a Cal Poly education.

The first scenario (A) expresses the importance of enhancing quality in order to achieve the University's goals and values as expressed in Vision 2022, particularly those that the President and Provost have emphasized as 'inextricably linked' – student success, diversity, and financial security. The first two scenarios that address University size (B), Current Situation and Recent Trends, represent no, or very little, change. The third University size scenario introduces some changes in student mix. The final scenarios (C) offer several means to educate more students through operational changes that reduce the need for physical facilities.

The task force's initial findings led to the following implications and recommendations.

- Most importantly, Cal Poly cannot sustain its competitive advantage and vision as the premier comprehensive polytechnic university in the country unless the University can do something different. Specifically, a revenue enhancement plan that addresses both operating and capital budgets needs to be implemented in advance of or along with any enrollment growth scenario.

- Analysis of the current situation and recent trends illustrates that the status quo is not tenable. If current conditions persist, Cal Poly will continue to lack sufficient operating and capital resources to support quality education. If not addressed, this dilemma would continue with no change or even a reduction in enrollment because costs exceed regular revenues and the annual budget is balanced from one-time funding sources.

- The summary of quality factors that need to be addressed independent of any potential change in enrollment includes (1) cumulative effects of deferred maintenance and inequities in compensation (in a high cost-of-living area), as well as (2) investment in the future in order to meet the University's goals and expectations.

- The analysis of scenarios that might alter student or program composition, or how the curriculum is delivered, was limited by the lack of detailed information about the true costs of instruction and total costs of educating Cal Poly students. For example, the task force was aware that the total cost of serving an international or domestic non-resident student may differ from a California resident, depending upon individual circumstances, and that with changing demographics nationwide, the future market needs further analysis. Nonetheless, the task force had sufficient data to confirm that non-resident student tuition already helps to cover educational costs for all students. Thus, a modest increase in the proportion of domestic non-resident students is a logical component of enrollment growth.

- In its initial consideration of potentially integrating year round operations, the task force identified a list of considerations that would need to be addressed in greater detail in order to meet the University's goals, and recommended extensive further study.[13]

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[13] The task force members stressed that the potential for year-round operations would require additional study by the Cal Poly community in the future.

Future Academic Program Composition – What to Add or Expand

During spring 2015, continuing to build on the academic planning discussions earlier in the academic year, the Provost's Task Force on Enrollment suggested that future deliberations about academic programs consider the following attributes of leadership as a premier comprehensive polytechnic university.

For the purposes of its report, the task force defined an academic program as any intentional set of courses or curriculum approved by the faculty with specific learning outcomes. Completion of a program may lead to a traditional baccalaureate or post-baccalaureate degree; other programs are designed as minors, certificates, teaching credentials or other modules. An academic program may be offered through a variety of funding mechanisms (state or self-support), delivered by a range of instructional modes, and offered to various student audiences according to a published calendar.

First, the task force assumed that any new program or existing program seeking to increase its enrollment would demonstrate that it meets basic University expectations. In addition, when considering the balance among programs, the task force recommended considering the following criteria: [14]

- Vision

  - Cal Poly's emerging academic plan emphasizes Cal Poly's leadership in offering program content and using pedagogy designed to meet future societal needs, so new or expanding programs that demonstrate their ability to achieve this vision should be given priority.

- Mission

  - As a comprehensive polytechnic university, Cal Poly recognizes that one of its hallmarks is the intersection between building comprehensive knowledge and skills for life and applying specialized knowledge and skills to professions. As a premier, comprehensive, polytechnic university, it is essential that all colleges contribute to an applied emphasis on addressing real-world problems, pairing technological innovation with contextual understanding of relevant behavioral, cultural, ethical, and social nuances and parameters.

  - The University's Learn-by-Doing philosophy applies across these academic domains as well so plans for adding or expanding a program need to show how the program can accommodate applied learning in formal classroom or lab settings and/or in broader co-curricular activities that are central to the particular discipline.

- Collaboration across Disciplines

  - Cal Poly's emerging academic plan emphasizes the value of inter- and multi-disciplinary learning. To expand such opportunities, new programs that meet the other criteria and integrate understanding and application of knowledge and skills across traditional

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[14] The suggested criteria regarding future academic program composition have been reorganized from the task force's final report.

disciplines should be given priority, and supported by appropriate administrative infrastructure.

  – The "wicked" problems[15] we confront require such an interdisciplinary approach, and Cal Poly's leadership position will depend on how well it can accomplish this. Cal Poly cannot afford to seek preeminence in technical fields only. Instead, Cal Poly must continue to be a leader in disciplinary expertise, in contemporary and emerging technical fields, AND must become a leader in integrating the liberal arts and basic sciences (the comprehensive anchors of the university) with professional (polytechnic), business and entrepreneurial programs into interdisciplinary problem-solving efforts.

- <u>University Learning Objectives</u>

  – Cal Poly recognizes that it is neither necessary nor appropriate for each individual academic program to address all of the University's Learning Objectives equally. Thus, as programs are added or expanded, an overall balance needs to be maintained so as to ensure that all graduates can achieve all ULOs.

- <u>Excellence</u> (existing program) or potential for excellence (new program)

- <u>Student Level and Composition</u>

  – Cal Poly seeks actively to increase ethnic, racial, and socio-economic diversity overall (and gender diversity in certain fields). Programs at all levels earmarked for growth and new programs must be able to demonstrate their ability to attract and successfully educate a more diverse student population.

  – Cal Poly expects that its academic programs will continue to focus primarily on traditional-age undergraduate students who are admitted through a selective process and live on campus or nearby in a residential learning environment for at least their first year or so.

  – Post-baccalaureate and graduate programs as well as non-degree programs should complement programs serving undergraduates, consistent with the University mission. During the academic planning process, all six colleges anticipated that the baccalaureate degree will be supplanted by the master's and/or additional post-baccalaureate certification as the minimum qualification for professional success. Thus, offering more advanced degrees and credentials is an opportunity for program development.

  – As a public institution in California, most of Cal Poly's students will continue to be California residents. Nonetheless, domestic non-resident and international students increase geographic and cultural diversity, which are important attributes of higher education.

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[15] Horst Rittel and Melvin Webber. "Dilemmas in a General Theory of Planning." *Policy Sciences*, 1973: 155-169. See also, Jon Kolko, ***Wicked Problems: Problems Worth Solving*** (Austin Center for Design, 2012): "A wicked problem is a social or cultural problem that is difficult or impossible to solve for as many as four reasons: incomplete or contradictory knowledge, the number of people and opinions involved, the large economic burden, and the interconnected nature of these problems with *other* problems."

- Student Success

  - Persistence (retention and graduation) by students in their academic program of choice.

  - The University needs to identify and provide for services appropriate for a more varied student population, including, for example, advising for veterans, housing during breaks for students from afar, dining options for different ethnic and cultural groups, faculty and staff training for serving international students, etc.

  - Most undergraduate programs at Cal Poly are currently designed to enroll students as freshmen. Programs that admit community college transfer students and/or accept students who change major should be designed so that students who enter as juniors can complete their degrees in a timely manner.[16]

- Demand

  - A strong applicant pool, with trend data showing that the size and quality of the pool is sufficient and sustainable for the proposed enrollment in the program.

  - High yield – or proportion of admitted students who enroll, reflecting student preference for Cal Poly.

  - Appropriate future prospects for graduates, e.g., in the work force or for more advanced study.

- Cohort Size

  - Critical mass of students and faculty to ensure that required courses can be offered frequently enough for students to stay on track toward degree completion;

- Faculty and Institutional Support

- Resource Requirements

  - A new or expanded program needs to include a sustainable budget plan, showing explicitly where it might generate revenues beyond tuition and fees associated with enrollment (if appropriate) as well as where it may need to be subsidized, so that the overall balance among programs can be weighed. Capital as well as operating costs need to be addressed – to account for facilities, equipment, technology, and any other factors particular to the discipline, curriculum, mode of delivery, or student clientele.

  - Ability to attract and retain faculty and staff required to support the program at the proposed enrollment level.

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[16] The task force members understand that parallel discussions in Academic Affairs are addressing the internal change of major policy.

- In its interim report in March 2015, the task force stated that "a revenue enhancement plan that addresses both operating and capital budgets needs to be implemented in advance of or along with any enrollment growth scenario" and that this plan needs to address quality recovery as well as enhancement. The task force recognizes that many services and costs are shared across the University and thus difficult to attribute to a particular program.

- **Administrative Requirements**

  - The University also needs to weigh the administrative infrastructure needed to support new or expanded programs, and ensure that appropriate systems and processes are in place prior to implementing a program. For example, the University might favor expanding or adding programs that can be supported by common policies and automated practices, and modify or limit the number and/or size of programs that require special handling until administrative routines are in place to support them.

Next Steps – 2015-16

The two themes and additional analysis can be pursued concurrently during the 2015-16 academic year.

__Themes__

First, the University community can publicize the Residential, Undergraduate, Learn-by-Doing Campus of the 21st Century concept as descriptive of how the core value and successful pedagogy of hands-on learning is being extended and transformed across the University to serve future generations.

Second, Cal Poly can explicitly endorse the importance of recognizing and extending its educational leadership. One way to do so would be to incorporate the resources, revenues, and enrollments directly in budget and enrollment planning. In addition, Cal Poly may want to consider establishing the academic equivalent of a corporate "skunk works," underscoring the value to the institution's overall health of having units that are expressly asked to think differently.

__Enrollment Implications__

Third, with respect to future enrollments, the master plan process can continue with multiple scenarios – focusing on the implications of extending recent trends (with adjustments to reinforce academic quality). Master plan phasing does not assume that enrollment growth would occur evenly over the next twenty years, but rather looks at a future "build out." As the physical and environmental analysis need to address the maximum potential size of the campus, the plan is being prepared to accommodate a future fall enrollment of 25,000 students – the logical extension of recent trends with a modest increase in domestic non-resident students. The master plan – and particularly the EIR – also address other enrollment scenarios, including a lower total enrollment and the possibility of integrating year-round operations. These other options would limit the increase in fall headcount, requiring less educational space and student housing for any single term. In contrast, integrated year-round operations would extend some impacts (such as traffic and resource consumption) over twelve months instead of nine.

Fourth, the academic community can discuss and refine the suggested criteria for adding and/or expanding both traditional and non-traditional academic programs. Then, data can be assembled to apply the criteria to future academic program decisions. The physical master plan is being designed to provide sufficient educational and support space to accommodate the maximum enrollment with Cal Poly's Learn-by-Doing approach. As specific facilities are programmed, adjustments can be made to accommodate the specific facility and equipment needs of in the disciplines identified for growth.