

EARLY COLLEGE ENGLISH AND MATH INSTRUCTION THAT LEADS TO SUCCESS IN INTRODUCTORY COLLEGE COURSEWORK

A Research Report from the

National Center for Restructuring Education, Schools, and Teaching (NCREST)

Teachers College Columbia University

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Introduction

The purpose of this study is to identify the characteristics of English and mathematics instruction in Early Colleges that lead to student success in college-level introductory coursework. Conceptually, this study is based on the idea that college readiness requires a skill-set fundamentally different from what is generally thought of as high school competencies. In this study, which is framed by the work of David Conley and the Education Policy Improvement Center (EPIC), college readiness is broadly defined as the level of preparation a student needs in order to succeed in non-remedial, credit-bearing, general education, college courses (Conley, 2005). As will be discussed throughout this report, the preparation necessary for college readiness is multi-dimensional and includes a range of skills and competencies.

In this report we describe some of the school and course characteristics, teacher philosophies, instructional methods, and leadership perspectives of a select sample of Early Colleges working to increase students' college readiness in English and mathematics, and address the following research questions:

1. What are the characteristics of English and mathematics courses in Early College schools that prepare students for college-level introductory courses?
2. What strategies, practices, and academic supports do teachers and schools use to accelerate the progress of students who are underprepared in these content areas?

Background on Early Colleges

Early Colleges are a network of small schools that are designed to blend high school and college course-taking in rigorous and supportive ways. Since 2002, Jobs for the Future (JFF), with support from the Bill and Melinda Gates Foundation, has coordinated the Early College High School Initiative (ECHSI) by providing support to 13 intermediary partners. These organizations have started or redesigned more than 200 schools in 24 states and the District of Columbia. Early Colleges are designed so that low-income youth, first-generation college-goers, English language learners, students of color, and other students from groups underrepresented in higher education can simultaneously earn a high school diploma and up to two years of tuition-free college credit.

Early Colleges are unified philosophically by a set of core principles which constitute the fundamental beliefs of the initiative.¹ The core principles provide a framework for understanding the essential purpose and design of Early Colleges. Although all Early Colleges embrace these essential characteristics, they employ a variety of strategies for meeting the specific needs of their students and communities.

Essential features of Early Colleges include:

1. *Small size*, which means that all teachers can know students well, both academically and personally, allowing them to more accurately and effectively target their instruction and support.
2. *Innovative by design*, most directly in the sense that students' impending college course-taking drives instructional practice in the high school.
3. *Collaborative by design*, which is demonstrated most notably in vibrant high school-college partnerships.
4. *College-focused and college-connected*, meaning that ECHSs are structured around the central purpose of preparing students for college course-taking.

The overriding focus on college preparation is the defining characteristic of the ECHSI. A corollary of this is the extent to which acceleration is built into the Early College model. Because the intent is to engage all students in college course-taking by the 10th or 11th grade (or earlier), the educational process is intrinsically an accelerated one. Further, because ECHSs often enroll students who are academically underprepared, a purposeful press toward college readiness becomes an essential component of the model.

Origins and Importance of the Research Topic

Participation in rigorous high school English and mathematics coursework has been held to be a reliable predictor of student success in college course-taking (Adelman, 1999). These are core content academic areas of high school study which facilitate the development of critical-thinking and communication skills that are used in other academic areas as well. Further, English and mathematics instruction is important in the development of critical

ECHSI Core Principles

Core Principle 1: Early College schools are committed to serving students underrepresented in higher education.

Core Principle 2: Early College schools are created and sustained by a local education agency, a higher education institution, and the community, all of whom are jointly accountable for student success.

Core Principle 3: Early College schools and their higher education partners and community jointly develop an integrated academic program so all students earn one to two years of transferable college credit leading to college completion.

Core Principle 4: Early College schools engage all students in a comprehensive support system that develops academic and social skills as well as the behaviors and conditions necessary for college completion.

Core Principle 5: Early College schools and their higher education and community partners work with intermediaries to create conditions and advocate for supportive policies that advance the Early College movement.

¹ See Appendix A for a more complete description of the Early College High School Initiative Core Principles.

thinking skills that support higher levels of academic achievement (Halpern, 1998).

Because ECHSs are explicitly preparing students for participation in college classes, those involved in these schools have sought a greater understanding of specific ways that English and math can be taught to increase students' acquisition of these skills. The research topic that is the focus of this report was one of two generated by the ECHS Research Working Group², formed in 2007 to identify areas of pressing concern and interest within the ECHSI. Following a *Request for Applications* process, the National Center for Restructuring Education, Schools and Teaching (NCREST), Teachers College, Columbia University was selected to conduct research on this topic.

Overview of the Research

Whereas previous studies have been useful in showing **why** it is important that students do well in core, high school academic coursework, the current research seeks to increase our understanding of **how** high school instruction serves to prepare students from economically disadvantaged backgrounds to succeed in college. The current research uses a mixed methods design involving quantitative and qualitative data to address the two research questions.

Mixed methods research can be especially powerful because it allows researchers to seek convergence and/or triangulation among data sources in answering complex questions (Creswell, 2003). We believe that this approach to research is very appropriate to address the current research questions as they call for both breadth of scope and deeper investigation. Breadth of scope is often addressed effectively using quantitative methods, while qualitative methods facilitate in-depth exploration.

In the current study, data were collected in three interrelated phases, with each phase designed to contribute to an understanding of the data collected in the others.

1. In the first phase, a *teacher survey* focused on English and math teachers' perceptions of incoming students' knowledge and skills in areas that research has shown to be critically important for college readiness. It also allowed exploration of priority areas for instruction in preparing students for college.
2. In the second phase of the study, our research team conducted *focus group interviews* with teachers in which the questioning centered on classroom instructional strategies and teacher beliefs relative to the roles of schools and teachers in preparing students for college course-taking.

² The ECHS Research Working Group was convened by Jobs for the Future, with funding from the Bill and Melinda Gates Foundation. Comprised on the leadership of the intermediary organizations involved in developing ECHSs, their charge was to identify priority research topics, participate in the selection of researchers to conduct the research, and receive, reflect on, and disseminate the findings of the research conducted. The two topics identified were the one reported on here and another that focused on reasons that students may leave ECHSs prior to graduation.

3. In the third and final phase of the study, we identified four schools for which there was evidence of effective instructional practices in preparing students for college course-taking. We spent several days in a *site visit* at each school, observing English and mathematics instruction and interviewing teachers and administrators.

We synthesized and analyzed the data from the three phases of the research in order to achieve a rich and nuanced understanding of the English and mathematics instructional practices most closely associated with college success in the ECHSI context.

Theoretical Framework

College readiness is comprised of factors both directly related to high school instruction as well as those that are supported by formal and informal structures within schools. The extent to which secondary schools effectively prepare students for college is determined in large part by how well the competencies emphasized in high school instruction are aligned with those required for postsecondary success.

Some researchers argue that the prevailing notions of high school achievement and college readiness exist in tension with each other, not in harmony. Conley (2008) and others (e.g., Dougherty, Mellor, & Smith, 2006) describe a fundamental disconnect between the academic content and skills emphasized in much of the secondary instruction at traditional schools and the expectations of college faculty.

To address this problem, Conley led a research team that conducted focus groups and interviews with college faculty members over a period of several years and asked for their perspectives on the knowledge and skills that entering freshmen needed to be successful in college. Based on his findings, he developed a framework that includes four key dimensions of college readiness which serves as an organizational guide in the current research.

Key Content Knowledge and Skills: Conley (2003) defines key content knowledge and skills as the factual knowledge and procedural skills that are necessary for students to develop rich and useful understandings of content in the core subjects at a level associated with readiness for college. In his book, *College Knowledge* (2005), he describes the major areas of content knowledge and skills that students should have acquired to successfully undertake college-level work in each disciplinary area.

Conley's Four Key Dimensions of College Readiness

Key Content Knowledge and Skills

- Writing skills, algebraic concepts, key foundational concepts and “big ideas” from core subjects.

Key Cognitive Strategies

- Analytic reasoning, problem solving, inquisitiveness, precision, interpretation, evaluating claims.

Academic Behaviors (Self-Management)

- Persistence, time-management, study group use, awareness of performance.

Contextual Skills and Awareness

- Admission requirements, purpose of college, types of college, college culture, forming relationships with professors.

He asserts that core English subject knowledge and skills enable students to engage texts critically and create well-

written, organized, and supported work products (Conley, 2007a). The foundations of English content knowledge and skills include knowledge of literature, reading comprehension, writing, editing, information gathering, analysis, and critiquing, skills, and making connections to other areas of knowledge and experience.

Core mathematics content knowledge and skills, particularly as they pertain to college readiness, enable students to develop an understanding of the basic concepts, principles, and techniques of algebra and geometry. Deep levels of engagement with algebraic- and geometric-related content promote more than a formulaic understanding of mathematics.

Cognitive Strategies: Academic content knowledge and skills are not the only dimensions of learning in a college readiness model, however. Achievement in challenging college courses requires that students be proficient in the use of cognitive strategies necessary for learning in the disciplines. According to Conley (2007b), successful college students use a variety of key cognitive strategies that enable them to understand the content of a range of disciplines. He asserts that these cognitive strategies are "consistently and emphatically identified by those who teach entry-level college courses as being as important or more important than any specific content knowledge taught in high school" (p.3).

Cognitive Strategies Prioritized in this Research

Inquisitiveness: the habit of active and deliberate engagement in inquiry and dialogue about subject matter and research questions.

Analysis: the habit of evaluating data and other information sources for quality of content, validity, credibility, and relevance.

Reasoning, argumentation, and proof: the habit of preparing well-reasoned arguments or proofs to explain phenomena and utilize recognized forms of reasoning to construct and defend an argument.

Interpretation: the habit of analyzing competing accounts to determine any strengths, flaws, commonalities, and distinctions among them.

Precision and accuracy: the habit of seeking correct conclusions through successive approximations generated from a task or process that is repeated.

Problem-solving: the habit of developing multiple strategies to solve routine problems and generating strategies to solve non-routine problems.

Academic Behaviors: Successful college students also demonstrate a range of behaviors that reflect self-awareness, self-monitoring, and self-control in the academic domain. According to Conley (2007a):

Self-monitoring is a form of metacognition, the ability to think about how one is thinking. Examples of metacognitive skills include: awareness of one's current level of mastery and understanding of a subject, including key misunderstandings and blind spots; the ability to reflect on what worked and what needed improvement in any particular academic task; the tendency to persist when presented with a novel,

difficult, or ambiguous task; the tendency to identify and systematically select among and employ a range of learning strategies; and the capability to transfer learning and strategies from familiar settings and situations to new ones. (p. 16)

In addition, academic behaviors encompass a range of study and life skills that are applied in educational settings. These include time management, note taking, effective use of information resources, public speaking, and study group participation.

Contextual Awareness (College Knowledge): Success in college also requires skill in negotiating the cultural landscape of the college environment—particularly if the traditions and cultural assumptions of the college environment are perceived as significantly different from the student's own cultural background. According to Conley (2007a):

Contextual factors encompass primarily the privileged information necessary to understand how college operates as a system and culture.... Examples of key contextual skills and awareness include a systemic understanding of the postsecondary educational system combined with specific knowledge of the norms, values, and conventions of interactions in the college context, and the human-relations skills necessary to cope within this system even if it is very different from the community the student has just left. (p. 17)

In sum, the goals of this study are to identify and describe instructional strategies and English and mathematics course characteristics that facilitate the development of students' cognitive capacities most associated with successful performance in college course-taking, using Conley's dimensions of college readiness as a framework.

Limitations and Delimitations

There are several limitations and delimitations in relation to our study. First ECHSs are often situated on or near college campuses, and as a result they possess features that may be unique to this setting. Thus, findings from a study of ECHSs have limited generalizability to other settings. Further, the research was conducted with relatively small numbers of teachers from a limited number of ECHSs, further limiting generalizability.

In the case of the four schools visited, we were able to observe a number of classroom and school activities, and talk with many people. However, because the numbers of observations of classroom practice and interviews conducted were not large, this also reduces to some degree the extent to which our findings may be generalized.

Because data on college course-taking in ECHSs is limited, we primarily used other criteria to identify and select schools for inclusion in the third phase of the research. As a result, the schools selected for site visits are not necessarily those with the greatest rates of success in placing and supporting students in college courses. However, they are all schools that reported that they place all or nearly all of their students in college courses by the 11th grade.

Finally, we were able to gather data more readily pertaining to some topics than others. Most specifically, school leaders and teachers seldom appeared to distinguish - and provide differential treatment to - students who entered underprepared, partially because they viewed this to be true for large numbers of their students. Thus, we emerged from this research with fewer findings pertaining to research question #2.

Research Design

To adequately address the two research questions, we identified a set of sub-questions that would allow a fuller analysis of the dimensions of each of them. These were then addressed using our mixed methods research design. The sub-questions are as follows:

Question 1. What are the characteristics of English and mathematics courses in Early College schools that prepare students for college-level introductory courses?

- 1.1. How do teachers help students to become college-ready in terms of content?
- 1.2. How do teachers help students to become college-ready in terms of the development of key cognitive strategies?
- 1.3. How do teachers help students to become college-ready in terms of encouraging positive academic behaviors?
- 1.4. What contextual conditions influence students' college readiness?

Question 2. What strategies, practices, and academic supports do teachers and schools use to accelerate the progress of students who are underprepared in these content areas?

- 2.1. In what ways are students who come into Early Colleges underprepared? What kinds of difficulties do they face?
- 2.2. What strategies, practices, and academic supports do teachers use to prepare underprepared students for college?
- 2.3. What contextual conditions exist in Early Colleges that enhance or hinder underprepared students' ability to become college ready?

Teacher Survey

NCREST invited English and mathematics teachers at Early Colleges across the country to participate in a web-based survey that was designed to draw out their perceptions of what is taught in English and mathematics ECHS coursework, and the strategies and practices employed to prepare students for successful engagement in college-level introductory coursework. The survey tool was designed to inform three areas of our inquiry in relation to effective high school English and mathematics instruction, all aligned with three of the four areas which Conley (2007a) identifies as critical in the preparation of students for college.

Survey content: The teacher survey was designed to answer the following questions:

1. What strengths and deficits (in terms of **content knowledge and skills**) do teachers identify in students?
2. Do English and mathematics teachers in the ECHSI deliberately devote significant portions of their instructional efforts to support the development of key **cognitive skills** that contribute to success in introductory-level college coursework? And

further, how does this correlate to what teachers identify as students' strengths and deficits?

3. What **academic behaviors** do teachers identify as being important to improve the likelihood for college success? Of interest also was the extent to which teachers believed that they could influence the development of these behaviors.

Survey development and format: The survey was developed by the research team to address the above questions, with different versions created for math and English teachers. The survey was designed around the English and mathematics foundational knowledge and skills identified in Conley's (2003) report, *Understanding University Success*. This document was especially useful for this purpose because it provides a detailed list of the knowledge and skills that successful students need to master, in specific subject areas, to be considered college ready. Items pertaining to math were used with math teachers; items pertaining to English were used with English teachers. Items were also included that provided information on teachers' views on instruction around cognitive skills and academic behaviors. These items were derived from Conley's (2003, 2005, 2007a, 2007b) writings on this topic. In addition, questions were included on teacher demographics and experiences.

We used Survey Monkey, an online survey tool that has been used successfully in prior NCREST research. Most of the survey questions were closed, while a selected number were open-ended. Items were developed keeping in mind Dillman's (2000) Tailored Design principles that emphasize the need to build trust among participants and provide rewards (e.g., feelings of interest or importance) while reducing costs (e.g., boredom with the process or difficulty in answering questions).

The survey was piloted with approximately 20 teachers (not Early College teachers). After making minor adjustments in language and format, the actual survey went live online in March of 2009. The final surveys, as administered, are included in Appendix B. The surveys stayed live until June when they were closed for analysis. During the roughly 100 days in which the survey was open, we made three attempts to contact Early College teachers to encourage their participation via email.

Sample: The targeted participation for teachers in the web-based survey was 33% of the universe of Early College English and mathematics teachers. Before extending invitations to participate, we first gained permission from each of the 13 intermediaries³ to contact

³ A total of 13 intermediary organizations oversee the development of Early College High Schools funded by the Gates Foundation. They are as follows:

- Board of Regents of the University System of Georgia
- Center for Native Education
- City University of New York
- Communities Foundation of Texas (Texas High School Project)
- Foundation for California Community Colleges
- Gateway to College National Network
- KnowledgeWorks Foundation
- Middle College National Consortium
- National Council of La Raza
- North Carolina New Schools Project
- SECME, Inc.

principals and teachers. In some cases, the intermediaries were able to provide email addresses of teachers; in others, we were provided with school principals' contact information. Our invitations for survey participation were made either directly to the teachers or through their school principals who were then asked to forward the requests for participation on our behalf. We offered a chance to win \$20 gift certificates as an incentive for participation. Names of respondents were randomly selected as winners; approximately 20 percent of the respondents received gift certificates.

A total of 138 English teachers and 118 mathematics teachers ultimately completed the survey, representing nearly 35% of the English teachers and about 34% of the mathematics teachers who were invited to participate. The responding teachers represented schools in 14 states and included teachers from 12 of the 13 intermediary organizations. The teachers' demographic characteristics are shown in Table 1.

Table 1: Surveyed Teachers' Age, Gender, and Race.

		English Teachers	Mathematics Teachers
Age	20-29	20%	15%
	30-39	26%	24%
	40-49	23%	33%
	50 or older	31%	28%
Gender	Male	19%	33%
	Female	81%	67%
Race	White	76%	72%
	Black	12%	8%
	Hispanic	6%	12%
	Asian/Pacific Islander	3%	4%
	Native American	0%	0%
	Biracial/ Multiracial	3%	5%

Data analysis: We conducted our original analyses of the responses of English and math teachers separately. Our analysis of the data was guided by the research questions and sub-questions. We used descriptive statistics to address most of the sub-questions and developed charts and graphs to display some findings. In addition, we used descriptive statistics and Pearson's correlation tests to investigate the extent to which teachers used their instructional time to address gaps in student college readiness.

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- Utah Partnership Foundation
 - Woodrow Wilson National Fellowship Foundation

Focus Group Interviews

Focus groups are particularly appropriate for gaining in-depth information about attitudes, perceptions, behaviors, and motivations (University of Texas, 2006), and thus were useful for exploring some of the themes that emerged in the survey data. In our focus group interviews, we endeavored to gather additional data on ECHSI teacher practices and attitudes directed to the preparation of students for college-level course-taking.

Focus group content: The focus group interviews were designed to elicit information on teaching and learning practices that lead to college readiness. In particular we were concerned with three areas that would address our research questions and sub-questions:

Content: 1) What are the essential [English/mathematics] knowledge and skills that students must master to be successful in college-level coursework? 2) How are these knowledge and skills taught in conjunction with cognitive strategies such as analysis and reasoning?

Teacher responsibilities: 1) What are the primary goals of teaching? 2) How is college-readiness defined? 2) How do teachers know when students are ready for college-level coursework?

School context: 1) What role does the school play in supporting students' college readiness? 2) Are there any aspects of the school ambience and/or culture that seem to support students' success in Early College English and mathematics instruction? Are there any that are unsupportive?

Focus group protocol development and format: The focus group questions were designed to elicit reflection of the members on the subjects listed above; they were also intended to encourage interaction among group members. The research team designed the focus group protocol and conducted the focus groups. The design of the protocol was informed by Patton's (2002) suggestions that they be conducted with homogeneous groups (English and math teachers were in separate groups), stay well-focused, and provide a sense of safety to participants.

The research team originally planned to conduct the focus groups via webinar and did implement one using this format. However, it proved more practical to hold focus groups at convenings sponsored by two ECHSI intermediary organizations. During each focus group session, one researcher took the lead in asking questions, while another took notes and tape-recorded. The focus group interviews were approximately 60 minutes in length. The focus group protocol is included in Appendix C.

Sample: Focus group participants were selected principally through convenience sampling in which four interviews were conducted at two major intermediary gatherings. English and mathematics teachers were contacted prior to the conference proceedings and invited to join the focus group interviews. Incentives were provided in the form of \$20 gift certificates to every teacher who participated. In addition, a number of teachers were invited to participate in online focus groups.

The focus group interviews were conducted at the 2009 summer conference of the Middle College National Consortium (MCNC) and the 2009 fall conference of the Foundation for California Community Colleges (FCCC). In total, we interviewed 45 teachers at these two conferences, and also conducted a small focus group interview of two teachers via webinar in the late spring of 2009.

Data analysis: The recordings of the focus group interviews were transcribed by the NCREST research team. Each statement made by participants of the focus groups was then classified according to the sub-question(s) that it addressed. Once categorized in this way, statements were coded according to emergent themes, using methods described by Patton (2002). In each case, the coding was reviewed by a second researcher to provide a second perspective and a cross-check.

Site Visits

The site visits were intended to provide greater insight into the ways that math and English instruction at selected Early Colleges contributed to college readiness. We chose four schools for which there was evidence of effectiveness in this area and conducted three-day visits at each one.

Site visit content: Our site visits were intended to contribute to an understanding of:

- The kinds of English and mathematics instruction that contributed to students' readiness for college.
- How students were prepared for college in relation to each of Conley's four domains of college readiness (content knowledge, cognitive strategies, academic behaviors, and college knowledge).
- The strategies, practices, and academic supports that teachers and schools used to accelerate the progress of students who were underprepared in English and mathematics.
- The contextual, school-level factors that influenced the way that English and mathematics instruction was provided.

Site visit protocol development and format: The research team developed an observation protocol that guided the school visits, (see Appendix C). The protocol was intended to help us capture a snapshot of the Early College, in particular to learn about how college readiness was promoted. The protocol design was informed by NCREST's extensive work on school quality reviews (see Aneess, 1996). The 3-day site visits consisted of the following:

- **Observations** - Observations were key components of the school visits. The NCREST researcher observed one or more math and English teachers across each three-day visit, attempting to observe the same teachers and classes each day of the visit when possible.

- **Interviews-** The NCREST researcher interviewed the teachers observed, school principals, counselors or other school personnel responsible for college placement, and college faculty who typically taught Early College students. In addition, the researcher had the opportunities to speak with several college faculty and administrators informally.
- **A school and college tour -** At the convenience of the school leadership team, the researcher was given a tour of the school. When possible, a tour of the college academic facilities was given.
- **Collection of class materials-** The researcher asked teachers for copies of lesson plans, class materials, and student work (without individual identification) related to the observed classes.

Site Selection: The school sites to be visited were selected through an iterative process in which we screened successively to identify schools that:

1. Had teachers in English and mathematics whose responses to survey questions indicated that:
 - a. Their schools provided supportive environments for student learning.
 - b. The teachers actively focused on students' development of content knowledge, cognitive strategies, and academic behaviors in their classes.
2. From the schools identified in step #1, we prioritized schools that:
 - a. Had been Early Colleges for at least four years (opened in 2005 or before).
 - b. Had at least 200 students.
 - c. Had 11th grade students participating in college classes (80% or more).
 - d. Met AYP.
3. From the schools identified in step #2, we prioritized schools to reflect diverse intermediary affiliations and geographies.
4. Finally, the list of schools was further reduced to four through:
 - a. Input from the Jobs for the Future Research Workgroup.
 - b. Initial discussions with school principals about their interest in participating in this research.

After following these steps, we selected and visited the following four Early Colleges:

Challenger Early College High School.

Location: Hickory, North Carolina

Year Opened: 2005

Postsecondary Partner: Catawba Valley Community College

Intermediary: North Carolina New Schools Project

Principal: Dr. Robert E. Daniel, Jr.

Students served (2008): 357

Proportion of 11th graders in college classes: 100%

Percent minority: 45%

Challenger Early College High School (also called the Catawba Valley Early College High School) serves students from four districts including Catawba County, Hickory, Newton-Conover, and Alexander. It has the largest student population of the Early Colleges in North Carolina and is the only Early College with a full-scale music and jazz program. It is located on the campus of Catawba Valley Community College and is served by the North Carolina New Schools Project intermediary.

Challenger ECHS PARTICIPATION IN COLLEGE COURSES			
2008-09 Students	Number of college course taking students	Number of students ever enrolled in an ENGLISH college course	Number of students ever enrolled in a MATH college course
9th Graders	96	--	--
10th Graders	94	87	1
11th Graders	80	79	26
12th Graders	70	70	51
Total	340	236	78
Source: Data are from the ECHSI Student Information System; not all college course-taking students are necessarily included.			

Harbor Teacher Preparation Academy.

Location: Wilmington, California (Los Angeles area)

Year Opened: 2002

Postsecondary Partner: Los Angeles Harbor College

Intermediary: Middle College National Consortium

Principal: Mattie Adams

Students served (2008): 362

Proportion of 11th graders in college classes: 100%

Percent minority: 91%

Harbor Teacher Preparation Academy (HTPA) was founded in 2002 as a collaborative effort between the Los Angeles Harbor College and Local District 8 of the Los Angeles Unified School District. The success of HTPA is unparalleled specifically in terms of the rates of which graduating students have earned college graduates. In the first two cohorts of graduates, 57% of the students earned AA degrees, 5% earned AA degrees with honors, and 94% graduated with 30 credits or more. Ninety-eight percent of those graduates went on to either attend either four-year university programs or continue on at Los Angeles Harbor College or another neighboring community college program. HTPA was the 2007 winner of the California Distinguished School Award and three-time winner of the Title One Academic Achievement Award.

Harbor Teachers Prep PARTICIPATION IN COLLEGE COURSES			
2008-09 Students	Number of college course taking students	Number of students ever enrolled in an ENGLISH college course	Number of students ever enrolled in a MATH college course
9th Graders	5	--	--
10th Graders	50	4	22
11th Graders	21	--	15
12th Graders	26	3	15
Total	102	7	52
Source: Data are from the NCREST database; only students with active parental consent for data to be shared are included here.			

Josephine Dobbs Clement Early College High School.

Location: Durham, North Carolina

Year Opened: 2004

Postsecondary Partner: North Carolina Central University

Intermediary: SECME, Inc. and North Carolina New Schools Project

Principal: Kendra O'Neal-Williams

Students served (2008): 340

Proportion of 11th graders in college classes: 100%

Percent minority: 94%

Josephine Dobbs Clement Early College High School (JDC), founded in 2004 is located on the campus of North Carolina Central University. Josephine Dobbs Clement Early College High School offers no electives, and students are placed into course-taking plans that reflect an assessment of their reading, writing, and mathematics abilities at the beginning of every year. The instruction is rigorous and fast-paced. The university partner has assigned a college liaison to the Early College who meets regularly with members of the JDC faculty and administration and seems to know every student in the building by name.

JD Clement ECHS PARTICIPATION IN COLLEGE COURSES			
2008-09 Students	Number of college course taking students	Number of students ever enrolled in an ENGLISH college course	Number of students ever enrolled in a MATH college course
9th Graders	1	--	--
10th Graders	69	1	--
11th Graders	68	68	37
12th Graders	--	--	--

Total	138	69	37
Source: Data are from the ECHSI Student Information System; not all college course-taking students are necessarily included.			

University High School of Science and Engineering.

Location: Hartford, Connecticut

Year Opened: 2004

Postsecondary Partners: University of Hartford

Intermediary: Woodrow Wilson National Fellowship Foundation

Principal: Eric C. Rice

Students served (2008): 346

Proportion of 11th graders in college classes: 80%

Percent minority: 80%

University High School of Science and Engineering UHSSE is located on the campus of the University of Hartford and also has college partnerships with the University of Connecticut and the University of New Haven. The school is a magnet school for science and engineering as well as an Early College. Students are encouraged to take internships in addition to their participation in college and AP courses. In 2009-2010, the school moved into a brand new facility located on the main campus of the University of Hartford after being previously located on the Asylum campus, a remote site maintained by the university.

UHSSE PARTICIPATION IN COLLEGE COURSES			
2008-09 Students	Number of college course taking students	Number of students ever enrolled in an ENGLISH college course	Number of students ever enrolled in a MATH college course
9th Graders	1	--	1
10th Graders	15	--	15
11th Graders	9	--	6
12th Graders	37	--	30
Total	62	0	52
Source: Data are from the ECHSI Student Information System; not all college course-taking students are necessarily included.			

Analysis of the site visit data: For each school, we organized the data into broad categories that addressed each of the research sub-questions. Data pertaining to English or math instruction were so identified. Once organized in this fashion, the research team searched for emergent themes, using methods proposed by Patton (2002). We compared these themes with those found in the survey and focus group data, assessing for consistency across data sources.

Research Findings

Each of the sub-questions addresses an important dimension of the primary research question. In the sections below, we present first our findings from each of the data sources in the three phases of data gathering, and then a synthesis with regard to each research question.

Findings: Research Question 1

Research question 1 asks, “What are the characteristics of English and mathematics courses in Early College schools that prepare students for college-level introductory courses?” The four sub-questions are designed to address this question, taking into account three dimensions from Conley’s framework—content, cognitive strategies, and academic behaviors—as well as consideration of contextual conditions that may influence students’ preparation for college-level introductory courses.

CONTENT

*Sub-question 1.1: How do teachers help students to become college ready in terms of **content**?*

CONTENT: Findings- Survey Data

In the surveys, both math and English teachers were asked, “*Thinking about the students in your highest grade-level math/English course, how often is instructional time spent in activities designed to teach students [a variety of content areas]?*” Figures A and B show the proportion of teachers who responded that they *regularly* or *routinely* offer instruction in these areas. As noted above, the response options provided were based on Conley’s (2003) description of the knowledge and skills needed for college readiness.

Mathematics teachers indicated that they were most likely to regularly or routinely spend instructional time teaching the following (see Figure A):

- mathematical notation to solve problems and communicate solutions.
- a select list of mathematical facts and know how to build on those facts.
- how to use formulas and algorithms of computation.
- how to use logical reasoning and common sense to find mathematical solutions.

English teachers were most likely to indicate that they regularly or routinely spent instructional time on the following (see Figure B):

- the use of writing to clearly and coherently communicate ideas, concepts, emotions, and descriptions.
- the development of reading skills and strategies (fiction and non-fiction).
- the application of basic grammar conventions in writing.
- the identification of defining characteristics of texts.

Figure A: Math Teachers Use of Instructional Time

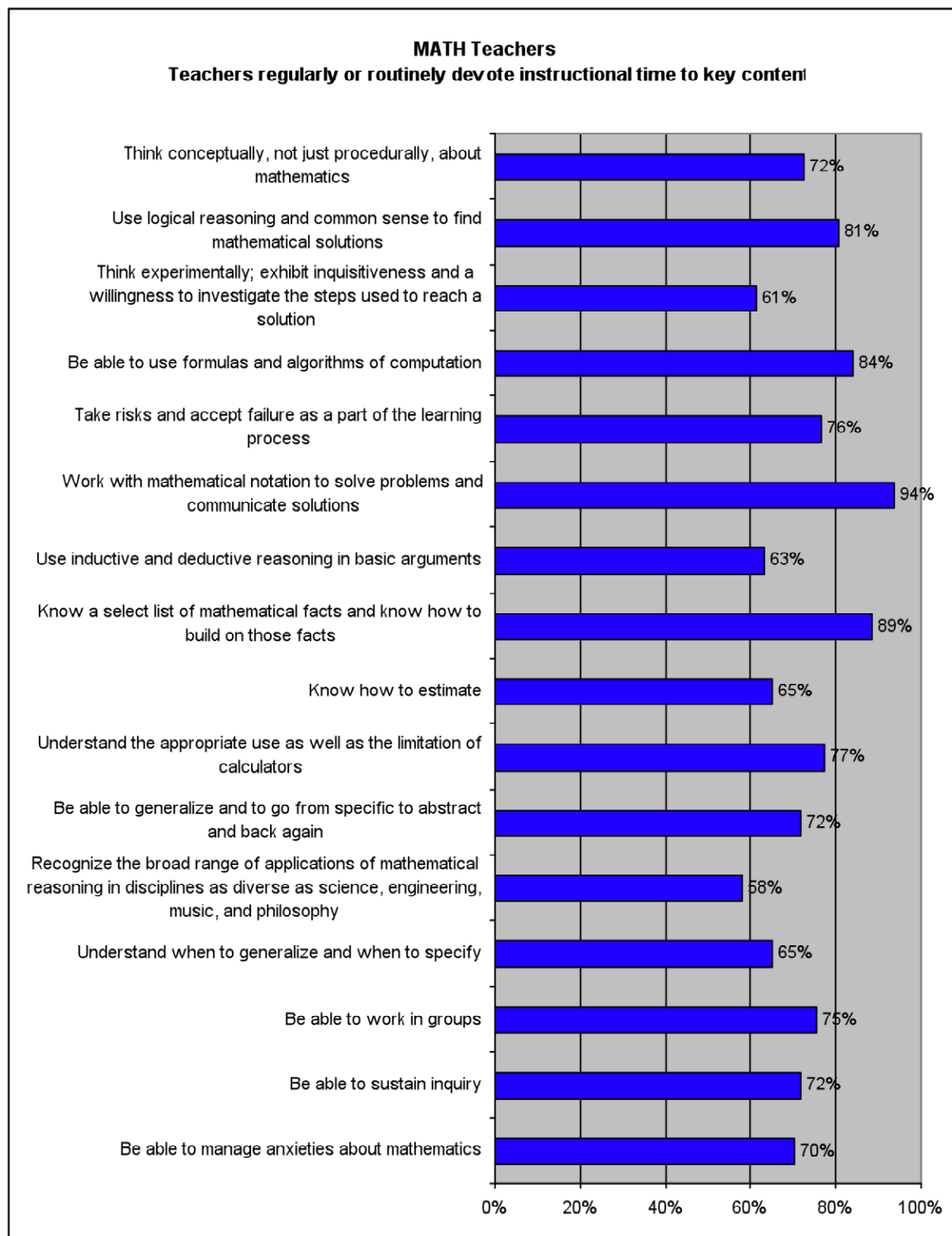
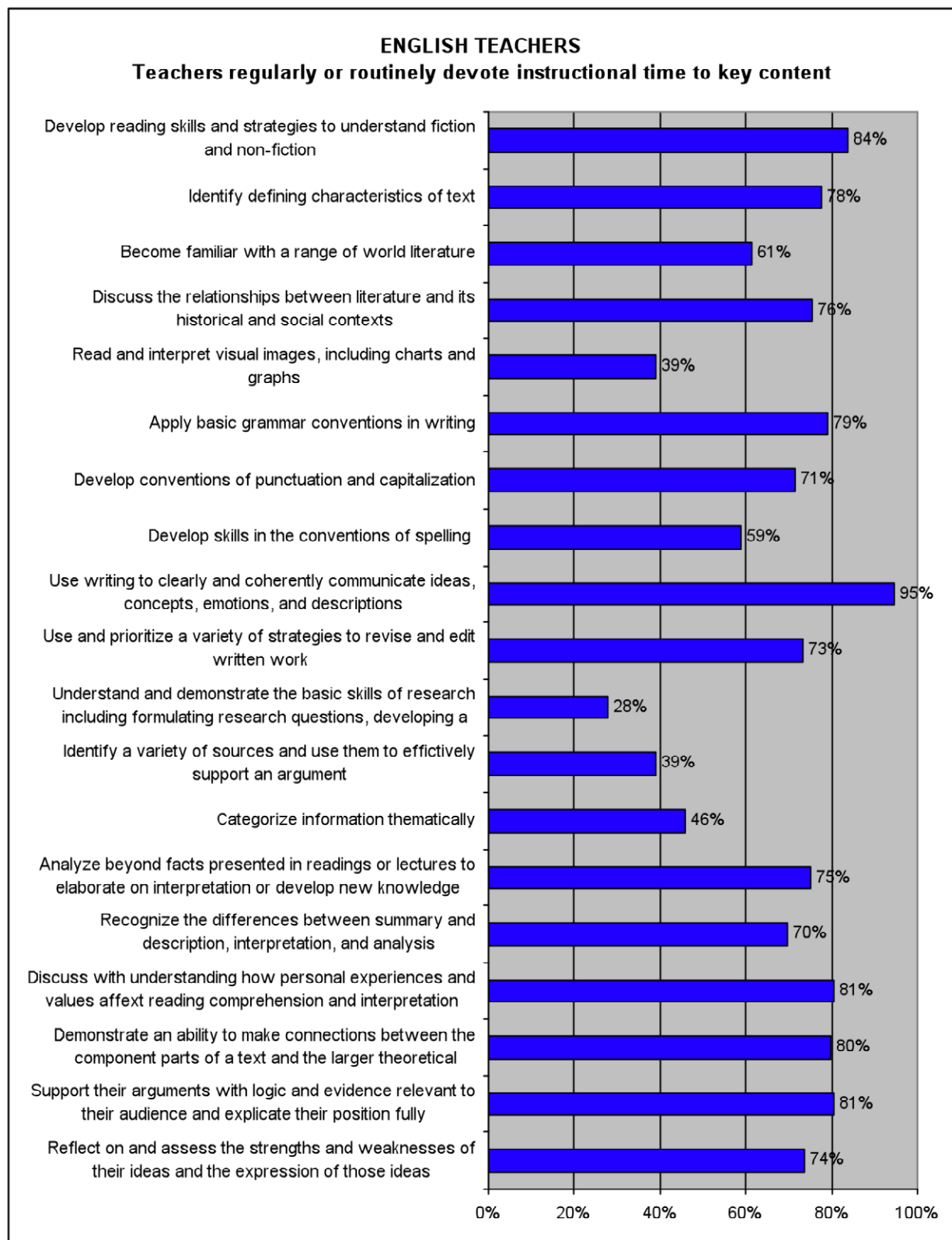


Figure B: English Teachers Use of Instructional Time



In addition, teachers were asked the following open-ended question, “*What are one or two specific teaching strategies that you utilize to support the development and acquisition of knowledge and skills that students need to be successful in college-level introductory coursework?*” Their responses are shown in Table 1 in order of the frequency with which they were mentioned. In many cases, teachers mentioned multiple strategies that they employed.

Table 1: Most Often Mentioned Instructional Strategies

<i>Instructional Strategies (in order of number of times mentioned)</i>		
	<u>Mathematics Teachers</u>	<u>English Teachers</u>
1	Note-taking	Writing exercises
2	Group-work	Group-work
3	Exploratory learning	Whole class discussion
4	Evaluation	Scaffolding
5	Projects	Projects
6	Questioning	Note-taking
7	Peer-to-peer work	Modeling
8	Writing in mathematics	Questioning
9	Students presentations	Direct instruction
10	Problem solving activities	Visual aids
11	Real life applications	Peer-to-peer work

CONTENT: Findings- Focus Group Data

Math and English teachers were much more likely to express differences in their views on instruction of content than in their perspectives on instruction on cognitive strategies or academic behaviors. They indicated that their thinking about instruction was highly influenced by the norms of their disciplines as well as by state and local standards.

Content-related goals: Both math and English teachers discussed their goals in teaching their discipline. Several math teachers emphasized the value of math for increasing students’ intellectual capacity, not only conceptually but physiologically. In the words of two math teachers:

Math teacher: Math is about exercising different parts of the brain...how to make connections between two things that could be related, how are they related, and if they are really related. In more advanced math classes, you start going into a part of the brain that exercises the abstract.

Math teacher: *I tell them all the time that when you do math that you grow brain cells and you get smarter, so I want them to want to do math. But, I tell them that you don't ever have to love it, but I want you to want to do math because it's going to make you smarter.*

Others focused on pragmatic goals such as having students master the material taught in class, meeting state standards, and preparing students for their upcoming college courses, for example:

Math teacher: *[My goals are to] meet the standards, cover the curriculum, and have as many students pass with a C or above grade or to reach a 70% passing on quizzes and tests.*

English teachers were most likely to emphasize the development of an appreciation of and personal connection to text, and communication capacity with regard to reading and writing. Two stated:

English teacher: *My primary goals are to help them reach their potential as effective writers and readers-- to give them the skills and tools that they need to communicate effectively in writing and orally.*

English teacher: *One of my primary goals is for students to actually learn to enjoy reading and to develop some type of relationship with what they have read and written.*

Foundational skills: Both math and English teachers offered perspectives on the foundational knowledge and skills that students need for success in future courses in the content area. As one stated, "If you don't have the foundation then you are going to be completely lost." Several indicated that it was critical for students to master certain skills in high school because college professors would not be willing or able to spend time on them.

Among the English teachers, the most frequently discussed foundational skills were: 1) the development and organization of papers, and 2) mastery of grammar. Several more specific areas of knowledge identified by English teachers as important ranged from formatting, to the appropriate use of sources, to abstract thinking:

English teacher: *I think one of the skills that is most important is to teach them to think figuratively. So for me ... if I had to pick something to teach specifically, content wise, it would be figurative language, symbolism, allegory, all of the thinking that is not literal.*

English teacher: *[Students should be] able to construct a response that is referencing the text appropriately.*

Math teachers emphasized the importance of foundational skills in: 1) arithmetic, and 2) basic algebra, saying that these were critical for all further math study. One teacher noted “I can see some students who I believe are college ready and what makes them different from the rest is these students have a great foundation in basic skills.”

Math teachers were considerably more likely than English teachers to stress the importance of content sequencing. As one said, “You can’t push them up into calculus if they can’t do algebra. You can’t push them ahead. Math is sequential and demanding of all your previous knowledge.” Specific areas of math content considered especially important by math teachers included knowledge of basic procedures, and being able to think about the problem in a context that makes sense:

Math teacher: Orders of operation, arithmetic. I mean it sounds funny but it really is. We can’t move on if they don’t know how to add, subtract, multiply, and divide.

Math teacher: When they are doing a word problem or any type of math problem, they need to be able to think about what they are doing, think about the answer: Does it make sense in the context of the problem?

Math teacher: I want them to be able to explain what they are doing and to not be able to just do the algorithms.

Overcoming fear: Math teachers were more likely than English teachers to focus on helping students overcome fear and other negative emotions. They talked about the need to structure classes to address this. While some talked about specific strategies to overcome student fear, others tried to build a relationship with students that would make it easier for them to seek help when needed. Two comments were:

Math teacher: You want to support them ... so that they are not afraid to come and won’t be shy if they don’t know what they are doing. They won’t be so reluctant to ask for help every once in awhile when they get stuck. They won’t feel like, “Oh I’m so stupid.” I think that’s the feeling they get and they are afraid to ask.

Math teacher: You have to make your environment friendly to mistakes.

Both English and math teachers identified instructional strategies that they had found useful in teaching content. Some strategies from English teachers follow; they emphasize class discussion and debate, various forms of shared writing, having students publicly share their work, and providing exemplars of what quality work looks like.

- *We have been using Socratic Seminars.*
- *We also do debates. This unites the writing, research, and the speaking portion.*
- *In my teaching of writing, revision is what it is all about.*
- *I think that peer editing can be very powerful.*

- *For me it's the discussion-- asking critical questions about what they read, and answering them, and then writing about it.*
- *Reading for information [is key]; I think often that they'll have the instructions right there and they'll want you to tell them what to do. So, I spend some time on that looking at prompts and just breaking it down, "What is it asking for you to do?"*
- *Having an audience for their work whether it's an online audience or actual faculty coming in to observe or parents at a parent night presentation. They need to put their best work out there for the world to see it.*
- *As far as instructional strategies go, I am from a project-based school and I firmly believe in project-based learning.*
- *I would argue that essay writing can be a project in itself in the sense that if you teach the writing process and if you can break it down with them and if you show them, "Here's a good example."*
- *I show them vignettes from past years. This is what an A looks like and they get to see of course it's somebody's older brother or sister, somebody who lives around the corner, and so these are kids that they know are not necessarily always the A plus kid.*

Specific instructional strategies from math teachers follow; these include the role of homework, technology, relevance, and collaborative work,

- *I do emphasize that is important for kids to do their homework. That's the only way I [the teacher] understood math actually by working on the homework and using different resources to see how I could solve the problem.*
- *There was a paradigm shift where I was no longer the center of knowledge. Technology became the center. Technology became a place where all kids could access and I became a facilitator, so I could help students from different levels use technology as a free way to get to where they needed to go. What that meant is: class web site, links, students creating links, and students accessing the website and math websites- 24/7/365. This made a big change in how I'm delivering instruction and assessing.*
- *I spend time talking about credit cards and how necessary it is to state debt free or as close as possible. Because they don't understand the idea of minimum payment. I think a lot of our peers don't understand the idea of minimum payment and how you will never get out of debt.*
- *Students work collaboratively on the class work trying to dissect, break down, and get to that level of understanding over a set of problems.*
- *I like to teach math labs where my kids can see the relationship/correlation between science and math. That's a very important focus of my class is for them to see that correlation-interdisciplinary.*

CONTENT: Findings - Site Visit Data

In the school visits, we observed that English and mathematics teachers employed multiple strategies for developing content mastery in Early College students. In this section, we will describe the strategies which were observed that specifically relate to delivering content. In each of the cases below, the 1-2 examples may be considered representative of other observations made during the site visits.

Interactive classrooms: Many of the Early College classrooms we visited were characterized by frequent interactions between the teacher and students and regular opportunities for interaction among students. The teachers seemed to encourage, and even insist on, the full participation of students through their classroom management strategies. Because of this, classrooms were often characterized by a high degree of engagement. Further, the teachers facilitated learning environments where students felt free to assist each other in learning and were regularly called on to demonstrate their understandings to their classmates, either in small groups or to the whole class.

Observation: One mathematics teacher spent nearly the entirety of the class period in motion. The teacher assigned a set of problems for students to work on at their desks. The students were seated at tables of two. The teacher moved from student to student, desk to desk, asking and answering questions of students. After answering the question of an individual, he sometimes brought the issue to the attention of the group. On other occasions, he would ask the class if they might have an answer to a student's question. The teacher's style was direct, his communication civil and respectful, but also blunt. The students seemed to trust and respect the teacher. Because of his constant interaction with students, he seemed to know where every student was in their understanding of the content at any given time.

Observation: In a mathematics class, students knew that they were often expected to interact with their peers as a function of their class participation. On one occasion, the teacher asked a male student who had previously been working silently and independently to assist a peer. Without any response or hesitation, the young man, previously seated in the back, got up and brought his textbook to the desk where he was directed. (In an interview later, the teacher reported to our research team that students are told on the first day of class that there are no assigned seats in his classroom.) Once seated, the two students engaged in quiet conversation about a specific problem and strategies for solving it.

Well-structured group work: There were many lessons observed in which group work was a key feature of the instruction. In both English and mathematics classes, we found that students were encouraged to assist each other in developing their individual and shared understandings of the learning activities. In the context of group work, students were often given opportunities to provide feedback to peers by serving as peer editors and peer instructors.

Observation: In one 10th grade English class, the teacher had students discuss short passages and prepare responses to questions meant to assess their comprehension and ability to identify tone and interpret theme. The teacher assigned group leaders

each week who were responsible for leading the conversation and for calling on individual group members to report answers to the whole class. The students had become accustomed to the group activities by the time of our visit in late November. They moved through the activity fluidly with all of the students appearing to be engaged.

Observation: In a 9th grade Integrated Mathematics class, the teacher broke the class into small groups to discuss strategies for finding the slope of straight lines. The groups were given multiple problems to solve, and once finished, they were required to post their answers on the board for discussion with the whole class.

Scaffolding: Scaffolding can be defined as techniques wherein a teacher models and/or provides intensive support for a desired learning strategy or task, then gradually shifts responsibility to the students. The goal of scaffolding instructional techniques is students' eventual autonomous handling of content, likely to be an expectation of college-level instruction. Throughout the visits, there was evidence of scaffolding at several of the sites.

Observation: An example of scaffolding that is representative of other observations was found in an English lesson on the interpretation and analysis of poetry in a 10th grade English. The teacher began the lesson with a detailed and structured description of the goals of the lesson and led the class in several close readings of the poem which was the subject of their lesson. He walked the students through the concrete steps of analyzing a poem. Initially, he taught a specific strategy in which students were instructed to identify the symbols, imagery, figurative language, and tone in the poem. He stopped frequently to have students discuss the items they were pulling from the poem and describe how they were understanding each element. Gradually, he increased their independence as they progressed through the lesson. When he introduced a second poem, he had the students break into small groups and identify the elements almost entirely on their own.

Observation: In a 12th grade English AP course, the teacher was giving a lesson on analysis of character in Shakespeare's Othello. Through the close review of Iago's soliloquies, the teacher constructed a lesson on character traits and character motivation. The teacher asked: "Do you see that Iago is trying out different strategies to accomplish his goal? What is Iago's most fundamental motivation?" In a review of first soliloquy, the teacher took a strong lead in whole class discussion of character traits and motivation while providing historical and contextual references to facilitate students' understanding. After some time, the teacher distributed a handout with Iago's short soliloquy from Act III. Students in small groups were then responsible for the line-by-line paraphrasing and analysis of the remainder of the soliloquy.

Just-in-time supplemental instruction: In many of the English class meetings observed, teachers focused on the analysis and interpretation of literature. These lessons were designed to give students instruction in elements of literature including (but not limited to) analysis of plot, character, conflict, point of view, theme, and figurative use of language. In

addition, we observed that they often offered mini-lessons on grammar and other conventions of writing on a *just-in-time* basis.

Observation: In a 10th grade English class, the teacher offered a strategy for analyzing poems and followed up by leading a brief group discussion of paraphrasing. He then assigned students to groups and had them paraphrase lines in the poem together. Soon the teacher recognized that the students did not recognize the devices of figurative language. He stopped the discussion of poetry and offered up a definition of figurative language--"anything that expresses meaning beyond the level of literal meaning." He interjected a quick lesson on onomatopoeia. Two days later, the poetry analysis lesson continued. Students read their paraphrased versions of the poem after which the teacher inserted a short lesson on metaphors.

Use of technology: The effective use of technology was also observed to be a key feature of instruction in some Early College classes. This description of technology use includes techniques that integrate computer-based and multimedia resources into the classroom.

Observation: In an Algebra II class, a teacher demonstrated great skill in using interactive whiteboard technology to emphasize the steps in problem-solving. With the interactive whiteboard, he demonstrated multiple strategies for answering problems. While the teacher led the lesson from the front of the room, students at their desks worked with graphic calculators, and at different times the teacher called students to the interactive whiteboard to work on problems, as well.

Involvement in original research: A teacher at one of the schools provided the opportunity for students to develop their writing skills, as well as their knowledge of African American history, by conducting independent research. Students used primary source documents to construct biographies of notable African Americans.

Observation: In order to meet the course objectives, students were encouraged to do original research with primary documents at the Connecticut Historical Society and the Connecticut State Library. The teacher used the African American National Biography, a rich history of the achievements of African Americans presented through a mosaic of the lives of more than 4000 individuals, as a source of content. The African American National Biography (AANB; <http://www.oxfordaasc.com>) is a joint project of the W. E. B. DuBois Institute for African and African American Research at Harvard University and Oxford University Press. While all students undertook this research, three submissions by students from this class were included among the new 2009 entries. These are to date, the only entries to the AANB which have been submitted by high school students.

CONTENT: Synthesis of Findings

Early College teachers balance multiple goals in their instruction of content. Along with helping students attain college readiness, they must attend to prescribed standards, encourage students' interest in the subject matter, and meet students' individual needs. Both math and English teachers emphasize the need to teach foundational skills on which more advanced knowledge is built, gradually asking students to increase their understanding of complex material and encouraging their ability to work more independently. Math teachers are especially concerned with proper sequencing of the content taught.

In addition, Early College teachers use a variety of methods to help students to learn the English and math content needed for success in their college classes. There was frequent mention of small group instruction and of encouraging students to support each other through peer teaching, editing, and assistance. Beyond that, there was considerable diversity in the methods used, ranging from the use of interactive technology to Socratic seminars. While it is impossible to know which strategies are most closely associated with positive student outcomes, it is clear that many of the teachers involved in this research incorporated certain principles in their teaching, including:

- Intentional scaffolding.
- Expectations of extensive note-taking and writing.
- Providing encouragement to students; helping them to overcome their fears related to learning difficult material.
- Supplementing planned content with *just in time* content that responded to students' needs and interests.
- Providing opportunities for students to conduct original research.

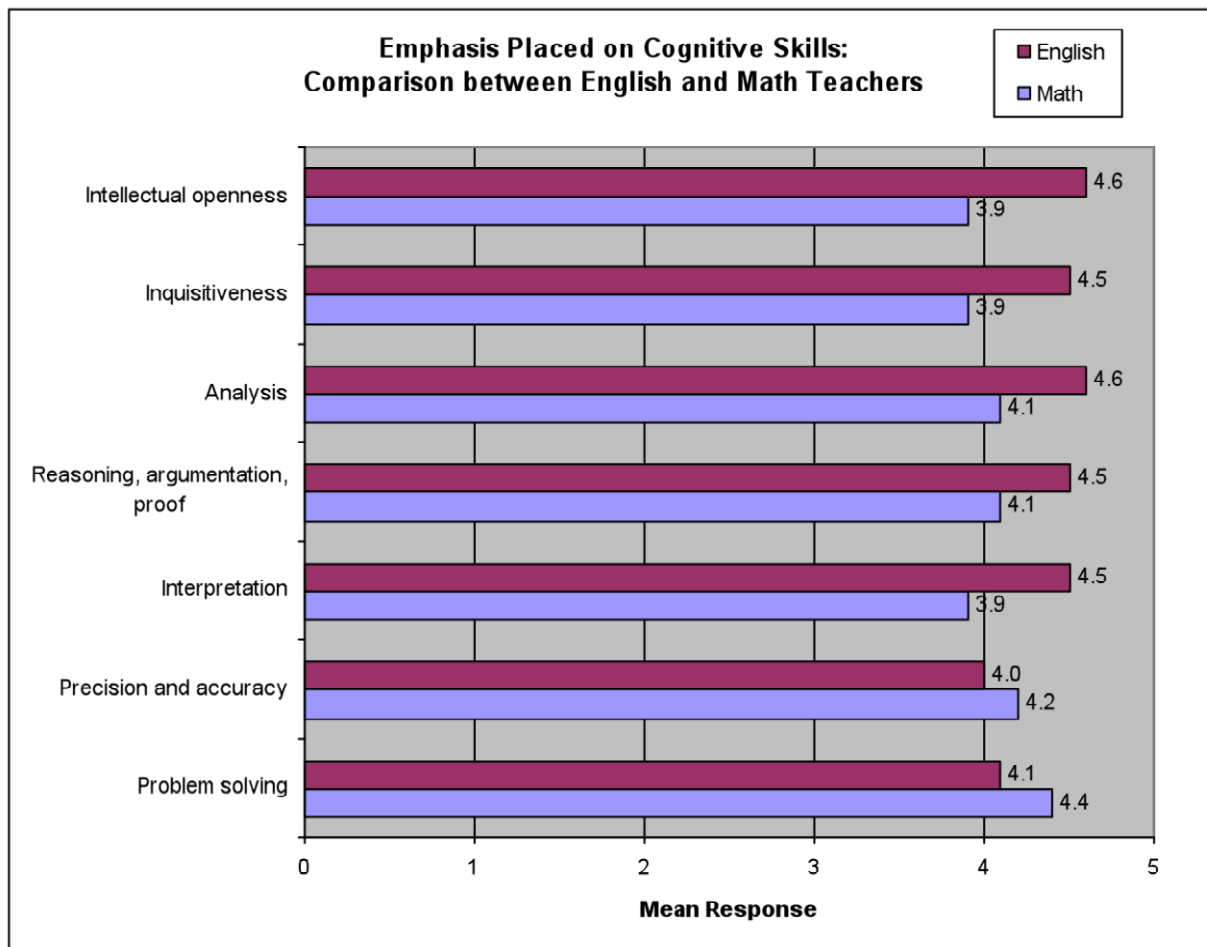
KEY COGNITIVE STRATEGIES

Sub-question 1.2: How do teachers help students to become college ready in terms of the development of key cognitive strategies?

KEY COGNITIVE STRATEGIES: *Findings- Survey Data*

Both English and math teachers were asked about the extent to which their instruction in their highest-level class emphasized the teaching of specific cognitive strategies. The response options ranged from 1 (not at all) to 5 (very much). Figure C displays their responses. English teachers were more likely than math teachers to emphasize intellectual openness, inquisitiveness, analysis, and reasoning-argumentation-proof. Math teachers were more likely than English teachers to emphasize precision and accuracy as well as problem solving.

Figure C: Emphasis placed on specific cognitive strategies`



KEY COGNITIVE STRATEGIES: *Findings- Focus Group Data*

In our analysis of the focus group data, it was clear that both math and English teachers believed that it was their responsibility to explicitly teach key cognitive strategies of the types identified in Conley's research. Some of their comments provide insights into the way they viewed their instruction in this area:

Math teacher: *[I work on] giving them approaches to problem solving and not just problem solving, but approaches to learning in general.*

English teacher: *I think it's more about the actual skill than the actual content that you're using in teaching-- how to do something, how to learn something or revise, as opposed to "I read this book."*

Math teacher: *I want the students to get what they want out of life and most often their goals are going to need an education whether it be a university degree or some kind of trade. Regardless of what they remember in math, it was the skills and the tools that they used in the problem solving to help them get to where they want to go.*

English teacher: *My primary concern is teaching analysis, evaluation, synthesis, and communication.*

Types of cognitive strategies emphasized: Math and English teachers were generally concerned with helping students to develop many of the same cognitive strategies; however there were differences between them as well. English teachers' comments were most likely to deal with encouraging students to: 1) engage in questioning and critical thinking, and 2) dissect and analyze complex texts. Some examples follow.

English teacher: *If you require them to dissect a certain scene or to look at the motivation of a character, they can apply that to other plays or other works or a whole host of other things. It's like feeding a man versus teaching a man to fish.*

English teacher: *[I try to help them] to understand that there is a connection on all disciplines. And how once when they can make those connections then I think it kind of opens them up to be able to logically be able to look at a piece of text or whatever it is and be able to analyze it and make other connections.*

English teacher: *I want them to be highly analytical thinkers and to not just read something and believe because it's in print that it is a fact.*

Math teachers were more likely to focus on: 1) finding multiple approaches to solving a problem, and 2) making sense of the use of math in the real world. For example:

Math teacher: *All of their problems can be solved multiple ways, which sort of makes it so rich because it is interesting to see the kids sometimes come up much more [efficient solutions] than I ever imagined.*

Math teacher: *Many of them don't question the answers when they get them. At the college level you have to start asking, is your answer reasonable.*

Instructional strategies: A number of the instructional strategies discussed in the previous section were seen to be useful in teaching cognitive strategies as well as content knowledge. However teachers mentioned some instructional strategies that they considered particularly helpful in relation to instruction on cognitive strategies, including analyses of multiple media, use of protocols and tasks that demand thinking, modeling desired behaviors, and peer teaching:

English teacher: *[It's] really important to do ... analysis not even using text but visuals, and having them analyze paintings or stuff like that in writing. If they can do it from paintings and you can say, "Well if you do it with this you can transfer the skill."*

English teacher: *In the presentation I could put students on the spot, so to speak, and force them to do that critical thinking where they had to come up with that answer and as we got into protocol with that; they realized that there was no right answer.*

English teacher: *I do other projects, debates, video projects--things designed to get those cognitive skills, get them critically thinking, thinking persuasively, and thinking analytically.*

Math teacher: *The teacher has to first model and break it down in schematics for the students and now the students are kind of mimicking/memorizing that cognitive skill base.*

Math teacher: *A lot of time I'll have students work in pairs ... and often they say I can do it but I can't explain it and of course my response is, if you can't explain it then you don't know understand it well enough. So, they have to go back and rethink on a different level of what they're doing.*

One math teacher found instruction on cognitive strategies to be particularly challenging, especially when dealing with the needs of different students, remarking, "I don't know what the answer is on how to teach thirty-five kids of varying levels that independent cognitive skill set that's needed to solve problems in their Algebra and Geometry class. That's my struggle day to day."

KEY COGNITIVE STRATEGIES: *Findings – Site Visit Data*

On the site visits, there were numerous opportunities to observe the ways that teachers organized their instruction to help students improve their cognitive strategies. Several of the most frequently noted ones are described here.

Progression toward more sophisticated thinking: On the site visits, a number of teachers expressed that a key instructional goal is to develop the intellectual capacity of

students to handle sophisticated material that requires deep thinking. Through different activities, we saw teachers seeking to develop within their students the capacity to analyze material in greater depth while also practicing reasoning skills and the construction of sound arguments.

Observation: One English teacher told us that teaching critical thinking skills is an explicit goal of instruction. The teacher said that she plans every lesson with some specific critical thinking goal in mind. In one lesson on the Wife's Tale in the Canterbury Tales, she told the students to complete a responsive writing assignment entitled, What Do Women Really Want? The teacher told the students: "I want you to think of three things: poverty, gentility, and social status." She framed an example of a response and walked students through it. The students struggled with constructing their responses, but the teacher pushed and prodded until she got more thoughtful answers.

Observation: In a Math Analysis class, students were working on predicting the growth of a bacteria culture. The question had seven parts, and the teacher had students work on the problem at their desks. The teacher continually required students to justify every decision they made in solving the problem. At various points, the teacher called students up to the board to show their work and the steps they'd taken in answering the problem. The teacher challenged the students to present multiple pathways to the correct answer by leading them into thinking more deeply about the problem.

Observation: In an Early College dual credit English course for 11th graders, the teacher stated that her instructional goals for the students are to teach them to use information to prove something or to make predictions. Instead of doing writing drills, she instead emphasized the "scientific method." She explained that she wants students to think of writing assignments as a multi-step task that involves developing reasoned arguments around a hypothesis and using evidence effectively to support that hypothesis. Every writing exercise, according to the teacher, is taught as a way of developing the students' capacity to think deeply and present a well-reasoned argument.

Use of varied texts: English teachers described their efforts to broadly introduce students to a wide range of texts so that students would be able to develop varied strategies for analysis and interpretation. Teachers saw this approach as a way of nurturing intellectual flexibility in students, allowing them to decipher meaning more easily from the types of literature that they would be likely to encounter in college-level coursework.

Observation: In one interview, an English teacher stated that it was important to expose students to a wide variety of texts of the types used in college coursework. According to him, it removes the "intimidation factor." In any given unit, the teacher explained that he is trying to ensure that students are exposed to multiple mediums, so that they can build fluency with multiple texts. In his view, this develops habits of thinking, which become natural ways for the students to engage with texts.

Multiple approaches to solving problems: A distinct feature of the instruction in several mathematics courses involved activities where students worked independently or in small groups to solve problems. Sometimes working on the board, students were pushed to explore multiple methods for problem solving. The process of arriving at answers was emphasized over arriving at a final correct answer.

Observation: At one school, the mathematics teacher had most of the 23 students in the class solving problems on chalkboards that covered the side walls of the classroom. The teacher also put several problems on the front board and worked through those with students, as well. She emphasized that each of these problems could be solved in numerous ways.

KEY COGNITIVE STRATEGIES: *Synthesis of findings*

While both English and math teachers were concerned with teaching cognitive strategies, English teachers were more likely to emphasize intellectual openness, inquisitiveness, analysis, and reasoning-argumentation-proof; math teachers were more likely to emphasize precision and accuracy along with problem solving.

Both the math and English teachers participating in this study considered it an explicit responsibility to teach cognitive strategies to their students. Many expressed that proficient use of key cognitive strategies was even more important for student success than mastery of content knowledge. They used varied approaches to increasing students' effective use of these strategies including presentations, writing tasks of varied types, text analysis, and class discussions. In many cases, teachers emphasized the need for increasingly sophisticated ways of thinking. These included:

- Approaching problems from multiple perspectives.
- Drawing connections among different disciplines and ideas.
- Using evidence to back up an argument.
- Having the flexibility to interact with varied problems and texts.

Particularly notable were teachers' assertions that there was a need to constantly push both themselves and their students toward habits of deeper thinking.

ACADEMIC BEHAVIORS

Sub-question 1.3: How do teachers help students to become college ready in terms of encouraging positive academic behaviors?

ACADEMIC BEHAVIORS: *Findings- Survey Data*

Another set of survey questions had to do with: 1) how English and math teachers rated students' mastery of academic behaviors at the beginning of the year, and 2) the extent to which they felt able to influence the development of these behaviors.

Figure D shows both math and English teachers' ratings of their students' academic behaviors at the beginning of the year. Both groups gave the highest ratings to students' ability to "effectively communicate with teachers and advisors." The lowest rating was given to "time management." The differences between math and English teacher responses were fairly minimal, with the biggest difference being in their assessment of student note-taking skills.

Figure D: Teachers ratings of students' skills on academic behaviors

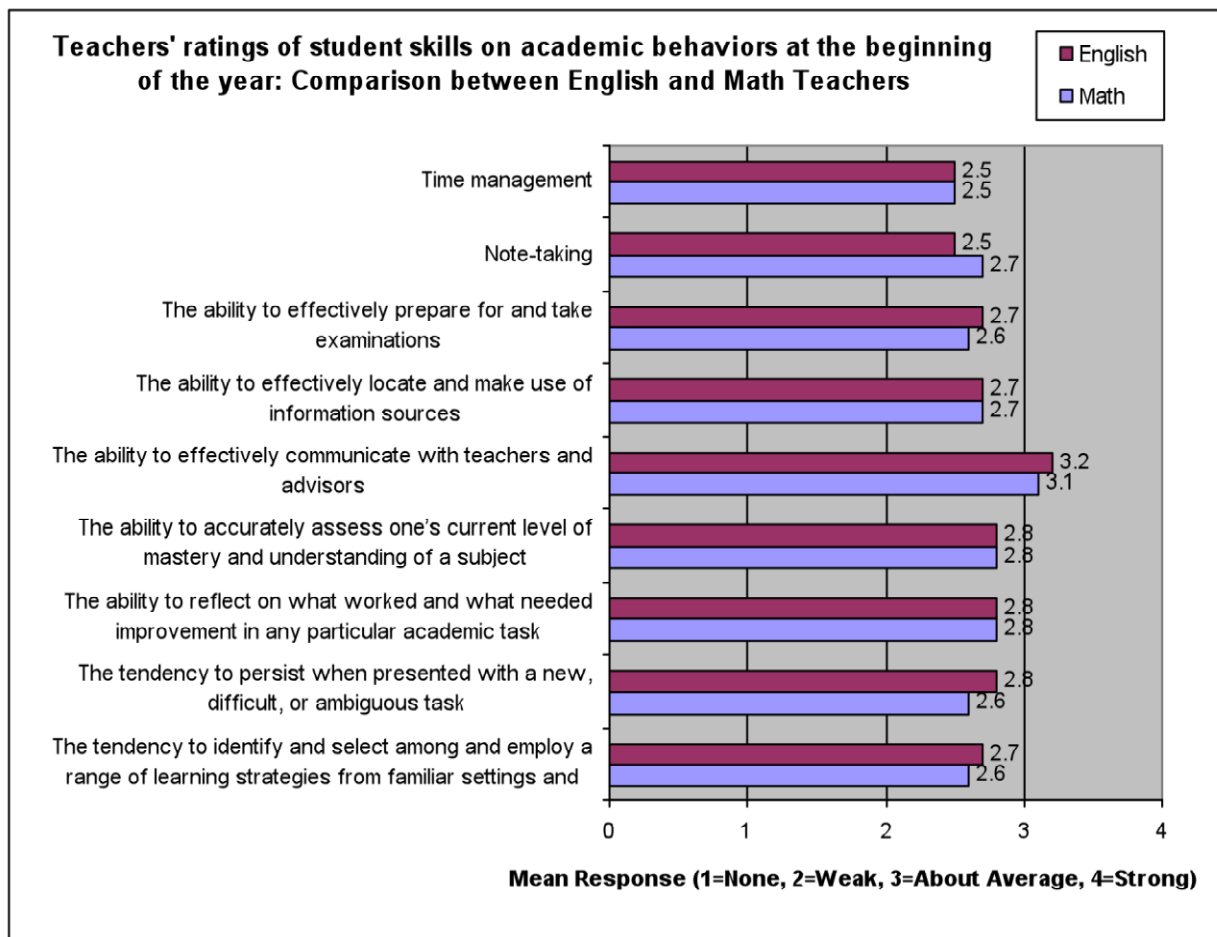
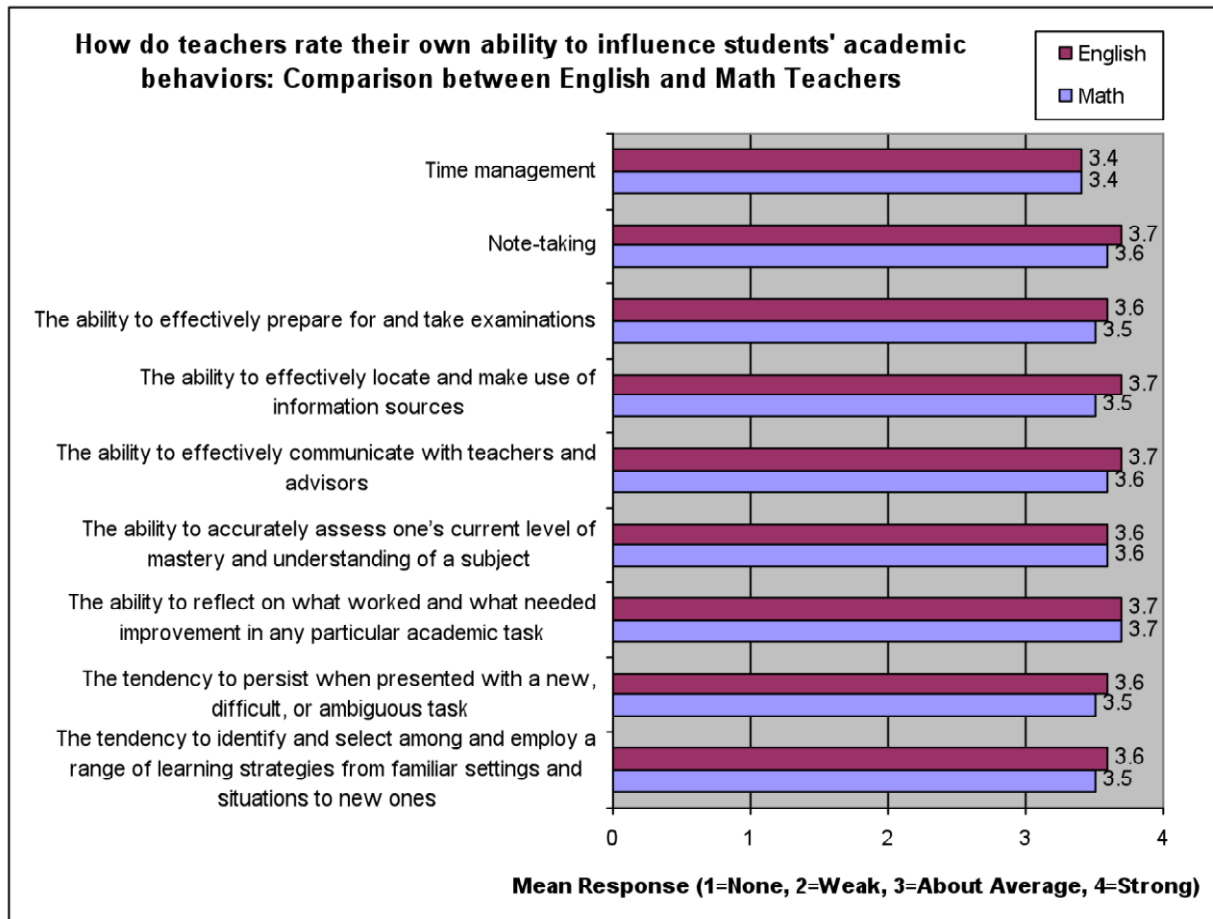


Figure E shows teachers' responses when asked how much they felt able to influence their students' academic behaviors. On all items, math and English teachers rated their own abilities as above average. English teachers rated themselves as slightly more able to influence every kind of academic behavior when compared with math teachers. The area that both math and English teachers felt least able to influence was students' time management.

Figure E: Teachers ratings of the ability to influence students' academic behaviors



ACADEMIC BEHAVIORS: *Findings- Focus Group Data*

Interestingly, the teachers in our focus groups were especially engaged in discussing instruction of academic behaviors. We found that the most animated discussion addressed this topic.

Types of academic behaviors that students need help to master: The focus group participants highlighted the kinds of academic behaviors that students frequently lack, both in terms of self-monitoring (or meta-cognitive awareness) and in terms of important study skills. Overall, the discussion emphasized students' need to master the following academic behaviors:

- Taking responsibility
- Self awareness, self monitoring, self evaluating
- Planning ahead; organizational skills
- Pro-active help-seeking
- A strong work ethic
- Communication (emphasized by English teachers)
- Working with others effectively (emphasized by math teachers).

Some of their thoughts on each of these areas follow here. Teachers spoke extensively about specific academic behaviors that students need to work on, as well as the ways that they, as teachers, try to address them.

Taking responsibility: When asked about behaviors that are key to college readiness, several teachers stressed the need for students to take responsibility for their own learning, emphasizing the development of an internal locus of control and the need for progressively greater independence as a learner:

English teacher: *The ones who are [college] ready have cultivated that internal locus of control and the others are operating with, "You failed me" or, "You didn't give me enough time" - always some excuse. They don't understand that it lies within them.*

English teacher: *[College ready students] understand the secret rule that you have to pass your work in. You have to turn it in, you have to be consistent with your work and meet those deadlines, and you don't have to have things explained to you several times.*

Math teacher: *The other thing is I want them to take ownership of their learning and I want them to design what they need to learn- and to move and to plan it.*

Math teacher: *You have to always get to where the kids are and then take them from there or show them how they can go from there to where they need to be, because sometimes they need to take on the responsibility themselves.*

Self awareness, self monitoring, self evaluating: While this dimension was less frequently mentioned, a number of teachers considered it important. Several teachers talked about ways that they build opportunities for self-reflection into their instruction.

English teacher: *The self monitoring and self-awareness are essential. That is something they are void of pretty much when they come in.*

English teacher: *I think reflecting on the process too is a good idea to look at ...what they did--their work, but also reflecting on the way that it was given to them [by the teacher]. "What could you see as a student that I could do better to help you with?"*

English teacher: *I teach online courses. I find some of my best discussions are mid-semester when I ask students to analyze how they are performing in this course and*

what effective methods they use [for studying]. In sharing those with other students it is very beneficial; that is, many students don't understand what it takes to succeed but through reading what other students do, they fully comprehend that.

Math teacher: I have my students do a lot of self-evaluation I make them give themselves a grade and then defend that grade ... They are very much harder on themselves than I ever would be.

Planning ahead; organizational skills: This was another area of great concern to the teachers, with an emphasis on the importance of time management. Some teachers described ways that they help students attain these skills, including deconstructing tasks, holding firm on deadlines, and developing calendars.

English teacher: They don't know how to plan or how to organize material, let alone a project. They don't understand about deadlines and there are so many things we have to teach them... We have to take it apart for our students and help them understand that, because most of them don't.

English teacher: They are in shock when you won't take the late assignments. So, I'll point over to the college building and ask the students, "Do you think the college will take your assignments late?"

Math teacher: I actually make them make a calendar of the whole week, hour by hour, picking out when they are going to study. I know this sounds really basic but they don't have any idea

Pro-active help-seeking: Several teachers emphasized the importance of students knowing when and how to search out the help that they need. They noted that students may avoid seeking help because they don't want to make the effort, or because they are afraid of looking stupid.

English teacher: They have to be an independent learner but they also have to recognize when they need help and where to go to get that help, whether it's going to a professor, going to a study group, going to tutorials, or spending extra time in the library or the internet--whatever. They need to be willing to put in that time and ask those questions.

Math teacher: They need to understand that when you struggle-- don't give up. "How are you going to react to it? Are you going to shutdown or are you going to seek out support?"

A strong work ethic: Several teachers emphasized the need for students to work hard, sometimes associating this with increased maturity or the ability to delay gratification. Math teachers were more likely to focus on this quality.

Math teacher: *So, it's got to be a desire for students to get to a point of understanding and mastery. I think that we struggle with both the teachers' and students' perspective in creating that consistent desire because now students, they're into the quick-now-now. Students aren't into working-working and working is what math teaches.*

Math teacher: *Keep practicing, practicing and not giving up and dealing with frustration.*

Math teacher: *Students who I believe are college ready ... first, they have a great foundation on basic skills, they work harder than all the other students, more motivated to learn; they do all their work.*

English teacher: *The perseverance and how hard they're going to work.*

Communication: In addition to skills in written communication, addressed under content knowledge, English teachers frequently noted the importance of developing skills in oral communication.

English teacher: *I think ... oral communication is important. If you are able express yourself clearly and you get your ideas across very thoroughly. I think that's an important skill to have once you go to college....*

English teacher: *Can you stand there and present all of your research or evidence, essay, your project, presentation, portfolio? Can you show who you are and what you know and what you have learned?*

Working effectively with others: A number of teachers in the focus groups described the ways that they helped students become more comfortable with, and proficient at, working in groups.

Math teacher: *Reciprocal teaching where students learn with teaching each other; collaborative groups, being able to revise notes with each other, testing each other...*

Math teacher: *I assign each group a different project and the only way a class is going to learn the topic is if that group teaches that topic well to the rest of the class; so they actually have taken over the teaching of the class once I demonstrate through a couple of lessons and that has gone amazing.*

English teacher: *Then I start them off in small groups because it's a safer place. After, they have practiced with small group then we share out and then eventually the whole group gets to discuss things.*

Classroom norms and structures: Teachers also discussed ways that they structured and ran their classrooms so as to encourage students to form good academic behaviors. In most cases, they referred to their own math and English classes. Some teachers also taught

seminar, a course used in many Early Colleges to assist students with the development of study skills and the transition to college, and this entered the discussion as well.

Encouraging students to form opinions: *I try to teach almost daily the ability to have an opinion. So often I say, "What do you think?" and it's often, "I don't know." How can you say, "I don't know" to what do you think.*

Natural consequences: *At our school we always talk about the natural consequences and making sure they understand the natural consequences of not doing something.*

High expectations: *I think probably for me, the most important thing that I do in my instruction is that I had to give up the desire to be popular So, I have to be the meany and say, "Hey no late work-no extra credit; it's due when it's due and I expect high quality work." I tell them, "You turn in crap and your grade will be crap," and the kids get that pretty quickly.*

Modeling: *And I try not to solve it ahead of time, I try to let them see me struggle with it. That's kind of scary thing to do when you have a real challenging problem because you know you always want to know the answer; but sometimes I just stand up there and think out loud and I encourage them to think about all the different ways we solved the other problems.*

Teacher as facilitator: *I am trying to force myself- and it's not easy- to do less and less in the front of the room. I set myself up for this all the time; for example ... the students tell you to put every step on the board, so they can copy it. I don't think they can learn from that. So, I'll put the problem down and I'll say, "What do you think the next step should be?"*

Just in time teaching: *If the kid has trouble, it's like a teachable moment; it's not my focus for the day. My focus is the math lesson. But, if something comes up where a kid says, "I didn't do the homework because I forgot to write it down," then we reinforce it. "Why didn't you get on the internet to look it up, why didn't you call somebody, and what is your support structure?"*

Use of seminars: *Well, that's one thing that we do with our seminars....You can work with them on study skills, taking notes and stuff like that, and how to talk to the professor and how to go and say, "I'm not getting what you're telling me," and how to approach it and not to let it ride, and that's the support that helps them out.*

ACADEMIC BEHAVIORS: Findings- Site Visit Data

In many of the courses we observed, there was evidence that teachers developed instructional strategies to teach students academic behaviors that were seen as integral to their success in college course-taking. As a part of this, students were encouraged to reflect on their behaviors and how they contributed to their success in school.

Taking responsibility for learning: A number of Early College teachers emphasized that the responsibility for learning belongs to students. In the eyes of many Early College teachers, students' willingness to accept responsibility for their learning was a strong indicator of their readiness for college course-taking.

Observation: One teacher described a set of *showcase portfolio* assignments as an opportunity for students to take initiative. She encouraged students to use them to answer: "What did I do in this class? What did I have trouble with? And what helped me to learn better?" In showcase portfolio projects, students had to explain not only what they had learned but also the rules and structures of the learning environment, including grading policies and the expectations of Early College and college faculty. (We heard students explain such concepts as plagiarism and syllabi.)

Observation: Many of the teachers reported that they determine the college-readiness of their students based on what they see from students in terms of academic behaviors. One teacher stated that she knows students are college ready when they are willing to tackle a problem that hasn't been explicitly explained to them, saying, "Some kids stop when they don't know what to do. When you keep going, that's when I know I can trust you out there. You have to have the confidence to know that you can do it."

Observation: In an interview, several Early College teachers stated that students are especially encouraged to take responsibility for their learning in the last high school classes before college course-taking. In the last Early College English class at this school, for example, self-pacing, organizing, and ownership were emphasized.

Observation: In an Early College English class, a teacher admonished students for not being prepared for the discussion. She held students accountable. At one point, she says: "You guys have not read. I'm having to dig too deeply. We have to shut this part of the class down. I can't do anything more with this part of the class if you guys haven't read."

Self-advocacy and help-seeking: The teachers emphasized the importance of students developing their capacity for identifying sources of help. Help-seeking was seen as a form of self-advocacy. According to those interviewed, students have to be taught and encouraged to articulate what they do not understand. In describing the responsibilities of students, teachers included their obligation to ask for assistance when they were in doubt or unable to complete an academic task.

Observation: During a mathematics class, the teacher reviewed the steps in solving a particular type of problem that required students to keep careful track of the previous steps taken. About half of the class was not grasping the concept and were not able to complete the practice problems that the teacher had assigned. While the teacher continued to explain the steps to individual and small groups of students, he also directed the students to identify other students who could help them. The teacher instructed students directly, "If you can't do the work, get someone who can help you."

Observation: One teacher commented, "If you can't advocate for yourself, you won't be successful in your college course-taking."

Planning and time management: During the school visits, we observed and also heard teachers describe the importance of explicitly teaching planning and time management.

Observation: In one classroom, students had monthly calendars and quickly and independently got to work. Students received an "exit card" which they completed, asking them to respond to two prompts: 1) List 2 things you learned from reading the article, and 2) Did using the preview strategy help or hinder you?

Observation: The summer bridge program at one Early College emphasized planning and time management, along with instruction in English and mathematics. Students had planners in which they were required to record assignments.

Observation: One teacher reported that she spends the first month of the year going over procedures for the class. The students are trained in her class to quickly produce and then share their work with classmates.

Development of presentation skills: Learning how to communicate what one knows to a group of peers was emphasized in many of the Early Colleges we visited. Students were given frequent opportunities to make formal presentations. Similarly, many of the Early College classrooms we visited were characterized by a high frequency of informal occasions for students to present their knowledge to the class.

Observation: In a 10th grade English course, groups worked together on in-class reading comprehension activities before the group leader designated a student to present answers to the entire class. The group, having first read a short piece of literature, was responsible for answering several questions before the entire class. The groups were given a short time to discuss their answers before individual members of the group presented the answers before the class.

Observation: One Early College regularly provides students with opportunities to "present what they know." The principal thinks of this as a key feature of the school culture and encourages every teacher to make it a regular part of instruction. Regular presentations, according to the principal, allow students to retain more of what they've learned and also provide students with opportunities to routinely develop their planning and communication skills.

ACADEMIC BEHAVIORS: *Synthesis of findings*

Both math and English teachers surveyed gave high ratings to their incoming students' ability to "effectively communicate with teachers and advisors." The lowest rating was given to "time management." Both math and English teachers rated their own abilities to influence students' academic behaviors as above average. English teachers considered themselves as slightly more able to influence every kind of academic behavior as compared with math teachers.

In both focus groups and site visits, there were useful opportunities to learn about ways that teachers' provided instruction related to students' academic behaviors. In our analysis of both data sets, the following academic behaviors were seen as especially important:

- Taking responsibility for learning.
- Planning, organizational skills, and time management.
- Pro-active help-seeking.
- A strong work ethic.
- Communication skills.

There were various ways that teachers attempted to enhance students' academic behaviors, both by explicitly designing ways for students to practice them, as well as by establishing positive classroom norms and expectations. Academic behaviors were seldom the focus of specific units of instruction; rather teachers sought ways to guide students in the use of these behaviors in the context of everyday teaching and learning.

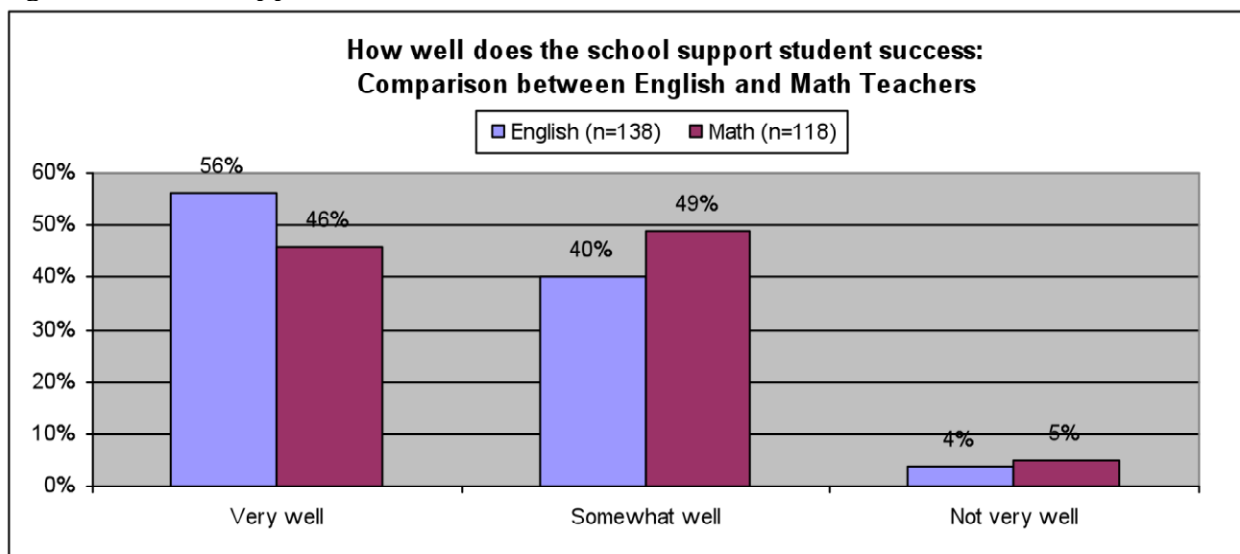
CONTEXTUAL CONDITIONS

Sub-question 1.4: What contextual conditions influence students' college readiness?

CONTEXTUAL CONDITIONS: *Findings- Survey Data*

In the survey, teachers were asked to respond to the following question about their own school environments, “How well do the instructional practices and resources in place at your school support the success of students in college-level introductory coursework?” Their responses to this item are shown in Figure F. About half of all teachers indicated that their schools support students “very well,” while most of the rest thought that their schools’ supported students “somewhat well.” English teachers were 10 percentage points more likely than math teachers to believe that their schools support student success “very well.”

Figure F: School support for student success



CONTEXTUAL CONDITIONS: *Findings- Focus Group Data*

A number of the focus group participants provided insights into contextual conditions that influenced their teaching and student success. These reflected conditions in the school, the college, and in the larger world.

School structures: Some teachers reflected on ways that their schools influence students' college readiness. One teacher commented on the use of school meetings to better define, as a group, what college readiness means.

English teacher: Part of what we learn at these meetings is that everyone has different definitions [of college readiness] and programs tackle that very differently.

In other cases, teachers focused on structures, particularly seminar, that were used school-wide to help students to prepare for college.

Math teacher: *We have a support system. We have seminars for our students taking college classes, especially if they are taking the first one... We do teach them those skills that they need to be successful in college.*

College expectations and norms: Many of the teachers were clearly influenced by the awareness that they were in a blended school environment. They were very aware of the close connection of their schools to the college and helped their students to stay focused on the expectations that they would face in the college setting. In several cases, teachers also expressed concern about what their students would experience in college. For example:

Math teacher: *[Most college] teachers are in love with their subjects and if students want to listen to them that's fine, but they would rather just talk to themselves because they love the subject. So, what happens to the students? If the students can catch on, that's great and if they can't, well then they just stop and try again next time. So, I think that it's a very sad story actually what's happening in college. I would like to see it change and maybe the high school teachers have something to teach the college teachers.*

English teacher: *The community college that our students go to is very lecture based... I think sometimes we do a disservice if we are holding their hands so much and then say, "Oh, well go to college." Then they sit there and they get a lecture for 50 minutes and then are expected to know how to do it and they're not ready for that. [We have] to prepare them for the style of courses they are going to receive in college.*

Standards and expectations of others: Many of the teachers, especially those teaching math, mentioned the extent to which they need to conform to external expectations in their practice. Many referred to the use of state and local standards when planning lessons. Others indicated that they are influenced by goals or desired outcomes set within the school or college. In addition, some were affected by school district policies.

Math teacher: *My primary goal course is teaching the standards. But, it is also to prepare [students] for the next math course they'll take.*

Math teacher: *I am very much dictated to by the standards of the state of California and I have to teach accordingly.*

Math teacher: *Our district has said, "Put the text books on the shelf; we don't want you to use them" and that is completely hindering our students in college.*

Math teacher: *But, it's very, very complicated because you have got this weight over you called the [state test] and it's based on what your boss sees as value. ... If you asked me that last year my answer would have been different because my boss was you know API-API and constantly analyzing my value through my student success on schematic-CST scores. But [my new boss] is different than last year's boss.*

Math teacher: *I teach at the college level and we have [Student Learning Outcomes]. So, my first [priority] is to make sure that I have covered them all and they have what they need for the course.*

English teacher: *We have performance outcomes and a college ready student has to meet all of the performance outcomes and there are pages and pages of them, so I don't know if I can explain all of them.*

Technology: A number of teachers talked about the way that emerging technologies enhanced or limited what they could accomplish. This was an area in which the availability (or lack) of these resources influenced the way that they thought about preparing students for college.

Math teacher: *There was a paradigm shift where I was no longer the center of knowledge. Technology became the center.*

English teacher: *We have limited technology at our school and just with two teachers we are limited in what we can do.*

Math teacher: *All this math information is there now on the internet that's in our textbooks. Our job is to facilitate and find the little gaps in the knowledge and make sure they know how to do it. You can go YouTube and watch a lecture on how to add fractions. There are these lectures out there with the same thing we do.*

CONTEXTUAL CONDITIONS: *Findings – Site Visits*

On the site visits, there was a chance to observe a wide range of school and college conditions that influenced teachers and students. These included structures, institutional culture, and the financial and political conditions that affect school designs and outcomes. The following factors emerged as especially important in relation to the focus of this study.

Collaboration: Several of the Early Colleges had created formal committees or groups that meet to discuss specific aspects of the schools' mission, design, and outcomes. These formal bodies are often responsible for the creation and implementation of policies and plans that affect key school functions. They also appear to provide important support to teachers and school leaders.

Observation: Several of the Early Colleges had established horizontal and vertical teams which meet regularly to discuss academic-area and developmental issues. These teams were helpful in providing a forum in which shared understandings of students' learning needs could be developed.

Observation: At one of the schools, coordination of the Early College and college mathematics curricula was facilitated through regular communication between the Early College mathematics department chair and the college department mathematics

chair. They meet twice a month and through their meetings have instituted a math lab where Early College students can get tutoring and extra support.

Observation: In an interview, a principal said, "This is as much a professional learning community as anything I've ever been a part of." The teachers work out of a kind of bull-pen. Courses do not begin until 11am, leaving approximately two hours every morning for planning and collaboration of teachers.

Observation: At one school, several formal committees exist to facilitate the ongoing communication of Early College teachers with each other as well as the communication between early college teachers and the college faculty. For example, an Advisory Committee facilitates communication among the Early College, the partner college, and a branch of the state university where many of the Early College students enroll following graduation.

Structured support and parent involvement: In the Early Colleges we visited, there was evidence of varied support systems and of direct efforts to draw in the parents and family members of the students. These efforts were seen as integral to the mission of the Early College and critical in sustaining the success of individual students. Through these efforts, parents were not merely invited to participate in various school functions, but provided with clear opportunities for doing so.

Observation: At one Early College school, there were a number of policies designed to ensure that students and their families were included in the community of the school. Every student had a PAA or Personal Adult Advocate who contacted the students' parents at least 5 times a year. There was a block of time (4pm to 5pm) carved out every day for teachers to be available to meet with students. The parents were also required to commit to volunteering at the school and participating in fund-raising.

Observation: The *showcase portfolio* project at one Early College has created a sense of ownership and accountability and made the school domain accessible, even for those parents who do not speak English. In this school, where approximately half of the students speak a language other than English in their homes, the opportunity to present themselves and their work allows students to interpret (literally and figuratively) their high school experiences so that their parents can understand what their children are learning. The student-led conferences inform and empower parents to be active participants in their children's education.

Observation: In one case, the teachers and school administrators decided to break the 9th grade students into single-gender sections. The teachers explained that because of the large Hmong population, the girls, who are discouraged from contradicting males in public, were performing better in all-female groupings.

Curricular and structural alignment: We observed in the school visits that some Early College faculty members were able to coordinate key features of their curricular offerings with those of other high school or college teachers. As well, many of the Early Colleges had

instituted specific, shared strategies that were designed to improve student readiness for college course-taking.

Observation: At one Early College, mathematics tutorials are built into AVID. The AVID teacher worked with English and mathematics teachers to coordinate AVID content with what was being taught in other classrooms.

Observation: The chair of the English department at one college worked with an Early College teacher to design a strategy for teaching the 5-paragraph essay in a way that also encourages critical thinking skills.

Observation: The local branch of the state university designed a 12th grade curriculum which the Early College adopted and spread out over four semesters. This meant that the Early College English curriculum was aligned with the state university expectations for entry level English course-taking.

Administrative/leadership support: Consistently, administrators discussed the role of school leadership in creating the conditions that are conducive to student success. Administrators often described their role as supporting classroom efforts to prepare students for college course-taking.

Observation: At one Early College, a principal told us that a great deal of coordination occurs across disciplines. In her view, "Administration's job is to help shape the vision and to provide resources." In describing one recent school-wide effort to improve students' mathematics performance, she said: "We all have a responsibility to raise math scores."

Observation: One Early College principal described his role as being supportive of collaboration among the school's staff. He discussed the importance of his being open to new strategies for preparing students for college success. Many of these strategies, he explained, come directly from teachers.

Community building activities: Teachers and administrators talked about the importance of community-building in the schools. The sense of community they strive for is developed through formal and informal channels. In many cases, the teachers talked about relationship-building in the same breath as academic skills.

Observation: At one school, the counselor conducts town-hall meetings for upper-classmen who are all taking the majority of their classes at the partner college. The town-hall meetings help to sustain the sense of community after students begin their college course-taking. There is also a summer orientation at this school for entering 9th graders that is important for setting expectations and developing an initial sense of community among the incoming class.

CONTEXTUAL CONDITIONS: *Synthesis of findings*

About half of all teachers surveyed indicated that their schools support students' success in introductory college coursework "very well" while most of the rest thought that their schools supported students "somewhat well." English teachers were 10 percentage points more likely than math teachers to assert that their schools support student success "very well."

In analyzing the focus group and site visit data, we were able to examine specific ways that contextual conditions in schools and colleges might influence students' college readiness. Most prominently, we found evidence that teachers were powerfully influenced by the early college design and the close physical and programmatic connection of the school to the college. The blended early college design created an atmosphere in which teachers were continually aware of the need for students' to become college ready. In addition, there were cases where the curriculum could become better aligned due to the proximity of the two institutions. There were other influences on teachers as well—these were most likely to be factors that affect the behavior of all teachers such as state standards and district policies.

Perhaps because early colleges are blended institutions, there were multiple examples of collaborative activities taking place among faculty. Many of these had to do with school planning and governance while others involved instruction. In addition, school structures designed to provide student supports were contextual features that emerged as important for student success.

Findings: Research Question 2

Research question 2 asks, “What *strategies, practices, and academic supports* do teachers and schools use to accelerate the progress of students who are underprepared in these content areas?” The three sub-questions are designed to address this question, providing insights into the ways that students are underprepared, and how teachers provide extra assistance.

With respect to this second research question, we were less able to consistently use all three sources of data in relation to each of the sub-questions. Thus, in the sections below, we share the findings from the analyses of the data sets that pertain to each sub-question.

UNDERPREPARED STUDENTS

Sub-question 1: In what ways are students who come into Early Colleges underprepared? What kinds of difficulties do they face?

UNDERPREPARED STUDENTS: *Findings- Survey Data*

English teachers were asked about the extent to which the students in their highest grade level class were able to demonstrate specified knowledge or skills at the beginning of the year. Their response options were as follows:

- 1= very low
- 2= a little below grade level
- 3= basically at grade level
- 4= a little above grade level
- 5= very high

Figure G shows the English teachers’ average assessments of specific types of students’ knowledge and skills at the beginning of the academic year in their highest grade level class. Their average responses ranged from 2.4 (a little below/at grade level) to 3.4 (a little above/at grade level). They were most likely to believe that their students began the year underprepared in: 1) research skills, 2) use of varied information sources, and 3) categorizing information thematically.

Math teachers were also asked about the extent to which the students in their highest grade level class were able to demonstrate the specified knowledge and skills at the beginning of the year. Figure H shows the teachers’ average assessments of students’ knowledge and skills at the beginning of the academic year. Their responses ranged from 2.6 (a little below/at grade level) to 3.4 (a little above/at grade level). They were most likely to believe that their students began the year underprepared in: 1) generalizing from the specific to the abstract and 2) using inductive and deductive reasoning.

Taken together, teachers perceived that their entering students had below grade level skills in over seventy percent of the skill dimensions found on the surveys.

Figure G: English Teachers' Ratings of Student Skills

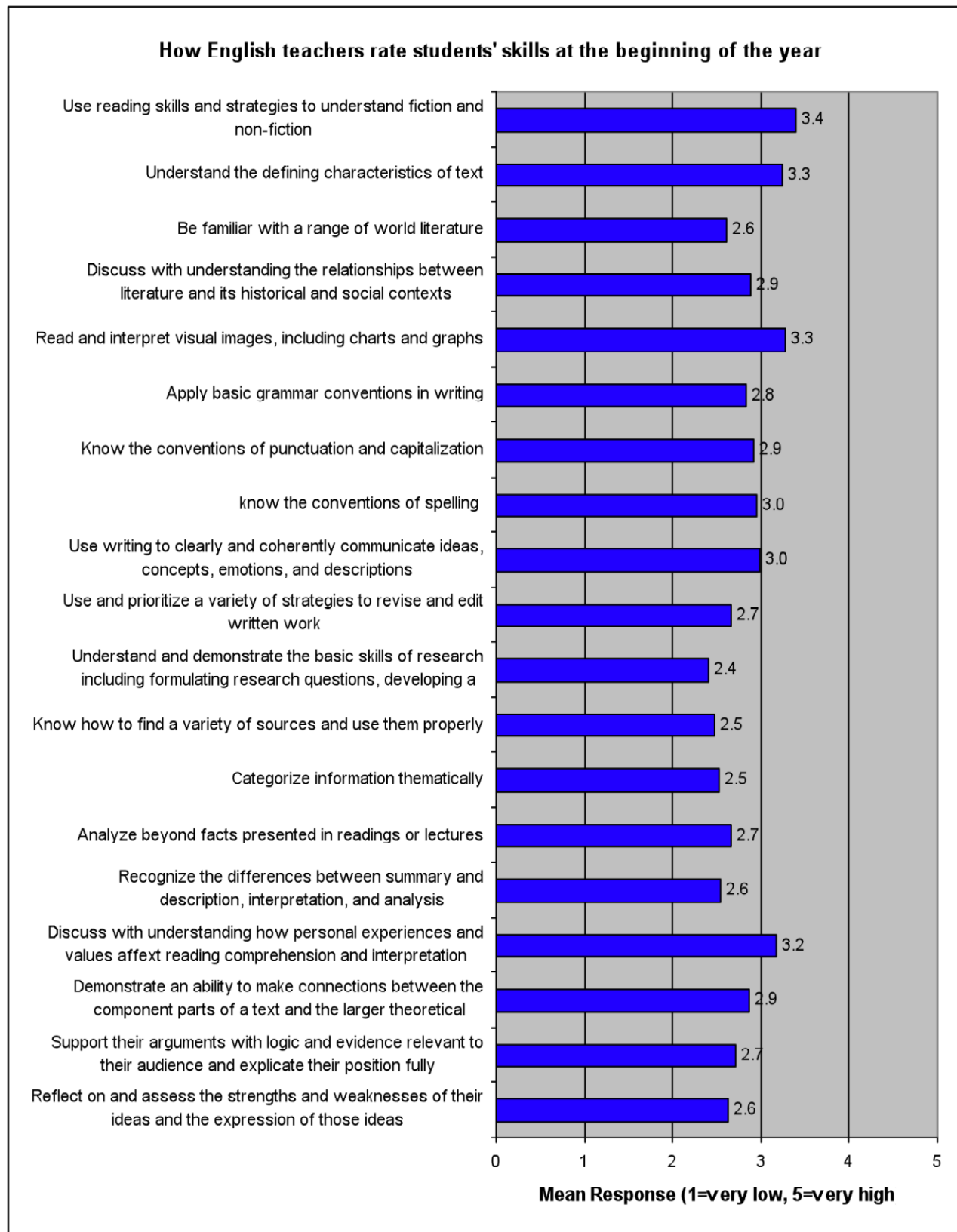
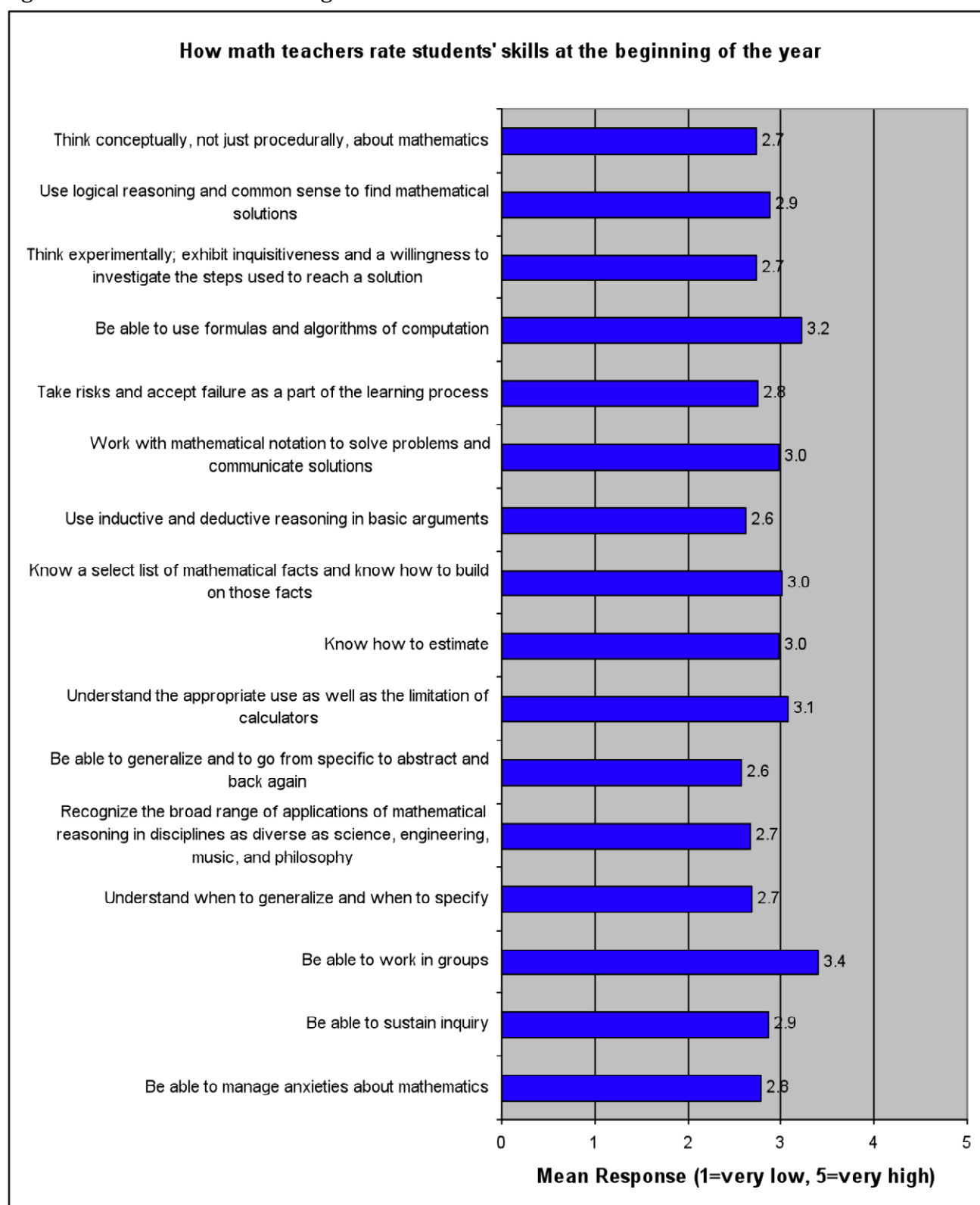


Figure H: Math Teachers' Ratings of Student Skills



UNDERPREPARED STUDENTS: Findings- Focus Group Data

In the focus groups, teachers discussed ways that students entered school underprepared and the ways that this affected their ability to help them to become college-ready in an accelerated fashion.

Foundational knowledge: In focus group interviews, teachers indicated that students frequently come into Early Colleges underprepared in foundational areas of content knowledge and academic behaviors. One English teacher said that she has “to play catch up with grammar, mechanics, spelling, and usage so that [students] have the basic composition skills.” Other teachers made similar statements:

English teacher: *Yet, I find myself having to go back and teach skills that I would expect for them to have coming into high school and I’m having to teach content from 6th, 7th, and 8th grade. So, that’s been difficult and well I’m frustrated with that.*

English teacher: *I completely agree and [I] teach freshmen as well. I find myself having to re-teach skills that were not acquired which are very basic. My main focus would be content knowledge but I can’t get to that unless they know those basic skills, so it’s a conjunction of having to do both at the same time.*

Deepening the level of understanding: Other teachers focused on academic difficulties pertaining to moving beyond a surface understanding of material. One English teacher stated that students were encountering difficulty fully understanding and engaging with text, while a math teacher wanted students to see the connections among mathematical ideas.

English teacher: *The problem that I am finding...[is that] they are coming in as freshmen and they think because they can read the words that they are fine. But, they don’t know how to do anything else with the words.*

Math teacher: *[I want them to know] how to make connections between two things that could be related, how are they related, and if they are really related.*

Academic behaviors: Similarly, teachers seemed concerned that students are often entering Early Colleges without essential academic behaviors.⁴

English teacher: *I’m planning on having to spend a lot of time on academic behaviors because not only are they having to transition from what is OK behavior at a middle school to what is not OK in high school; I’m also having to prepare them for that college campus where the high school behaviors aren’t acceptable.*

⁴More detail on specific academic behaviors that students were seen to be lacking is included in pages 33-36.

English teacher: *They don't know how to plan or how to organize material, let alone a project. They don't understand about deadlines and there are so many things we have to teach them.*

The intersection of behaviors and content knowledge: Several focus groups respondents indicated that there may be a connection between weak content understandings and academic behaviors – particularly metacognitive practices. One teacher, in particular, stated that students who are missing knowledge of discipline-specific skills are not likely to know how to ask for help since they do not know what do or do not understand.

Math teacher. *The biggest problem is they don't know what's missing. There are little holes throughout their foundational knowledge and the challenging part is to identify what those holes are and to patch them up. They don't know how to patch them up, so they aren't able to say, "Hey, I don't know how to do fractions." They don't know. They just know that they struggle with it.*

A conversation between two math teachers was aligned with this notion as well. They stated that students who are having difficulties with mathematical content may also have difficulty with mathematical reflections and the reasoning behind an answer.

Math teacher A: *The other idea of number sense where they can think mathematics; and I think many steps come procedurally, you know like they can follow procedures.*
Math teacher B: *Right! But many of them don't question the answers when they get them. At the college level you have to start asking, is your answer reasonable?*

Language: A small number of teachers mentioned that English Language Learners may experience academic difficulties because of language barriers. Teachers stated that some academic behaviors that support content acquisition were difficult for ELL students.

English teacher: *I think that communication [is a challenge]. Oral communication is important [so] you are able to express yourself clearly and you get your ideas across very thoroughly. I think that's an important skill to have once you go to college especially in our school. We have a lot of kids, who English isn't their first language ... there are a lot of kids that never speak because they are afraid to talk in Spanish, and I think that being able to clearly express yourself will help with that.*

UNDERPREPARED STUDENTS: *Synthesis of findings*

English teachers responding to our surveys were most likely to indicate that students started the academic year underprepared in research skills, the use of varied information sources, and categorizing information thematically. Math teachers were most likely to respond that students had difficulties generalizing from the specific to the abstract and using inductive and deductive reasoning.

Those participating in focus groups were especially concerned that some students came into Early Colleges with inadequate foundational skills in content areas and/or deficits in their academic behaviors. It also emerged that there were intersections between students' content knowledge and their academic behaviors, especially in relation to being able to self-assess any deficits and seek out needed help.

STUDENT SUPPORTS

Sub-question 2: What strategies, practices, and academic supports do teachers use to prepare underprepared students for college?

STUDENT SUPPORTS: *Findings- Survey Data*

We were interested in whether teachers who thought that their students were weak in certain content areas would be likely to spend more instructional time on these areas. To assess this, we looked for relationships using Pearson's correlation analyses. In Tables 4 and 5 we show the relationships found between students' initial knowledge levels in key content areas as assessed by teachers and the amount of instructional time spent on these areas.

In Table 4, based on responses from English teachers, there were only two cases in which statistically significant relationships were found i.e., *become familiar with a range of world literature*, and *discuss the relationships between literature and its historical and social contexts*. In both cases, the relationships were positive. Thus, in these two cases, English teachers who found students to be already strong in these areas were *more* likely to spend time on them. In the rest of the cases, teachers did not adjust their instructional time according to their perceptions of students' prior knowledge.

We were also interested in whether math teachers who thought that students were weak in certain content areas would be likely to spend more instructional time on these areas. To assess this, we again performed Pearson's correlation analyses. In Table 5, we show the relationships found between students' knowledge levels at the beginning of the year in key content areas as assessed by math teachers and the amount of instructional time spent on these areas. We see that in the majority of cases (13 out of 16) there are statistically significant positive relationships (r values). In these 13 cases, we find that math teachers who believed that their students began the year with already strong skills in a content area were *more* likely to prioritize instruction in that area.

This finding was very hard to explain, especially in the case of the math teachers who consistently spend more instructional time on areas of perceived student strength. It is possible that their instructional time is highly influenced by state standards and other criteria apart from perceived student need. Further research would be needed to seek an explanation for these results.

Table 4: Relationships between English teachers' perceptions of students' initial skills and instructional time spent

Key content areas	Average ratings of students' skills ⁵	% of teachers who regularly or routinely taught the topic	Correlation (r) ⁶
Reading Comprehension & Literature			
Develop reading skills and strategies (fiction and non-fiction).	3.4	84%	-.026
Identify defining characteristics of texts.	3.3	78%	.059
Become familiar with a range of world literature.	2.6	61%	.285*
Discuss the relationships between literature and its historical and social contexts.	2.9	76%	.263*
Read and interpret visual images, including charts and graphs.	3.3	39%	.117
Writing			
Apply basic grammar conventions in writing.	2.8	79%	.002
Develop conventions of punctuation and capitalization	2.9	71%	-.111
Develop skills in the conventions of spelling	3.0	59%	.064
Use writing to clearly and coherently communicate ideas, concepts, emotions, and descriptions.	3.0	95%	.034
Use and prioritize a variety of strategies to revise and edit their written work.	2.7	73%	.037
Research Skills & Analysis, Critique & Connections			
Understand and demonstrate the basic skills of research including formulating research questions, developing a research plan, identifying unsupported claims, and determine through research the major concerns and debates in a field of inquiry	2.4	28%	.003
Identify a variety of sources and use them to effectively support an argument.	2.5	39%	.031
Categorize information thematically.	2.5	46%	.055
Analyze beyond facts presented in readings or lectures to elaborate on interpretation or develop new knowledge.	2.7	75%	.003
Recognize the differences between summary and description, interpretation and analysis.	2.6	70%	-.008

⁵ Ratings are on a 1 to 5 scale where 5 is high.

⁶ The relationship or correlation (r) is significant if shown in bold and marked with an asterisk. Those considered significant have p values of < 0.05.

Table 5: Relationships between math teachers' perceptions of students' initial skills and instructional time spent

Key content areas	Average ratings of students' skills ⁷	% of teachers who regularly or routinely taught the topic	Correlation (r) ⁸
Understanding Mathematics			
Think conceptually, not just procedurally, about mathematics.	2.7	72%	.107
Use logical reasoning and common sense to find mathematical solutions.	2.9	81%	.197*
Think experimentally; exhibit inquisitiveness and a willingness to investigate the steps used to reach a solution.	2.7	61%	.222*
Be able to use formulas and algorithms of computation.	3.2	84%	.187*
Take risks and accept failure as a part of the learning process.	2.8	76%	.180
Mathematical Reasoning			
Work with mathematical notation to solve problems and communicate solutions.	3.0	94%	.160
Use inductive and deductive reasoning in basic arguments.	2.6	63%	.269*
Know a select list of mathematical facts and know how to build on those facts	3.0	89%	.264*
Know how to estimate.	3.0	65%	.387*
Understand the appropriate use as well as the limitation of calculators.	3.1	77%	.395*
Be able to generalize and to go from specific to abstract and back again.	2.6	72%	.238*
Recognize the broad range of applications of mathematical reasoning in disciplines as diverse as science, engineering, music, and philosophy.	2.7	58%	.261*

⁷ Ratings are on a 1 to 5 scale where 5 is high.

⁸ The relationship or correlation (r) is significant if shown in bold and marked with an asterisk. Those considered significant have p values of < 0.051.

STUDENT SUPPORTS: *Findings- Focus Group Data*

There was limited discussion in the focus groups of strategies that teachers used to meet the needs of underserved students. In general, their ideas about instruction applied to students in general, rather than those with particular needs. However, the idea of differentiation of instruction for English Language Learners was discussed, as was the use of technology to meet the needs of struggling learners.

Differentiation: Several teachers mentioned differentiating instruction specifically to support the needs of English Language Learners. Teachers mentioned using instructional strategies such as scaffolding, group work, and various reading strategies to address the needs of their students.

English teacher: Instruction tends to be more challenging when you have students in the classroom that don't speak English or that are acquiring the language slowly but surely-- and therefore when I teach my students to read or write I try to implement different strategies for them to understand the text and I try to include words that they will be able to reference. For example, if a majority of the population [speaks Spanish], I try to reference words in Spanish so that they can better understand what they are reading. However, including strategies can be a little tricky because the language barriers are great.

English teacher: I have a large-large percent of English language learners and I find by getting them into the groups and doing all the scaffolding, and leaning them on into the end product, and being in the presentation I could put students on the spot, so to speak, and force them to do that critical thinking where they had to come up with that answer. And as we got into a protocol with that, they realized that there was no right answer. They needed to just discuss it in order to prepare themselves to answer whatever question there was... I felt that it promoted that discussion, and it got them to delve deeper into critical thinking.

Use of technology: One math teacher stated that students enter his class at varying levels and that he must be strategic in his approach in addressing each student's need. He mentioned that he has found technology to be a great bridge for all students.

Math teacher: It's a necessity day to day because you get kids of all varying levels in the classroom and you have to try and meet the needs of all these varying levels and get to these end results. Now how that's done? It's done in a variety of ways..... I could help students from different levels use technology as a free way to get to where they needed to go. What that meant is-- class web site, links, students creating links, and students accessing the website and math websites- 24/7 365. This made a big change in how I'm delivering instruction and assessing.

From his statement, it is clear that he is using technology as a way to address the needs of students at different levels.

STUDENT SUPPORTS: *Findings- Site Visit Data*

On the site visits, there were limited opportunities to observe ways that students who entered underprepared were provided with different instruction from the student population at large. However, there were interesting findings with regard to teachers' sense of responsibility for preparing all students for college course-taking. Teachers also emphasized the need for all students to gain solid foundational skills and to become more aware of their own learning needs.

Teacher responsibility/ownership of the problem: Many of the teachers we talked described the challenge of addressing students' limitations as an integral part of their work as Early College instructors, and something for which they accepted responsibility. In general, this was not seen as something extra, but rather was viewed as central to their responsibilities.

Observation: One teacher described the task of making material understandable to underprepared students in this way: "It takes a great deal of patience. It can be frustrating when they don't get it. It is my job to make it understandable.... If I can't make it understandable, I have to figure out a new way of understanding it and explain it."

Observation: At one Early College, mathematics teachers discussed how they work collaboratively to teach struggling students. At this school, teachers collaborate to determine who might be the best tutor for struggling students. Some teachers tutor some students; some work with others. The selections are made in large part based on the strength of the individual relationships between teachers and specific students. Said one teacher, "We get to know the students well, and where they are in terms of skill and ability."

Foundational skills: The topic of basic or foundational skills came up often in our conversations with mathematics teachers. (English teachers also discussed students' limitations in basic writing conventions, but tended to approach the task of addressing those deficiencies differently than mathematics teachers.) While the mathematics teachers didn't discuss the specific basic skills needed in detail beyond the general description of core arithmetic skills, they talked about the importance of filling in basic skill gaps that students brought with them to Early College.

Observation: According to teachers at one school, it is important to have a staff that understands students and students' needs. They believe that students need a lot of assistance in basic skills. At this particular school, there is a literacy center, a writing lab, and individualized, web-based, self-paced instruction in English basic skills and some foreign languages.

Teaching metacognition: Early College teachers' perceptions of students' readiness for college course-taking are closely associated with students' academic behaviors. Many of the teachers expressed the sentiment that it is even more important for students to develop

the capacity to think about their learning and behaviors than it is master key content knowledge. In particular, metacognition was emphasized.

Observation: A teacher explained instruction around metacognition as teaching students to “verbalize internal dialogue” (i.e. what questions do I ask myself?). She talked about keeping a balance between practical questions and more philosophical questions.

STUDENT SUPPORTS: *Synthesis of findings*

Teachers were no more likely to spend instructional time on topics or skills when they believed that their students had begun the year with related deficits. In fact, math teachers, in particular, were more likely to spend instructional time on topics that they considered their students to be already better prepared in. This could be attributed to a number of causes, but additional research would be needed to explore it further.

According to our analysis of focus group and site visit data, teachers considered themselves responsible for addressing the needs of underprepared students. Ways that they mentioned doing so included: assisting students to improve their basic skills, teaching metacognition (self awareness of areas that are strong and those that need work), differentiating instruction for English Language Learners, and using technology as an accompaniment to instruction.

CONTEXTUAL CONDITIONS FOR UNDERPREPARED STUDENTS

Sub-question 3: What contextual conditions exist in Early Colleges that enhance or hinder underprepared students' ability to become college ready?

Neither the survey data nor the focus group data revealed information about contextual conditions in Early Colleges that influence underprepared students' college readiness. However, two important conditions emerged in the analysis of our site visit data. These pertained to structuring the math sequence and provision of extra help to students who need it.

Structuring the math sequence: Two of the four Early Colleges visited had developed alternative math sequences that were designed to meet the needs of students who entered school underprepared. In one case, students needing extra help took two math courses concurrently during their 9th grade year; in the other, some students took an extended Algebra I course in 9th grade.

Observation: In one of the schools visited, many of the students enroll in two mathematics courses in their 9th grade year. Most of the students sit for Algebra I while also taking a Mathematics Lab course. Math Lab is essentially a review course of basic arithmetic and pre-Algebraic concepts. This allows students to simultaneously reinforce skills in which they are deficient while keeping pace with the state course-taking requirements for the fulfillment of high school mathematics requirements.

Observation: At one high school, most of the high school courses are taught in a compressed format in a single semester. However, a year-long, 9th grade, Algebra I section provides an opportunity for teachers and selected students to drill down on key Algebraic concepts. The curriculum is designed so that students are able to move more or less quickly through the curriculum, depending on how well they demonstrate mastery of key concepts. The mathematics format and the curriculum for the 9th grade year were developed by the Early College teachers, in close consultation with the college liaison.

Extra help: Some Early Colleges have instituted *Saturday Academies*, tutoring, and other programming in which students work on academic activities that are designed to either address skill area deficiencies or as preparation for future examinations.

Observation: At multiple Early Colleges which we visited, Saturday tutoring sessions were implemented in the winter and early spring in advance of the season of standardized tests. Generally these sessions were voluntary but also tied to some incentive. In most cases, these weekend sessions were well attended, sometimes averaging better than 90% attendance.

CONTEXTUAL CONDITIONS FOR UNDERPREPARED STUDENTS: *Synthesis of findings*

The research revealed two ways that Early Colleges provide conditions that provide underprepared students with help in becoming college ready: structuring the math sequence and offering extra help for particular purposes.

Conclusions and Implications

In this study, we had the opportunity to explore ways that Early College English and mathematics teachers approach instruction that prepares students to enter and succeed in college classes. In each of the following sections, we draw conclusions and consider implications for practice.

The Early College context keeps college readiness a present and central goal in the minds of teachers, but also presents challenges. We found that the teachers who participated in this study were highly influenced by being situated within Early Colleges. College readiness is an integral and embedded goal of curriculum and instruction in these settings, as many students take college classes while in high school. As a result, teachers often receive clear and immediate feedback on how students are doing in college, and are able to make adjustments to their practice accordingly. However, the Early College setting also challenges school leaders and teachers. As members of blended institutions, they are expected to know and follow the standards for high school graduation and for college entry, as well as the norms of their disciplines. They feel accountable for their students' success in high school as well as in their initial college classes.

This situation provides an important opportunity. Taking time to explicitly sort out the extent of the alignment among disciplinary norms, state secondary school standards, and the skills and knowledge required for college success can be very helpful to faculty. A tight alignment within a school can strengthen the opportunities for creating a pedagogy that is maximally helpful to students. It is suggested that this be an explicit subject of conversation among school staff and faculty and including, when possible, college faculty as well.

There is no single approach or strategy that uniquely prepares students for college. Rather, numerous strategies are linked together in a "value chain." As in many areas of life and education, no "magic bullets" emerged in this research. No teacher depended on any one key instructional strategy to educate students effectively. Neither did any individual strategy stand out as the best way to prepare students to be successful in college. Rather, we found that teachers linked together multiple strategies in sequences and/or simultaneously. They selected those that they considered as most powerful in addressing students' need to gain content knowledge, as well as to strengthen and refine key cognitive strategies and academic behaviors.

A helpful way to think about these findings is through the lens of the *value chain* framework, used in the business world (e.g., Kaplinsky & Morris, 2002; Roper, Du, & Love, 2008). In this conceptualization, series of inputs are connected in sequences that lead up to a final output or product. Each of the inputs adds value and contributes to the final goal. In preparing students for college, high school leaders and teachers need to think about the range of student experiences that will result in college-readiness and how they should be ordered. This could be conceptualized as a *college-readiness value chain*, a sequence of well-planned opportunities for learning. School development organizations may want to use this framework in helping schools to combine and arrange student learning experiences most effectively.

Students who enter Early Colleges underprepared are generally not treated differently from the rest. Acceleration is important for all students to greater or lesser degrees. However, clearer information on students' strengths and deficiencies could help teachers and schools in preparing students for college. According to the survey findings, teachers perceived that their entering students had below grade level knowledge and skills in over seventy percent of the dimensions included. We also found that teachers did not increase the instructional time in content areas in which they perceived their students as deficient upon entry. Given these results, Early Colleges may want to more explicitly assess incoming student knowledge and skills to better diagnose areas of strength and weaknesses and/or make better use of existing assessments. This would allow for greater differentiation in classroom instruction and in the provision of better supplemental assistance.

Additionally, early diagnostic assessment would allow for more targeted use of special programs. Early Colleges could potentially create or expand programs for entering students such as short summer courses focused on bridging gaps in knowledge and understanding. They might broaden the use of technology in helping students to fill gaps, taking advantage of technology available in colleges when possible (e.g. computer labs with programs such as ALEKS and MyMathLab). In some cases, contextualized learning methods might be helpful in providing students with extra opportunities for instruction in math, reading, or writing while focusing on other subject areas.

While teachers are well aware of the importance of helping students develop key cognitive strategies and academic behaviors, they would benefit from explicit training on how to plan and implement instruction in these areas. In interviews, teachers highlighted the need for students to develop a more college-ready set of cognitive strategies and academic behaviors. Research shows that behaviors such as persistence, time management, and help-seeking are linked to academic success. For example, one study found that students who received training in self-management skills, among other skills, performed better on a state standardized exam (Brigman et al., 2007). Similarly, cognitive strategies such as higher-order thinking skills can be taught effectively to students of varied prior achievement levels (Zohar & Dori, 2003). However, teachers generally receive little explicit training in how to teach these strategies and behaviors.

Professional development would greatly help teachers to undertake this task. We recommend that training on how to encourage good academic behaviors and key cognitive strategies be integrated with training on instruction on imparting content. Teachers could be helped to be more deliberate in the ways they incorporate this instruction in their pedagogical plans, possibly creating tasks that demand their utilization. Since we found evidence that teachers generally try to develop content knowledge, behaviors, and cognitive strategies in concert, trainings should focus on ways to promote the interconnectedness of these domains.

In this study, teachers mentioned a variety of academic behaviors and cognitive strategies that they believed to be important. There was, however, no clear consensus on which behaviors and strategies are most essential to teach and develop. Neither does the research literature provide much guidance on this. Thus, it would be advantageous for school leaders to encourage teachers to make collaborative decisions about the learning outcomes

that the school will prioritize, and to articulate clear and unambiguous expectations for academic behaviors.

It may be helpful to increase the opportunities for intentional collaboration between Early College and college faculty and staff. In our site visits, we observed a blend of formal and informal structures that were designed to facilitate students' progress toward greater college readiness. This was enhanced by the close and multi-faceted relationships between the Early Colleges and their college partners. Other Early Colleges may want to consider ways to strengthen and diversify the ways that they interact with their college partners. Possibilities could include: more interaction between the faculty of the two institutions, greater utilization of college academic and student services, and the development of collaborative projects.

Final Thoughts

In sum, a wide range of instructional practices are used by teachers in Early Colleges in preparing students for college success. Their creativity, good ideas, and dedication are often impressive. It is hoped that studies such as this will be useful in helping teachers and school leaders to learn about methods used by others, allowing them to broaden their repertoire of practices which, in combination and over time, will lead to ever-better student outcomes in college.

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Appendices

- A. Core principles of ECHSI
- B. Math and English teacher surveys
- C. Focus group protocol
- D. Site visit protocol