Dual Enrollment

A Comprehensive Literature Review & Bibliography

August 2010

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CUNY Collaborative Programs
Office of Academic Affairs

http://www.cuny.edu/academics/k-to-12.html

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CUNY Collaborative Programs – Research & Evaluation Unit

The following is a comprehensive review of recent (2000 – 2010) publications, articles, presentations and ongoing research on dual enrollment practices, effectiveness, and policy issues. This document is organized around a core set of questions about dual enrollment. Appendices include a listing of recent research methodologies, best practices for data management, examples of current dual enrollment programs, a dual enrollment implementation guide, and a research guide for collecting data on dual enrollment programs and policies.

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Questions about Dual Enrollment

I. WHAT IS DUAL ENROLLMENT?

Dual enrollment programs are collaborative efforts between high schools and colleges in which high school students are permitted to enroll in college courses and, in most cases, earn college credit that is placed on a college transcript. In some programs, students earn high school and college credit simultaneously; these programs may be referred to as dual credit or concurrent enrollment (Karp, Calcagno, Hughes, Jeong & Bailey, 2007; Hughes, Karp, Bunting, & Friedel, 2005).

The goal of dual enrollment programs is to give high school students the chance to take college-level classes, and possibly earn college credit, as well as expose students to the college campus environment. Dual enrollment programs give high school students first-hand exposure to the requirements of college-level work. While these programs were initially limited to academically advanced students, they are increasingly serving a wider student population, including middle and even low-achieving students (Karp et al., 2007). Unlike other accelerated learning programs such as Advanced Placement(AP), which target academically gifted students, dual enrollment courses are often available to a much broader range of students—not just those who have traditionally attended college—and introduce them to college expectations, culture, and curricula (Venezia, Kirst, and Antonio, 2003).

Dual enrollment students earn college credit by successfully completing a college course, rather than by passing an exam as with AP. Dual enrollment courses vary in structure. Some are offered at high schools, while others provide high school students the chance to take courses at a college with regularly matriculating college students. Courses may be taught during the school day, evenings, weekends, on or off campus, as a regular college course, or specially adapted to the high school's objectives. Students are typically admitted as non-degree students to the postsecondary institution offering the dual enrollment course. Because these courses are the same as those offered on college campuses—usually the same syllabi and textbooks—high schools and colleges do not need to engage in a process of matching competencies, such as that done for some Tech Prep and other articulation agreements.

According to Bailey and Karp (2003), the biggest growth in credit-based transition programs, by far, has been in the area of dual enrollment and dual credit. While high school seniors have long been able to enroll in a course at a college under special circumstances, the creation of programs with state support and administrative assistance from schools and colleges is relatively new and is expanding rapidly.

a. How is dual enrollment defined?

It is important to make a distinction between dual enrollment in general and other, more specific types of dual enrollment, such as concurrent enrollment and dual credit.

Dual enrollment, in the most general sense, refers to high school students taking college courses. Students typically receive college credit for passing these courses (Hoffman, Vargas & Santos, 2008; Karp & Jeong, 2008).

Dual credit and **concurrent enrollment** typically refer to programs in which students earn high school and college credit simultaneously. Such programs may also be referred to as joint enrollment. It is important to note that dual enrollment is not always for dual/joint credit (Hughes, Karp, Bunting, & Freidel, 2005). Dual credit/concurrent enrollment programs are sometimes accredited according to standards developed by the National Alliance of Concurrent Enrollment Partnerships (www.nacep.org). Bragg and Kim (2006) note that concurrent enrollment is the preferred term in Arkansas, California, Utah, and a few other states.

In 2003, Kim, Barnett, and Bragg conducted a survey in response to the need to clarify dual credit definitions and prioritize issues in Illinois. The researchers had two meetings with a panel of experts consisting of secondary and postsecondary personnel and state representatives in Illinois. Definitions agreed upon by a majority of panel members were:

- **Dual enrollment:** Students are concurrently enrolled (and taking college-level classes) in high school and college.
- **Dual credit**: Students receive both high school and college credit for a college-level class successfully completed.
- **Articulated credit:** Articulated credit programs align secondary and postsecondary courses in order to allow students who successfully complete selected high school courses to become eligible to apply for credit in the corresponding college course in the future.

More recently, **intensive dual enrollment** has been used to describe programs where students take dual enrollment courses during the 11th and 12th grade year to satisfy requirements for a high school diploma and an associate degree concurrently. Early college high schools are examples of intensive dual enrollment programs (Heath, 2008).

The term **dual-enrollment pathway** has been used to describe a structure for dual enrollment in which students participate in a variety of preselected sequences of college activities, introductory zero-credit courses, and credit-bearing courses. The pathway includes opportunities for those not likely to qualify for college courses before graduation. CUNY's College Now is a good example of this type of program structure (Meade & Hofmann, 2007).

b. How are dual enrollment programs implemented and how do they vary?

Partnering institutions must decide the location of the course (high school or college), who will teach the course (college faculty or high school faculty certified as college adjuncts), what the students mix will be (high school students only, or high school students mixed with college students), how the courses will be financed (who will pay tuition?), and which students will be permitted to enroll (Hughes, Karp, Bunting, & Friedel, 2005).

Andrews (2001) identifies several dual credit models:

- students receive college credit for courses they take at the high school;
- college teachers teach at the high school;
- college courses are taught at a location other than the high school and limited to high school students;
- college courses are taught at a location other than the high school and include high school and college students.

Bailey and Karp (2003) have developed a terminology for various types/intensities of dual enrollment programs:

- **Singleton programs**: refer to stand-alone college-level courses;
- **Comprehensive programs**: subsume most of a student's academic experience;
- **Enhanced Comprehensive programs**: offer students college coursework coupled with guidance and support to ensure their success in postsecondary education.

The best dual credit programs—as Jobs for the Future describes in its 2008 publication *On Ramp to College*—involve a well-designed, coherent sequence of courses, instead of "cafeteria-style" course options that high schools typically offer. The best programs focus on real college-level material "pegged to explicit college course standards, with the opportunity to earn college credit."

Dual enrollment programs vary depending on their individual state policies and/or local program requirements. While each model has its distinct characteristics, all are designed to allow high school students to enroll in college-level courses. According to Karp, Bailey, Hughes and Fermin (2004), programs typically vary by:

- Entrance Criteria
- Financing
- Location
- Instructors
- Student Mix
- Credit Earning
- Intensity

c. How does dual enrollment differ from other college transition programs?

Lerner and Brand (2006) refer to dual enrollment as a type of "secondary-postsecondary learning option" (SPLO) that links secondary and postsecondary education. The other most prevalent transition programs are Advanced Placement (AP), Tech Prep, International Baccalaureate (IB), Middle College high schools, and Early College high schools. Because the programs vary greatly, districts and schools often focus their efforts on only those programs that they feel best fit their students' needs (Klekotka, 2005). The following is a summary of these programs:

Advanced Placement (AP)
http://www.collegeboard.com/student/testing/ap/about.html

Administered by the College Board, AP allows high school students to take college-level classes in high school settings culminating in a nationwide exam aligned with college-level content and expectations. Scores on the AP exams demonstrate students' mastery of the material and can provide college credit or the opportunity to place out of introductory-level courses. AP subject matter tests include areas in English, calculus, several foreign languages, various sciences, music, and art. Acceptable AP exam scores are determined by the individual postsecondary institutions to which the students are accepted. Typically exam scores of 3 out of 5 must be attained for students to receive college credit for their AP course, but increasingly a 4 or higher is required (Lerner & Brand, 2006; Weiss, 2005).

The Advanced Placement program has a history dating back to about 1950. Dual enrollment, while dating back to the 1970s, did not begin to gain popularity until the mid-1980s (AASCU, 2002). According to Weiss, there are differing opinions on AP as a college preparatory tool. School administrators, often from better-resourced schools, sometimes argue that AP is a better way to indicate to colleges that the student has taken advanced level coursework. On the other hand, some school administrators, often from more moderate-income communities, look to dual enrollment programs, rather than AP, to provide college-level learning opportunities to their students (Weiss, 2005).

Tech Prep
http://www.ed.gov/about/offices/list/ovae/pi/cte/tpreptopic.html

Tech Prep: Tech Prep is a planned sequence of study in a technical field that typically provides students the opportunity to earn postsecondary credit towards a technical certificate or diploma. Tech Prep is funded under the Federal Carl D. Perkins Vocational and Technology Education Act through grants to states. The legislative framework calls for a program of study that combines at least two years of secondary and two years of postsecondary education (Lerner & Brand, 2006; Weiss, 2005).

International Baccalaureate
http://www.ibo.org/ibo/index.cfm

The International Baccalaureate Organization oversees the implementation of the International Baccalaureate program. The program is a two-year course of study for high school juniors and seniors. There are six core academic subject areas within the program: English, second languages, experimental sciences, arts, mathematics and computer science, and individuals and societies. College credit may be available for students who successfully complete this course of study and earn an International Baccalaureate diploma. College credit is granted at the discretion of colleges, based on cutoff scores (Weiss, 2005). According to Waits, Setzer, and Lewis (2005), two percent of public high schools offered International Baccalaureate courses during the 2002–03 school year.

Dual enrollment programs differ from other programs like International Baccalaureate (IB) or AP in that dual enrollment students take a course with an actual college syllabus and receive college credit when passing the course without additional end-of-course exams. Instead, IB and AP courses, while intended to be college-level, are taught using a standardized curriculum developed by a national/international entity, and students are not guaranteed college credit upon course completion (Lerner & Brand, 2006).

Middle College High Schools
http://www.mcnc.us/

Middle College high schools are small high schools located on college campuses. These are often alternative high schools for students who have academic potential but are at risk of dropping out of traditional high schools. The schools structure a program of study that includes both high school and college courses and provide a range of personalized student supports. The location offers students additional opportunities and exposes them to a more diverse and more mature student population. One of the goals of Middle College high schools is to combine the benefits of small schools with access to facilities and opportunities that are more typical of large schools (Lerner & Brand, 2006; Weiss, 2005).

Early College High Schools
http://www.earlycolleges.org

Early College high schools are small schools in which students earn both a high school diploma and two years of college credit in four or five years. Typically, these schools are located on or near college campuses. The campus location facilitates student access to the range of opportunities on campus, increases student motivation, and allows students to accelerate their education. The college schedule allows teachers to utilize innovative instructional approaches. The Bill & Melinda Gates Foundation has supported the Early College Initiative with various grants (Early College High School Initiative, 2004; Lerner & Brand, 2006; Weiss, 2005). Early College schools use a variety of models for providing college courses to high school students, including: 1) high

school teachers with adjunct status teach the courses at the high school; 2) college faculty teach high school students at the high school; 3) college faculty teach a group of high school students on a college campus; and 4) high school students, either individually or in small groups, attend traditional college courses. According to a survey administered at a sample of 20 Early College schools during the 2006-07 school year, the majority of Early College schools (92 percent) offer college courses, and most students (65 percent) had taken a college class (Shkolnik, 2008).

d. How do dual enrollment programs fit into other college transition initiatives?

Barnett and Gardner (2004) point out that dual credit (i.e. concurrent enrollment) in Illinois is sometimes integrated with other activities and programs:

- Dual credit is sometimes provided for AP classes, giving students "increased confidence that they will actually receive college credit."
- Tech Prep, when combined with dual credit, allows students to begin college-level career-oriented education early.
- Industry credentialing, as with CISCO or A+ certification programs, may be combined with dual credit opportunities.
- There are examples in Illinois of students moving as a cohort through dual credit programs providing them with additional opportunities and support, e.g., Daley College's Manufacturing Technology program and Kankakee Community College's TRIO program.
- Distance learning or online courses may be offered for dual credit to high school students.

e. Are there national standards for dual enrollment programs?

The voluntary accreditation group National Alliance for Concurrent Enrollment Programs (NACEP) has established a set of standards to be used in assessing or improving quality in *dual credit* or *concurrent enrollment* programs. These are available on their website at http://www.nacep.org/.

The NACEP standards were developed "as the result of a three-year, nationwide discussion among CEP professionals" and identify key elements of quality in the areas of curriculum, faculty, students, assessment, and program evaluation. Member institutions may be accredited as full NACEP members upon demonstrating that they meet these standards (NACEP, 2009). Syracuse University's Project Advance is an example of an accredited program.

NACEP is specifically geared toward "concurrent enrollment partnerships" (CEPs). They define these partnerships as follows:

"Through Concurrent Enrollment Partnerships, qualified students can earn college credit prior to high school graduation. CEPs differ from other pre-college credit programs because high school instructors teach the college courses during the normal school day. Such programs provide a direct connection between secondary and postsecondary institutions and an opportunity for collegial collaboration. Although courses in some CEPs may have some elements or characteristics of the programs stated below, CEPs are distinct programs from the following:

- Programs in which the high school student travels to the college campus to take courses prior to graduation during the academic year or during the summer.
- Programs where college faculty travel to the high school to teach courses to the high school students.
- The College Board Advanced Placement Program and the International Baccalaureate Program where standardized tests are used to assess students' knowledge of a curriculum developed by a committee consisting of both college and high school faculty."

f. What are some examples of dual enrollment programs in the US?

Florida has a statewide college credit program for high school students. Courses can be taken during/after school hours and during the summer term. Over 37,000 students participated in Florida's dual enrollment program in 2006. The average dual enrollment student completes five college courses. In order to be eligible to participate, students must be enrolled in a public or private school or be a home school student, have a 3.0 unweighted GPA (or at least a 2.0 GPA for students wishing to take Career and Technical Education courses), show college-readiness by passing appropriate sections of the College Placement Test (CPT), have minimum SAT/ACT/FCAT scores, and have written approval from parents/legal guardians. Tuition fees and text book costs are free for dual enrollment students who attend a public high school. Private and home school students pay for their text books, but tuition is free also. Dual enrollment college credits are posted on college transcripts and are used towards high school graduation. Florida's Statewide Course Numbering System (SCNS), with over 100,000 courses assigned distinct numbers, facilitates the transfer of credits. Approximately 80 percent of Florida's dual enrollment classes are currently offered on college campuses; the state expects to see growth in courses located at high schools (Florida Department of Education, 2006).

Although Florida's statewide dual enrollment program is one of the most cited, other states and universities have well developed dual enrollment initiatives. See Appendix C for a listing of additional examples.

g. What are the national statistics on dual enrollment?

Nationally, over half of postsecondary institutions have dual enrollment programs (Hoffman 2005; Kleiner and Lewis 2005; Waits, Setzer, & Lewis, 2005).

Dual enrollment and dual credit program development has now been identified in various forms in all 50 states (Andrews 2004). Forty states have policies directly addressing dual enrollment (Karp, Bailey, Hughes, & Fermin, 2005). The Western Interstate Commission on Higher Education reports that, as of January 2006, 42 states had legislation and/or Board policies related to dual credit/enrollment. These primarily include policies regarding program eligibility (over half of the states), how credit is awarded, who pays for dual credit programs, requirements for counseling and information sharing, and implementation of institutional accountability. According to Bragg and Kim (2006), data show about half of the states mandate that high school students gain access to dual credit or dual enrollment courses, sometimes prescribing the way tuition and fees should be apportioned between secondary and postsecondary institutions and the students. Policies in at least 13 states make a point of identifying community colleges as a primary higher education provider of dual credit, and officials of 17 states select dual credit or dual enrollment as an academic pathway that is a high priority to increase access to college for underserved students.

Almost no *recent* statistics are available on dual enrollment participation at the national level. The most widely-cited nationwide numbers come from two National Center for Education Statistics reports and are for the 2002-03 academic year. The 2005 NCES report "Dual Enrollment of High School Students at Postsecondary Institutions: 2002-03" was designed to provide national estimates specifically for dual enrollment programs using data collected through the Postsecondary Education Quick Information System (PEQIS). The study reports that during the 2002-03 academic year, more than half (57 percent) of all colleges and universities in the nation enrolled high school students in courses for college credit, which translates into about 813,000 or about five percent of high school students (Kleiner & Lewis, 2005).

In addition, "Dual Enrollment of High School Students at Postsecondary Institutions: 2002-03" found that:

- Of the 57 percent of postsecondary institutions that had high school students who took college courses during the 2002-03 academic year, 85 percent had high school students taking them in dual enrollment programs, and 55 percent had students who simply enrolled in college courses and were treated as regular college students.
- About 98 percent of public two-year institutions had high school students taking college courses during the 2002-03 academic year, compared to 77 percent of public 4-year institutions, 40 percent of private four-year institutions and 17 percent of private two-year institutions.

- Among the estimated 2,050 institutions with dual enrollment programs, about 110, or five percent, had dual enrollment programs specifically geared toward high school students at risk of academic failure. This represents about two percent of all institutions.
- Some 20 percent of institutions with dual enrollment programs indicated that students and parents generally paid full tuition for college courses taken in these programs. Another 20 percent said that students and parents generally paid partial tuition, 23 percent said that students and parents generally paid for books and/or fees only, and 19 percent said that students and parents generally paid nothing for courses.

In the second of the two NCES reports on dual enrollment, "Dual Credit and Exam-Based Courses in U.S. Public High Schools: 2002-03," Waits, Setzer, and Lewis (2005) reported that 71 percent of public high schools offered programs in which students earned credit at both the high school and college levels for the same courses (dual credit/concurrent enrollment). In addition, 67 percent of public high schools offered Advanced Placement (AP) courses, while two percent offered International Baccalaureate (IB) courses. During the 2002-03 school year, there were an estimated 1.2 million enrollments in courses for dual credit, 1.8 million enrollments in AP courses, and 165,000 enrollments in IB courses.

Other highlights of the report on dual credit and exam-based courses at public high schools include:

- Larger public high schools were more likely than smaller ones to offer dual credit and/or Advanced Placement courses. Specifically, 63 percent of small schools, 75 percent of medium-sized schools and 82 percent of large schools offered courses for dual credit. Similarly, 40 percent of small schools, 82 percent of medium-sized schools and 97 percent of large schools offered AP courses.
- Of the public high schools that offered courses for dual credit, 61 percent indicated that the courses were taught on a high school campus, 65 percent on the campus of a postsecondary institution and 25 percent through distance education technologies. Schools could offer these courses at more than one location.
- Of the schools that offered courses for dual credit on a high school campus or on the campus of a postsecondary institution, 92 percent indicated that the courses had an academic focus, and 51 percent reported that the courses had a career and technical/vocational focus.
- Smaller public high schools were more likely than larger high schools to offer dual credit courses through distance education (35 percent of small schools, 21 percent of medium schools and 17 percent of large schools). High schools in rural areas and schools in towns were both more likely than either schools in cities or schools in urban fringe areas to offer courses for dual credit through distance education (33 and 29 percent vs. 11 and 18 percent, respectively).
- Students in the Central region of the country were more likely than students in any other part of the country to be offered dual credit options, while students in the Northeast region were least likely to have access to them. Further, students attending high schools with the highest minority enrollment were less likely to have access to dual credit.

Demographic data on dual enrollment is not collected nationally, and thus we do not know from what social or academic backgrounds participants come (Jobs for the Future, 2006).

h. What are the most-commonly mentioned benefits and concerns associated with dual enrollment?

Many researchers and administrators who are familiar with dual enrollment maintain that there are a multitude of benefits to the programs (Bailey, Hughes & Karp, 2003; Blanco, Prescott & Taylor, 2007; Boswell, 2001; Clark, 2001; Conklin, 2005; Coplin, 2005; Hoffman, 2005; Karp, Calcagno, Hughes, Jeong, & Bailey, 2007; Johnstone & Del Genio, 2001; Kim, 2006; Kirst & Venezia, 2001). These proposed benefits include:

- Facilitating the transition between high school and college
- Allowing students to complete a degree faster
- Reducing costs for a college education
- Reducing high school dropout rates
- Preparing students for college work and reducing the need for remedial coursework
- Enhancing the high school curriculum
- Making more effective use of the senior year in high school
- Developing the connection between high school and college curricula
- Raising the student's motivation and goal to attend college
- Acclimatizing students to the college environment
- Freeing space on college campuses
- Improving relationships between colleges and their communities
- Easing recruitment of students to college
- Enhancing opportunities for underserved student populations

Researchers and policymakers have also identified several concerns associated with dual credit/enrollment (Andrews, 2001; Clark, 2001; Johnstone & Del Genio, 2001; Kim, 2006; Krueger, 2006; Lerner & Brand, 2006). These include:

- Little solid quantitative data supports the claims of the benefits
- Low or uncertain academic quality
- Limited oversight of academic rigor
- The college course experience is not duplicated in high school courses
- Capability of high school teachers to teach college-level courses
- Transferability of credits
- Costs involved in the programs

- Potential funding uncertainty
- Limited access for low-income, minority, and academically underprepared students
- Lack of policies to ensure students are prepared to begin college-level work
- Liability with underage high school students on college campuses
- Actions by many interested groups are required

i. Does dual enrollment have support from researchers and policymakers?

According to Roderick's *From High School to the Future: Potholes on the Road to College* (2008), the single most consistent predictor of whether students took steps toward college enrollment was whether their teachers reported that their high school had a strong college climate. Roderick observed that having a strong college climate seemed to make the biggest difference on students with lower levels of qualifications. Dual enrollment programs give high school students first-hand exposure to the requirements of college-level work.

Adelman (2006) maintains that "if all traditional-age students entered college or community college with a minimum of six credits of 'real stuff,' not fluff, their adaptation in the critical first year will not be short-circuited by either poor placement or credit overload." According to Adelman, less than 20 credits by the end of the first calendar year of enrollment is a serious drag on degree completion. "It is all the more reason to begin the transition process in high school with expanded dual enrollment programs offering true postsecondary course work so that students enter higher education with a *minimum* of 6 additive credits to help them cross that 20-credit line."

The Pathways to College Network is a national initiative committed to improving college access and success for underserved populations. Pathways has established a set of general principles to guide educators and other stakeholders in efforts to improve college access and success. One of these action strategies, specifically geared toward college and university presidents, vice-presidents, and deans, states that "Higher education has two crucial roles in creating clear pathways to a college credential. One is as a partner with K—12 schools: preparing teachers, clearly conveying the academic skills needed for first-year college work, and collaborating with schools to prepare students for college success. The other role is providing meaningful learning experiences and support, including adequate financial aid, to enable underserved students in college to achieve successfully." Strategies include:

- Providing high school leaders with "specific, clear information about the knowledge and skills that students need in order to succeed in first-year college courses without remediation."
- "Partner with high schools and community-based college access programs to assist students, families, and staff with college and financial aid awareness and planning."
- "Offer dual enrollment and other bridge programs to help underserved students make successful transitions to college."

- "Initiate and support college access programs; provide supplemental services to schools with large low-income populations and low college-going rates."

A recent publication by Educators for Social Responsibility (2009) examines the barriers to college that face urban students and methods for reducing them, models for developing college access programs to support all students in urban high schools, and policy supports to adequately implement them. This publication recommends that high schools and colleges be allowed the flexibility to fund dual-enrollment programs. "Providing an opportunity for students to experience college life while they are still in high school through dual-enrollment programs is a recognized way to motivate and engage students about college. No longer are dual-enrollment programs solely for the top achievers in a school; they can also be used for students in need of credit recovery or remediation. Dual enrollment can also be a powerful vehicle by which faculty from higher education and high schools can come together to work through issues of curriculum alignment, student performance, and seamless academic pathways that can ensure success for students in high school and college."

Kuh, Kinzie, Buckley, Bridges and Hayek (2006) offer propositions about what matters to student success. "The trajectory for academic success in college is established long before students matriculate. Provide incentives in state budgets to increase the number of students who become college ready in high school and enroll in colleges. Offer incentives to local school districts to provide dual enrollment opportunities to high school students."

McDonough in *The School-to-College Transition* (2004) recommends that colleges and universities should develop or expand dual enrollment and other school-to-college bridge programs that assist students in making a successful transition to college.

Rhode Island's commissioner of higher education Jack Warner stated in a 2009 article that the most valuable aspect of dual-enrollment programs is convincing students they can handle the work. "We spend a lot of time in education trying to address the question of what predicts success in college, and the answer is nothing predicts success in college like success in college," Warner said. "So if you expose a student to college-level courses while they are still in high school, now they know they are college material. There is no mystery. They've proved it to their professors and to admissions officers. And they've proved it to themselves" (Jordan, 2009).

II. WHAT ARE THE SHORT-TERM OUTCOMES OF DUAL ENROLLMENT STUDENTS?

a. Does dual enrollment have an effect on participants' high school course-taking patterns, GPA or high school graduation rates?

Research is very limited on short-term effects, primarily due to the difficulty in controlling for important factors affecting the decision to participate in dual enrollment. One of the only recent research findings directly related to short-term effects of dual enrollment comes from Karp, Calcagno, Hughes, Jeong, and Bailey's 2007 study of dual enrollment in Florida. The authors analyzed Florida's large-scale administrative dataset using non-experimental methods and found that dual enrollment was positively related to students' likelihood of earning a high school diploma. Dual enrollment students were 4.3 percent more likely than their peers to earn a diploma.

b. How do students perform in dual enrollment courses?

Individual dual enrollment programs often collect information on student outcomes and pass rates in courses, and some have taken steps to compare outcomes of high school students with outcomes of college students in the same course. For instance, an Iowa psychology instructor matched high school dual enrollment students with high ability students in a college campus class. The outcomes for both groups were assessed via a 100-point multiple-choice exam. The campus mean was 84.82 and the high class mean was 84.35. Additional courses were matched in subsequent years and in other secondary schools within the college district. There were no differences between students on campus and in the area secondary schools (Andrews, 2004)

Running Start, Washington State's dual credit program, has found that students participating in dual credit courses perform as well as other college students in two-year institutions (Hanson, 2001).

c. Does dual enrollment have an effect on participants' satisfaction with their high school experience?

Shkolnik and Knudson (2008) recently reported that most students in Early College high schools were satisfied with their dual enrollment experience: 80 percent said that if they could start over, they would choose the ECS again.

Heath (2008) surveyed alumni of the College Academy at Broward Community College, an intensive dual enrollment public high school in Florida, and found that dual enrollment students were satisfied with their experience. Open ended questions on the survey instrument revealed that the students did miss

some of the extra-curricular activities of a traditional high school, but they liked the mature environment, the opportunity to earn college credit, and the relationships that were formed during their time at the College Academy.

III. HOW DOES DUAL ENROLLMENT PARTICIPATION CONTRIBUTE TO COLLEGE PREPAREDNESS, ACCESS, AND SUCCESS?

The stated goals of many dual enrollment programs address student preparedness for, access to, and success in college. Dual enrollment is seen by many as directly impacting the college readiness of a wide range of students. David Conley, Director of the Educational Policy Improvement Center, states that college readiness is "the level of preparation a student needs in order to enroll and succeed—without remediation—in credit-bearing general education courses that meet requirements for a baccalaureate degree." Conley further described four key dimensions of college readiness: key cognitive strategies, including problem solving, research, interpretation and reasoning; key foundational content knowledge and "big ideas" from core subjects; academic behavior, such as time management and study skills; and contextual skills and awareness, which refers to knowledge of admissions requirements, affording college, and accessing professors and key resources. Baker, Clay and Gratama (2005) point to three "essential requirements for college readiness": college awareness, college eligibility, and college preparation.

The following section identifies recent research into how dual enrollment programs contribute to college readiness and student success in college.

NOTE ON LIMITATIONS OF DATA AND RESEARCH

According to Karp, Calcagno, Hughes, Jeong, and Bailey (2007), studies on dual enrollment generally suffer from two shortcomings:

- Studies generally **lack comprehensive data** to include in their outcomes analyses, as few programs or states have comprehensive K—16 data systems. Therefore, most studies identified below are based on fairly narrow samples or populations of students, primarily due to limited or unavailable data.
- Studies often **do not use rigorous statistical methods** to control for preexisting student characteristics, even when such data are available. Most dual credit programs use academic performance requirements to select students. However, many studies do not address these preexisting characteristics and self-selection and do not control for factors that may lead to student success in colleges, such as career goals, academic motivation, differences in counseling at high schools, differences in methods of instruction. Even when rigorous statistical methods are employed to control for student characteristics, there are still limitations. Without a randomized design, it is difficult to control for all possibly important preexisting characteristics. Therefore, it is important to note that positive findings may be due in part to unmeasured factors that are not accounted for in the models rather than to dual enrollment participation (Bragg & Kim, 2005; Karp, Calcagno, Hughes, Jeong, & Bailey, 2007; Kim, 2008).

Although the results of dual enrollment research have been largely positive, more rigorous research studies are needed to determine the impact of these programs on student access and success in college. Even so, the largely positive findings of the studies documented in this section—coupled with the obvious appeal of such programs—are sufficient to justify "continued support and experimentation" (Bailey & Karp, 2003).

a. Do dual enrollment programs lead to greater educational aspirations of high school students?

Smith (2007) examined the relationship between participation and location of dual credit enrollment and the educational aspirations of high school students. A total of 304 students from five rural Kansas high schools were surveyed. Results indicated that participation in dual credit programs had a positive and significant relationship with educational aspirations, after controlling for parents' highest level of education and students' personal factors. The findings further indicated that concurrent enrollment location was a significant predictor of educational aspirations. This study has limitations, however. Participants in the study were predominantly White (93 percent), the schools were in a primarily rural setting, and results were based on self-reports. While this study was able to show a relationship between dual credit enrollment and educational aspirations, there can be no assumptions made as a part of this study linking that relationship to cause and effect.

b. Do dual enrollment programs lead to an increased understanding of the expectations of college life and the skills needed to succeed in college?

In addition to increased educational aspirations, dual enrollment has been associated with students' increased understanding and expectations of the role of a college student. In order to investigate the ways dual enrollment serves as a site for students to learn the norms and expectations of the role of college student, Karp (2007) conducted in-depth interviews and observations of students in their first semester of a dual enrollment course. The sample of 26 students was drawn from CUNY's College Now program at a comprehensive high school with large, well-established College Now programs. Karp found that course authenticity was strongly related to whether or not students shifted their role conceptions. Students who perceived their College Now course as similar to college were also more likely than their peers to change their understanding of the college student role. Seventeen of the 26 high school students shifted their conceptions of the role of college student during their first semester in a college course, as indicated by their more accurate descriptions of the role at the end of the course.

Many dual enrollment programs offer supplemental courses designed to give students skills needed to succeed in college, such as note-taking, test-taking, time management, and how to make use of faculty and campus resources. Zeidenberg, Jenkins, and Calcagno (2007) have examined the effects of these

types of "student life skills" (SLS) courses offered in Florida. Using a multivariate analysis that controlled for the known differences between students (i.e., test scores, race, gender, age), the researchers found that for students who did not take remediation, SLS enrollment was associated with a nine percent increase in the chances of completing a degree program. For those who did take remediation, SLS enrollment was associated with a five percent increase in the chances of completion. Results show that SLS enrollment increased the chances of degree completion, while controlling for many commonly-used covariates.

c. What are the college-going rates of dual enrollment participants, as compared to those who do not participate?

Student-level data tracking students from high school into college is very limited and difficult to obtain. Therefore, not much research has been conducted on college-going rates of dual enrollment participants.

Researchers at Columbia University's Community College Research Center (CCRC) examined the outcomes of 2000-01 and 2001-02 Florida high school graduating cohorts who entered postsecondary public institutions in Florida. Dual enrollment was positively related to students' likelihood of earning a high school diploma. Florida dual enrollment students were 4.3 percent more likely than their peers to earn a diploma. Participation in dual enrollment was positively related to enrollment in college and increased the likelihood of initially enrolling in a four-year institution by 7.7 percent (Karp, Calcagno, Hughes, Jeong & Bailey, 2007).

The Kentucky Council on Postsecondary Education (2006) examined the impact of dual enrollment on matriculation into four-year public institutions in Kentucky in fall 2002. On the whole, dual enrollment and dual credit programs did not appear to enhance college matriculation rates. Students who took academic courses while dually enrolled did matriculate at slightly higher rates than the overall high school student population, but the majority of students who took technical and occupational courses matriculated at lower rates.

d. Are dual enrollment participants prepared for subsequent coursework in college?

Windham and Perkins (2001) conducted a study to determine if students who have taken dual enrollment courses in the Florida Community College System (FCCS) were prepared for the next course. Researchers looked at the academic records of students who took dual enrollment courses from summer 1994 through spring 1999. They looked at subsequent coursework, meaning courses taken in the State University System in Florida in the same discipline as the dual enrollment course. Windham

and Perkins found that, compared with other State University System students, dual enrollment students were statistically more successful in their subsequent course. There was also virtually no difference between the percentage of students succeeding when their dual enrollment course was taught by a high school teacher versus another type of instructor. It is important to note, however, that there were no rigorous statistical techniques used and no controls for preexisting student characteristics included in the study's design. These results are consistent with what one would expect from a group of students who sought college academic experiences prior to graduating from high school.

Kim (2008) examined the impact of dual and articulated credit hours on college readiness and total college-level credit hours in four selected community colleges in Ohio, Texas, Florida, and Oregon. Kim used a sample of 1,141 high school graduates who enrolled in a community college in four consortia, drawn from the Community College and Beyond (CC&B) dataset, to examine the effect of dual enrollment on college readiness in reading, writing, and math and total college-level credit hours, controlling for students' gender, tech prep participation, and high school course-taking. Correlation analysis showed that academic dual credit was significantly related to being college-ready in math. Students who took more semesters of math and more advanced math courses showed better college readiness in math in all four consortia.

The Ohio Post Secondary Enrollment Options policy (PSEO) allows Ohio high school students to take college courses for both high school and college credit at no cost to them. In 2007, Blanco, Prescott and Taylor released a research report finding that high school students who took college courses through PSEO may be more likely to attend college. Nearly 71 percent of PSEO participants who graduated from high school in 2003 enrolled in Ohio public colleges, substantially more than the 59 percent of Ohio high school graduates who went to college anywhere in 2002. However, data used for this study were not student-specific; therefore, researchers could not determine whether students who participated in PSEO were those who were already college bound.

Running Start, Washington State's dual credit program, has found that students participating in dual credit courses perform as well as other college students in two-year institutions. They also perform equally well when they enter the University of Washington (Hanson, 2001).

e. What are the college outcomes of dual enrollment participants, as compared to similar students who do not participate?

EVIDENCE FROM FLORIDA AND NEW YORK

One of the most cited recent studies on dual enrollment is a report by the Community College Research Center (CCRC) on dual enrollment student outcomes in Florida and New York. The study, conducted by Melinda Mechur Karp, Juan Carlos Calcagno, Katherine Hughes, Dong Wook Jeong and Thomas Bailey, is considered by many researchers to be one of the best attempts thus far to measure the effect of dual enrollment. Researchers examined the influence of dual enrollment program participation on CTE and

non-CTE students in Florida and on CTE students in CUNY's College Now program while controlling for student and school characteristics. They analyzed two existing large-scale administrative datasets using non-experimental methods, including ordinary least squares (OLS) and logistic regression, and controlled for individual and school level characteristics that are likely correlated with dual enrollment participation and students' outcomes, including race, gender, socioeconomic status, academic background, and school demographics.

The study found that dual enrollment in Florida and New York City is positively associated with the likelihood of obtaining a high school diploma, initially enrolling in a four-year institution, enrolling full-time and continuing college enrollment through the second semester. Dual enrollment students have significantly higher cumulative college GPAs three years after high school graduation and earn more college credits than their non-participating peers. Although this report is one of the first comprehensive studies that attempts to control for relevant pre-existing student differences, it is still possible that students' or schools' unmeasured characteristics may be confounding these findings.

In Florida, the CCRC researchers examined the outcomes of 2000-01 and 2001-02 Florida high school graduating cohorts who entered postsecondary public institutions in Florida. Students with dual enrollment experience (n=36,217) were tracked, as well as a dual enrollment subgroup of CTE students (n=4,654). Key findings included:

- Dual enrollment students were statistically significantly more likely to persist in college to a second semester: 4.5 percent for the full dual enrollment sample and 4.2 percent for the CTE sub-sample.
- Dual enrollment students also had statistically significantly higher postsecondary GPAs one year after high school graduation. The difference ranged from as low as 0.21 points for all students to as high as 0.26 points for CTE students only.
- Of those students ever enrolled in postsecondary education, dual enrollment participation was positively associated with their likelihood of remaining enrolled two years after graduating from high school.
- Dual enrollment students' GPAs after two years of college were also statistically significantly higher than their non-participating peers, and dual enrollment students' cumulative college GPAs three years after high school graduation were statistically significantly higher than those of their non-participating peers.
- Dual enrollment students had earned more postsecondary credits three years after high school graduation. Dual enrollment students earned 15.1 more credits than their non-dual enrollment peers, and the subsample of CTE dual enrollment students earned 15.2 more credits (some of these credits were likely earned in dual enrollment, however).
- Participation intensity had little impact on short- and long-term outcomes.

Researchers concluded that male and low-income students seemed to glean a particularly strong benefit from the dual enrollment programs, while, on some measures, students with lower high school grades benefit more than students with higher grades.

As for New York City, the researchers tracked the outcomes of 2,303 vocational high school graduates who participated in CUNY's College Now program and subsequently enrolled in CUNY in 2001 and 2002. Findings were as follows:

- College Now participants were more likely than their peers to pursue a bachelor's degree. Participants were 9.7 percent more likely than their peers to pursue a bachelor's degree as opposed to an associate degree.
- College Now participation was positively related to students' first-semester GPAs. Participants had first-term GPAs 0.133 points higher than those of non-participants.
- Over the 3.5 years of postsecondary experience that was examined, the dual enrollment students earned 10.6 more credits than their non-dual enrollment counterparts.
- Intensity of participation appeared to be more important for long-term outcomes. Students who took two or more College Now courses were 3.5 percent more likely to enroll in college full-time than non-participants. Participation in two or more College Now courses was also associated with statistically significantly higher GPAs after four semesters.

In addition to the research on College Now conducted by the Community College Research Center, CUNY's Office of Academic Affairs studied the effects of College Now participation on three post-secondary outcomes: credits earned the first year, GPA in the first year, and persistence to a third semester. Using multiple regression, Michalowski (2007) controlled for students' race, family income, gender, age, academic preparedness as measured by high school GPA and standardized test scores, high school and college attended, and other college-level factors. Results indicated that students entering CUNY colleges in fall 2003 who participated in College Now earned additional credits in their first year, had a statistically higher GPA (for students enrolled in Baccalaureate programs), and had an increased probability of persisting to a third semester. Students in associate degree programs with College Now experience were found to have a 5.3 percentage point increase in the probability of persisting to a third semester. Those in baccalaureate degree programs had a three percentage point increase in the probability of persisting to a third semester. This finding supported previous research by Skadberg (2005) on student retention of College Now alumni.

EVIDENCE FROM A NATIONWIDE STUDY: ADELMAN AND SWANSON

According to research by Adelman for the US Department of Education (2004), college credits earned prior to high school graduation reduce the average time-to-degree and increase the likelihood of graduation for the students who participate in these programs. Adelman asked whether —and to what extent—students' use of credit-by-examination and postsecondary credits earned by coursework prior to high school graduation accelerated their progress toward degrees and, in fact, shortened time-to-degree. The research employed the National Education Longitudinal Study of 1988 (NELS:88/00), which began with a sample of 25,000 8th graders in 1988, and followed subpanels of this cohort for 12 years

until 2000. Adelman found that for those who earned at least a bachelor's degree, the more credits earned by examination and in dual-enrollment status, the shorter the time-to-degree. For those with no acceleration credits, time-to-degree averaged 4.65 elapsed calendar years; for those who earned nine or more acceleration credits, time-to-degree averaged 4.25 years.

In the 2006 report *The Toolbox Revisited: Paths to Degree Completion from High School through College*, Adelman maintains that less than 20 credits by the end of the first calendar year of college enrollment is a "serious drag on degree completion." The 20 credits is "all the more reason to begin the transition process in high school with expanded dual enrollment programs offering true postsecondary work so that students enter higher education with a minimum of six additive credits to help them cross that 20-credit line. Six is good, nine is better, and 12 is a guarantee of momentum."

Adelman (2004; 2006) was one of the first to employ a nationally representative student population to study dual enrollment. However, Adelman's work was limited in its use of sophisticated statistical methods that control for student attributes and behaviors. Swanson (2008) attempted to address these limitations by building on the groundwork laid by Adelman by using the same NELS:88/00 data set (213,000 dual enrollment students identified as graduating in 1992). Swanson used logistic regression to model the effects of dual enrollment participation, controlling for demographic and high school variables, such as gender, race, first generation student, socioeconomic status, and high school record (class rank, GPA, standardized test scores and level of rigor in the curriculum completed).

Findings suggested that dual enrollment participation may play a significant role in persistence to degree, especially for students who entered college within seven months of high school graduation, those who acquired 20 or more college credits by the end of the first year of college, and those who continued their enrollment in postsecondary education without a break of more than one semester through the second year of college.

- Dual enrollment students were 12 percent more likely to enter college within seven months of high school graduation than non-participating students.
- Dual enrollment students were 11 percent more likely to persist through the second year of college than non-participating students.
- Dual enrollment students who completed 20 or more credits in the first year of college were 28 percent more likely to persist through the second year in college than were students who did not complete dual enrollment courses.
- Dual enrollment students who entered college within seven months of high school graduation improved their likelihoods of receiving a bachelor's degree from between 16 percent and 20 percent ($p < .001$) as compared with non-participants.
- Dual enrollment students who had not anticipated earning a BA improved their likelihood of graduating with a bachelor's degree by 12 percent as compared with non-participating students who had originally intended to earn a BA.

- Earning 20 credits in the freshman year and continuously enrolling to the end of the sophomore year increased the likelihood of dual enrollment students earning graduate level degrees or completing graduate level courses by 14 percent and 34 percent respectively, as compared to non-participants.

According to Swanson, these composite persistence factors constitute "academic momentum" toward a degree. Dual enrollment participation, therefore, indicated statistically significant impacts upon students' academic momentum.

It is important to consider several limitations to NELS:88/00 data that Adelman (2004; 2006) and Swanson (2008) used, however.

- The National Education Longitudinal Study of 1988 (NELS:88/00) began with a sample of 25,000 8th graders in 1988, and followed subpanels of this cohort for 12 years until 2000, when they were 26 or 27 years old. These students were scheduled to graduate from high school in 1992. Dual enrollment programs have grown and evolved significantly, especially in the last several years (Karp, Calcagno, Hughes, Jeong & Bailey, 2007). It is difficult to make any conclusions about dual enrollment effectiveness using data on students graduating high school before most dual enrollment programs even existed in the forms they know today.
- The NELS:88/2000 transcript data cannot make the distinction between high school students who took courses within formal agreements or programs and those who took courses outside of those agreements . These data lump together all postsecondary credits earned at colleges or community colleges prior to the date of high school graduation.
- The NELS data only collects information about dual enrollment through the Postsecondary Education Transcript Study which samples students that enroll in college after high school. Therefore, this data cannot be used to evaluate the effect of dual enrollment on college enrollment, an important outcome for educators and policymakers.

ADDITIONAL RESEACH FROM FLORIDA

According to a report released by the Florida Department of Education (2006), students with dual enrollment experience in 2004-05 maintained a higher GPA in the State University System than those who had not participated in dual enrollment. Mean college GPA after one year was 2.83 for students with dual enrollment experience, compared to 2.71 for those without dual enrollment experience.

An earlier report by the Florida Department of Education (2004) found that high performing dual enrollment students (students with a 3.0 GPA) graduated from community colleges at higher rates than similar students who did not participate in dual enrollment. For each of the 1994 to 1998 cohorts tracked, the college graduation rate for dual enrollment students was consistently higher than for non-Dual Enrollment students. The difference in the dual enrollment students and non-dual enrollment students who completed an Associate in Arts degree was between 12 percent and 16 percent. The

average number of hours earned as a dual enrollment student between 1994 and 1998 ranged from 7.6 to 9.8 hours.

Heath (2008) tracked students from the College Academy at Broward Community College, a two-year intensive dual enrollment program, who enrolled in Associate of Arts degree programs at Broward Community College in fall 2001 and fall 2002. A comparison of academic records revealed that College Academy students had significantly higher community college GPAs (3.2) compared to traditional community college students (2.8). College Academy students also had significantly higher associate degree completion rates (97.3 percent) compared to traditional community college students (38.8 percent). However, Heath did not attempt control for student characteristics; the analysis is a straightforward comparison of means.

ADDITIONAL STUDIES FROM STATES AND PROGRAMS ACROSS THE US

Minnesota State College and University System: Kotamraju (2005) analyzed state-level data to determine the relationship between participating in the Minnesota's dual enrollment program and college GPA. Kotamraju identified students who participated in the Minnesota State College and University system's dual enrollment program in 1999-2000 or 2000-2001 school years, graduated in the summer of 2001, and then enrolled in the same college as a degree-seeking student in fall 2001. A matched sample – based on gender, ethnicity, and high school GPA – was then constructed of students who also graduated in summer 2001 and entered the same colleges during that time. The final sample included 3,639 students, of whom 461 had taken dual enrollment courses. Kotamraju found that participants in dual enrollment had a cumulative mean GPA of 2.92 after three years, compared to 2.53 among similar matched students who had no dual enrollment experience.

City College of San Francisco: Spurling and Gabriner (2002) compared 377 dual enrollment students at City College of San Francisco (CCSF) who went on to matriculate at CCSF, with 2,274 first-time freshmen at CCSF who graduated from the San Francisco Unified School District (SFUSD) high schools without dual enrollment experience at CCSF. Researchers looked at 18 and 19 year-old students graduating from a SFUSD high school and matriculating at CCSF between fall 1998 and fall 2000. They found that students with prior CCSF dual enrollment experience passed 58 percent of their units with a C or better once matriculated at CCSF, whereas students without prior college experience passed 53 percent of their units. Those students with prior experience had a cumulative average GPA of 2.33, while those without prior experience had an average GPA of 2.10. Considering the potential influence of prior-academic performance on college outcomes measured by cumulative percentage of units passed and GPA, Spurling and Gabriner compared student groups based on the level of their college placements as a way to control for students' prior-academic performance. Results showed higher cumulative percentage of units passed of dual enrollment students than others in most categories. Dual enrollment participants also had higher average GPAs than non-participants in all categories:

- participants (*GPA* = 2.61) compared to non-participants (*GPA* = 2.34) in no basic skills placement category,

- participants (*GPA* = 2.25) compared to non-participants (*GPA* = 1.93) in one basic skills placement,
- participants (*GPA* = 1.76) compared to non-participants (*GPA* = 1.73) in two basic skills placement, and
- participants (*GPA* = 2.69) compared to non-participants (*GPA* = 2.59) in no placement category.

Overall results of this study support the positive impact of the program on students' academic performance in college.

Ohio: The Ohio Post Secondary Enrollment Options policy (PSEO) allows Ohio high school students to take college courses for both high school and college credit at no cost to them. In 2007, Blanco, Prescott and Taylor released a research report finding that high school students who took college courses through PSEO, on average, got degrees faster than the general population. The median time to get an associate degree was 2.7 years for PSEO students, compared to 3.8 years for all students. For bachelor's degrees the difference was 3.8 years for PSEO students as opposed to 4.3 years for all students. However, data used for this study was not student-specific; therefore, researchers could not determine whether students who participated in PSEO were those who were already college bound.

Washington: The Running Start program in Washington allows 11th and 12th grade students to take college courses at Washington's 34 community and technical colleges, and at Washington State, Eastern Washington and Central Washington Universities, The Evergreen State College and Northwest Indian College. Students receive both high school and college credit for these classes. According to the Washington State Board for Community and Technical Colleges (2008), Running Start students completed more of the credits they attempt, with better grades, than other recent high school graduates who are attending college. In 2006-07, Running Start students enrolled for 479,064 credits and completed 94 percent of those credits. A comparison group attempted 559,173 credits and completed 84 percent of those credits. Among the Running Start students, 90 percent of the students earned a C or better grade in their courses compared with 83 percent of the comparison cohort.

University of Missouri: Eimers and Mullen (2003) studied 7,913 first time, full-time degree-seeking students at the four-campus University of Missouri System. The researchers sorted four groups according to type of credit: AP only (*N* = 505), dual credit only (*N* = 3,135), both AP and dual credit (*N* = 300), and no college credit (*N* = 3,973). They found that students who entered a college with "dual credit only" returned to their second year at a higher rate (89 percent) than "no college credit" students (76 percent). Results also revealed that dual credit students were already more academically able than no college credit students before entering college, showing higher ACT score (25.8 for dual credit students compared to 24.7 for no college credit students) and high school rank. Recognizing the difference in the prior-academic performance, Eimers and Mullen conducted logistic regression analysis to control ability indicators in examining second year return rate. With academic ability controlled, results indicated that dual credit students had an increased likelihood of second-year college return compared to no college credit students. They reported that dual credit students had an average of 2.92

on first year GPA, compared to 2.70 for no college credit students. However, holding entering academic ability such as ACT score and high school rank constant, multiple regression analysis results showed that dual credit students did not perform significantly better in first-year GPA.

Kentucky: The Kentucky Council on Postsecondary Education (2006) researched the impact of dual enrollment in Kentucky. Due to data limitations, the analysis was restricted to students entering four-year public institutions in fall 2002. Researchers used multivariate analyses to examine the effect of dual enrollment on GPA and retention, with the effect of students' ACT composite scores factored out statistically. Results suggested that, independent of differences in ACT scores, dual enrollment had a modest, positive effect on GPA at the end of the sophomore year, increasing students' GPA by about one-third of a letter grade. However, dual enrollment was found to have no impact on retention, either at an institution or system level.

Texas: Peng (2003) examined students in the first two years of public four-year universities in Texas and found that students who participated in dual enrollment had higher GPAs and retention rates at the university level than non-participants.

OTHER MEASURES OF STUDENT SUCCESS IN COLLEGE

Finally, some dual programs have based their measures of success on surveys of dual enrollment alumni.

Syracuse University measured success among students in their Project Advance program, and reported the following success of their high school students after transferring to colleges or universities after graduation.

- Ninety-one percent of Project Advance graduates received recognition for their courses.
- Ninety-three percent of these students report a GPA of B or above through the four years of college.
- Ninety-five percent recommended Syracuse University courses that were offered through Project Advance.
- Ninety-two percent of the teachers involved in the program reported their jobs as being more challenging (Andrews, 2004).

Southside Virginia Community College surveyed dual credit alumni: 93.8 percent of the dual credits transferred successfully and classes were compared favorably to the on-campus classes taken; there was a near unanimous response recommending continuation of the program (Andrews, 2004).

IV. WHAT ARE THE EFFECTS OF DUAL ENROLLMENT PROGRAMS ON SCHOOLS AND COLLEGES?

Dual enrollment programs foster collaborative partnerships between high schools and colleges. These partnerships have numerous potential benefits, including opportunities to share costs, grant funding initiatives, community needs, instructional capacity in certain subject matter, and facilities (Amey, Eddy & Ozaki, 2007). George Otte states that a true partnership should be something that makes knowledge-making about effective teaching and learning a shared activity, a visible enterprise. The chief point of collaboration between high schools and colleges, according to Otte, is that "this knowledge-sharing and community-building models what is produced: a way of building knowledge, pooling information, sharing resources – and in a time when knowledge is unstable, information rapidly obsolescent, and resources both too scarce and too varied not to share" (p.118 , 2002).

a. How does dual enrollment affect high schools?

The American Association of State Colleges and Universities (2002) points to two primary benefits for high schools. First, the improved communication resulting from partnerships with colleges or universities allows high schools to learn more specifically what is expected from students at the college level and alter their current and curricular practices as needed to prepare students effectively. High schools can also benefit from these programs because they allow for an expanded curriculum, which has the potential to develop students who are better prepared to meet the demands of postsecondary education. However, Museus, Lutovsky and Colbeck (2007) identify a concern about the possible "general equilibrium effects" of dual enrollment programs to high schools. Dual enrollment programs might reduce the incentives to improve the level of high school courses available to those that do not participate, thus exacerbating the already existing inequalities in postsecondary opportunity.

Dual enrollment program may also help link high schools to businesses and community resources traditionally tied to colleges or universities. Some researchers describe the college as an "academic bridge" for students, serving as a link between public schools, businesses, and community organizations (Amey, Eddy & Ozaki, 2007).

In 2006, Jobs for the Future (JFF) carried out a study to assess dual enrollment in Rhode Island and provide recommendations to enhance the state's programs. JFF conducted site visits at high schools across the state and interviews and focus groups with high school administrators, teachers, guidance counselors, and students to record their opinions of and recommendations for dual enrollment. They found that for *comprehensive high schools* with a traditional college preparatory curriculum, dual enrollment serves three main purposes:

1. An enrichment program for high-achieving students who have outgrown the standard high school curriculum;
2. A way to accelerate time to degree and decrease college costs;
3. A method to impact particular college-level skills among students who are otherwise intellectually ready for college.

For *urban core high schools* serving at-risk students, dual enrollment serves as a way to:

1. Develop college habits of mind among students who are the first in their family to attend college;
2. Bring the social and cultural divide that exists between students from low-income communities and their peers from more affluent communities.

JFF found that among school principals in Rhode Island's urban core/alternative high schools, dual enrollment is viewed as an essential part of their central mission to prepare at-risk, low-income, first-generation students for colleges. According to one principal, "You just cannot put a price on the value of bridging the cultural barriers between inner city kids and the dominant class culture inherent on most college campuses." Staff from high schools in less affluent communities, including small and alternative schools, reported difficulty finding reliable resources to offer AP courses and cover student test fees. They preferred that their students take dual enrollment courses because they better reflect college-level work and assess student proficiency for credit in a number of ways rather than by one exam.

b. How does dual enrollment affect colleges and universities?

Dual enrollment programs open new pathways to recruitment and retention. Offering a high school student the opportunity to begin work on an associate or baccalaureate degree prior to completing high school can be very attractive to students concerned about the cost of a college education and the length of time to degree. Additionally, by granting credit for work completed at the college level, an institution may retain a student to degree completion simply because the student has already completed some of the work at that institution. Dual enrollment programs can attract top high school students who otherwise might not have considered a community college or local university (American Association of State Colleges and Universities, 2006).

In recent years, institutions have been urged to become more involved with the communities in which they are rooted. Increasingly, colleges and universities are accepting greater responsibility in local economic and social development. Colleges and universities that offer dual enrollment increase their visibility within their service areas, and dual enrollment can generate a positive image in the community and strengthens community ties (Boswell, 2001; Clark, 2001; Hoffman, 2005; American Association of State Colleges and Universities, 2006; Krueger, 2006).

JFF, in the study on Rhode Island dual enrollment, found that institutional leaders viewed dual enrollment as central to the mission to build a more economically and racially diverse student body. However, interviews also revealed that university leaders were also concerned with what they saw as a decrease in quality control, especially for dual enrollment courses taught at high schools. In addition, college academic departments and faculty expressed concern about the quality of dual enrollment courses and lost revenues from students who transfer in large numbers of credits (2006).

In a study on why dual credit programs were more fully implemented in some Illinois community colleges than in others, Barnett (2003) found that institutions with the larger dual credit programs were associated with the perception that dual enrollment is helpful for student recruitment, and with the perception that it is associated with leading colleges. Barnett carried out interviews and site visits at community colleges and looked at the correlation between the number of dual credit students enrolled and various aspects of "relative advantage." When examining aspects of dual credit that made it attractive to colleges, the three most prominent factors in terms of association with higher enrollments were ones that could be considered to be of direct benefit to the colleges rather than to their students. These were: dual credit's value in recruiting students, dual credit as a program undertaken by leading colleges, and the ease with which dual credit programs can be initiated (trialibility). It is important to note that the most highly rated reason for undertaking dual credit programs was that they are "perceived as producing good results for students." However, Barnett points out that this factor was not as highly related to program size as were the other three.

V. WHAT ARE THE MAJOR PROGRAMMING AND POLICY QUESTIONS SURROUNDING DUAL ENROLLMENT?

Admission and Access

Who can participate? Does state and/or program policy regulate how students are admitted into dual enrollment programs or outline criteria they must meet to be eligible for participation? If so, what are these criteria?

Because dual enrollment students are enrolling in college courses, they often have to meet the same entry standards that regularly matriculating college students do. Eighty-five percent of colleges nationwide have admission requirements for dually enrolled students (Kleiner & Lewis, 2005). In addition, high schools and states sometimes impose additional eligibility criteria (Waits, Setzer & Lewis, 2005). A few states regulate only the age of dually enrolled students, while others set forth specific admission requirements (Hughes, Karp, Bunting & Friedel, 2005). Clark (2001) reported that the most common criterion used is high school standing; in most cases students are require to be a junior or senior. Other common criteria are test scores on the ACT or SAT or a certain score on a college's placement tests.

Colleges are often encouraged to consider the ramifications of having younger students on their campuses. The American Association of State Colleges and Universities recommends establishing a minimum age and involving parents in the admissions process (AASCU, 2002). While students should be academically qualified to engage in college-level work, Lerner and Brand (2005) point out that programs and universities need to be careful to ensure their admissions standards do not create barriers for student participation. Lerner and Brand suggest that admissions decisions be based on multiple measures, not a single test score, and that weakness in one academic area should not preclude students from participating in college-level coursework in another academic area.

Examples

- The state of Florida has two sets of admission requirements: students applying for the academic courses must have a 3.0 GPA; students who plan to enroll in career and technical certificate programs through dual enrollment must have a 2.0 GPA.
- California does not impose statewide eligibility criteria for dual enrollment, except that students must obtain their principal's recommendation and parental consent. School districts can determine which students might benefit from dual enrollment, and community colleges may restrict admission based on age, grade level or multiple assessments. Some colleges require that students pass assessment tests before enrolling in courses, particularly academic courses such as math and English (Golann & Hughes, 2008).
- Based on a survey of postsecondary institutions in Pennsylvania in the 2003-04 academic year, 87 percent had academic eligibility requirements for high school students to participate (Kleiner, 2004).

- Most Illinois colleges require students to attain minimum college placement test scores or meet other college admission standards. The majority use multiple criteria (grades, grade level, placement testing, high school recommendation, etc.), with some using as many as five different factors (Barnett, 2003).
- College Now programs at CUNY colleges consider New York Regents scores, SAT or PSAT scores, and/or GPA to decide whether dual enrollment students can take a course for college credit.

Target Population

Do programs/policy mandate or encourage programs to target a specific type of student, and, if so, which type?

Providing an opportunity for students to experience college life while they are still in high school through dual-enrollment programs is a recognized way to motivate and engage students about college. No longer are dual-enrollment programs solely for the top achievers in a school; they can also be used for students in need of credit recovery or remediation (Lieber, 2009). An important policy question is whether or not programs and/or states should broaden access to dual enrollment. Traditionally, dual enrollment has been targeted at academically advanced students. However, policymakers and educators now believe that dual enrollment is not only for high-achieving students. Instead, they argue that dual enrollment programs may meet the needs of a wide range of students (Bailey & Karp, 2003; Bailey & Karp, 2005; Hoffman, 2005; Karp, Bailey, Hughes & Fermin, 2004).

According to Hoffman (2003), state governments have taken steps to increase college participation among historically underrepresented groups in higher education by specifically investing resources and encouraging participation in dual enrollment programs (Hoffman, 2003). Florida and CUNY's College Now program are often used as successful examples of programs geared toward a wide range of students. Initiatives to expand dual enrollment beyond the highest-performing students also exist or are being developed in Georgia, Illinois, Kentucky, Maine, North Carolina, Pennsylvania, Rhode Island, Texas and Utah, according to Joel Vargas, program director for the nonprofit Jobs for the Future (Lee, 2009). In the report *Betraying the College Dream: How Disconnected K-12 and Postsecondary Education Systems Undermine Student Aspirations*, authors Venezia, Kirst, and Antonio (2003) indicate that one of the key steps that states, K—12 schools and districts, postsecondary institutions and systems, and the federal government can take to improve the transition from high school to college for all students is to expand successful dual or concurrent enrollment programs between high schools and colleges so that they include all students, not just those traditionally "college-bound".

A study by Museus, Lutovsky and Colbeck (2007) examined participation in dual enrollment programs in Pennsylvania in order to understand current levels of access to and equity in these programs. Researchers conducted a survey of all two and four-year colleges and universities in Pennsylvania in order to understand who was participating in dual enrollment programs at institutions of higher

education in Pennsylvania during the 2003-04 academic year. Examination of the demographic characteristics of students enrolled in dual enrollment programs in Pennsylvania reveals vast inequities in access and participation in those programs.

One reason for unequal access and participation in dual enrollment is students' lack of information about options for earning college credit. Michalowski and Newman (2008) note that many factors shape attitudes and decisions of underrepresented students about the place of school in adolescent life, including: a lack of understanding about how high school, college and career are connected; the role of family and community in shaping educational attitudes and behaviors; and, particularly for males, the lure of mostly non-normative alternatives to school. Even if racial/ethnic minority and low-income youth do gather information about participation in dual enrollment programs, barriers such as out-of-pocket fee requirements, lack of transportation, and exclusion based on past academic performance still present major obstacles for those students (Hoffman, 2003).

Course Content

Are dual enrollment courses identical to regular college courses? If not, are processes in place to ensure that their content is college-level? What are colleges doing to insure high quality in their dual enrollment programs?

According to Kim, Barnett, and Bragg (2003), the biggest concern related to the quality of dual credit courses has to do with ensuring that they are taught at the college level. Critics of dual and concurrent enrollment programs argue that significant numbers of concurrent classes don't maintain the academic rigor of the same courses taught on college campuses. A major tension related to dual credit/enrollment programs that surfaced in Kim, Barnett, and Bragg's research of Illinois programs was between promoting accessibility vs. maintaining program quality/integrity. Some interviewees in the study prioritized the need to keep the doors open for as many students as possible. Others emphasized selection of students based on academic competency and urged that they meet the same entrance standards as regular college students.

According to Johnstone and Del Genio (2001), "[There] is a great similarity—indeed a virtual overlap—between the curricular content and the educational purposes of the last years of high school and the first years of college." Even so, their analysis of policies and practices at 450 postsecondary institutions showed great differences between two and four-year colleges and universities in the extent to which "college-level" courses taken by high school students are accepted and credited toward graduation. The researchers found that some colleges and universities question whether the grading standards, particularly in high school-based dual enrollment programs, are rigorous enough, or whether "high school teachers, however pedagogically talented, know what is genuinely 'college-level' in assessing the learning of their students."

The issue can be problematic because there is no universal agreement on the meaning of "college-level." Jobs for the Future and other dual enrollment researchers maintain that there should be some investment in quality control in order to ensure the skill of the teachers offering college-level classes and to certify that those courses and course examinations are in fact college-level (Hoffman, Vargas & Santos, 2008; Makela, 2005). JFF recommends the following guidelines as a minimum to ensure quality:

- College courses taught at high schools use the same syllabus, assign comparable work, and give the same examinations as the equivalent courses taught on the postsecondary campus.
- The kind and number of college courses offered is limited in order to monitor quality efficiently.
- Higher education sets minimum instructor qualifications.

Schnee (2007) studied and compared the curriculum and instruction in two pairs of similar courses offered as a section in CUNY's College Now program to high school students and as a section in the same college's undergraduate curriculum: an expository writing course at a senior college and an introductory psychology course at a community college. Schnee closely observed the four sections, interviewed the instructors, and conducted focus groups with the College Now students. The study provides descriptive details about curriculum and pedagogy and concludes that there were no substantial patterns of difference between the College Now and undergraduate sections of these courses.

Course Location

Are dual enrollment courses offered at the high school, the college or both locations?

Location is strongly tied to funding and academic quality. Are courses offered at high schools perceived to have the same academic rigor as those offered on a college campus? Course location may even have long-term impacts on future collaborative efforts, such as the development of joint campuses (Barnett, 2003). In some cases, policies that limit course location may inhibit the spread of dual enrollment programs by complicating implementation and discouraging innovation (Karp, Bailey, Hughes & Fermin, 2004). Some states require that dual enrollment courses be offered only on college campuses; programs must then develop ways to transport students from the high school to the college during the school day.

Burns and Lewis (2000) examined the effect of class location on student satisfaction with dual enrollment classes by conducting interviews with six students evenly split between high school- and college-based dual enrollment courses. Researchers asked students about their experiences and perceptions of their dual enrollment course. All students felt positively about their experience and desired further opportunities to take college courses, those in high school-based programs were less satisfied than those in college-based programs. The students who took their college courses on a high school campus felt that the courses did not differ much from their other high school courses. In

contrast, students who took their courses on a college campus felt that they learned more than just academics: they stated that they felt more independent, responsible, and grown-up.

Cochran and Burns (2007) interviewed students in CUNY's College Now program located in a Brooklyn high school and noted that students differed in their views about where and with whom they would prefer to take College Now courses. The authors explored students perceptions of how "college-like" courses are when taught on a high school campus and found that some students did not find the courses as demanding as they expected nor necessarily different from high school courses, although they placed a higher value on them. "Students had definite, though at times mistaken, ideas about college teaching and learning and were critical of or confused by the teaching methods of College Now instructors that did not align with their expectations."

Instructor

Who is eligible to teach dual enrollment? What credentials must dual enrollment instructors hold?

In most dual enrollment programs, a community college or university may share faculty members to teach a dual enrollment course, or a high school teacher with the appropriate credentials may teach a college-level course.

For example, in California community college instructors must possess a master's degree in their subject area for academic disciplines and for many career-related disciplines. In order for a high school teacher to be hired as an adjunct by the community college, he or she must meet the qualifications of a college instructor. According to Golann and Hughes (2008), some California high schools have difficulty finding instructors for dual enrollment courses because many high school teachers to not possess a master's degree in the subject that they are teaching.

Hebert (2001) compared two groups of students who took a dual credit mathematics course, one group of students taught by high school teachers and the other group taught by college faculty. She found that the grades for students taught by high school teachers were significantly better in subsequent coursework in mathematics than those from the other group. The students taught by the high school teachers received more high grades (A's and B's) in subsequent coursework than did their counterparts. The students taught by the college faculty received more low grades (D's and F's).

Course Transferability

How do dual enrollment courses and credit transfer from high school to college? What courses are most or least likely to transfer? How does dual enrollment compare to other ways to earn college credit in terms of transferability? How do dual enrollment students earn credit? Is it dual credit? How do courses count and how do they look on students' records?

Easy transfer of course credit from high school to college, and then from community college to four-year institutions, is an essential component of any successful dual enrollment program (Krueger, 2006). Because there are no consistent policies about accepting dual enrollment course for college credit, it should not be assumed that credits will automatically transfer when students enroll in college. Critics of dual and concurrent enrollment programs sometimes employ the argument that such courses may not be accepted for credit if the student later enrolls or transfers to another university. Johnstone and Del Genio (2001) conducted a survey of 451 postsecondary institutions, asking about their acceptance of college credit earned while still in high school. Nearly one-third of all institutions indicated that they were "suspicious" of credit earned through transition programs offered in the high school.

Transferability also has close ties to issues of course quality and program structure. For instance, NYU recently announced that it will no longer award academic credit for college classes that also count for high school credit (i.e. dual credit, concurrent enrollment), beginning with students who enter in the fall of 2009. According to the university, dual credit courses are "not verifiable in terms of academic rigor" (Heggen, 2008). In an online comment meant to clarify the article posted on Inside Higher ED about NYU's change in transfer policy, John Beckman, NYU Public Affairs, wrote:

> *"Dual Enrollment," to our minds, means courses taught at a college where the student is in class principally with college students, not high school students . . . However, another phenomenon that has developed over the last number of years is "college-level" courses that are taught in high schools to high schoolers, not infrequently by high school teachers who are certified to teach college-level courses. . . They received credit—appropriately—on their high school transcript during the application process. That, however, is separate and distinct from giving COLLEGE CREDIT for the course, which we will not be doing.*

To counter concerns students may have about non-transferability, research by Rasch (2002) found that some institutions take proactive steps to inform students of transferability, such as listing four-year institutions that accept dual credit courses on their dual credit websites.

Florida uses a common course numbering system to facilitate transfer between the systems (Kruger, 2006). But even in Florida, dual enrollment course transferability can still be problematic. Hunt and Caroll (2006) describe how Lake City Community College (LCCC) in rural Florida has developed a number of strategies to facilitate the involvement of traditionally underrepresented students in dual enrollment. However, LCCC continues to face challenges with the attitude of the state's universities toward admitting students with dual enrollment credit as opposed to AP credit. Students who transfer with an associate degree are covered under the Florida articulation agreement law, but those without the degree may face problems transferring their coursework. Hunt and Caroll point out that this is particularly troublesome when high school students apply for admission and are competing with students from other parts of the state. In awarding preference, most of the public universities give AP students one preference point but give dual enrollment students only half a preference point.

In a 2008 report on expanding educational pathways in California, authors recommend that one of the ways policymakers can facilitate smooth transitions from high school to college is by encouraging improved communication regarding requirements and the transfer of college credit for dual or concurrent enrollment coursework (Hoachlander, Stearns & Studier, 2008).

Funding

How are dual enrollment programs funded? Does state policy address the responsibility for payment of student tuition and fees? What happens to Full Time Enrollment (FTE) and Average Daily Attendance (ADA) funding for dual enrollment students?

Dual enrollment, especially programs that are designed with the supports to be an on ramp to college for underrepresented students, entail costs beyond instruction-related expenses. Examples are costs for books, transportation, tutoring, support services, and professional development and planning time for administrators and instructors who design and deliver the courses. A continuing challenge with dual enrollment remains the limited funding in many states, colleges, and schools to support comprehensive dual enrollment programs (Lieber, 2009).

Kuh, Kinzie, Buckley, Bridges and Hayek, in their 2006 review of literature on educational attainment, offer seven propositions about what matters to student success. These propositions "point to a series of complementary policies, programs, and practices that promise to enhance the performance and educational attainment of all students." The authors state that "the trajectory for academic success in college is established long before students matriculate" and recommend providing incentives in state budgets to increase the number of students who become college ready in high school and enroll in colleges and offering incentives to local school districts to provide dual enrollment opportunities to high school students.

Outreach and Marketing

How are students and parents informed on dual enrollment options available and how to access them? How do colleges approach marketing and public information on dual credit?

A variety of strategies are used to inform students and parents about dual enrollment offerings, including brochures, posters, website, and student/parent orientation sessions. High School counselors, teachers, and current and former students are all considered essential in student recruitment (Hughes, Karp, Bunting & Friedel, 2005).

Makela (2005) researched current practices and policies on dual enrollment admissions in Illinois four-year colleges and universities, and found that the most common way of communicating dual enrollment information to prospective students, parents, and school counselors was word-of-mouth. The study

also revealed, however, that other forms of communication were essential. "Student handbooks, course catalogs, and websites should include clear and unambiguous information about dual credit."

State policies sometimes directly address outreach. Florida school districts are required to annually inform all high school students of the opportunity to take college-credit courses through dual enrollment beyond the traditional academic year calendar. Local partnership agreements between Florida institutions address how students and their families will be informed about dual enrollment opportunities. Texas school districts are responsible for notifying the parents of students in grade nine and above of the opportunities available in the district for students to gain college credit. Washington law requires school districts to provide information about college admissions requirements and dual enrollment options to parents and students in the state.

VI. WHAT DOES THE FUTURE HOLD FOR DUAL ENROLLMENT RESEARCH AND POLICY?

In 2005 the Social Science Research Council designed the project "Transitions to College: From Theory to Practice," to explore and document existing knowledge about transitions issues and strengthen the connections between research production and policy/practice. The number one "Crucial Areas of Inquiry" listed for the area of College Preparation was as follows:

> *Can we demonstrate the effectiveness of academic preparation programs aimed at fostering college going and success among various disadvantaged and underserved subgroups? Examples of such programs include dual enrollment programs, middle college, vocational/technical policies and innovations (including Tech Prep), bridge programs, and P-16 initiatives.*

The need for additional solid research that establishes a causal link to positive college outcomes remains a key issues and will likely drive directions of future research and policy. Researchers continue to look for opportunities to conduct studies that will control for the self-selection of students into dual enrollment programs. Future research and development activities will address some of the gaps in the understanding of factors that contribute to student success. In the absence of solid and sustained evidence of what works, it is difficult to persuade policymakers and institutional leaders to allocate resources to college access initiatives. Students, teachers, and local administrators also need research-based information to guide decisions about implementation and to link dual enrollment to other issues of critical importance in higher education, such as increasing student retention and credential attainment (Hughes, Karp, Fermin & Bailey, 2005; Karp & Hughes, 2005; Kim, Kerby & Bragg, 2006).

The following is a list of a few additional suggestions by researchers for future inquiry:

- Determine the more effective approaches for encouraging different types of students (e.g., first generation, low income, students of color, males) to participate in and benefit from college access and programs and identify policy/institutional barriers to access for these students. According to Hoffman (2003), far more needs to be known systematically about the barriers for underrepresented students and how they can be overcome.

- Examine where and how dual enrollment growth is occurring (Kim, Kerby & Bragg, 2006). What are some promising new practices and techniques in school districts, universities, and states across the U.S.? What is working and why? How do we know it is working?

- Confirm the relationship between specific program features and intermediate outcomes. For example, participation in developmental course work is presumed to increase students' academic skills. Do some program components have a greater influence on intermediate outcomes than do other components? Do developmental courses have a different impact on

student motivation than do support services? Are some components more necessary than others (Hughes, Karp, Fermin & Bailey, 2005; Karp & Hughes, 2005)?

- Establish the role of families in dual enrollment programs. What can we learn about how parents are engaged by these programs that can help schools address the "disappearing parent" of the middle and high school years (Gullat & Jan, 2003)?

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APPENDIX A

BEST PRACTICES FOR DATA COLLECTION AND ANALYSIS

Florida P-20 Education Data Warehouse

Florida Department of Education

Florida's P-20 Education Data Warehouse (EDW) allows for longitudinal tracking of education outcomes at the student level, including outcomes related to dual enrollment participation. The Department of Education reports regularly to the legislature on key dual enrollment outcomes, providing evidence about whether the program is achieving the objective of accelerating student transitions from high school through postsecondary education.

The EDW integrates existing, transformed data extracted from multiple sources that are available at the state level. It provides a single repository of data concerning students served in the K-20 public education system as well as educational facilities, curriculum and staff involved in instructional activities.

EDW Characteristics

- K-20 public education data integration
- Allows longitudinal analyses
- Student centric
- Historical (1995 forward, when available) and current data
- Confidentiality ensured (personally identifiable information removed)
- State-of-the-art analytical capabilities

EDW Benefits

- Provides capabilities to track students over time and across delivery systems
- Provides capabilities to perform trend analyses
- Allows business users to run their own queries against summarized data in a timely, efficient manner
- Provides decision-makers with tools and information necessary to make informed, fact-based decisions about education

EDW Contents

- Student
- Demographics
- Enrollment
- Courses
- Test Scores
- Financial Aid

- Awards
- Employment
- Educational Curriculum
- Staff
- Demographics
- Certified Staff
- Instructional Activities
- Educational Institutions

Illinois Community Colleges

Barnett, Gardner & Bragg, 2004

In response to a request from the Illinois Community College Board and for internal monitoring purposes, all Illinois community colleges collect data on student enrollments, courses offered, credits awarded, and location of course delivery. Similarly, high schools provide data on high school students enrolled in community college courses for high school credit to the Illinois State Board of Education every other year. Quality control and evaluation of instruction is generally conducted in the same way as would be done for any other community college or high school course.

Recommendations for Rhode Island by Jobs for the Future

JFF, 2006

The state should connect its monitoring and analyses of dual enrollment outcomes to current and future data-quality initiatives that improve its ability to track student performance across the secondary and postsecondary sectors. The system's architecture should be designed to answer questions on program effectiveness and, at a minimum, dual enrollment high school students need to be identifiable and that the courses they take can be tracked to postsecondary institutions and instructors.

Additional Resource

For additional information on data and research strategies for dual enrollment, see the Columbia University Community College Research Center's report *Conducting Research to Answer Your Questions about Dual Enrollment* by Karp and Jeong (2008). This report provides recommendations for improving states' dual enrollment data collection and research capacities.

APPENDIX B

REVIEW OF METHODS

Methodologies and Statistical Techniques for Dual Enrollment Research

The lack of research on dual enrollment programs is not only due to the unavailability of data, but also to the failure of most research to account for the non-random assignment. Selection bias arises because more able students are more likely to participate in dual enrollment. Programs may compare the academic achievement of dual enrollment participants with nonparticipants or survey students regarding their college aspirations in order to detect differences in students before, during, and after their participation in various program components (Karp, Bailey, Hughes & Fermin, 2005). However, in order to fully understand the effectiveness of dual enrollment programs, researchers should pay close attention to preexisting differences among dual enrollment students and their peers not participating in the program, as well as to any other factors that may be responsible for positive outcomes.

Advanced statistical techniques are currently being used to study the effects of educational programs and interventions while taking into account selection bias, such as the following:

Regression Discontinuity Design: This methodology is increasingly being used by researchers to obtain unbiased impact estimates of education-related interventions. Regression discontinuity can identify the impact of a program, such as dual enrollment, by comparing outcomes of students who barely pass entry requirements with those that barely miss the requirements. The idea is that students just above and below the cutoff are on average very similar in many relevant respects. The model must be carefully constructed to take into account the fact that not every student above a cutoff participates in a program and not every student below a cutoff is disallowed enrollment.

Regression discontinuity design is a good choice for evaluating dual enrollment programs that have consistent and enforced admissions requirements, such as Florida's statewide program. The state of Florida mandates that high school students have a minimum of 3.0 un-weighted GPA in order to enroll in academic courses. This policy creates an ideal setting to estimate the program effect using a regression discontinuity design.

Calcagno and Long (2008) have employed regression discontinuity design in their study of remediation in Florida. By definition, less-prepared students are more likely to be placed in remedial education, and hence, straight forward regressions on the impact of remediation on academic outcomes are biased due to selection. Calcagno and Long instead use the regression discontinuity design, which exploits the fact that remedial placement in Florida is largely based on a test score. Students are assigned to either remedial or college-level courses, depending on

their scores on the standardized tests. The researchers took advantage of these score cutoffs to develop an advanced and rigorous research design.

Propensity Score Matching: Education researchers, such as Paul Attewell of the City University of New York, have employed a statistical technique known as "the counterfactual model of causal inference", or, more informally, as propensity score matching. According to Attewell, Levin, Domina and Levey (2006), propensity score matching provides a superior methodological tool to separate the effects of remedial coursework from those of background variables. This method can also be used to exam the effects of dual enrollment programs.

Propensity score matching finds the closest match of a control and a treatment from a highly comparable subsample of controls, where the match is determined using rich observed characteristics. Although a key assumption of propensity score matching is that selection into treatment (dual enrollment, for instance) is based on observable covariates, it is probably safe to assume that the corresponding unobservables are similar when a large number of control variables are included.

In the Community College Research Center report *Paths to Persistence: An Analysis of the Research on Program Effectiveness at Community Colleges* (2005), authors Bailey and Alfonso offer suggestions for strengthening the reliability and validity of research on these issues.

- Empirical research must, as much as possible, control for measured student background characteristics. Scores on entry assessment tests or information on the high school academic record are particularly important.
- Under some circumstances, statistical techniques can account for unmeasured characteristics, such as motivation, that might influence student outcomes.
- Random-assignment designs address many of the most difficult methodological problems; thus, their conclusions are particularly useful and influential. However, because such studies are costly and difficult to administer, they are infrequent.
- Finally, every study of a program must include a detailed description of the characteristics of the program and of the process through which students enter that program. This information gives readers essential background that allows them to interpret the research results and judge the validity of the conclusions.

APPENDIX C

DUAL ENROLLMENT PROGRAM EXAMPLES

City University of New York College Now
http://collegenow.cuny.edu/

College Quest of Chicago
http://www.ccc.edu/collegequest/Dual_Credit_Dual_Enrollment.asp

Early College High School Initiative
http://www.earlycolleges.org/

Florida Dual Enrollment Program
http://www.fldoe.org/articulation/

Georgia ACCEL program
http://www.doe.k12.ga.us/ci_cta.aspx?PageReq=CICTASeam

Hawaii Running Start
http://www.hawaii.edu/runningstart/

Massachusetts Dual Enrollment
http://www.mass.edu/currentinit/currentinitdualenrollment.asp

National Middle College Consortium
http://www.mcnc.us/

Ohio Seniors to Sophomores
http://uso.edu/opportunities/seniors2soph/index.php

Pennsylvania's Project 720
http://www.portal.state.pa.us/portal/server.pt/community/project_720/7475

Salt Lake Community College Concurrent Enrollment
http://www.slcc.edu/concurrentenrollment/

Washington State Running Start
http://www.k12.wa.us/RunningStart/default.aspx

West Kentucky Community & Technical College
http://dualcredit.westkentucky.kctcs.edu/

APPENDIX D

DUAL ENROLLMENT PROGRAM IMPLEMENTATION GUIDE

An outline of key issues and questions related to dual enrollment program implementation, adapted from:
Barnett, E., Gardner, D., & Bragg, D. (2004). Dual credit in Illinois: Making it work. Champaign, IL: Office of Community College Research and Leadership, University of Illinois at Urbana-Champaign.

1. **Program Approach**
    a. Why does the university offer dual enrollment?
    b. What advantages do colleges associate with dual enrollment programs?
    c. How do dual enrollment programs fit into other university/college initiatives?
    d. What are some threats to the development of dual enrollment programs?

2. **Organization and Funding**
    a. Where are dual enrollment programs situated organizationally within the university?
    b. How are these programs administered in high schools?
    c. How are dual enrollment programs funded?
    d. What are some promising practices in the organization of dual enrollment programs?

3. **Course Delivery**
    a. Where are dual enrollment courses delivered?
    b. What kinds of courses are offered for dual enrollment/dual credit?
    c. How are courses selected?
    d. Which type of course delivery is best for students?
    e. How does course delivery vary among colleges?

4. **Student Selection and Guidance**
    a. How are students selected to participate in dual enrollment?
    b. How are students tested for college placement purposes?
    c. How accessible are dual enrollment programs to different student groups?
    d. What are some promising practices to improve student access to dual enrollment courses among colleges?

5. **Faculty Selection and Supervision**
    a. How are faculty selected and supervised?
    b. What are areas of concern related to faculty selection?
    c. What are promising practices in the selection and supervision of dual enrollment course faculty?

6. **Quality Assurance**
    a. What is college-level coursework?
    b. How do we assure that dual enrollment courses are equivalent to those taught to college students on college campuses?
    c. What are colleges doing to insure high quality in their dual enrollment programs?
    d. What are colleges doing to make sure that students are ready for college-level courses?

7. **Relationships with High Schools?**
    a. What partnerships currently exist?
    b. How well established are these relationships?
    c. What kinds of support does dual enrollment have from different groups of educators?
    d. What are some current promising practices?

8. **Credit Award and Transfer**
    a. Do students in these programs get both high school and college credit, high school credit only, or college credit only?
    b. What courses are most or least likely to transfer?
    c. How can students improve their chances that credit will transfer?
    d. How many college credits do dual enrollment students earn?
    e. How does dual enrollment compare with other ways to earn college credit in terms of transferability?

9. **Marketing and Public Information**
    a. What kind of support does dual enrollment have?
    b. How do the university and individual colleges approach marketing and public information on dual enrollment?
    c. What impact does the dual enrollment experience have on students' perceptions of the college and university?
    d. What are some current promising practices?

10. **Monitoring and Evaluation**
    a. How are dual enrollment programs being evaluated by the university, colleges and high schools?
    b. What are some promising practices in program monitoring and evaluation?
    c. What do we know about the outcomes of dual enrollment programs?

APPENDIX E

Rhode Island Dual Enrollment Project

Jobs for the Future (JFF) Guide to Interviewing Dual Enrollment Program Directors/Coordinators

In 2006 the Rhode Island Governor's Statewide PK-16 Council retained JFF to conduct research on dual enrollment programs in the state and to recommend ways to develop a dual enrollment system. Dual enrollment program directors and administrators were interviewed using the following as a guide. Researchers were instructed to look for promising strategies that meet the Commissioner's twin goals of (1) developing a system-wide dual enrollment policy that emerges from existing program's best practices and most promising strategies; (2) while maintaining academic quality.

Program Name

- Is it truly dual enrollment? *(define dual enrollment as high school students enrolled in college courses, no matter the crediting arrangement. "Dual credit" is dual enrollment where students receive both high school and college credit)*

History/Background

- How and why was the program implemented
- How long in operation
- What is its purpose? Has the purpose evolved?
- Why is college involved? Why is district involved?

Number Served

Primary population:

- Typically college bound, atypical college bound
- Urban, rural, suburban
- Minority, first-generation
- Low-income, moderate income
- High achievers, academically challenged
- Has the composition or eligibility standards for entry changed?

Program goals

- Academic enrichment, developmental, college readiness

Program Structure/Eligibility/Curriculum

- What courses are offered
    - How (if at all) do students choose which courses to take?
    - What is/was the rationale for organizing course sequences or discrete course options in this way? (Trying to get at if there was any thought given to "alignment" of high school and college curriculum.)
- Are they offered individually, in bundles, as introductory courses in a college program?
- How many credits can students take?

- Who teaches?
- Where are courses taught?
- How is eligibility/readiness for participation in college courses determined (e.g. test, course prerequisites, GPA, etc.)? Has this changed over time?
- How well does the course(s) transfer?

Governance

- Who certifies courses?
- How are teachers selected?
- How are credits awarded?
- What is the level of collaboration between college and high school (both at level of governance and day-to-day practice)?
- Has the collaboration changed over time?

Funding

- Who pays for what?
- Who loses money/who earns money?
- Is student tuition waived/supplemented?
- Additional expenses: books, fees, transportation
- Special funding streams used? (state, federal grants, f/a?)
- Has the way the program is funded changed over time?

Outcomes

- Is there a way to track student progress?
- How are students tracked [great, would be good to get any data they have too]
- How is course integrity/rigor/quality monitored?
- What do these data say about student achievement and/or achievement of program goals?
- Have you seen changes in student achievement over time?

Policy Issues/Challenges

- What are the biggest challenges to sustaining this program?
- Who are its biggest boosters? Where is the resistance to the program?
- What is the programs greatest strengths**?**
- Barriers to student participation?
- What is standing in the way of sustaining or expanding this program?
- What needs to be done in order to expand?
    - Institutional-level initiatives
    - State-level initiatives
    - Student incentives
- In what ways could the state be helpful to the program—by getting involved or leaving it alone?
- How does program contribute to state goal of high school reform and PK-16 educational transformation?