Implementing Content Review for Communication and Computation Prerequisites

Academic Senate for California Community Colleges

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Content Review Paper Ad Hoc Committee
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Abstract

This paper is one of a collection of papers written by the Academic Senate for California Community Colleges (ASCCC) to support the use of content review as the basis for establishing communication and computation prerequisites. *Student Success: The Case for Establishing Prerequisites Through Content Review* was adopted at the Fall 2010 Academic Senate Plenary Session and provides the rationale for recommending a Title 5 change that would permit the use of content review as the primary means of validating communication and computation prerequisites. This paper serves as a follow-up to the earlier one, providing guidance for local colleges that wish to move from statistical validation of prerequisites to reliance on content review. While content review has always been a required component of the process of assessing the skills needed for student success in a given course, the use of content review absent statistical validation will require a review and possible modification of existing content review processes to ensure the necessary rigor. A third paper on the use of multiple measures, a component of the assessment for placement process is also planned. Any change in local prerequisite practices that increases the use of communication and computation prerequisites will require planning to ensure that resources are allocated to meet any increased demand for assessment and counseling services and basic skills course offerings. This paper provides not only an overview of effective practices relating to content review, but also suggestions regarding more global considerations. Because the use of prerequisites will likely increase in the future as reliance on content review as the means of validating prerequisites becomes more common, planning to minimize negative unintended consequences is critical. Assuring students on-going access to courses for which they are prepared must be a primary consideration as changes are made to further student success through the appropriate use of prerequisites.

Background

Declines in student success as measured by course, program, and degree completion rates led faculty to conclude that more must be done to communicate the level of student preparation necessary for success in a limited but crucial range of courses in community colleges. For that reason, the Academic Senate adopted resolutions urging expanded use of content review for establishing prerequisites and advocated for a Title 5 change that makes optional the requirement of statistical validation for the establishment of communication and computation prerequisites. *Student Success: The Case for Establishing Prerequisites Through Content Review* (ASCCC, 2010) provides a detailed overview of the history of prerequisites and the rationale for reliance on content review for all prerequisites.

Since the early 1990's, communication (English and reading) and computation (mathematics) prerequisites for courses in other disciplines (e.g., a reading prerequisite for a history course or a math prerequisite for an economics course) have been established only on the basis of statistical validation unless receiving universities require the prerequisite. As a consequence, prerequisites often were not placed on courses due to the perceived complexity of conducting the required research or an inability to validate the prerequisite by statistical means. Effective use of statistical validation requires a demonstrated lack of student success that may not be evident across all course sections due to small sample size, variation in faculty expectations, availability and student use of support services, average level of student preparation, and a wide array of external

factors that are not readily quantifiable. This approach to the validation of prerequisites is unique to the California community colleges; no other higher education faculty is required to use statistical validation to establish the legitimacy of prerequisites. As a consequence, California community college students were often able to enroll in courses in which they were not prepared to succeed. The Academic Senate has passed numerous resolutions regarding prerequisites over the past decade, and a variety of external scholars and policymakers have questioned the wisdom of mandatory statistical validation for establishing prerequisites. The purpose of this paper is to guide the implementation of a modified approach to prerequisites. In March, 2011, the Board of Governors adopted Title 5 language (Appendix A) that will permit colleges to establish communication and computation prerequisites based on content review alone. Colleges, of course, may continue to use content review and statistical validation together; the adopted language is permissive and would enable colleges to determine whether or not, when, and how statistical validation is required locally. Regardless of the role of quantitative data in the validation process, data collection will be necessary to determine the impact of any new prerequisites. Since statistical validation is not new to the regulations, this paper will focus on assisting faculty with expanding the content review process so that communication and computation prerequisites can be identified and implemented when necessary and appropriate.

Introduction

Transitioning from the use of statistical validation to the use of content review for the establishment of communication and computation prerequisites will require a local examination of policies and procedures directly related to the processes for determining the recommended preparation for courses and planning for a potential shift in course enrollments. Any implementation of new prerequisites should be conducted with a consideration of both student access and student success. Leaving students who lack basic skills with no course options is no more appropriate than permitting students to enroll in classes in which they have little chance of success. Local conversations about prerequisites need to focus on not only the content review process, but also on planning for a likely increase in demand for assessment for placement, counseling services, courses that do not have prerequisites, and basic skills courses. Planning is critical and should involve the implementation process, as well as a long-term plan for assessing the impact of new prerequisites. Prerequisites have always been subject to periodic review; this requirement is unchanged. The revised Title 5 regulations, however, expand the district's obligation to anticipate the impact of and plan for new prerequisites, including taking measures to ensure the availability of course options for all students. Even if statistical validation is no longer required for the establishment of prerequisites, research on the impact of prerequisites must be both on-going and well-planned.

Some colleges have content review committees, some use forms, and others rely on the curriculum committee to provide a thorough review of the proposed prerequisite with input from the discipline faculty. In all cases, content review must be a documented process that is understood by all faculty interested in establishing a prerequisite for a course, and the curriculum committee must vote separately to establish the prerequisite based on evidence provided by the discipline faculty that demonstrates that the prerequisite is both necessary and appropriate. Arriving at that point means that faculty will have engaged in a thoughtful, complete review of the course, how it's taught, all elements of the COR, and then a matching of the prerequisite skills to computation and communication courses.

In order to implement a prerequisite for any course, the course outline of record (COR) must delineate the skills and knowledge that are necessary to succeed in the course and the assignments or assessments that make this preparation necessary. Discipline faculty must agree as to the rigor and types of assignments that are necessary and be committed to teaching to the COR as adopted. A well-written course outline will provide the details necessary to ensure consistency across sections while permitting individual faculty freedom to make appropriate instructional decisions based on their own pedagogy and style. The COR thus helps to maintain the integrity of the course from one section to another and creates consensus on the expectations and demands for preparation prior to enrollment. Without establishing this common ground, instructors lose credibility in their request for prerequisites.

The academic senate, curriculum committee, and discipline faculty all have roles to play to make the process work. Faculty will work together within and across disciplines to ensure that students understand the skills and knowledge necessary for success in the course. Academic senates and curriculum committees must work together to develop processes, plans, and board policies to allow for options in establishing prerequisites.

Regulatory Changes

The rules governing prerequisites are found in Title 5 section 55003, and the amendments to this regulation provide curriculum committees more flexibility in determining what prerequisites are necessary to ensure the potential for student success. Colleges wishing to implement new prerequisites through content review will need to know what has and has not changed in regulation. Much more is unchanged regarding prerequisites than is new. The following aspects of prerequisites remain unchanged:

- prerequisites continue to be mandatory when a student is "highly unlikely to succeed" without the prerequisite
- prerequisites must still be validated on a course-by-course and/or program-by-program basis
- prerequisites must be revalidated every six years or two years for Career Technical Education (CTE, i.e., "vocational") courses
- prerequisites may still be required without validation when they are (1) required by stature or regulation, (2) part of a lecture-lab pairing, (3) required by a four-year college
- colleges must still be attentive to and seek to alleviate any disproportionate impact
- students may challenge prerequisites

The primary change in the revised version of §55003 is that colleges may choose between "traditional" content review in combination with statistical validation or content review as accompanied by additional requirements. Content review as described in this paper could be used to establish prerequisites, but only when colleges meet additional criteria, as described in a plan developed by the college, which addresses the following:

- the method used to determine which courses might be the most compelling candidates for new prerequisites
- the provision of appropriate numbers of prerequisites course sections
- the assurance that other degree applicable courses are available such that student progress toward their educational goals is not unnecessarily impeded

- training for the curriculum committee
- the use of research to evaluate the effect of new prerequisites on student success, with particular attention to disproportionate impact

The requirement that colleges develop an implementation plan should have the effect of bringing together discipline faculty, curriculum committee members, senate leaders, and key administrators to identify parts of the curriculum in which the introduction of a prerequisite might significantly improve student success. The new regulatory elements require that the college have developed an intentional strategy of identifying such courses and that the curriculum committee be trained before new prerequisites may be applied. Additionally, those responsible for enrollment management must assure that students have opportunities to reach their educational goals by making adequate provision for both prerequisite courses and degree applicable courses that do not require prerequisites or require lower-level prerequisites.

The evaluation of the effect of new prerequisites should be especially manageable because the Chancellor's Office will use data from the curriculum inventory to track newly developed prerequisites. These data will allow evaluation of the effect of new prerequisites not only at the campus level but at the regional and state level as well.

Using Data to Prioritize Courses for Prerequisite Implementation

Data and other forms of evidence will be a critical element in a college's development of its prerequisite plan and useful to discipline faculty as they prioritize which courses should be considered for the establishment of new prerequisites. Quantitative and qualitative data may help to establish trends or patterns of success that may be affected by student preparation for a course. Examining success rates for all students in all courses in a discipline can help faculty identify the course with the lowest student success as measured by withdrawal and pass rates. This course may be the best and first to consider for a prerequisite in the discipline. Alternatively, courses where students are generally more prepared may also be viable candidates; if a course has a high pass rate due to students generally being more prepared, proper signaling of a required level of preparation may protect students from enrolling in a course in which they have little chance of success. In some courses, the need for a prerequisite might be readily established by statistical means, but the need may not have been documented and the prerequisite not implemented as the majority of the students have the necessary level of preparation. In other words, students who do not have the necessary communication or computation skills rarely enroll in the course and therefore there is less evidence of a lack of student success; adding a prerequisite would merely enforce the status quo. The establishment of prerequisites in such instances would likely have a minimal overall impact.

Both regulatory language and common sense require that the addition of new prerequisites be phased in at an appropriate pace that does not unreasonably impede student progress or unduly disrupt college-scheduling decisions. One approach to expanding the use of prerequisites may be to determine which disciplines feel that prerequisities are needed for their courses and then to identify one course in each of those disciplines that most warrants a prerequisite. After each discipline that perceives a need for prerequisites identifies one course with the lowest rates of student success, then curriculum committees could prepare to assist faculty with the next steps to confirm that a prerequisite is warranted as well as the correct level or course for the prerequisite.

This approach to prioritization will assist in planning and enrollment management for the college and workload management for the curriculum committee.

Further disaggregation and examination of student success data will show whether any specific cohorts of students are struggling with success. Faculty will want to address disproportionate impact immediately, whether with a prerequisite on a course or other intervention strategy to improve success. Local implementation plans will need to include an approach to the establishment of new prerequisites that is thoughtful, cautious, and mindful of the impact on students and college resources.

Other forms of evidence that faculty may want to consider in determining the need for a prerequisite include the use of existing support provided to students in particular courses such as tutoring services on campus. Tutoring centers and labs may have data on student use of services, the type of tutoring received, and other information that may inform the discussions about a need for a communication or computation prerequisite. While such services and interventions complement strategies to improve student success, they also may mask the greater need that students have for a stronger foundation in basic skills. Continued use of certain tutoring services or assistance in a writing center in a given term may not bring a student to the needed skill, and expecting a student to meet the requirements of the course while filling gaps in prior knowledge from tutors may not best serve students. Evidence from the tutoring and writing centers can provide various types of useful data that can help faculty determine which courses might need prerequisites.

The assessment for placement process is another source of data which may contribute to an understanding of the preparation of students and the need for establishing prerequisites. Assessment office staff can provide information on the number of students placing into basic skills courses below transfer which can give a sense of the number of basic skills sections required to meet student need. In addition, success rates of students placed into basic skills courses can be tracked to the types of degree applicable or transfer level courses in which they register and their success in those courses. Courses where students have low success rates may be courses where student placement scores are also low. Researchers may also be able to assist with analyzing assessment for placement scores. Success rates and placement into basic skills sequences are related measures that can inform the prioritization of courses for prerequisites.

If faculty use the many tools available to them, determining a need for a communication or computation prerequisite will be a thoughtful and deliberative process. Colleges choosing to use content review to establish prerequisites without statistical validation should nevertheless collect and use data and evidence of various types in considering which courses need prerequisites and what specific prerequisites are appropriate. By considering factors determined through data analysis and strategies in place at the college, faculty can move thoughtfully to the next step in the process, which involves participating in the content review of courses and using faculty's professional expertise to determine the best preparation for students.

Once the prerequisite is established, data on student success must be tracked. The initial collection and review of data prior to establishing the prerequisite will form the baseline for future comparisons. Prerequisites must be reviewed every six years (or two years for career technical education courses and programs), but student performance should be monitored much

more frequently in order to ensure that the identified prerequisite is having the anticipated impact on student success and not creating an unwarranted barrier to access. Curriculum committees, as well as discipline faculty, will want assistance from researchers to find the best means to track student performance in courses with newly established prerequisites.

Content Review Revisited

The content review process begins with a review of the Course Outline of Record (COR). The COR delineates not only the content of the course, but also the competencies a student is expected to achieve (objectives and/or student learning outcomes), the assignments to be completed (e.g., reading assignments, projects, and reports), and the assessments that will be used to measure student performance. During the initial approval of a course and subsequent revisions, a content review is conducted. The COR is examined and the skills and knowledge a student needs for success are identified. When faculty determine that content knowledge within the discipline is necessary for success, content review has always sufficed for the establishment of a prerequisite. For example, if a biological psychology course presumes student understanding of basic psychology concepts, the faculty have always been able to establish a psychology course as a prerequisite. Similarly, math and English coursework typically consists of intradisciplinary sequenced courses that build upon one another. However, a more complex, interdisciplinary content review process is needed to determine that an English or reading prerequisite is appropriate for a psychology, history, or political science course or that a math prerequisite is appropriate for an economics or automotive course.

In some instances, these issues have been resolved by the expectations of the California State University and University of California systems. In those cases where interdisciplinary communication and computation prerequisites exist at the university for courses that are taught at the community college, the community colleges are able to implement those prerequisites without statistical validation – and even without justification by content review. For example, the University of California requires that community college courses that are intended to serve as lower division preparation for the Biological Sciences major at the University of California must have a prerequisite of Intermediate Algebra (http://info.assist.org/pdf/assist/2009_uc_tca_letter.pdf). But beyond those specific instances, California community colleges currently offer courses which are deemed comparable to university courses by virtue of existing articulation agreements but which may not expect or require students to have the skills that they would necessarily have upon acceptance to the university. This discrepancy, and the resulting impact on student success, is one issue that using content review for communication and computation prerequisites seeks to address.

The term “content review” is a misnomer. The content review process is far more than a mere examination of the content of a proposed or existing course. Rather, content review is a process that determines what skills or knowledge are required for success in a given course and how that preparation can be obtained in order to advise or require students to acquire the necessary preparation prior to enrolling in (prerequisite) or while taking (corequisite) a given course. It is more than reviewing the traditional “exit and entrance skills” and involves examining how the course is taught and all components of the Course Outline of Record (COR).

As a starting point for ensuring that local content review processes are sufficiently rigorous for use in establishing prerequisites, one may consider the description of content review provided in *The Model District Policy on Prerequisites, Corequisites, and Advisories on Recommended Preparation* (*Model District Policy*, Board of Governors, 1993). While much of this document may be dated, its treatment of content review remains relevant and serves as a useful reference for colleges as they prepare for a transition to a greater reliance on content review. The following excerpt is particularly noteworthy and clearly delineates the necessary steps and participants in the content review process.

It is crucial that there be a careful content review process and that the specific steps of that process are clearly specified in the policy. It is also crucial that the approval of the prerequisite or corequisite (or advisory) be done explicitly and not be inferred from the approval of the course. Lastly, it is also crucial that provision be made for providing those with expertise in the discipline in question an adequate voice in the content review process.

(1) Approve the course; and,

(2) As a separate action, approve any prerequisite or corequisite, only if:

(a) The prerequisite or corequisite is an appropriate and rational measure of a student's readiness to enter the course or program as demonstrated by a content review including, at a minimum, all of the following:

i. involvement of faculty with appropriate expertise;

ii. consideration of course objectives set by relevant department(s) (the curriculum review process should be done in a manner that is in accordance with accreditation standards);

iii. be based on a detailed course syllabus and outline of record, tests, related instructional materials, course format, type and number of examinations, and grading criteria;

iv. specification of the body of knowledge and/or skills which are deemed necessary at entry and/or concurrent with enrollment;

v. identification and review of the prerequisite or corequisite which develops the body of knowledge and/or measures skills identified under iv.

vi. matching of the knowledge and skills in the targeted course (identified under iv.) and those developed or measured by the prerequisite or corequisite (i.e., the course or assessment identified under v.); and

vii. maintain documentation that the above steps were taken.

One consequence of a greater reliance on a robust content review process should be a greater consistency not only in the skills of students, but in the manner in which courses are taught. Content review, as described in *Model District Policy*, moves beyond a review of the COR and includes references to documents that would necessarily involve a consideration of *how* the course is taught, not merely how it is described in the COR. The section from *Model District*

Policy that lists the items to be considered in a rigorous content review (iii above) includes not only the COR, but also syllabi, number of examinations, and grading criteria. Such requirements move the dialogue away from the COR and to a consideration of how individual faculty are teaching the course. A robust content review process needs to involve a discussion of not just what the COR describes, but how that COR is implemented at the section level. Faculty should share not only how they are teaching their courses as described in the syllabus, but sample assignments and examinations. Review of the assessments used may even involve faculty who teach the proposed prerequisites to ensure that the assessments are consistent with the identified skills and courses. Grading rubrics, for example, could be used to show the skills and tasks that students must complete in order to earn a passing grade on an assignment. Every aspect of a course should be discussed and reviewed by those teaching the course to prepare the most complete view of the course content and the preparation needed by students. Syllabus sharing among faculty teaching the course will confirm expectations for students across the course, and the number of major assignments as well as the weight of each assignment can be discussed. Such a discussion among discipline faculty will ensure the integrity and rigor of a course across all class sections without impinging on the pedagogy and creativity of individual faculty members as they work within agreed-upon standards to design their instruction according to their own styles and preferences.

The chart that follows might serve as a conversation starter for faculty who are conducting a content review for the purpose of establishing a communication or computation prerequisite. Curriculum committees may adopt or modify this model based on input from discipline faculty as a component of their content review process. As a sample, the methods of evaluations and assignments sections of the grid are provided here from the full chart which is included in Appendix B.

Content Review Conversation Starter

Element of the COR	English Composition	Mathematics	Reading
Methods of Evaluation	Students must express their understanding of the course content though college-level, academic writing assignments. Students must express their understanding through in-class writing such as essay exams. Students must know how to locate outside resources relevant to the course content, document their research properly, and incorporate that research into their writing clearly and effectively	Students must know how to complete certain calculations using a calculator on exams. Students need to interpret graphs, make graphs on tests or in reports, organize data, report data. Students have equations to solve on tests, quizzes, or other assignments: linear equations? Nonlinear equations?	Students must express their understanding of the course content as it is presented in written materials (textbooks, primary sources, secondary sources, etc.) Students must know how to locate outside resources relevant to the course content (determining a source's relevance is linked to a sophisticated reading level.) Bibliographies
Assignments	Outlines, essays Research papers. Essay exams Bibliographies or other research assignments.	Conducting elementary research. Reporting results of surveys, lab tests, etc. Producing quantitative information in graph, numerical or paragraph form. Homework exercises include quantitative problem solving, applications or word problems.	Expected types and levels of reading materials outside of class.

As faculty begin to identify and list the skills and knowledge that students will need or are expected to have in order to succeed in a given course, the mathematics, English, and reading faculty will be able to assist with determining the appropriate course where the skills are learned and tested. The faculty who teach potential prerequisite courses might develop guides similar to the example presented in Appendix B or in other forms that may be used by faculty in other disciplines to use in deciding which course would be the best prerequisite.

Determining the Correct Prerequisite

Determining the need for a prerequisite through content review is one step in the process of establishing cross-disciplinary prerequisites. Next, faculty must identify the appropriate prerequisite course or courses. Locally developed guides, a review of the CORs of potential prerequisite courses, and course basic (CB) 21 code rubrics may all inform the process of determining the correct prerequisite.

Matching the necessary entrance skills with existing courses may take some time and effort. In many cases, no one course may offer a perfect one-to-one match, and faculty therefore will have to make decisions based on the minimum skills that are absolutely essential for students to have prior to enrolling in the course. For example, some courses demand that students have a broad experience with mathematical content so that they have a strong quantitative sense and maturity while other courses demand that students have specific skills, such as mastery of percents or fractions. The content review process should reveal which circumstance exists for the course: general background and maturity or very specific skills. Then a prerequisite course or courses may be recommended. In other instances, a given level of English proficiency may be preferred and more desirable, but the student's chances of success are greatly enhanced by a course one level lower. Every effort should be made to be less restrictive in the establishment of prerequisites; students should not be barred from enrolling in a course in which they have a reasonable chance of success.

The CB21 rubrics, created by discipline faculty in English, reading, English as a Second Language (ESL), and mathematics, list the content and exit skills for courses below transfer for the purpose of ensuring consistency in coding across colleges and districts. These Academic Senate endorsed rubrics provide a consistent map of the content of courses, the relationship to transfer level, and easily understood terminology for discipline faculty and curriculum committee members to grasp. At colleges where some or all courses are aligned with these rubrics, they can inform the prerequisite discussion. The English composition rubric for the course one level below transfer English is provided here as an example, and the other rubrics may be accessed from the Chancellor's Office website at http://www.cccco.edu/ChancellorsOffice/Divisions/TechResearchInfo/MIS/tabid/1275/Default.aspx (click on "Memos" and scroll down to "MIS Data Submission Updates"). The complete English rubric may be found in Appendix C, and all the others electronically.

English Composition	Writing Assignments	Reading	Voice Audience	Organization, Development, and Thesis/ central idea	Sentences and Vocabulary	Mechanics and Grammar	Resources
CB21 - A 1 level prior to transfer	Write essays including argumentation which integrate & synthesize course readings & are clearly focused, fully developed & logically organized. Produce in-class essays that demonstrate organizing, composing, revising, editing & time management skills.	Analyze and paraphrase texts, drawing a conclusion, making generalizations and analyzing arguments. Apply reading skills to multiple texts.	Write essays to specific audiences using an appropriate voice for those readers.	Formulate an essay with a thesis statement or central idea. Organize essays in which the topic sentences and paragraph details support the thesis.	Construct sentences that demonstrate control of sentence variety and effective word choice, using mostly college level diction. Uses strategies to tackle unfamiliar vocabulary.	Proofread, and edit essays for public so they exhibit few gross errors in English grammar, usage, or punctuation.	Identify & evaluate supporting evidence. Demonstrate and apply an emerging competence with documentation methods and simple usage of outside sources.

Locally developed guides may also be useful. Below is a sample that one college uses to guide faculty in making determinations regarding recommended communication preparation. A sample for mathematics can be found in Appendix D. This guide is intended to aid faculty in the selection of a course based on what they expect students to be able to do. For example, if short essays will be required, ENGL 30 or the equivalent is appropriate, and if students are expected to read a college-level text, READ 23 is the course that will teach students these skills. This model includes not merely a list of the outcomes of the preparatory courses, but a guide intended to assist faculty in other areas in selecting the appropriate preparation.

ENGL 30 or ESL 197 or appropriate assessment:

- Write basic paragraphs and short essays with limited introductory and concluding remarks
- Write with some patterns of grammatical and mechanical errors and simple sentence structures, but demonstrate adequate fluency in grammar and mechanics to qualify for intermediate-level composition
- Write with occasionally limited detail and weak analysis, but demonstrate adequate detail and analysis to qualify for intermediate-level composition
- Write with at times weak paragraph organization, but demonstrate adequate organization to qualify for intermediate-level composition

ENGL 35 or ESL 198 or appropriate assessment:

- Write a multi-paragraph essay with a thesis statement and general introductory and concluding remarks
- Write with some grammatical errors, but demonstrate adequate fluency in grammar and mechanics to qualify for freshman composition
- Write with some specific details and some analysis and reflection, demonstrating adequate detail and analysis to qualify for freshman composition
- Write with occasional errors in paragraph organization, but demonstrate mostly good paragraph organization and transitions

ENGL 101:

- Write a multi-paragraph essay with a thesis statement and the use of outside research sources to support the thesis
- Analyze research material adequately but with occasional errors in analysis
- Incorporate research material into student writing with some errors but with enough fluency and accuracy to demonstrate college-level proficiency
- Document outside research material using MLA format with some errors but with enough fluency and accuracy to demonstrate college-level proficiency
- Write with some grammatical and organizational errors, but demonstrate college-level proficiency in organization, grammar, and mechanics

READ 022 or appropriate assessment – Read instructor-generated handouts

READ 023 or appropriate assessment – Read a college-level textbook

Another example is included in Appendix D and demonstrates the conversation between geology and mathematics faculty in possibly determining a prerequisite for a geology lab. The conversation is documented to show the types of questions and considerations for cross-disciplinary discussions of determining the correct prerequisite. The example is included to assist faculty and curriculum committees with the outcomes that may result from content review.

Role of the Local Academic Senate

The work of the local academic senate in the implementation of prerequisites spotlights the senate's role in participating in governance, delegating or assuming responsibility for the implementation plan, and monitoring student success. Because of its authority for curriculum, including prerequisites, as stated in Title 5 § 53200, the senate should be actively involved in determining the direction of prerequisite implementation for the college. The senate should recommend board policy and procedures and enrollment management options, as well as endorse a re-invigorated content review process. A successful implementation process and plan will have the senate at the helm, guiding all aspects of this effort to increase student success.

Before any changes can occur to a college's current practice of establishing cross-disciplinary communication and computation prerequisites, the local senate must review its options. Title 5 regulations now give faculty the choice of establishing cross-disciplinary prerequisites through content review alone or continuing to rely on content review plus statistical validation. Faculty

will need information about the pros and cons of both options before making a decision. Information in this paper can help, and the researcher for the college or district may also be available to assist with understanding the statistical process. Although content review is not new to the curriculum process, the content review process employed for the establishment of cross-disciplinary prerequisites is necessarily a more involved process than what many colleges are currently doing. Senates will have several factors to review before making a decision about the best process to recommend for students and the college culture. Faculty should revisit and make any necessary changes in content review practices prior to the implementation of any policy changes. Local boards and concerned community members may need assurances that the processes to be employed are well-developed and effective.

Once a senate determines that it will rely primarily on rigorous content review for the establishment of communication and computation prerequisites, the next step toward implementation will be to review and update as necessary local board policy with regard to prerequisites. Administrative procedures often accompany board policy, and the senate will be instrumental in creating policy and procedures that recognize faculty responsibility for determining that a prerequisite is necessary for student success and the means by which the prerequisite will be validated. In addition, because board policies and administrative procedures facilitate actions within a district, any autonomy allowed to individual colleges in a multi-college district should be included within the board policy.

Following the establishment of policies and procedures that permit the use of content review as the means of validating all prerequisites, new prerequisites can be implemented. The next step is creating an implementation plan for the establishment of new prerequisites based on content review. This multi-faceted plan will include many elements that are clearly faculty responsibility, including curriculum-related elements such as a rigorous content review process that examines how courses are being taught. The plan should also include a means to monitor student performance in courses with newly established prerequisites, enrollment management and course offerings tracking, and other aspects of implementation that impact students and faculty. The senate must be actively involved in the development of the plan and, through the senate, all faculty should participate in its development and implementation. In addition, the senate should discuss timelines, participants, research capabilities, and other considerations during the development of the plan.

Although many senates delegate most or all curriculum work to the curriculum committee, communication between the senate and curriculum committee is critical as changes in the way prerequisites are established have implications that extend beyond curriculum. In addition, the senate is well-positioned to ensure that all faculty are aware of any changes made. The curriculum committee should review all internal processes for establishing prerequisites to ascertain that content review will be a flexible process from sequences of courses within a discipline to cross-disciplinary courses. Training for curriculum committee members on putting into practice cross-disciplinary content review will be available from the Academic Senate for California Community Colleges at the annual Curriculum Institute.

As the implementation of prerequisites expands, local senates should work with administrators to track the impact of the new prerequisites. This type of monitoring should be integrated into the prerequisite plan, but senates will be instrumental in watching for any anomalies in the

curriculum, enrollment patterns, or student success outcomes. Even as new prerequisites are implemented, senates will want to collaborate with administrators to hold departments establishing prerequisites harmless from shifts in weekly student contact hours (WSCH), full-time equivalent faculty (FTEF), facilities usage, and other measures that are used in program review or college planning processes for distributing resources. Efforts to improve student success should not be used against faculty or departments where funding, new faculty, or other benefits accrue due to high enrollments. However, basic skills faculty will no doubt require additional facilities and faculty to accommodate their increased responsibility for preparing students to meet newly established prerequisites. Senates will be essential in providing context to quantitative and qualitative measures of faculty and student success during the phasing in of new prerequisites.

The senate must begin the conversation on prerequisites as well as monitor the effects of any implemented changes. It has the authority and responsibility to recommend the direction for student success through senate actions, recommendations of policy, procedures, and plans to the board of trustees and delegating work to the curriculum committee. Because student success for all students and prerequisites are both part of senate purview through the "10+1," senates will be required to make many decisions with regard to the implementation of prerequisites.

Role of the Curriculum Committee

As the faculty body charged with ensuring the quality of the curriculum for the college, the Curriculum Committee features prominently in the establishment of prerequisites. The committee has certain roles outlined in Title 5 and local board policy, or through delegation of authority by the local senate, which give it responsibility to implement, and in some cases set and implement, prerequisite processes. Committee members must be well-versed in the locally documented processes used to establish prerequisites, which may be established via content review or a combination of content review and statistical validation methodologies. In either case, the committee must be prepared to implement the adopted options for the college regarding prerequisite implementation and make decisions in the best interest of students.

When the curriculum committee has a rigorous content review process in place, then the following elements are easy to recognize:

- Who –discipline faculty, members of the curriculum committee, technical support from curriculum specialists, etc.

- How - Documented process with appropriate forms, conversation starters for cross-disciplinary faculty dialog, checklists of entrance and exit skills, review of outcomes at the course, program, and institutional levels, outcomes, etc.

- When – Timelines are established for proposals, faculty conversations, deadlines to meet with researchers, intervals at which student success data need to be reviewed.

- What – Definitions of need and level of need are included in curriculum committee documentation, final recommendation to the curriculum committee, expected depth of review using elements from the course outline of record and other relevant materials.

- Why – Data to demonstrate that a prerequisite is needed. The data can be qualitative, quantitative, or both.

As proposals for prerequisites come forward to the curriculum committee for consideration, the committee will deliberate on the rationale for the prerequisite and the proposed prerequisite course or courses. Some sort of tracking mechanism will be useful for the committee in order to prepare a report for the senate, administration, and board which lists all the courses approved for prerequisites, the approved prerequisite courses, and the probable need for additional sections of mathematics, English, and reading courses. Reporting to the Chancellor's Office will also be required through the Curriculum Inventory. The committee may want to track all courses with a specific prerequisite, e.g., the English course one-level below transfer, to monitor the effectiveness of the prerequisite, as well as keep a list of courses available to students with varied preparation and skills. Additionally, the committee can track the need for modules or shorter courses to meet the needs of students and make recommendations to reading, English, and mathematics faculty to consider development of these other courses. The establishment of a new prerequisite is the beginning of a process that must include assessing the effect of that prerequisite and, if necessary, revisiting the prerequisite in the future.

The curriculum committee may have to play referee at times, which is not uncommon for this committee and its role in protecting the quality of college courses. Faculty may bring conflicting information to the committee about the level of prerequisite needed or the requirement for more than one prerequisite for a given course. Such conflicts may be minimized if the college has in place a documented process that the committee and discipline faculty can obtain and understand. The committee's role is to facilitate conversations between discipline faculty, when needed, and to make the final recommendation regarding any prerequisites to a course. Conflicts can also be minimized by keeping a record of all transfer courses with comparable prerequisites for comparison and consistency.

The curriculum committee is where the major work of prerequisite implementation takes place. It is responsible for developing and implementing a process that works for discipline faculty and the committee. All the elements of a rigorous process can be found in good curriculum committee work, and documented processes must be readily available to all faculty on campus. More tracking will be required with the implementation of more prerequisites, and the curriculum committee must take the lead to provide this data to the senate, administration, and board of trustees.

Role of discipline and counseling faculty

Faculty have important roles to play in implementing prerequisites. Various faculty groups contribute to the successful process: the faculty from a discipline who believe that a prerequisite might be needed; the mathematics, English, and reading faculty who can help determine the best prerequisite course; and counseling faculty who guide student educational plans and provide advice on course sequencing. These faculty first must communicate with each other to establish prerequisites and then must communicate with students to help them plan each term.

Faculty who teach courses that are likely to be prerequisites should be involved in conversations with other discipline faculty about the skills and knowledge taught in various courses. They

might use the exit skills already developed for content review within a sequence, or they might want to use the conversation-starter questions included in this paper. Faculty from math, English, and reading will need to help their colleagues determine the types of skills and preparation students need for success in a given course and whether the students must know the information ahead of time or whether the discipline faculty can teach the concepts within the course. In some instances, the skills needed may be so specific that workshops, one-unit modules, or computer aided-instruction might be available to students instead of a full semester length course. Math, English, and reading faculty must advise the enrollment management committee or group on campus of the need for additional sections of basic skills courses and advise the curriculum committee if new curriculum might be beneficial to meet the needs of students.

The counselor's role will be critical in helping to inform students in orientations, workshops, and individual appointments when courses have newly added reading, writing, or mathematics prerequisites. Developing an education plan with a counselor becomes even more important because of course sequencing, and counselors will need to stress even more that completing basic skills coursework early is vital to success. Counselors should also emphasize the importance of taking the assessment process seriously, since course placement could affect not only a student's eligibility for basic skills courses but eligibility for transfer-level courses as well.

Counselors can also help provide crucial qualitative information to discipline faculty concerned about establishing a prerequisite. This information may help substantiate the first course to be targeted for a prerequisite. Enrollment plans and course scheduling should also include counselor feedback and input. Very few people on campus see the interaction of prerequisites with long-range planning the way that counselors view it, and that perspective will be instrumental in making certain that students have access to the courses they need and can design a schedule that helps them move forward toward meeting their goals.

Recommendations

- Local senates should review the current status of district policy and procedure regarding the establishment of prerequisites.

- Local senates should consider making a presentation to the local board of trustees to explain the opportunity to improve student success implicit in the revised Title 5 regulations relating to the establishment of prerequisites.

- Local senates should determine the role to be played by the senate and the curriculum committee in establishing a college plan for modifying local practices with respect to prerequisites, especially if clear delegation of duties to the curriculum committee is not already in place.

- The discipline faculty should work with the college research office to explore and evaluate areas of the curriculum with anomalous rates of student retention and success.

- The academic senate should begin conversations with the individuals or committees charged with overseeing enrollment management and play an active role in ensuring that adjustments in course offerings are made such that student access is preserved; the implementation of new prerequisites will likely require a compensatory increase in basic skills sections. ~~; the academic senate should initiate a conversation with the local bargaining agent regarding potential shifts in patterns of course offerings.~~

- The local academic senate and/or curriculum committee should review all forms and procedures used to establish prerequisites to ensure the integrity and rigor of the process.

- Local senates should consider using a flex day or other campuswide occasion to provide a conceptual framework for the understanding of the role of prerequisites to the college community.

~~Other ideas to possibly include –~~

~~Ensuring Both Access and Success for Transition to Content Review to Establish Prerequisites: Jon Drinnon, Merritt College, Faculty Development Committee~~

~~Whereas, Senate and faculty overview of curriculum is a key feature of the 10+1 areas of faculty control such that faculty need to take responsibility for establishing effective prerequisites to enhance student success;~~

~~Whereas, Should a change to content review to establish prerequisites come about, the success of such a change for courses in different disciplines would be contingent upon faculty through their senates and curriculum committees being vigilant about how prerequisites support and seamlessly intersect with the courses for which they are the prerequisites; and~~

~~Whereas, The Academic Senate for California Community Colleges wants to promote the development of prerequisites for courses for which a prerequisite would greatly enhance the possibility of student success.~~

~~Resolved, That should a change to content review to establish prerequisites come about, the Academic Senate for California Community Colleges will establish a transitional process to work with discipline faculty, curriculum committees and senates to ensure that every effort is made to create standards for creating prerequisites that will be maintain a balance between encouraging access and proper preparation for student success;~~

~~Resolved, That should a change to content review to establish prerequisites come about, the Academic Senate for California Community Colleges will sponsor a series of webinars for discipline faculty, curriculum committees, local senates and administrators to engage entire campus communities in discussion about the importance of establishing appropriate prerequisites and how to create effective prerequisites that will enhance student success without creating barriers to access; and~~

~~Resolved, That should a change to content review to establish prerequisites come about, the Academic Senate for California Community Colleges will organize, sponsor and provide technical support for two area symposiums, one north and one south, for mathematics and English faculty to meet with various target disciplines that want to implement prerequisites for their courses with the goal of developing processes and strategies to create effective prerequisites that will enhance both access and student success at their colleges.~~

References

Academic Senate for California Community Colleges [ASCCC] (2010). Student Success: The Case for Establishing Prerequisites Through Content Review. Sacramento, CA: Author. Retrieved from *http://www.asccc.org*.

Board of Governors (1993). *The Model District Policy on Prerequisites, Corequisites, and Advisories on Recommended Preparation*. Sacramento, CA: Author. Retrieved November 1, 2010, from http://www.asccc.org/sites/default/files/MODDIST.pdf.

Appendix A: Revised Title 5 Regulations

Board of Governors of the California Community Colleges
Revisions to the Title 5 Regulations:
Policies for Prerequisites, Corequisites and Advisories

1. Section 55003 of article 1 of subchapter 1 of chapter 6 of division 6 of title 5 is amended to read:

§ 55003. Policies for Prerequisites, Corequisites and Advisories on Recommended Preparation.

(a) The governing board of a community college district may establish prerequisites, corequisites, and advisories on recommended preparation, but must do so in accordance with the provisions of this article. Nothing in this subchapter shall be construed to require a district to establish prerequisites, corequisites, or advisories on recommended preparation; provided however, that a prerequisite or corequisite shall be required if the course is to be offered for associate degree credit and the curriculum committee finds that the prerequisite or corequisite is necessary pursuant to sections 55002(a)(2)(D) or 55002(a)(2)(E). Unless otherwise specified in this section, the level of scrutiny required to establish prerequisites, corequisites, and advisories on recommended preparation shall be based on content review as defined in subdivision (c) of section 55000 or content review with statistical validation as defined in subdivision (f) of this section. Determinations about prerequisites and corequisites shall be made on a course-by-course or program-by-program basis.

(b) A district governing board choosing to establish prerequisites, corequisites, or advisories on recommended preparation shall, in accordance with the provisions of sections 53200-53204, adopt policies for the following:

(1) ~~T~~the process for establishing prerequisites, corequisites, and advisories on recommended preparation. Such policies shall provide that in order to establish a prerequisite or corequisite, the prerequisite or corequisite must be determined to be necessary and appropriate for achieving the purpose for which it is being established. ~~District policies shall also specify the level of scrutiny that shall be required in order to establish different types of prerequisites, corequisites, and advisories on recommended preparation. At a minimum, prerequisites, corequisites, and advisories on recommended preparation shall be based on content review, with additional methods of scrutiny being applied depending on the type of prerequisite or corequisite being established. The policy shall provide that~~

~~the types of prerequisites described in subdivision (e) may be established only on the basis of data collected using sound research practices. Determinations about prerequisites and corequisites shall be made on a course-by-course or program-by-program basis.~~

(2) ~~P~~procedures to assure that courses for which prerequisites or corequisites are established will be taught in accordance with the course outline of record, particularly those aspects of the course outline that are the basis for justifying the establishment of the prerequisite or corequisite.

(3) the process to ensure that each section of the prerequisite or corequsite is to be taught by a qualified instructor in accordance with a set of objectives and with other specifications defined in the course outline of record, as required in section 55002 for all courses.

~~(3)~~ (4) ~~T~~the process, including levels of scrutiny, for reviewing prerequisites and corequisites to assure that they remain necessary and appropriate. These processes shall provide that at least once each six years all prerequisites and corequisites established by the district shall be reviewed, except that prerequisites and corequisites for vocational courses or programs shall be reviewed every two years. These processes shall also provide for the periodic review of advisories on recommended preparation.

~~(4)~~ (5) ~~T~~the bases and process for an individual student to challenge the application of a prerequisite or corequisite.

(c) A district governing board choosing to use content review as defined in subdivision (c) of section 55000 to establish prerequisites or corequisites in reading, written expression or mathematics for degree-applicable courses not in a sequence shall first adopt a plan specifying:

(1) the method to be used to identify courses to which prerequisites might be applied;

(2) assurance that courses are reasonably available to students when prerequisites or corequisites have been established using content review as defined in subdivision (c) of section 55000. Such assurance shall include sufficient availability of the following:

(A) appropriate courses that do not require prerequisites or corequisites, whether basic skills or degree-applicable courses; and

(B) prerequisites or corequisite courses;

(3) provisions for training for the curriculum committee; and

(4) the research to be used to determine the impact of new prerequisites based on content review.

~~(c)~~ (d) Prerequisites or corequisites may be established only for any of the following purposes:

(1) the prerequisite or corequisite is expressly required or expressly authorized by statute or regulation; or

(2) the prerequisite will assure, consistent with section 55002, that a student has the skills, concepts, and/or information that is presupposed in terms of the course or program for which it is being established, such that a student who has not met the prerequisite is

highly unlikely to receive a satisfactory grade in the course (or at least one course within the program) for which the prerequisite is being established; or

(3) the corequisite course will assure, consistent with section 55002, that a student acquires the necessary skills, concepts, and/or information, such that a student who has not enrolled in the corequisite is highly unlikely to receive a satisfactory grade in the course or program for which the corequisite is being established; or

(4) the prerequisite or corequisite is necessary to protect the health or safety of a student or the health or safety of others.

~~(d)~~ (e) Except as provided in this subdivision, no prerequisite or corequisite may be established or renewed ~~pursuant to subdivision (b)(3)~~ unless it is determined to be necessary and appropriate to achieve the purpose for which it has been established. A prerequisite or corequisite need not be ~~so~~ scrutinized using content review as defined by subdivision (c) of section 55000 or content review with statistical validation as defined by subdivision (f) of this section, ~~until it is reviewed pursuant to subdivision (b)(3)~~ if:

(1) it is required by statute or regulation; or

(2) it is part of a closely-related lecture-laboratory course pairing within a discipline; or

(3) it is required by four-year institutions~~.~~; or

(4) baccalaureate institutions will not grant credit for a course unless it has the particular communication or computation skill prerequisite.

~~(e)~~ (f) Content review with statistical validation is defined as ~~A course in communication or computation skills may be established as a prerequisite or corequisite for any course other than another course in communication or computation skills only if, in addition to~~ conducting a content review (as defined in subdivision (c) of section 55000) and the compilation of ~~, the district gathers~~ data according to sound research practices ~~and~~ which shows that a student is highly unlikely to succeed in the course unless the student has met the proposed prerequisite or corequisite.

(g) If the curriculum committee, using content review with statistical validation, initially determines, pursuant to section 55002(a)(2)(E), that a new course needs to have a communication or computation skill prerequisite or corequisite, then, despite subdivision (~~d~~e) of this section, the prerequisite or corequisite may be established for a single period of not more than two years while the research is being conducted and the final determination is being made, provided that all other requirements for establishing the prerequisite or corequisite have been met. The requirements of this subdivision related to collection of data shall not apply when~~:~~

~~(1) baccalaureate institutions will not grant credit for a course unless it has the particular communication or computation skill prerequisite; or~~

~~(2)~~ the prerequisite or corequisite is required for enrollment in a program, that program is subject to approval by a state agency other than the Chancellor's Office and both of the following conditions are satisfied:

~~(A)~~ (1) colleges in at least six different districts have previously satisfied the data collection requirements of this subdivision with respect to the same prerequisite or corequisite for the same program; and

~~(B)~~ (2) the district establishing the prerequisite or corequisite conducts an evaluation to determine whether the prerequisite or corequisite has a disproportionate impact on particular groups of students described in terms of race, ethnicity, gender, age or disability, as defined by the Chancellor. When there is a disproportionate impact on any such group of students, the district shall, in consultation with the Chancellor, develop and implement a plan setting forth the steps the district will take to correct the disproportionate impact.

~~(f)~~ (h) Prerequisites, corequisites, and advisories on recommended preparation must be identified in college publications available to students as well as the course outline of any course for which they are established.

(i) By August 1 of each year districts establishing prerequisites, corequisites or advisories shall submit to the Chancellor's Office in the manner specified by the Chancellor the prerequisites and corequisites that were established during the prior academic year. Districts shall also specify the level of scrutiny, i.e., content review as defined in subdivision (c) of section 55000 or content review with statistical validation as defined in subdivision (e) of this section, used to determine whether the prerequisite or corequisite was necessary and appropriate for achieving the purpose for which it was established.

~~(g)~~ (j) Prerequisites establishing communication or computational skill requirements may not be established across the entire curriculum unless established on a course-by-course basis.

~~(h)~~ (k) The determination of whether a student meets a prerequisite shall be based on successful completion of an appropriate course or on an assessment using multiple measures, as required by section 55521(a)(3). Any assessment instrument shall be selected and used in accordance with the provisions of subchapter 6 (commencing with ~~S~~section 55500) of this chapter.

~~(i)~~ (l) If a prerequisite requires precollegiate skills in reading, written expression, or mathematics, the ~~governing board of a~~ district shall:

(1) ensure that ~~nondegree-applicable basic skills~~ courses designed to teach the required skills are offered with reasonable frequency and that the number of sections available is reasonable given the number of students who are required to meet the associated skills prerequisites and who diligently seek enrollment in the prerequisite course.

(2) monitor progress on student equity in accordance with section 54220. Monitoring shall include:

(A) conducting an evaluation to determine the impact on student success including whether the prerequisite or corequisite has a disproportionate impact on particular groups of students described in terms of race, ethnicity, gender, age or disability, as defined by the Chancellor.

(B) where there is a disproportionate impact on any such group of students, the district shall, in consultation with the Chancellor, develop and implement a plan setting forth the steps the district will take to correct the disproportionate impact.

~~(j)~~ (m) Whenever a corequisite course is established, sufficient sections shall be offered to reasonably accommodate all students who are required to take the corequisite. A corequisite shall be waived as to any student for whom space in the corequisite course is not available.

~~(k)~~ (n) No exit test may be required to satisfy a prerequisite or corequisite unless it is incorporated into the grading for the prerequisite or corequisite course.

~~(l)~~ (o) The determination of whether a student meets a prerequisite shall be made prior to his or her enrollment in the course requiring the prerequisite, provided, however, that enrollment may be permitted pending verification that the student has met the prerequisite or corequisite. If the verification shows that the student has failed to meet the prerequisite, the student may be involuntarily dropped from the course. If the student is dropped, ~~if~~ the applicable enrollment fees ~~are~~ shall be promptly refunded.

Otherwise a student may only be involuntarily removed from a course due to excessive absences or as a result of disciplinary action taken pursuant to law or to the student code of conduct.

~~(m)~~ (p) Any prerequisite or corequisite may be challenged by a student on one or more of the grounds listed below. The student shall bear the initial burden of showing that grounds exist for the challenge. Challenges shall be resolved in a timely manner and, if the challenge is upheld, the student shall be permitted to enroll in the course or program in question. Grounds for challenge are:

(1) The prerequisite or corequisite has not been established in accordance with the district's process for establishing prerequisites and corequisites;

(2) The prerequisite or corequisite is in violation of this section;

(3) The prerequisite or corequisite is either unlawfully discriminatory or is being applied in an unlawfully discriminatory manner;

(4) The student has the knowledge or ability to succeed in the course or program despite not meeting the prerequisite or corequisite;

(5) The student will be subject to undue delay in attaining the goal of his or her educational plan because the prerequisite or corequisite course has not been made reasonably available; or

(6) Such other grounds for challenge as may be established by the district governing board.

~~(n)~~ (q) In the case of a challenge under subdivision ~~(m)~~(p)(3) of this section, the district shall promptly advise the student that he or she may file a formal complaint of unlawful discrimination pursuant to subchapter 5 (commencing with section 59300) of chapter 10 of this division. If the student elects to proceed with the challenge, completion

of the challenge procedure shall be deemed to constitute an informal complaint pursuant to section 59327.

~~(o)~~ (r) District policies adopted pursuant to this section shall be submitted to the Chancellor's Office as part of the district's matriculation plan pursuant to section 55510.

Note: Authority cited: Sections 66700 and 70901, Education Code. Reference: Sections 70901 and 70902, Education Code.

Appendix B: Content Review Conversation Starter

Based on the Course Outline of Record (COR), content review requires that faculty examine aspects of the course to learn where students need to come prepared with certain skills and knowledge sets rather than learn the skills while taking the course. Conversation-starter questions have been prepared to assist with the process of content review when faculty are reviewing a course and believe that certain basic skills are necessary for student success.

Element of the COR	English Composition	Mathematics	Reading
Course Objectives	Does the objective require the students to write clear, thesis driven writing assignments organized in academic form? Does the objective require students to incorporate or synthesize other texts in order to support the points made in their writing? Does the objective require the students to conduct research and include researched material in assignments? Does the objective require students to analyze quoted material and determine its relationship to the assertions in the essay? Does the objective require students to demonstrate competence in standard written English in terms of grammar, punctuation, and other conventions? Does the objective require correct documentation of sources in the citation form of the discipline?	Does the objective require students to be proficient with a calculator? Does the objective seem quantitatively based – will the student need to be competent in a range of mathematical skills in order to be successful? Do students need to be able to understand two or more variables ? Are systems of equations (linear or nonlinear) essential to meeting the objectives of the course? Are making and analyzing graphs integrated into the objectives? Linear graphs? Nonlinear graphs?	Does the objective require the students to complete college-level writing assignments based on written materials (textbooks, primary sources, secondary sources, etc.)? Does the objective reqire analysis of the credibility of the author(s) as expert in the topic under consideration? Does the student need the ability to analyze the audience, purpose, and tone of the text? Does the student need the ability to objectively summarize the text? Does the student need the ability to identify the thesis in the article and the main ideas in the sections of the text?

			Does the student need the ability to identify supporting evidence used to validate the assertion? Does the student need the ability to draw reasonable inferences from the text, inferences based on evidence offered.? Does the student need the ability to determine bias and world view in the text based on the evidence provided? Does the objective require students to conduct research and include researched material in assignments based on written materials (textbooks, primary sources, ksecondary sources, etc.)?
Course Content	Do elements of the content link easily to general essay writing skills (i.e. grammatical competence, organized and clear written communication, use of evidence, etc.)? Do elements of the content implicitly require higher level writing and thinking skills such as synthesis of ideas and researching Does the course require specific writing skills or a specific type of writing, or is an overall background required?	Are elements of the content easy to link to math skills (i.e. finding percentages, graphing, calculating certain quantities, etc.)? Are elements of the content implicit about math skills that students need (have the discipline faculty explain what is going on)? Are specific skills necessary or an over-	Do elements of the content link easily and explicitly to reading skills (i.e. understand and paraphrase main ideas; identify and leanr supporting details; summarize college-level written texts)? Do elements of the content implicitly require college level reading skills (research of written texts, essays based on reading assignments; broad detailed mastery of textvook information; analy-

		all background? Can the skills be isolated? Can the discipline faculty teach the concept? Can a math faculty visit the course for one hour or day to teach it?	sis, integration, and synthesis of multiple written materials, even if texts are below college-level; understand and apply theories, concepts and critical analyses of college-level reading. Does the course require: specific reading skills determined by test or assignment purpose? A specific type of text? Or an overall experience in reading college-level texts?
Methods of Evaluation	Students must express their understanding of the course content though college-level, academic writing assignments. Students must express their understanding through in-class writing such as essay exams. Students must know how to locate outside resources relevant to the course content, document their research properly, and incorporate that research into their writing clearly and effectively	Students must know how to complete certain calculations using a calculator on exams. Students need to interpret graphs, make graphs on tests or in reports, organize data, report data. Students have equations to solve on tests, quizzes, or other assignments: linear equations? Nonlinear equations?	Students must express their understanding of the course content through college-level, academic writing assignments based on weittne materials (textbooks, primary sources, secondary sources, etc.) Students must know how to locate outside resoureces relevant to the course content (determining a source's relevance is linked to a sophisticated reading level.) Research papers, essays Bibliographies
Assignments	Essays Research papers.	Conducting elementary research. Reporting results of surveys, lab tests,	Expected types and levels of reading materials outside of class.

	Essay exams Bibliographies or other research assignments.	etc. Producing quantitative information in graph, numerical or paragraph form. Homework exercises include quantitative problem solving, applications or word problems.	
Required Texts and Other Instructional Materials			College-level textbook College-level primary print sources (journal articles, etc.) Primary and secondary print sources not at the college-level, but critical analysis is required.
Other	What level of critical thinking is expected? Grading criteria Syllabi	What level of critical thinking is expected? Grading criteria Syllabi	What level of critical thinking is expected? Grading criteria Syllabi

Appendix C: CB 21 Transfer Level Freshman Composition Rubric

Final English WRITING RUBRIC							
English	**Writing Assignments**	**Reading**	**Voice Audience**	**Organization Development, and Thesis/ central idea**	**Sentences and Vocabulary**	**Mechanics and Grammar**	**Resources**
Transfer level Freshman Composition or English 1 A Source: IMPAC Document w/ minor revisions	Write a unified, well-developed essay, consisting of introduction, body, and conclusion, with an arguable thesis and persuasive support Use a variety of rhetorical strategies, which may include argument, analysis, textual analysis, comparison/contrast, and causal analysis.	Analyze and evaluate a variety of primarily nonfiction texts for their rhetorical and technical merit, with consideration of the principles of unity, coherence, tone, persona, purpose, methods, and the effects on a target audience.	Demonstrate a sophisticated awareness of audience using a consistent voice.	Organize paragraphs into a logical sequence, developing the central idea of the essay to a logical conclusion.	Employ a variety of sentence structures consistently, using college level diction.	Proofread, and edit essays for public presentation so they exhibit no gross errors in English grammar, usage, or punctuation.	Find, read, analyze, interpret, use, synthesize & evaluate outside sources, including online information. Incorporate sources as appropriate. Use MLA or APA documentation format.
CB21 - A 1 level prior to transfer	Write essays including argumentation which integrate & synthesize course readings & are clearly focused, fully developed & logically organized. Produce in-class essays that	Analyze and paraphrase texts, drawing a conclusion, making generalizations and analyzing arguments. Apply reading skills to	Write essays to specific audiences using an appropriate voice for those read-	Formulate an essay with a thesis statement or central idea. Organize essays in which the top-	Construct sentences that demonstrate control of sentence variety and effective word choice, using mostly college level diction.	Proofread, and edit essays for public so they exhibit few gross errors in English grammar, usage, or punctuation.	Identify & evaluate supporting evidence. Demonstrate and apply an emerging competence with

	demonstrate organizing, composing, revising, editing & time management skills.	multiple texts.	ers.	ic sentences and paragraph details support the thesis.	Uses strategies to tackle unfamiliar vocabulary.		documentation methods and simple usage of outside sources.
CB21 - B 2 levels prior to transfer	Write coherent essays and paragraphs, about course readings and/or other subjects. Demonstrate the ability to summarize, analyze and make a simple synthesis between two readings or ideas. Complete in-class writings that demonstrate some organizing, composing, revising, editing & time management skills.	Read, identify, and summarize short expository texts for the purposes of writing and discussion. Distinguish between fact and opinion, identify author's purpose and recognize author's tone.	Direct writings to a specific audience using a fairly consistent voice.	Construct writings with a central idea and paragraphs that support it. Write paragraphs with supporting sentences that relate to the topic sentence.	Recognize and begin to apply sentence variety and appropriate word choice. Demonstrate an awareness of and emerging competence with vocabulary strategies.	Proofread and edit their essays for public presentation. Identify some errors in English grammar, usage, or punctuation.	Use some outside sources and begin to use quotes to attribute those sources. Differentiate between one's own ideas and those of others.
CB21 – C 3 levels prior to transfer	Write short, topic-based papers with a main idea. Write guided in-class assignments based on a variety of prompts that attempt to organize, compose, revise and edit.	Read relevant texts and learn to respond in writing with clarity and commitment. Identify the author's purpose and conclusions. Express personal opin-	Direct writings to an audience considering voice.	State a topic and use details to support a central idea.	Apply basic sentence variety. Recognize the importance of accurate word choice. Distinguish between standard American English and vernacular.	Identify basic errors in English grammar, usage, or punctuation. Construct writings w/ mostly effective sentence structure.	Use a variety of outside sources.

		ions about texts.					
CB21 - Y 4 levels prior to transfer	Write short, topic-based assignments with a main idea. Write guided in-class assignments,	Read, identify, summarize & restate the main idea of the text in writing. Identify the author's write for different purposes with guided assistance from the instructor. Express personal opinions about reading.	Demonstrate the use of a writing voice.	Use details to support a central idea.	Recognize and imitate basic sentence models. Use familiar vocabulary correctly. Identify slang.	Write grammatically correct simple sentences.	Identify a variety of outside sources.

Appendix D: Content Review for Computational Prerequisite for Geology Lab

Example of How to Begin Content Review for Computational Prerequisite

Faculty teaching a transfer lab course in geology believe that students need mathematics skills and knowledge in order to be successful in the course.

Catalog Description:
Provides hands-on experience to accompany and augment Geology XXX. This course will include laboratory and field investigations of the Earth, emphasizing experience with minerals, rocks, and fossils, as well as topographic and geologic maps. Field trips will acquaint students with local rock units, and past and present geologic processes.

Course Objectives:

The student will:

a. Compare and contrast common minerals, and rock types, in hand specimen.
b. Analyze basic geographic parameters of topographic maps: projections, location grids, and elevation indicators.
c. Construct and interpret topographic maps.
d. Assess the forces which produce the various types of folds, faults, and unconformities as they appear on maps, photos, and in the field.
e. Construct 3-D interpretive diagrams of geologic structure from primary information.
f. Construct the geologic history of an area when provided with a geologic map/cross-section/stratigraphic column.
g. Appraise the general geology of a specific area or region through analysis of appropriate photos, maps, and/or field observations.

Course Content:

a. Earth Materials: Minerals and rocks. Class time will be spent learning to sight identify approximately 40 minerals and 40 rocks by learning the combination of important characteristics of each specimen.
b. Topographic Maps: Students will learn to correctly read symbolic devices for depicting elevations, locations, scale factor, cultural features, and other aspects of United States Geological Survey topographic maps. Students will also draw simple topo maps using raw data.
c. Fossils: Students may have one opportunity to identify common representatives from each major fossil phylum and class and relate them to the geologic time scale.

d. Structure and Geologic Maps: Students will learn the common deformation patterns in crustal rocks by drawing examples of each. They will then learn to write a chronological list of geological events for a specific area, given appropriate supporting cross-sections, maps and/or field observations.
e. Landscape Interpretation: With skills as developed above, students will go on to analyze the geology of specific earthly regions, both above and below sea level, as shown on appropriate maps.
f. Field trips to local areas of geologic interest.

Methods of Evaluation:

a. Grading of laboratory exercises
b. Quizzes over each unit
c. Final exam: May include objective and essay questions, and/or construction and interpretation of a geologic diagram

The faculty in the department determine the following mathematical skills and knowledge which students must have before enrolling in the course:

1. Unit conversions
2. Percent
3. Fractions, ratios, and operations on fractions
4. Grid systems (essentially graphing skills)
5. Slope calculation
6. Protractor and compass skills, degrees, angle measurement
7. 3-dimensional geometry, intersection of 3-D shapes, construction of 3-D models and 2-D diagrams from the models
8. Calculator may be used (even a cell phone calculator) but is not required

The required math skills as identified by the department are listed from simplest to more advanced, and not all the skills are found in a single math course. What is represented is a collection of knowledge that a student would obtain by taking a complete high school sequence of courses (Beginning Algebra, Geometry, Intermediate Algebra) plus some advanced knowledge of three dimensions.

In trying to determine if a prerequisite is required or which course might best fit the needs of the department, there are many issues to consider.

Linking the entrance skills to the course outline – There is little in the course description, objectives, content, or other features of the course outline to indicate these are the necessary skills. Does that mean that the skills are unnecessary? No, not necessarily. The expertise of the faculty and concurrence of the department indicate that these skills are necessary for success. Should the entrance skills be included in the course outline? Yes. By including the entrance skills on the course outline of record, faculty expertise is validated when the curriculum process approves the course outline and the college owns the expectations for student success.

Prioritizing the entrance skills – Since not all the entrance skills fall neatly into a single course but instead represent a collection of knowledge and critical thinking abilities, the department may want to prioritize which of the skills are necessary to be learned in a prerequisite course. The advanced skills (3-D and 2-D modeling and diagrams) may need to be taught by the geology instructors, and the use of protractors and compasses may also need to be taught by the geology faculty. However, the math faculty may find a way to offer a workshop for science students on how to use these tools successfully.

How to determine if a prerequisite is necessary – Now that the department has prioritized the entrance skills, matching them to the exit skills of a math course comes next. Matching should be accomplished through a discussion between the geology and math faculty. The skills listed by the geology department are typically found in the exit skills or course objectives from a Prealgebra course (aside from the protractor and compass skills and the 2-D and 3-D modeling). If the geology faculty want to list Prealgebra as the prerequisite course, math faculty might disagree and suggest that the Beginning Algebra, the course after Prealgebra, is the better choice. Why? Because a student only needs to know 70% of the exit skills in Prealgebra to pass the course, so completion of the next course would give the student a greater chance to master these entrance skills. It is rare that a student just passing a course has mastered the content sufficiently to apply it outside the discipline in another course. However, in an effort to keep courses open to as many students as might succeed, perhaps the two sets of faculty need to have a longer conversation about alternative ways to help students be prepared.

Finding prerequisites for transfer level courses – All students taking courses at the universities have demonstrated certain skills and knowledge by completing "a-g" requirements in high school. They bring to the universities a collection of critical thinking skills that they can apply to any course taken freshman year at the university. If community college transfer courses are equivalent to the university level courses, then it could be argued that students need to have this same combination of skills and knowledge from English and mathematics courses in order to be successful. A further consideration is regarding articulation. Say the geology faculty and the curriculum committee determine that Prealgebra is the prerequisite for the transfer geology lab course. Is the articulation of the course in jeopardy because of the low level of expected skills and knowledge needed to be successful? Does such a low prerequisite challenge the level of rigor at which the course is taught?

Recency of acquiring prerequisite skills – Many students studied the skills that the geology faculty have listed, but they learned the skills several years ago. The students may not have done any unit conversions in recent years making it difficult for them to adequately recall how to do this specific task. What kind of recency requirements will the geology faculty want to include as part of the prerequisite? New Title 5 regulations (§55040.b.3 and §55043.a.1), allow for repetition of courses because of significant lapse of time which might include a prerequisite course called a "recency prerequisite." Curriculum committees must determine how to assign recency prerequisites by listing criteria such as courses to which recency applies, number of years lapse, and any alternate ways in which students can be refreshed in the skills and knowledge necessary.

Appendix E: Resources

Prerequisite Training to be provided by the Chancellor's Office and the Academic Senate

The resources that follow were provided to the Board of Governors in support of the recent changes in the Title 5 section pertaining to prerequisites. As they are likely to be useful to local colleges as they review their prerequisite polices, they are included here.

There has been longstanding agreement within the Academic Senate Executive Committee and the Prerequisite Task Force (which includes representatives from the statewide bodies representing the CEO, CIO, CSSO, R-P and Student Senate organizations) that training on the use of content review should be provided before local curriculum committees establish cross-disciplinary prerequisites. This training would take place in two stages:

Training to be provided by the Chancellor's Office and the Academic Senate: The Chancellor's Office and **the Academic Senate** should provide annual training on the use of content review.

There is already a working model for this in the training currently provided by the Chancellor's Office for compliance with Education Code §70901, §70902 and Title 5 sections 55000, 55002, 55006, 55070, 55100, and 55130 for Stand Alone Training. This training is provided annually as part of the Academic Senate's annual Curriculum Institute and it is supplemented by webinar trainings for those colleges unable to send representatives to the Curriculum Institute. The training includes the text of relevant statute and regulatory language and a PowerPoint presentation elaborating on several of the more important details in law and regulation.

Following a "train-the-trainer" model and using materials made available at the Curriculum Institute, local curriculum committee chairs (and other administrators and faculty who receive training at the Curriculum Institute) return to their campuses in the fall and provide training locally.

Additional Training Provided by the Academic Senate

In addition to organizing the annual Curriculum Institute, the Academic Senate organizes two plenary sessions and other conferences during the academic year. The Academic Senate commits to including sessions on content review, addressing implementation and enrollment management questions, and developing the tools necessary to evaluate the effect of prerequisites, with special attention to disproportionate impact. The Academic Senate will develop additional resources, including examples of effective practices, to guide the work of colleges.

FAQs: Enrollment Management & Student Options

It has been clear from the earliest conversations that the most challenging part of establishing prerequisites will be the way in which they are phased in. Too gradual or narrow a phase-in is likely to result is students enrolling in other classes. A too aggressive implementation will shift an unmanageable level of student demand to basic skills and unrestricted course sections. Here are some questions colleges should ask as part of the development of their local plan for applying prerequisites based on content review.

Q: What level of commitment to basic skills course offerings exists in the system at present?

A. The variation is enormous. According to data reviewed by the *System Advisory Committee on Curriculum* (SACC), students enrolled in a basic skills class ranges from 4.8% to 57.4%. Because of this vast range in existing commitment to basic skills, it is impossible to mandate that colleges commit a *predetermined* percentage or number of sections to new basic skills course sections. Nevertheless, it is evident that in the short run, many colleges will need to add basic skills course sections.

Q: What information should be gathered before colleges establish new prerequisites?

A: Colleges should collect data on student success and retention in high demand transferable courses, disaggregated by ethnicity. Colleges should focus on those courses in *which* the success rates are low. Some of this information is available via Datamart, though it is aggregate by discipline and not available on a course-by-course basis.

Q: What questions should colleges ask about those courses?

A: Once colleges have identified courses with low success rates, research should conduct two kinds of research.

(1) Colleges should conduct a *qualitative* review of the existing course outlines and see if they require skills for which a basic skills prerequisite might be warranted.

(2) Colleges should conduct *quantitative* research to determine the numbers of students taking these class who would already meet prerequisites. Colleges with little flexibility to add or shift course sections could establish prerequisites in courses which enroll a smaller number of students who would need to be accommodated in other classes. Colleges with greater flexibility to add or shift sections might look at classes with lower rates of student preparation, knowing that they will need to provide increased access to basic skills course sections.

Q: Won't new prerequisites trap underrepresented students out of classes altogether?

A: No. Virtually all colleges in the state use a computer-based priority enrollment method for enrolling students in classes. While the criteria for determining a student's enrollment priority varies, a student who seeks to enroll in a class for which there is a prerequisite should still have access to both basic skills sections and to other non-restricted transferable courses. It is the students with the latest enrollment time slot who are at risk, but that is the result of reductions in funding and other factors, not prerequisites