

CALIFORNIA STATE UNIVERSITY



A Pilot Evaluation of the Outcomes of Elementary Subject Matter Programs In the California State University System

**Study Sponsored in Part by the
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In the California State University System**

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**Analyses and interpretations in this report are the
responsibility of the principal investigator, and do
not necessarily represent the views of the California
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Teacher Credentialing.**

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The Subject-Matter Preparation of Elementary School Teachers in the California State University: A Pilot Evaluation of Program Outcomes

Introduction to the Pilot Evaluation

California has established rigorous new *academic standards* for all students in K-12 public schools. At each grade level, the standards describe information, ideas, skills, abilities and perspectives pertaining to the broad subject areas of reading-language arts, mathematics, science, history-social science, and the visual and performing arts. In the additional subjects of physical education, health, and languages other than English, California school districts continue to utilize the state's *curriculum frameworks*, which also establish rigorous expectations for student learning. For students and their teachers and principals, there are important consequences for achieving or not achieving the new academic standards.

To fulfill the academic standards and curriculum frameworks, K-12 students rely very heavily on the expertise of their teachers. The standards and frameworks focus on *content* that students are to learn, so state leaders have lately given increased attention to *teachers' knowledge and understanding of school subjects*, which are related to but distinct from the teachers' abilities to plan and manage instruction. State education policy leaders also have increased concerns about the subject-matter preparation of university students who intend to earn credentials and become K-12 teachers.

In this context, the California State University System, which prepares most of California's new teachers each year, has undertaken several initiatives pertaining to the subject-matter preparation of CSU students who intend to become teachers. Under the leadership of Chancellor Charles Reed, twenty CSU campuses now offer *blended programs of subject-matter and pedagogical preparation* for undergraduate students who make relatively early decisions to pursue teaching careers. Each campus also initiated an in-depth review of its subject-matter programs for Multiple Subject Teaching Credentials, which are predominantly used in K-8 schools. Systemwide, the Office of the Chancellor completed in 2003 a thorough analysis of the extent to which these programs are aligned with the academic standards for California pupils in grades K-8. Most recently, the Chancellor's Office also initiated a study of the degree to which the CSU's new blended programs address the needs of "early deciders" by providing strong campuswide preparation for teaching in elementary schools.

In the CSU system, the present study is the first outcomes-oriented evaluation of subject-matter programs for prospective teachers. By compiling evidence of *program effectiveness* from a sample of recent CSU graduates and their K-8 school supervisors, this study complements other recent CSU initiatives. Sponsored by the Chancellor's Office in conjunction with the 21 CSU campuses that offer accredited teacher preparation programs, this study examines how well subject-matter preparation is functioning while the state is making significant changes in the curriculum of K-12 education and in the preparation of future teachers for the modified curriculum.

Intended Uses of the Pilot Evaluation

In 2000, the CSU Chancellor and Deans of Education jointly decided to undertake annual evaluations of the *outcomes* of CSU programs of *professional* (pedagogical) preparation. Beginning in 2001, the Chancellor's staff surveyed a small sample of the *graduates* of CSU schools of education as they finished their first year of teaching. This pilot in 2001 also compiled evidence from the *supervisors* of the CSU graduates, who provided candid assessments of the extent to which the new teachers were well prepared for the rigors of classroom teaching in California public schools. Chancellor Reed and the Deans of Education concluded that the pedagogy-focused pilot study yielded important data about program strengths and areas of needed improvement. These judgments were based primarily on the clarity, reliability and validity of the evaluation questions and responses. It was decided to expand and continue the evaluations of professional preparation programs each year beginning in 2002.

In much the same way, the CSU intends to review the methodology and findings of the present study, which focuses on subject-matter preparation programs. Can first-year teachers and their school-site supervisors reliably answer valid questions about the effects of their subject-matter preparation on their teaching? The primary purpose of this study is to determine the feasibility and potential value of expanding the size of subject-matter evaluations and doing them on a recurring cycle in the future. The pilot study may also yield important preliminary information about the CSU's effectiveness in preparing elementary teachers for a changing school curriculum. Given the growing public focus on the academic progress of all K-12 students, it is important to assess and maximize the effectiveness of CSU programs for undergraduate students who intend to teach. The present study is part of a broad CSU strategy to achieve this policy goal comprehensively at the earliest possible time.

Sample Size and Response Rates in the Pilot Evaluation

Two groups of professional educators in California schools participated in the pilot evaluation. First was a *random sample of teachers* who (1) completed CSU programs of subject-matter preparation when they were undergraduates during the late 1990s, (2) then completed programs of professional preparation at CSU campuses during 2000-01, (3) then received Multiple Subject Teaching Credentials from the State of California, and (4) then served as K-8 classroom teachers during 2001-02. To create the sample, the Chancellor's Office randomly selected 564 individuals from the population of 3,675 graduates who satisfied conditions (1) through (4) above. The pilot evaluation does not pertain to programs for other credentials or to subject-matter program graduates who do not pursue professional preparation or become teachers. Further study would be needed to assess the outcomes of blended programs; too few students had graduated from them when the present study was done.

The second group of participants were the *school supervisors* of the selected CSU graduates. Each graduate received a set of questions about her/his subject-matter preparation. Similar questions were intended for K-8 school administrators. The latter questions were mailed to the school's principal and included the name of the randomly-selected CSU graduate. The principal was asked to answer the questions if s/he was the person who evaluated the first-year teacher's performance for the school district. If another school manager (e.g. an assistant principal) fulfilled this responsibility, the principal forwarded the questions to the second person (the "supervisor") who answered the questions by reflecting on the subject-matter knowledge and understanding of the named CSU graduate.

Of the 564 graduates in the sample, the Chancellor's Office received responses from 237 graduates and 357 supervisors, yielding response rates of 42 percent and 63 percent respectively. With these sample sizes and participation rates, *the aggregated responses describe the subject-matter preparation of elementary school teachers throughout the CSU system during the late 1990s with a margin of error of approximately six percent.* The pilot-study sample size was too small to reliably describe the subject-matter preparation of elementary teachers at individual CSU campuses.

The relatively large response rates also address, in part, the feasibility of evaluating the outcomes of subject-matter programs. If the evaluation questions had been unclear or unanswerable, the actual response rates would have been much lower than they were. If a decision is made to assess subject-matter programs on a recurring and expanded basis, representative response rates should be feasible.

CSU Graduates Who Participated in the Pilot Evaluation

Two-thirds of the participating graduates had done much of their lower-division academic work at community colleges (65%). More than one-third of the participants earned CSU credit toward their subject-matter preparation for community college work (37%). At four-year institutions, 87 percent of the participating graduates attended one CSU campus and 96 percent did all of their upper-division subject-matter work at that campus. *Teaching was the primary career choice* for three-quarters (76%) of the participants when they were undergraduates. Programs of subject-matter preparation *were the undergraduate majors* for even larger majorities of the participants: 75 percent majored in Liberal Studies and 11 percent majored in Child Development. No more than two percent of the respondents completed any other undergraduate major. Most of the participants had been *employed extensively* while preparing to be teachers: 60 percent had jobs that were not related to their college education, but 39 percent served as substitute teachers or emergency teachers and 27 percent were teachers' assistants and para-educators in K-12 schools. Because of the need to work and the lack of CSU credit for subject-matter coursework in community colleges, most of the participants needed five or more years to earn Bachelor's degrees (61%), and more than five years to earn degrees and credentials (68%). Another 21 percent finished CSU baccalaureates in four years, however, and 22 percent earned degrees and credentials in five years. Overall, the academic and employment backgrounds of the 237 respondents were *typical* for CSU teaching graduates in general, suggesting that the effectiveness of their preparation to teach may also represent that of the entire population.

All of the CSU participants were qualified teachers who earned California credentials prior to being in the pilot evaluation. All earned Multiple Subject Credentials for teaching in self-contained classrooms. A few also earned credentials for teaching in special education. None of them earned Single Subject Credentials for high-school teaching. All of the participating graduates were *teachers* during 2001-02. They were assigned to teach self-contained classrooms (83%), or core classes (5%) in which they taught two subjects to successive groups of students, or special education classes (4%). Another seven percent were assigned to departmental classes, however, for which they were neither prepared nor qualified. When the CSU graduates participated in the pilot study, they were teaching students in grades K-3 (59%), grades 4-6 (40%), grades 7-8 (11%) and/or grades 9-12 (3%).¹ Nearly all of them had English language learners in their classes (94%). In 29 percent of the cases, more than two-thirds of the children were ELLs. In another 19 percent, more than one-third were ELL pupils.

¹ Some of the background questions allowed for multiple responses, so percentages may sum to more than 100 percent.

School Supervisors Who Participated in the Pilot Evaluation

Of the participating supervisors, 92 percent were school principals and six percent were assistant principals. Nearly all of them had supervised six or more beginning teachers in their administrative careers (89%), had served more than six months as the supervisor of the CSU graduate whose preparation was being evaluated (94%), had observed the CSU graduate's classroom during active instruction on three or more occasions of extended duration (97%), and had extended conferences with the CSU graduate about her/his teaching on three or more occasions (87%). Supervisors also reported the sources and depth of their knowledge of California's *academic standards* in each subject. (Such knowledge would be a basis for valid assessments of the teachers' subject-matter preparation.) Nearly all of them had extensive prior study and contact with the state standards for reading-language arts (93%), mathematics (90%) and history-social science (81%). Large numbers also had extensively studied and worked on local implementation of the standards in science (54%), languages other than English (54%), physical education (59%) and the arts (64%). Overall, there is considerable evidence that the supervisors were well-qualified to make reliable judgments about the subject-matter preparation of the sampled CSU graduates – particularly judgments about their preparation to teach California's *academic standards* for K-8 students.

The supervisors also provided important information about the schools in which the CSU graduates were teaching in 2002. In one-third of the graduates' schools, more than 55 percent of the students were English language learners and more than 80 percent were eligible for reduced-price school meals. In two-thirds of the schools, more than 20 percent were ELLs and more than 45 percent were from low-income families. The supervisors indicated that almost two-thirds of the graduates were working in "urban," "inner-city," and "metropolitan schools" (62%). One-fifth of the graduates' schools were "rural schools" (21%). Before the CSU graduates were hired, 45 percent of the schools had earned low scores on California's Academic Performance Index (API), 21 percent had earned intermediate scores, and 34 percent had earned high scores on the index, which was based entirely on the schoolwide results of standardized achievement tests. These data describe the *contexts* in which CSU graduates and their supervisors answered the evaluation questions. They suggest that the participating schools *exemplify* the environments where most CSU graduates are assigned to teach.

Evaluation of CSU Program Effectiveness by School Supervisors

Among the most important outcomes of a university program of subject-matter preparation are the teaching graduates' aggregate knowledge and understanding of subjects that (1) they are authorized to teach by their state credentials and (2) they actually teach in their first-year teaching assignments. One purpose of the pilot study of program outcomes is to determine if school principals and other site managers can provide valid, reliable estimates of a first-year teacher's knowledge and understanding of the subjects s/he is assigned to teach. To test this purpose on a small scale, the pilot evaluation instrument included a list of 24 school subjects that teachers with Multiple Subject Teaching Credentials are authorized to teach. In relation to each of these school subjects, supervisors were asked: *How well did this teacher know and understand each subject listed below?* On page 6 below, the left column of Table 1 shows the 24 school subjects as they were printed in the evaluation instrument.

It was anticipated that few first-year teachers would be assigned to teach all 24 subjects, and that a supervisor could not assess a teacher's knowledge and understanding of a subject that the teacher did not teach. Another assumption was that a typical supervisor would be able to assess a teacher's knowledge and understanding of a "taught subject" only if the supervisor had observed the teacher presenting the subject to students during one or more extended periods of classroom instruction, and/or if the supervisor had discussed the CSU graduate's teaching of that subject during one or more extended conferences with the teacher. The pilot evaluation instrument solicited information from supervisors about their observations and conferences with the CSU graduates. It also requested the supervisors to "please leave a space blank if you do not know" how well the teacher knew and understood a subject.

In asking a supervisor to report "how well did this teacher know and understand" each subject, the pilot evaluation instrument provided four response options representing distinct levels of knowledge and understanding.

- 3 = The teacher was *well prepared* to know and understand this subject.
- 2 = The teacher was *adequately prepared* to know and understand this subject.
- 1 = The teacher was *somewhat prepared* to know and understand this subject.
- 0 = The teacher was *not at all prepared* to know and understand this subject.

The right side of Table 1 summarizes the supervisors' responses to the 24 subject-specific items. For each subject, Column (1) shows *how many of the participating supervisors* selected one of the four response options (N). Column (2) shows the *percentages* of the responding supervisors who reported either of the two first response options, e.g. that the teacher was either *well prepared* or *adequately prepared* to know and understand the subject. Column (3) shows the average or "*mean*" response on the above scale. Mean values in Column (3) could vary from a minimum value of zero, which would occur if all CSU graduates were *not at all prepared* to know and understand a subject, to a maximum value of 3.00, which would occur if every CSU graduate was *well prepared* to know and understand the subject. Finally, Column (4) shows the *standard deviations* among the supervisors' responses. Each *SD* measures how much the knowledge and understanding of a subject varied, on average, from one CSU graduate to the next. Standard deviations could vary from zero (all graduates had exactly the same level of knowledge) to 1.50 (half of the graduates were at each "end" of the scale).

Again, the pilot evaluation assumed that supervisors would assess teacher expertise only if they had knowledgeable grounds for such assessments. One way to test these assumptions is to examine the numbers of supervisors who assessed the teachers in the different subjects. The data in Column (1) reflect the fact that several subjects are not widely taught before grade four, including world history (Item 7), social science (8), physics (13), chemistry (14), biology (15) and dance (18). The *Ns* in Column (1) also show that the numbers of supervisors responding to the twenty-four subjects were proportional to the typical amounts of time that teachers spend on classroom instruction in the various subjects. Busy supervisors of first-year teachers probably allocate their classroom-observation time and their teacher-conferencing time proportionally to the instructional time that is given to subjects. These inter-related factors account for the widely varying *Ns* in Column (1), which suggest that the participating supervisors were conscientious in responding only to those subjects in which they had tangible bases for assessing teachers' knowledge and understanding. This finding also adds to the prospect that the evaluation data in Columns (2) through (4) have validity and reliability.

Table 1:
Supervisors' Evaluations of the Knowledge and Understanding of
K-8 School Subjects by CSU Teaching Graduates

School Subjects in Which K-8 School Supervisors Evaluated Each CSU Graduate's Knowledge and Understanding	Descriptive Statistics for Each School Subject			
	(1) N	(2) %	(3) Mean	(4) SD
1. Fiction and Non-Fiction of Varied Genres, Periods and Cultures	213	83 %	2.18	0.70
2. Writing, Composition and Oral Language (Including Listening)	252	87 %	2.28	0.68
3. Structure of English Including Sounds, Words and Sentences	248	89 %	2.29	0.65
4. Vocabulary, Word Derivations, Spelling and Grammar	245	87 %	2.27	0.68
5. Major Events & Developments in U. S. History (Not California)	68	75 %	2.06	0.75
6. Major Events and Developments in California History	67	75 %	2.12	0.79
7. Major Developments in the History of Peoples Outside the U. S.	55	80 %	2.13	0.72
8. Concepts of Economics, Geography, Government, Psychology	51	82 %	2.12	0.68
9. Solving Problems in Arithmetic Including Shapes & Measures	230	92 %	2.34	0.62
10. Solving Problems in Mathematics Including Pre-Algebra	196	88 %	2.26	0.66
11. Understanding Estimation, Probability and Basic Data Analysis	175	90 %	2.29	0.63
12. Technology (Including Computers) and Its Effects on Society	110	86 %	2.19	0.67
13. Physics Including Topics Such as Energy, Matter and Motion	48	77 %	2.08	0.74
14. Chemistry Including the Structure and Properties of Matter	35	74 %	2.00	0.73
15. Biology Including Topics Such as Life Forms and Evolution	50	78 %	2.04	0.70
16. Topics in Astronomy, Geology, Oceans, Climate and Weather	61	84 %	2.13	0.67
17. Lessons in Art Including Appreciation, Drawing and Crafts	104	87 %	2.17	0.65
18. Lessons in Dance Including Social Dance & Creative Movement	45	82 %	2.18	0.72
19. Lessons in Music Including Appreciation, Singing & Instruments	69	83 %	2.10	0.67
20. Drama Lessons Including Making Plays & Reading Them Aloud	67	78 %	2.07	0.72
21. Physical Education Instruction in Fitness, Skills and Sports	120	83 %	2.17	0.69
22. Instruction in Health Including Nutrition, Diseases and Safety	93	84 %	2.15	0.67
23. The Teacher's Knowledge of Child Growth, Learning & Thinking ²	120	86 %	2.20	0.67
24. The Teacher's Knowledge of Human Development After Childhood	74	80 %	2.16	0.74

² Subjects 23 and 24 were included in the pilot evaluation because state law requires that they be included in an accredited subject-matter program for Multiple Subject Teaching Credentials. The fact that teachers do not teach these subjects did not appear to interfere with the supervisors' capacity to assess the teachers' knowledge and understanding.

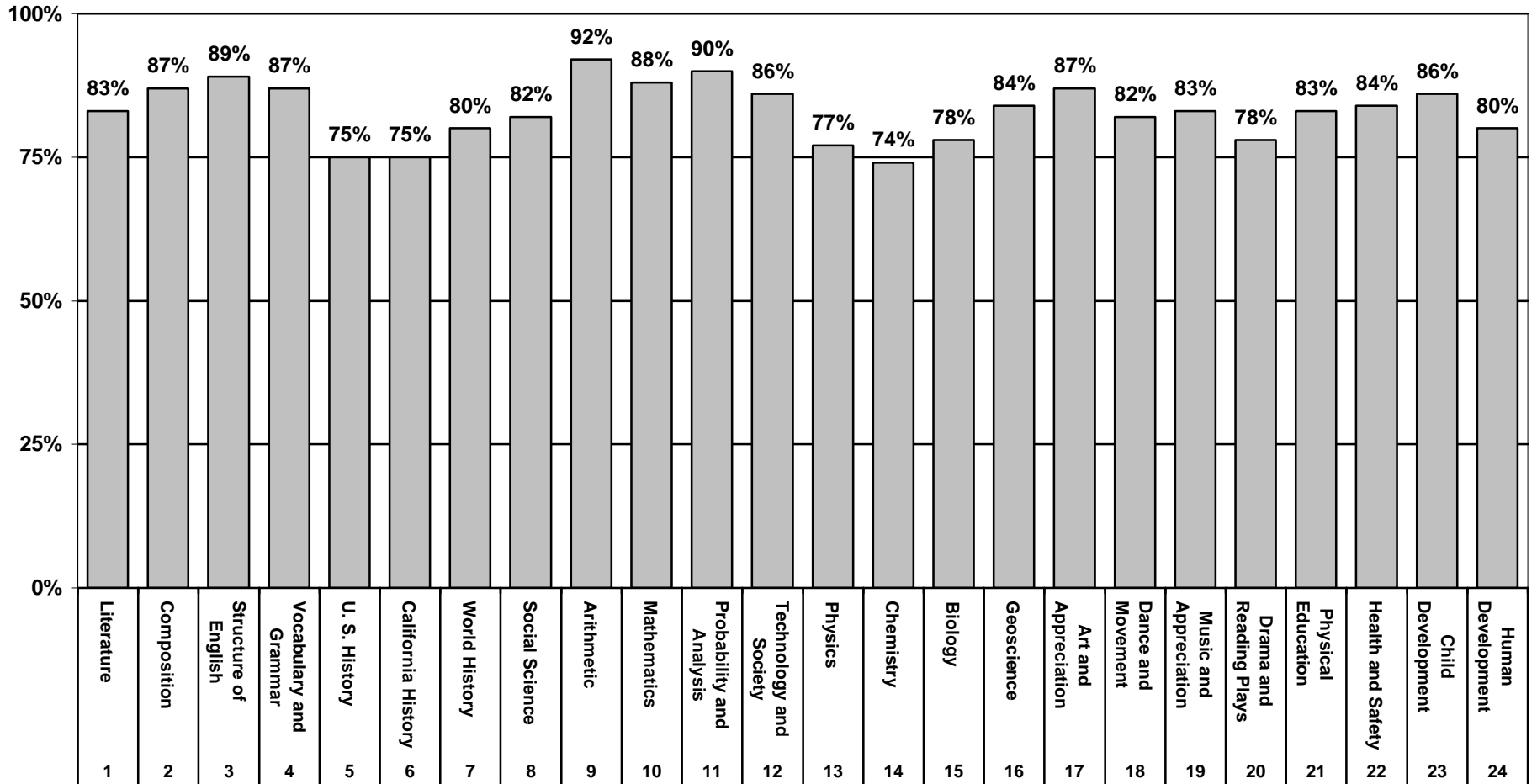
An Interpretation of Supervisors' Evaluations in the Pilot Study

Figure 1 on page 8 displays the *percentages* of CSU teaching graduates who were *well-prepared* or *adequately-prepared* to know and understand each subject, according to the teachers' supervisors. These percentages were shown in Column (2) of Table 1. The graph highlights the fact that, with some exceptions, the effectiveness of CSU preparation varies according to the broad areas in which the 24 subjects are taught. The first four subjects comprise the broad area of *reading-language arts*, followed by the broad areas of *history-social science* (subjects 5-8), *mathematics* (9-12), *science* (13-16) and the *visual and performing arts* (17-20). In the aggregate, the responding supervisors reported the CSU graduates' knowledge and understanding to be very strong in the broad areas of *mathematics* (particularly arithmetic) and *reading-language arts* (particularly the structure of English). They also judged the graduates' knowledge and understanding to be somewhat less strong in the broad area of *visual and performing arts* (with graduates having the weakest understanding of drama), and considerably less strong in the areas of *history-social science* (with the weakest understanding being in U. S. history and California history) and *science* (with the weakest knowledge being in chemistry). In the aggregate, the supervisors also reported the CSU graduates' knowledge and understanding of *physical education* (21), *health* (22) and *human development* (23 and 24) to be at intermediate levels relative to subjects in the other areas. These aggregate findings apply only to *the overall system of campus-based programs* as these programs were experienced by a single cohort of graduates who began teaching in 2001-02. Neither the findings nor the interpretations describe individual programs or campuses within the CSU system.

In examining the percentages in Table 1 and Figure 1, it is important for the pilot study's margin of error to remain in mind. The *reported percentages* are the most reliable estimates of preparation effectiveness in 24 subjects. The percents in Table 1 and Figure 1 have a *greater probability* of being "true" than any other percentages. But their accuracy is *not certain* because they are based on a finite sample of participants drawn from a larger population, and because errors may have occurred in measuring the effectiveness of preparation. In estimating the "true" percentages, the next-most-probable values (after the reported percentages) are *one point greater and less than the reported values*. After those, the next most likely percentages are *two percent higher and lower* than the values in Table 1 and Figure 1, and so on. Given the size of the response group and the magnitude of the reported percentages, we can have 95 percent confidence that the true percentages are no more than six points greater or lower than the percents in Figure 1 and Table 1.

As an alternative to testing the CSU graduates to directly measure their subject-matter expertise, the pilot evaluation solicited assessments from their school-site supervisors. As a measure of the CSU system's overall effectiveness in subject-matter preparation, the *validity* and *reliability* of the supervisors' reports (in the aggregate) derive from the following facts: The graduates were selected randomly from the entire cohort of CSU graduates; 63 percent of the selected supervisors elected to participate in the pilot evaluation; 89 percent of the responding supervisors had supervised six or more new teachers in their administrative careers; 94 percent had supervised the designated CSU graduates for more than six months; 97 percent had observed the graduates' classrooms during active instruction on three or more occasions; 87 percent had conferenced with the graduates about their teaching on three or more occasions; the evaluation data suggest that the participating supervisors evaluated only those subject areas in which they had observed or conferenced with the graduates; and a teacher's knowledge and understanding of subject-matter is commonly a focus of observation and conversation when a supervisor visits a classroom or conferences with a teacher. Alternative sources of evaluation data with equivalent validity and reliability may not be available to the university.

Figure 1: Percentages of K-8 School Supervisors Reporting that Randomly-Selected CSU Teaching Graduates Were Well-Prepared or Adequately Prepared to Know and Understand Twenty-Four School Subjects that the CSU Graduates Taught



Evaluation of CSU Program Effectiveness by CSU Teaching Graduates

First-year classroom teachers who had completed CSU programs of subject-matter preparation were asked to report on *their knowledge and understanding* of the same school subjects that were listed in Table 1. The pilot evaluation assumed that teaching a subject provides an opportunity for teachers to “come to grips” with their knowledge and understanding of that subject. Accordingly, when CSU graduates responded to each subject in the list of 24 school subjects, they were asked this question: *When you taught material related to this subject in your class, how well did you know and understand the material?* The evaluation did not ask the CSU graduates *in the abstract* how well they knew and understood the subjects. An abstract self-evaluation would be difficult for respondents to complete, and would likely yield responses that were somewhat inflated. Instead, the pilot study focused on knowledge and understanding of *material that the graduates had taught*. The term *material* denoted an open-ended category of ideas, information, skills, abilities and attitudes that form the content of a subject and that the CSU graduates had actually taught in their classes during the first school year after they received their CSU-based credentials. This open-ended denotation was *by design* because a wide array of content elements are taught in different schools and districts, even within specific subjects such as literature, history, music and health.

CSU graduates were directed to make no response “if you did not teach a subject in your classroom this year.” Like their supervisors, then, the graduates assessed the knowledge and understanding *that they actually used*, not the knowledge and understanding that they thought they possessed. The CSU graduates also had four response options that were equivalent to those of their supervisors.

- 3 = When I taught material related to this subject, I knew and understood it *well*.
- 2 = When I taught material related to this subject, I knew and understood it *adequately*.
- 1 = When I taught material related to this subject, I knew and understood it *somewhat*.
- 0 = When I taught material related to this subject, I knew and understood it *not at all*.

On the following page, Table 2 summarizes the responses of CSU graduates to the pilot evaluation question about their knowledge and understanding of the 24 subjects. (For an explanation of the four types of statistics in Table 2, see the preamble to Table 1 found on page 5.) Given the fact that some subjects are taught at *limited grade levels* (e.g. California history, world history, physics, chemistry and biology), and that state standards and school district policies do not emphasize the importance of some other subjects for *any grade level* (e.g. geoscience and dance), and that subject specialists teach some subjects in place of classroom teachers in some schools (e.g. physical education and music), we should expect the numbers of respondents in Column (1) to vary considerably. In fact, the *Ns* in Table 2 mirror these state and district policies very accurately. Again, participants in the pilot evaluation appear to have been reliable in adhering to the admonition that they assess their knowledge and understanding of *the subjects they had taught* in their first-year classrooms.

Table 2:
CSU Graduates' Evaluations of Their Knowledge and Understanding of the
K-8 School Subjects in Their Teaching Assignments

K-8 School Subjects in Which CSU Graduates Evaluated Their Knowledge and Understanding	Descriptive Statistics for Each School Subject			
	(1) N	(2) %	(3) Mean	(4) SD
1. Fiction and Non-Fiction of Varied Genres, Periods and Cultures	185	81 %	2.15	0.78
2. Writing, Composition and Oral Language (Including Listening)	207	88 %	2.31	0.72
3. Structure of English Including Sounds, Words and Sentences	209	86 %	2.26	0.73
4. Vocabulary, Word Derivations, Spelling and Grammar	209	82 %	2.20	0.76
5. Major Events & Developments in U. S. History (Not California)	169	64 %	1.76	0.82
6. Major Events and Developments in California History	151	60 %	1.74	0.86
7. Major Developments in the History of Peoples Outside the U. S.	151	56 %	1.66	0.82
8. Concepts of Economics, Geography, Government, Psychology	155	67 %	1.88	0.85
9. Solving Problems in Arithmetic Including Shapes & Measures	194	89 %	2.43	0.70
10. Solving Problems in Mathematics Including Pre-Algebra	178	90 %	2.45	0.72
11. Understanding Estimation, Probability and Basic Data Analysis	178	85 %	2.29	0.78
12. Technology (Including Computers) and Its Effects on Society	142	76 %	2.01	0.88
13. Physics Including Topics Such as Energy, Matter and Motion	133	62 %	1.76	1.01
14. Chemistry Including the Structure and Properties of Matter	117	57 %	1.63	0.99
15. Biology Including Topics Such as Life Forms and Evolution	143	77 %	2.05	0.84
16. Topics in Astronomy, Geology, Oceans, Climate and Weather	150	68 %	1.87	0.92
17. Lessons in Art Including Appreciation, Drawing and Crafts	173	76 %	2.05	0.83
18. Lessons in Dance Including Social Dance & Creative Movement	114	60 %	1.66	1.10
19. Lessons in Music Including Appreciation, Singing & Instruments	141	63 %	1.78	1.05
20. Drama Lessons Including Making Plays & Reading Them Aloud	146	66 %	1.86	0.98
21. Physical Education Instruction in Fitness, Skills and Sports	175	78 %	2.11	0.79
22. Instruction in Health Including Nutrition, Diseases and Safety	167	77 %	2.05	0.79
23. The Teacher's Knowledge of Child Growth, Learning & Thinking ³	182	90 %	2.41	0.74
24. The Teacher's Knowledge of Human Development After Childhood	156	82 %	2.27	0.81

³ Subjects 23 and 24 were included in the pilot evaluation because state law requires that they be included in an accredited subject-matter program for Multiple Subject Teaching Credentials. The fact that teachers do not teach these subjects did not appear to interfere with the graduates' capacity to assess their own knowledge and understanding.

An Interpretation of CSU Graduates' Evaluations in the Pilot Study

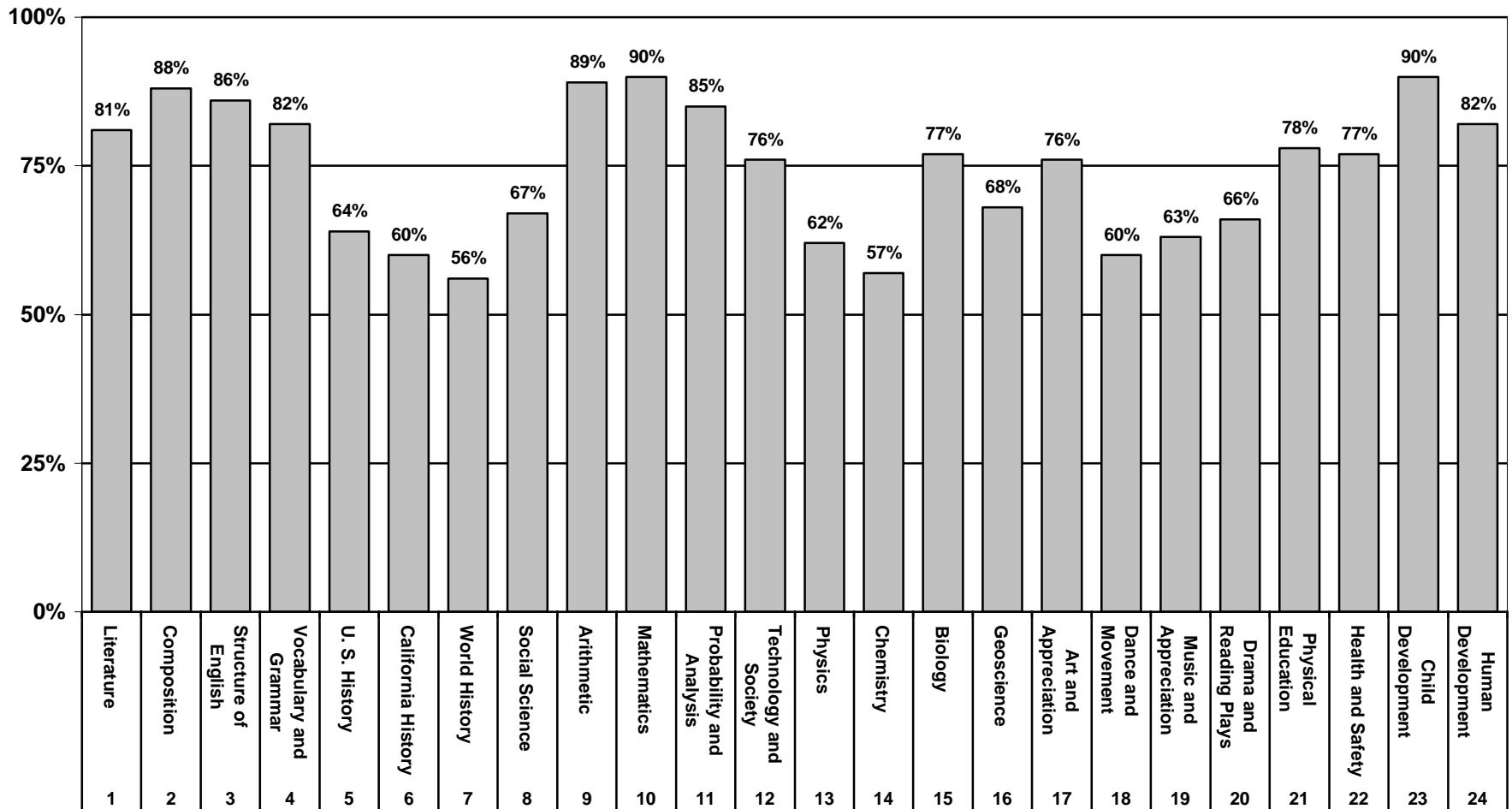
Figure 2 on the following page highlights the percentages of graduates who were *well prepared* or *adequately prepared* to know and understand the material they taught in each subject, which were also shown in Table 2 above. In the broad area of *reading-language arts*, the graduates' assessments of their knowledge and understanding were roughly equivalent to those of their supervisors in Table 1 and Figure 1. Similarly, the graduates' assessments within the broad area of *mathematics* (Items 9-11) were almost equivalent to their supervisors' evaluations. In other subjects, however, the graduates reported their own knowledge and understanding to be weaker than was reported by their supervisors. CSU evaluations of the effectiveness of *professional* teacher preparation programs consistently yield similar findings in which *supervisors report the preparation of first-year teachers to be stronger than is reported by the teachers themselves*. The reduced judgments of the graduates are attributable to their inexperience compared with the many years in which their supervisors have gained perspective and acquired realistic expectations about how much first-year teachers should know and be able to do. Despite the fact that many beginning teachers assessed their subject-matter knowledge and understanding more critically than did their supervisors, the two participant groups were similar to each other in rank-ordering the broad areas: both groups reported the graduates to be strongest in the broad areas of *mathematics* and *reading-language arts*, followed by *physical education* and *health*; the *visual and performing arts*; *science*; and *history-social science*.

Overall Interpretations of the Pilot Evaluation Results

An Interpretation Pertaining to Validity and Reliability of the Pilot Evidence. In all subjects of the school curriculum, the pilot evaluation questions were directly aligned with the *academic content standards* and the *curriculum frameworks* of the State of California. These are the same standards and frameworks that govern California's school curriculum and accountability system. Unless the CSU graduates and/or their supervisors misunderstood the pilot evaluation questions, their replies have considerable validity for CSU programs of subject-matter preparation. There is no evidence that the participants misunderstood the questions; in fact, the pilot evaluation yielded considerable evidence to the contrary. Response rates were high; response patterns reflected the directions given to the participants; the numbers of respondents to specific questions varied in predictable ways; and very few individuals in the sample indicated they were confused or unclear about the questions or the response options. As was the case with the pilot evaluation of CSU *professional* programs in 2001, *the present study suggests that CSU graduates and their school-site supervisors are valid and reliable in answering questions about the subject-matter preparation of teachers in the CSU system.*

An Interpretation Pertaining to the Utility of Evaluating the Outcomes of Subject-Matter Programs. By focusing on as many as 24 distinct subjects of the school curriculum, the pilot evaluation yielded a profile of evidence regarding the CSU's *systemwide strengths and weaknesses* in subject-matter preparation (K-8). Even with relatively small numbers of respondents, the pilot study produced very different results for distinct subjects of university preparation and school teaching. If the pilot's findings lack utility or value, it is because they only describe the outcomes of the *entire CSU system* while shedding no reliable light on the outcomes of specific programs at particular CSU campuses. Responsible academic officers are not in a position to use the pilot findings in academic decisions because the pilot evaluation was small in scale. With the participation of larger numbers of graduates

Figure 2: Percentages of Randomly-Selected CSU Teaching Graduates Reporting that They Were Well-Prepared or Adequately-Prepared to Know and Understand Content Material that They Taught in Their K-8 Classes and That Related to Twenty-Four Subjects of the School Curriculum



and supervisors, a *full-scale evaluation* would provide outcomes-oriented evidence that (1) would be *aligned* with the teaching responsibilities of CSU's future graduates, (2) would be *specific* to each CSU campus, and (3) would answer *uniform evaluation questions* among all CSU campuses and programs. CSU campuses do not have access to such information from other sources. Given the increasingly important role of subject-matter preparation in K-12 schools, campuses have a growing need for campus-specific data regarding program strengths and weaknesses.

An Interpretation of the Potential Value and Benefits of Expanding the Scope of the Evaluation. If a full-scale evaluation included the same questions and response options as the pilot study (with few major changes in their language), the CSU system would receive *longitudinal evidence* of changes that may be occurring in the *effectiveness* of subject-matter programs over time. Additionally, CSU campuses and the entire system would learn *still more* about subject-matter preparation if some or all of the following additional questions were also included in future evaluations.

- Whereas the pilot evaluation focused on the preparation of K-8 teachers who earn Multiple Subject Credentials, expansion of the evaluation scope would enable CSU to ascertain its effectiveness in the subject-matter preparation of *high school teachers* who earn Single Subject Credentials. State academic standards apply to high school students as well as children in the lower grades. Moreover, state accreditation standards for Single Subject Credentials are changing quickly. Beginning in 2003, it would be feasible to assess the outcomes of subject-matter programs in English and mathematics, followed by studies of other subjects in subsequent years.
- It would be important for the CSU to ascertain how its teaching graduates assess the actual value and helpfulness of *key elements* of their subject-matter preparation, based on their teaching experiences. For example, graduates could be asked to evaluate advisement, the availability of program information, their sense of belonging to a “cohort,” and the assessments used to ascertain their end-of-program expertise. Answers to such questions would be particularly valuable if the program elements and features to be evaluated by the graduates were aligned with current and forthcoming accreditation standards for subject-matter programs (SB 2042).
- In order to “unpack” the *sources* of subject-matter knowledge and understanding on the part of CSU's first-year teaching graduates, they could be asked how many courses they took in each subject, how many of these courses were completed at CSU campuses and at community colleges, and how many were completed with a grade of B or better. In addition to revealing whether or not subject-matter expertise comes primarily from lower- and upper-division courses in the subjects, responses to these questions could reveal how many courses are needed for typical graduates to be well prepared in each area.
- At least one large-scale evaluation of subject-matter preparation should include a random sample of CSU teaching graduates who qualified for credentials by passing standardized state examinations in their subjects. By including such a sample in an evaluation, the CSU could, for the first time, compare the relative subject-matter expertise of exam passers and program completers – two groups of new teachers who have met the state's subject-matter requirement in alternative ways.

These questions (and others like them) illustrate the potential value and benefits of sponsoring larger-scale evaluations of CSU subject-matter preparation.

An Interpretation of the Importance of Alignment Between K-12 Curriculum and Teacher Subject-Matter Preparation. In two areas of the K-8 school curriculum – mathematics and language arts – all students in all grades are instructed by their classroom teachers every day. Student advancement from grade to grade, and student eligibility to graduate from high school, depend on learning to read and compute. All CSU graduates in self-contained classrooms teach reading and math; this is not true of any other subject. Significantly, the pilot evaluation indicates that, in recent years, more than 85 percent of CSU’s teaching graduates have been *well prepared* or *adequately prepared* to know and understand the content of California’s language arts and mathematics curricula.

Compared with the evidence of strong effectiveness in the core elementary subjects of language arts and mathematics, the pilot-study findings suggest that preparation in other subjects is less effective. Here, the most likely explanation stems from the sequence of recent changes in California education policies. California’s new academic standards for grades K-8 were adopted and implemented *while and after the pilot-study participants enrolled in CSU subject matter programs*, not before they did so. Due to the standards, K-8 schools dramatically shifted the focus of curriculum and instruction in several subject areas. In the broad area of history-social science, for example, the State Board of Education dropped the prior focus on world history and world cultures, which was in effect *while the pilot-study participants were preparing to teach*. In place of this focus, the Board adopted a set of standards that emphasize United States and California history. *In the schools, this new focus went into effect while the pilot-study participants were securing their credentials and their initial teaching positions.* Additionally, the new academic standards for K-8 students were not the only policy changes to take effect *while the pilot participants were earning credentials*. California also adopted new accreditation standards for the subject-matter programs that are the focus of this study. For the first time in California history, subject-matter accreditation standards require CSU programs to be *fully aligned and congruent* with the K-8 academic standards for pupils. The pilot-study participants were CSU students during a prior period when the state’s accreditation standards encouraged each CSU campus to emphasize the subjects that the campus deemed to be important. These “pre-2042 standards” did not call for any level of alignment between subject-matter teacher preparation and the state’s learning expectations for K-8 students. *Some pilot-study participants experienced a “disconnect” between subjects they studied in college and content they were expected to teach in K-8 classrooms a few years later. Such disconnected experiences probably occurred most frequently in science and history-social science, and would prompt many reasonable teachers to question the value of their subject-matter preparation in these subject areas.*

The pilot-study findings suggest that the most important priority for the next few years will be for CSU programs of subject-matter preparation to complete their alignment with the new academic standards for K-8 students. Curriculum alignment is most likely to strengthen the effectiveness of subject-matter programs – particularly in science and history-social science – throughout the CSU. The most productive course for policymakers would be to foster the earliest possible alignment of teacher programs with K-8 standards.

For the foreseeable future, it would be most responsible for the CSU system to sponsor a series of carefully-designed evaluations to track subject-matter programs and ensure they become fully aligned with the state’s high-stakes standards for K-8 children. Additional policy changes during this period are only likely to undermine the alignment process and the CSU’s opportunity to track and monitor its continued progress toward excellence in the preparation of teachers for California’s K-8 students.