The Dual Enrollment of High School Students in Postsecondary Education in Kentucky, 2001-02 to 2004-05

Kentucky Council on Postsecondary Education

March 2006

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Executive Summary

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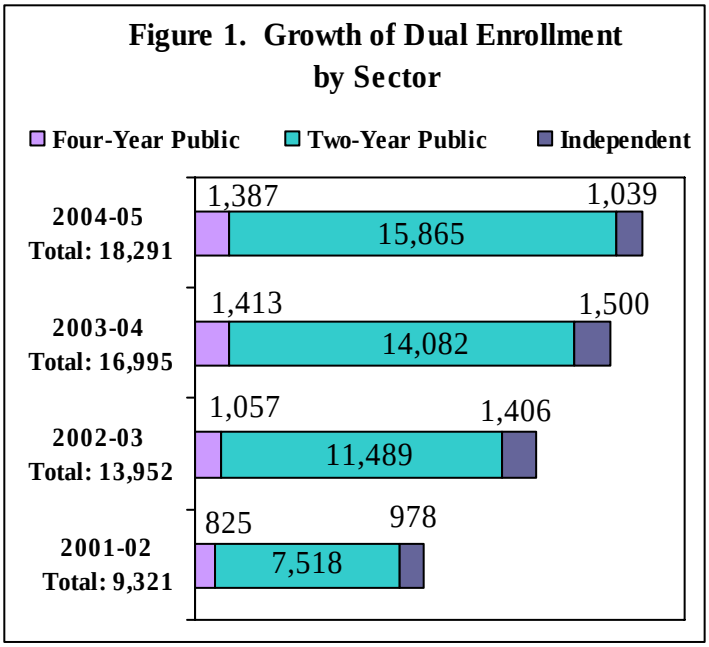
The enrollment of high school students in postsecondary courses, called "dual enrollment," has grown dramatically in Kentucky in recent years, focusing attention on dual enrollment and its potential benefits. This study presents an overview of dual enrollment in Kentucky from the postsecondary perspective, examining dual enrollment course-taking and the matriculation and success of dual enrollment students in regular postsecondary study.

The data used in this report are administrative data submitted by postsecondary institutions to the Council's Comprehensive Database between 2001 and 2005. Much of the study concerns the 16,995 students who dually enrolled in the 2003-04 school year, with additional time trend data and an analysis of the college entry cohort of 2002.

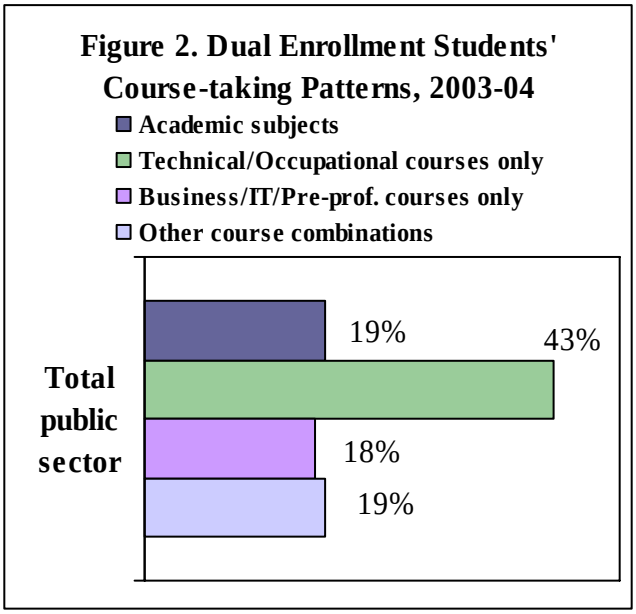
Figure 1 shows the dramatic growth of dual enrollment in recent years, almost doubling from 9,321 in 2001-02 to 18,291 in 2004-05. Most of this growth has occurred at the Kentucky Community and Technical College System (KCTCS), which is also the largest provider of dual enrollment courses. Eighty-seven percent of all dual enrollers in the 2004-2005 academic year attended the KCTCS.

Figure 1. Growth of Dual Enrollment by Sector



Seventy-nine percent of dual enrollment students in 2003-04 received high school credit as well as postsecondary credit for their dual enrollment courses, called "dual credit." Also, most dual enrollment students that year (62 percent) took a total of six credit hours or less.

Figure 2. Dual Enrollment Students' Course-taking Patterns, 2003-04

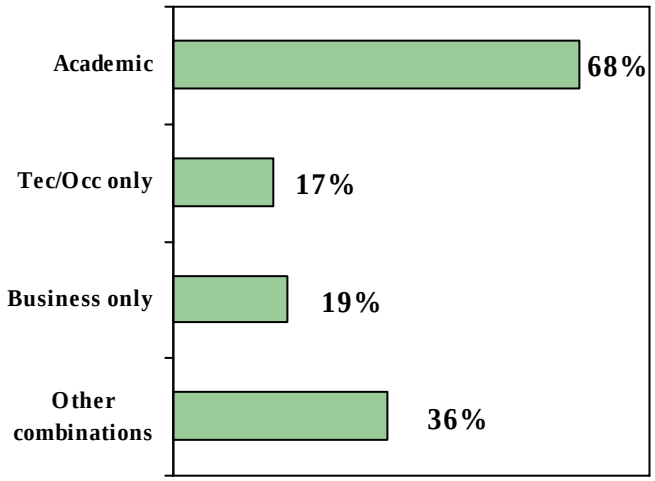


Given the predominance of the KCTCS in dual enrollment, it is not surprising that the most common type of courses taken by dual enrollment students were technical or occupational (Figure 2). Four out of every ten students dually enrolled in the 2003-04 academic year took only technical and

occupational courses. One in five students chose to take academic courses, including those that relate to the pre-college curriculum such as English, science, and math, with a roughly equal number exclusively taking business, IT, and pre-professional courses.

Student course-taking varied considerably depending on whether or not a student received credit at the high school as well as at the postsecondary level (dual credit). Two-thirds of students dually enrolled outside of dual credit programs took academic courses only, compared to 6 percent of those in dual credit courses. Fifty-two percent of students receiving dual credit took technical and occupational courses only, compared to 11 percent of those enrolled outside these programs.

Figure 3. Matriculation Rate by Type of College Courses Taken in High School, 2003-04 Cohort



Matriculation of Dual Enrollment Students

Overall, 32 percent of dual enrollers had matriculated into regular postsecondary study in the year after they were dually enrolled. Unfortunately, the CPE's data does not distinguish between juniors and seniors in high school, so these year-to-year rates are not restricted to high school seniors as they should be. Giving dual enrollment students three years to matriculate takes this problem into account. Of students who dually enrolled in 2001-02, 57 percent had matriculated into regular postsecondary study by 2004-05.

As the numbers of dual enrollment students have increased over the past few years, their one-year matriculation rate has dropped from 38 percent in 2001-02 to 29 percent in 2003-04. This drop may be due in part to increases in the number of high school juniors and other underclassmen taking dual enrollment courses, but it may also reflect a real drop in matriculation among these students.

A question arises about which students are more likely to matriculate. Figure 3 compares the one-year matriculation rate of students who took different types of courses and shows that students who took primarily academic courses while dually enrolled were much more likely to matriculate into regular postsecondary study than their peers. Sixty-eight percent of students taking primarily academic courses had matriculated by the next academic year, a figure that exceeds the overall college-going rate of Kentucky high school graduates in 2002, which was 62 percent (NCHEMS, www.higheredinfo.org).

The one-year matriculation rates of students who dually enrolled for dual credit and those who did not are given in figure 4. It does not appear that dual credit programs in and of themselves encourage matriculation after high school.

Figure 4. Matriculation of Dual Enrollers by Dual Credit Status, 2003-04 Cohort

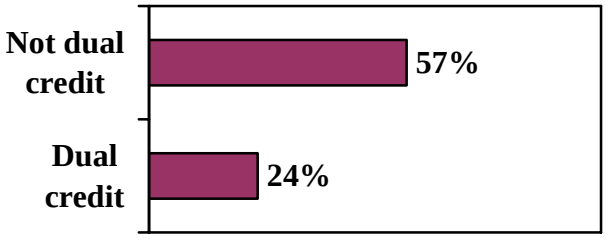
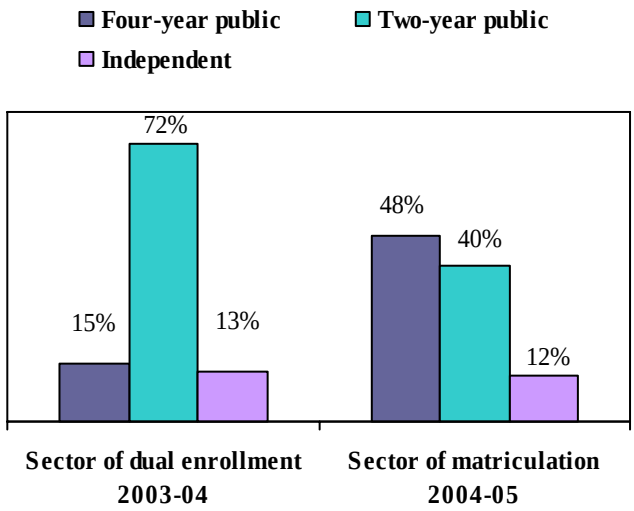


Figure 5 presents the sectors of dual enrollment and matriculation of students dually enrolled in 2003-04 who matriculated in 2004-05. The KCTCS was the primary sender of dual enrollment students to postsecondary education, while the four-year publics were the primary receivers of these students.

Figure 5. Sectors of Dual Enrollment and Matriculation, 2003-04 Cohort



Impact of Dual Enrollment on Postsecondary GPA and Retention

The impact of dual enrollment on these two measures of postsecondary success were examined, with the effect of students' ACT composite scores factored out statistically. This analysis was restricted to students entering four-year public institutions in fall 2002 due to data limitations.

These multivariate analyses suggest that, independent of differences in ACT scores, dual enrollment has 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 is found to have no independent effect on retention. These results were the same for both dual credit students and students who dually enrolled outside of dual credit programs.

Summary of Outcomes

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 low rates. These findings suggest that encouraging dual credit programs to provide academic rather than technical coursework may increase the matriculation rates of dually enrolled students.

Among students who matriculated into four-year public institutions, dual enrollment increased students' GPA at the end of their second year of college by about one-third of a letter grade. However, dual enrollment had no impact on retention. Overall, dual enrollment seems to have a small, positive effect on student success, at least among students who matriculated into public, four-year institutions.

The Dual Enrollment of High School Students in Postsecondary Education in Kentucky, 2001-02 to 2004-05

Kentucky Council on Postsecondary Education
March 2006

The number of high school students taking postsecondary courses has grown phenomenally in recent years, more than doubling between the 2001-02 and 2004-05 academic years. This growth has sparked increased interest in dual enrollment policies. Who is dually enrolling and what subjects are they studying? Are dual enrollment students matriculating into degree study after they graduate from high school? How do students who dually enrolled in high school perform in college compared to their peers? This report answers these and other questions about the dual enrollment students and the postsecondary institutions at which they are enrolling.

This report covers two topics relating to dual enrollment. First, it presents a description of dual enrollment in Kentucky, including sectors of dual enrollment, student demographics, and student course-taking patterns. The second section deals with the matriculation of dually enrolled students for regular college study after graduation from high school. This section includes matriculation rates overall and for students dually enrolled in different sectors and taking different types of courses while dually enrolled. This study relies exclusively on data from postsecondary institutions, and unfortunately cannot address important questions about the advantages of dual enrollment while students are still in high school.

In 2000, the Council on Postsecondary Education revised its dual enrollment and dual credit policy for high school students from a fairly restrictive set of criteria (including student age, grade, and grade point average) to a policy in which individual institutions and school districts may set their own agreements for accepting credit. Since then, the number of high school students enrolled in college courses has almost doubled from 9,321 in 2001-02 to 18,291 in 2004-05.

Data and Methodology

The data used in this report are administrative enrollment data submitted as student and course unit records by public and independent postsecondary institutions to the Council's Comprehensive Database. None of this data is self-reported by students, rather it is obtained through institutions' admissions and registration processes. These records include enrollment and demographic information about students and descriptions of the courses they have taken. The students included in this study are all those postsecondary students identified as high school students under the age of 21. The methodology of this report uses descriptive statistics only and should not be used for causal inferences.

The various tables pull from a few different datasets, each of which are described in detail along with the table in the report. In general, the tables that show change over time include all high school students who were dually enrolled in public or independent postsecondary institutions in Kentucky starting with the summer semester of 2001 and ending with the spring semester of 2005 or 2004, depending on the table. The other primary dataset is of the dual enrollment cohort of 2003-04, the most recent cohort of dual enrollment students for whom complete dual enrollment and matriculation data are available.

Most of the tables used in this report include dual enrollment records from both the public and independent sectors. However, independent institutions are required to submit enrollment records in the fall semester only, resulting in an undercount of dual enrollment activity in the state because those who dually enroll at independent institutions in the spring and summer semesters are not included. Also, independent institutions are not required to submit the course inventory file used to categorize courses by subject, and so are not included in the course type analyses.

It is important to note that many students dually enroll across multiple institutions, semesters, and academic years. The methodology used in this report to remove this duplication of student records varies according to the question being answered, resulting in totals in different tables that may vary. These differences are noted and explained as they occur throughout the report.

Dual Enrollment in Kentucky

Table 1 presents the total annual growth of dual enrollment in Kentucky over the past four academic years. This growth has been phenomenal – almost doubling from 9,321 in 2001-02 to 18,291 in 2004-05 – although this growth has slowed in the past year. Growth in dual enrollment occurred across all three sectors of postsecondary education included in this report: public four-year institutions, public two-year institutions, and independent, non-profit institutions (AIKCU member institutions only).

Table 1. Total Annual Growth in Dually Enrolled Students, by Sector

Academic Year	Four-year public	Two-year public	Independent	Total Students
2001-02	825	7,518	978	9,321
2002-03	1,057	11,489	1,406	13,952
2003-04	1,413	14,082	1,500	16,995
2004-05	1,387	15,865	1,039	18,291

Note: Headcount enrollment by academic year, summer through spring. 2000-01 number for two-year public sector does not include technical school enrollments during the summer 2000 semester. Independents report enrollment only in the fall semester.

The majority of dual enrollment has been taking place at the Kentucky Community and Technical College System (KCTCS). Eighty-seven percent of all dual enrollers in the 2004-2005 academic year attended the KCTCS. The numbers for the independent institutions only include the fall semester as noted above, so these annual numbers are understated.

Table 2 shows the growth of dual enrollment over time at the semester level. Previous Council publications have used fall semester headcounts to track the growth of dual enrollment, largely because this semester includes the independents, as can be seen below. The exclusion from this study of a small number of "high school students" who were ages 21 and over, presumed here to be the result of erroneous data, explains the small discrepancies between previously published fall headcounts and the fall headcounts given below. What is most interesting about Table 2 is that, while fall enrollments did not grow from fall 2003 to fall 2004, public-sector enrollments did grow in the spring and summer semesters, explaining the annual growth that year.

Table 2. Growth of Dual Enrollment by Semester and Sector

Academic year and semester		Four-year public	Two-year public	Independent	Total students
2001-02	**Summer 2001**	30	42	.	72
	Fall 2001	516	4,787	978	6,281
	Spring 2002	463	5,061	.	5,524
2002-03	**Summer 2002**	41	271	.	312
	Fall 2002	697	8,886	1,406	10,989
	Spring 2003	627	6,365	.	6,992
2003-04	**Summer 2003**	48	217	.	265
	Fall 2003	955	11,679	1,500	14,134
	Spring 2004	875	6,023	.	6,898
2004-05	**Summer 2004**	60	258	.	318
	Fall 2004	1,014	12,068	1,039	14,121
	Spring 2005	892	8,583	.	9,475

Note: Headcount enrollment by semester, counting students once per semester, not once per academic year, resulting in larger annual totals than in Table 1. Independent institutions report enrollment only in the fall semester.

A Closer Look at Dual Enrollment in Academic Year 2003-04

The rest of this report presents a more in-depth analysis of a single cohort year of dual enrollment students, those who were dually enrolled in the 2003-04 academic year. This year was selected because it is the latest year for which the CPE has complete enrollment data that enables us to assess matriculation into regular college study in the next year, 2004-05.

Table 3 gives the distribution of students who were dually enrolled in the 2003-04 academic year by the number of sectors in which they were enrolled. The vast majority have only dually enrolled in one postsecondary sector. Given that the sector of dual enrollment is a primary topic of this report, the question of how to classify the sector of those students who dually enrolled in more than one sector becomes important. Given the small proportion of students who dually enrolled in more than one sector, for clarity sake these students will be excluded from all of the following tables that report findings by sector.

Table 3. Students Dually Enrolled in More than One Sector, 2003-04

Number of sectors in which students were dually enrolled, Academic Year 2003-04		
One	16,552	97.5%
Two	403	2.4%
Three	17	0.1%
Total	16,972	100.0%

Missing data: 23 students were missing sector data and are excluded. Note: Independents report enrollment only in the fall semester.

Tables 4 and 5 present demographic information about dually enrolled students by sector. The gender breakout of dually enrolled students is given in Table 4. At 54 percent, students who dually enrolled were slightly more likely to be male than were high school students in general in Kentucky (51 percent in 2003) and much more male than

Table 4. Gender of Dual Enrollment Students, 2003-04

	Sector of Dual Enrollment							
	Four-year public		**Two-year public**		**Independent**		**Total**	
Female	803	64.8%	5,978	42.9%	817	61.5%	7,598	46.1%
Male	436	35.2%	7,950	57.1%	512	38.5%	8,898	53.9%
Total	1,239	100.0%	13,928	100.0%	1,329	100.0%	16,496	100.0%

Missing data: 420 students dually enrolled in more than one sector and 79 students with missing data are excluded. Note: Independents only report enrollment in the fall semester.

Kentucky's postsecondary population in 2003 (44 percent). These differences may be explained in part by the types of courses dual enrollment students took. Upcoming tables show that a majority of these courses, 60 percent, are in technical and occupational fields. The most common technical and occupational courses taken by dual enrollment students are in fields that train students to enter traditionally male occupations such as mechanics and repair, precision production, and construction trades.

This relationship between gender and field of study can also be seen in the gender differences between the sectors. The majority of dual enrollers at two-year schools where technical and occupational courses are offered are male, while the majority of dual enrollers at four-year colleges and universities are female, corresponding to the gender mix of postsecondary education as a whole. In fact, dual enrollers at four-year institutions are more heavily female than the postsecondary population as a whole.

Table 5 is more problematic. Given the large amount of missing data related to students' race/ethnicity, which for 22 percent of dual enrollment students was given as "unknown," it is difficult to draw any conclusions about the racial composition of dual enrollment students overall from this table. This high rate of missing race data is common to nondegree students because their admissions process is often abbreviated. However, the four-year public sector has fairly complete race-ethnicity data, and it is suggestive. Ninety-three percent of dual enrollment students in this sector are white, compared to 88 percent of all Kentucky public high school students and 89 percent of all Kentucky postsecondary students in fall 2003. At least in the four-year public sector, dual enrollment students are more likely to be white than students in either of these comparison groups.

Table 5. Race/Ethnicity of Dual Enrollment Students, 2003-04

Race/Ethnicity	Sector of Dual Enrollment						Total Students	
	Four-year public		Two-year public		Independent			
Nonresident Alien	2	0.2%	3	0.0%	1	0.1%	6	0.0%
Black, Non-Hispanic	23	1.9%	314	2.2%	14	1.1%	351	2.1%
American Indian or Alaskan Native	4	0.3%	25	0.2%	2	0.2%	31	0.2%
Asian or Pacific Islander	26	2.1%	50	0.4%	23	1.7%	99	0.6%
Hispanic	11	0.9%	68	0.5%	4	0.3%	83	0.5%
White, Non-Hispanic	1,148	92.6%	10,017	71.6%	1,168	88.1%	12,333	74.5%
Unknown	26	2.1%	3,506	25.1%	117	8.6%	3,649	22.0%
Total	1,240	100.0%	13,983	100.0%	1,329	100.0%	16,552	100.0%

Missing data: 420 students dually enrolled in more than one sector and 23 students with missing sector data are excluded. Note: Independent institutions only report enrollment in the fall semester.

Table 6 presents the distribution of total credit hours taken by sector. Students who dually enrolled in the KCTCS were more than twice as likely to take more than six credit hours than those in public and independent four-year schools. Forty percent of students dually enrolled in the KCTCS took more than six credit hours, compared to 15 and 19 percent in the other sectors. These sector-level differences are also seen in the mean number of credit hours taken.

Table 6. Total Credit Hours Taken as Dual Enrollment Students 2003-04

Credit Hours	Sector of Dual Enrollment							
	Four-year public		Two-year public		Independent		Total Students	
3 or fewer	639	51.5%	3,863	27.6%	726	54.8%	5,228	31.6%
3.1 to 6	419	33.8%	4,440	31.8%	351	26.5%	5,210	31.5%
6.1 to 9	108	8.7%	2,043	14.6%	116	8.8%	2,267	13.7%
9.1 to 12	45	3.6%	1,334	9.5%	57	4.3%	1,436	8.7%
More than 12	29	2.3%	2,303	16.5%	75	5.7%	2,407	14.5%
Total	1,240	100.0%	13,983	100.0%	1,325	100.0%	16,548	100.0%
Mean credit hours		5.5		7.8		5.9		

Missing data: 420 students dually enrolled in more than one sector and 27 students with missing data are excluded.
Note: Independent institutions report enrollment only in the fall semester.

The next two tables present information about students who took dual credit courses, which are courses for which students received academic credit at both the postsecondary and secondary levels, not just at the postsecondary level. Table 7 shows that the majority of students taking dual enrollment courses in the two-year public and independent sectors are also receiving high school credit for this work. However, most students who dually enrolled at public four-year institutions received only postsecondary, not high school, credit.

Whether or not a student is taking courses for dual credit is an important aspect of dual enrollment. For instance, Table 8 gives the number of credit hours taken for dual credit and not for dual credit. Students who took classes for dual credit were almost twice as likely to have taken three credit hours or less (49 percent) than students not receiving high school credit (27 percent). This may reflect the fact that dual credit students dually enroll through a formal arrangement between a college and their high school, an arrangement which would be likely to include multiple course offerings and possibly even supportive services such as transportation or on-site classes that would encourage more course taking.

Table 7. Students Who Took Courses for Dual Credit, 2003-04

Dual Credit	Sector of Dual Enrollment: Four-year public		Two-year public		Independent		Total Students	
Did Not Take Any Courses for Dual Credit	1,069	86.2%	2,252	16.1%	243	18.3%	3,564	21.5%
Took One or More Courses for Dual Credit	171	13.8%	11,731	83.9%	1,086	81.7%	12,988	78.5%
Total	1,240	100.0%	13,983	100.0%	1,329	100.0%	16,552	100.0%

Missing data: 420 students dually enrolled in more than one sector and 23 students with missing data are excluded.
Note: Independent institutions report enrollment only in the fall semester.

Table 8. Total Credit Hours Taken by Dual Enrollment and Dual Credit Students, 2003-04

		Sector of Dual Enrollment: Four-year public		Two-year public		Independent		Total	
Did Not Take Any Courses for Dual Credit	**3 or less**	620	58.0%	932	41.4%	196	82.0%	1,748	49.1%
	3.1 to 6	322	30.1%	635	28.2%	37	15.5%	994	27.9%
	6.1 to 9	66	6.2%	211	9.4%	3	1.3%	280	7.9%
	9.1 to 12	36	3.4%	179	7.9%	1	0.4%	216	6.1%
	More than 12	25	2.3%	295	13.1%	2	0.8%	322	9.0%
	Total	1,069	100.0%	2,252	100.0%	239	100.0%	3,560	100.0%
	Mean hours		4.9		7.0		3.2		6.1
Took One or More Courses for Dual Credit	**3 or less**	19	11.1%	2,931	25.0%	530	48.8%	3,480	26.8%
	3.1 to 6	97	56.7%	3,805	32.4%	314	28.9%	4,216	32.5%
	6.1 to 9	42	24.6%	1,832	15.6%	113	10.4%	1,987	15.3%
	9.1 to 12	9	5.3%	1,155	9.8%	56	5.2%	1,220	9.4%
	More than 12	4	2.3%	2,008	17.1%	73	6.7%	2,085	16.1%
	Total	171	100.0%	11,731	100.0%	1,086	100.0%	12,988	100.0%
	Mean hours		8.0		8.0		6.4		7.8

Missing data: 420 students dually enrolled in more than one sector and 27 students with missing data are excluded.
Note: Independent institutions report enrollment only in the fall semester.

Who is teaching dual enrollment courses? Table 9 shows that the public sector rarely employs high school teachers to teach dual enrollment courses, while the independent sector relies heavily on high school teachers. Nevertheless, in terms of sheer numbers, the KCTCS is the largest employer of both high school teachers and postsecondary instructors of dual enrollment courses.

Table 9. Dual Enrollment Courses by Type of Teacher, 2003-04

Type of Instructor	Sector of Dual Enrollment						Total Courses	
	Four-year public		Two-year public		Independent			
Postsecondary Instructor	732	94.8%	5,158	93.4%	88	30.3%	5,978	90.8%
High School Teacher was Teacher of Record	40	5.2%	366	6.6%	202	69.7%	608	9.2%
Total	772	100.0%	5,524	100.0%	290	100.0%	6,586	100.0%

Missing data: Courses taken by 420 students dually enrolled in more than one sector and 23 students with missing data are excluded.

Table 10 separates out dual credit courses, which *could* be taught by high school teachers, from the postsecondary-only courses that, by definition, can only taught by instructors employed by postsecondary institutions. It is clear that the independent sector utilizes high school teachers for dual enrollment almost exclusively when possible to do so. The four-year publics also rely on high school teachers when possible, although the vast majority of their dual enrollments are not for dual credit and so cannot be taught by high school teachers.

Table 10. Dual Enrollment Course Sections by Type of Teacher and Dual Credit Status, 2003-04

		Sector of Dual Enrollment							
		Four-year public		Two-year public		Independent		Total	
Courses for postsecondary credit only	**Postsecondary Instructor**	719	100.0%	2,992	100.0%	87	100.0%	3,798	100.0%
Dual credit courses	**Postsecondary Instructor**	13	24.5%	2,166	85.5%	1	0.5%	2,180	78.2%
	High School Teacher was Teacher of Record	40	75.5%	366	14.5%	202	99.5%	608	21.8%

Missing data: Courses taken by 420 students dually enrolled in more than one sector and 23 students with missing data are excluded.

Types of Courses Taken by Dual Enrollment Students

Tables 11 to 16 examine the types of courses taken by dual enrollment students. These tables present courses broken out into five categories based on the 2-digit federal Classification of Instructional Programs (CIP) codes. Every course offered at Kentucky's public postsecondary institutions is assigned a CIP code which is reported to the Council each year. Independent institutions are not required to submit this course information, so these institutions are not included in these tables.

The five course categories developed by the CPE's staff for the purpose of this study are:

1. Academic subjects in the pre-college-curriculum (PCC): Includes those academic subjects included in Kentucky's PCC such as English, math, social sciences, physical sciences, and foreign languages.
2. Non-PCC academic subjects: This category includes courses in disciplines that are clearly academic in nature but are not in the PCC (mainly because they are not offered in high school), such as philosophy, religious studies, etc.
3. Technical and occupational courses: Courses in technical and occupational CIP codes. The majority were in mechanic and repair technician, precision production, health technician, engineering technician, and construction trades.
4. Business/IT/Pre-professional: Includes courses on computer and information sciences and support services, business management, marketing and related services, and pre-professional courses such as communications, education, and architecture. These courses are somewhat occupational in nature.
5. Personal improvement: Includes courses taken in CIP codes relating to sports and recreation and to personal improvement courses such as civics or interpersonal relationships. This category also includes remedial courses.

Table 11. Courses Taken by Dual Enrollment Students by Subject, 2003-04

	Sector of Dual Enrollment				Total courses taken	
	Four-year public		Two-year public			
Pre-college curriculum	1,763	71.1%	4,335	13.5%	6,098	17.7%
Non-PCC academic	460	18.6%	366	1.1%	826	2.4%
Technical/Occupational	49	2.0%	20,516	64.1%	20,565	59.6%
Business/IT/Pre-professional	144	5.8%	5,504	17.2%	5,648	16.4%
Personal Improvement	62	2.5%	1,306	4.1%	1,368	4.0%
Total	2,478	100.0%	32,027	100.0%	34,505	100.0%

Missing data: 1,461 course records were missing course type data and are excluded. Note: Most students take more than one course. Independent institutions do not report class types, accounting for most of the missing course data.

Table 11 gives the number and distribution of courses taken by dually enrolled students by sector and overall. What is striking is the number of students taking technical and occupational courses – 60 percent. This large number of courses taken in technical and occupational fields suggests that many students are using dual enrollment to prepare for the workplace, rather than postsecondary study. Table 12, below, presents this same information broken out by dual credit status. This table shows that technical and occupation courses are primarily being offered through dual credit programs; 73 percent of dual credit courses were technical and occupational, compared to 20 percent of courses not taken for dual credit. The majority of courses taken for postsecondary credit only were academic (60 percent).

Table 12. Courses Taken by Dual Enrollment Students by Subject and Dual Credit Status, 2003-04

		Sector of Dual Enrollment					
		Four-year public		Two-year public		Total courses taken	
Post-secondary credit only	**Pre-college curriculum**	1,248	67.4%	3,278	48.5%	4,526	52.5%
	Non-PCC academic	350	18.9%	315	4.7%	665	7.7%
	Technical/Occupational	49	2.6%	1,699	25.1%	1,748	20.3%
	Business/IT/Pre-professional	144	7.8%	978	14.5%	1,122	13.0%
	Personal Improvement	62	3.3%	491	7.3%	553	6.4%
	Total courses	1,853	100.0%	6,761	100.0%	8,614	100.0%
Dual credit courses	**Pre-college curriculum**	514	82.4%	917	3.8%	1,431	5.7%
	Non-PCC academic	110	17.6%	49	0.2%	159	0.6%
	Technical/Occupational	.	.	18,273	74.9%	18,273	73.1%
	Business/IT/Pre-professional	.	.	4,362	17.9%	4,362	17.4%
	Personal Improvement	.	.	787	3.2%	787	3.1%
	Total courses	624	100.0%	24,388	100.0%	25,012	100.0%

Missing data: 2,340 course records were missing course type data or dual credit data and are excluded. Note: Independent institutions do not report class types, accounting for most of the missing course data.

Given that most students take multiple courses, what are the most common combinations of courses that dually enrolled students took in 2003-04? Table 13 presents the three most common course combinations: those taking business, IT, and pre-professional courses only; those taking academic courses (PCC and non-PCC); and those taking technical and occupational courses only. Students taking courses in these three categories account for 81 percent of dual enrollment students. The "other" category includes all other possible course combinations. This breakdown shows that most students took just academically-oriented courses or just occupationally-oriented courses

(either technical/occupational courses or business/IT and pre-professional courses), without large numbers of students mixing these two course categories.

Table 13. Students' Overall Dual Enrollment Course-Taking Patterns, 2003-04

Overall Course-Taking Patterns	Sector of Dual Enrollment					
	Four-year public		Two-year public		Total Students	
Academic (PCC & other)	1,059	85.4%	1,888	13.5%	2,947	19.4%
Tech./Occ. only	24	1.9%	6,515	46.6%	6,539	43.0%
Bus/IT/Pre-prof. only	57	4.6%	2,738	19.6%	2,795	18.4%
Other combinations	100	8.1%	2,842	20.3%	2,942	19.3%
Total	1,240	100.0%	13,983	100.0%	15,223	100.0%

Missing data: Courses taken by 420 students dually enrolled in more than one sector and 1,352 students with missing data are excluded. Note: Independent institutions do not report course types and account for most of the missing data.

Table 14. Course-taking Patterns of Students by Dual Credit Status, 2003-04

Overall Course-Taking Patterns by Dual Credit Status		Sector of Dual Enrollment					
		Four-year public		Two-year public		Total	
Did Not Take Any Courses for Dual Credit	**Academic (PCC & other)**	890	83.3%	1,296	57.5%	2186	65.8%
	Tech./Occ. only	24	2.2%	350	15.5%	374	11.3%
	Bus/IT/Pre-prof. only	57	5.3%	260	11.5%	317	9.5%
	Other combinations	98	9.2%	346	15.4%	444	13.4%
	Total	1,069	100.0%	2,252	100.0%	3,321	100.0%
Took One or More Course for Dual Credit	**Academic (PCC & other)**	169	98.8%	592	5.0%	761	6.4%
	Tech./Occ. only	.	.	6,165	52.6%	6165	51.8%
	Bus/IT/Pre-prof. only	.	.	2,478	21.1%	2478	20.8%
	Other combinations	2	1.2%	2,496	21.3%	2498	21.0%
	Total	171	100.0%	11,731	100.0%	11,902	100.0%

Missing data: The 1,086 students from independent institutions (which do not report course information) were missing course data and were excluded.

Students' course-taking patterns are shown by their dual credit status in Table 14. What is most striking about this table is the low proportion of students in dual credit courses who are taking academic courses exclusively, only 6.4 percent. This is a marked contrast to the two-thirds of students who took postsecondary courses outside of dual credit programs who took academic courses exclusively.

Table 15 reports students' dual enrollment credit hours in the previous year by their course-taking patterns. Most students taking business and academic courses took less than six credit hours the previous year. Larger numbers of students who had taken only technical and occupational courses took more than six credit hours, but the largest proportion was in the "other" category. This is not surprising given that all of the course combinations that include three or more types of classes are in this group. This table does not include dual enrollment courses that these same students may have taken in previous years, which would increase their total credit hours. None of the information presented in Tables 15 or 16 varies substantially by dual credit status, so those tables are not included.

Table 15. Total Credit Hours by Type of Courses Taken, 2003-04

Total Dual Enrollment Credits	Courses taken while dually enrolled								Total Students	
	PCC & other academic		Tech./Occ. only		Bus/IT/Pre-prof. only		Other combinations			
3 or less	1,313	44.6%	1,397	21.4%	1,388	49.7%	404	13.7%	4,502	29.6%
3.1 to 6	952	32.3%	2,306	35.3%	1,022	36.6%	579	19.7%	4,859	31.9%
6.1 to 9	347	11.8%	922	14.1%	266	9.5%	616	20.9%	2,151	14.1%
9.1 to 12	190	6.4%	728	11.1%	85	3.0%	376	12.8%	1,379	9.1%
More than 12	145	4.9%	1,186	18.1%	34	1.2%	967	32.9%	2,332	15.3%
Total	2,947	100.0%	6,539	100.0%	2,795	100.0%	2,942	100.0 %	15,223	100.0 %
Mean credit hours		6.1		8.1		4.5		9.5		7.5

Missing data: Courses taken by 420 students dually enrolled in more than one sector and 1,352 students with missing data are excluded. Note: Independent institutions do not report course types and account for most of the missing data.

Table 16 presents information about remedial courses taken through dual enrollment. These courses represent a very small proportion of the total (3.6 percent), but one which is not insignificant in sheer numbers. 1,257 of the courses that dual enrollment students took in 2003-04 were remedial.

Table 16. Remedial Courses Taken Through Dual Enrollment, 2003-04

	Sector of Dual Enrollment					
	Four-year public		**Two-year public**		**Total**	
Not remedial	2,465	99.1%	30,836	96.1%	33,301	96.4%
Remedial	22	0.9%	1,235	3.9%	1,257	3.6%
Total	2,487	100.0%	32,071	100.0%	34,558	100.0%

Missing data: 1,408 course records were missing course type data and are excluded.
Note: Independent institutions do not report course types and are not included.

Matriculation into Postsecondary Study of Dual Enrollment Students

From the postsecondary perspective, an important outcomes question about dual enrollment is the extent to which students who dually enroll later matriculate into postsecondary institutions for regular postsecondary study. Table 17 presents the one-year matriculation rates of dual enrollment students between 2001-02 and 2003-04. So, if a student dually enrolled in 2002-03, this table shows whether or not they matriculated the following year (2003-04). Matriculation is defined here as first entry as a regular undergraduate into public or independent, two or four-year institutions for degree or nondegree study.

Table 17. One-Year Matriculation Rates for Postsecondary Study by Sector and Academic Year of Dual Enrollment

Academic Year and Sector of Dual Enrollment		Matriculation Status					
		Did not Matriculate		Matriculated into PSE		Total	
		Number	Percent	Number	Percent	Number	Percent
2001-02	**Four-year public**	274	35.9%	489	64.1%	763	100.0%
	Two-year public	4,894	65.7%	2,553	34.3%	7,447	100.0%
	Independent	495	56.5%	381	43.5%	876	100.0%
	Total	5,663	62.3%	3,423	37.7%	9,086	100.0%
2002-03	**Four-year public**	304	33.1%	615	66.9%	919	100.0%
	Two-year public	8,246	72.5%	3,120	27.5%	11,366	100.0%
	Independent	638	51.7%	597	48.3%	1,235	100.0%
	Total	9,188	68.0%	4,332	32.0%	13,520	100.0%
2003-04	**Four-year public**	450	36.3%	790	63.7%	1,240	100.0%
	Two-year public	10,722	76.7%	3,261	23.3%	13,983	100.0%
	Independent	656	49.4%	673	50.6%	1,329	100.0%
	Total	11,828	71.5%	4,724	28.5%	16,552	100.0%
Average matriculation rate		26,679	68.1%	12,479	31.9%	39,158	100.0%

Missing data: Differences between this table and Table 1 are due to the exclusion of students dually enrolled in more than one sector or missing sector data. Note: Includes students matriculating as degree or nondegree undergraduates in the next academic year only.

In each academic year, students who dually enrolled in public and independent four-year institutions matriculated at higher rates than did those in the KCTCS. The overall matriculation rate also appears to have declined slightly over time. Two factors may be at work here. As dual enrollment numbers increased during this period, it is

likely that more juniors and even sophomores in high school are dually enrolling. These students would not be eligible to matriculate in the next academic year, as they would still be in high school. Unfortunately, the CPE does not have information on dual enrollment students' year in high school, so we cannot investigate this possibility at this time. It also is possible that as dual enrollment has grown, it has attracted more students who do not intend to matriculate into college, especially among the technical/occupational students.

Table 18. Pooled One-Year Matriculation Rates by Dual Credit Status and Sector of Dual Enrollment, 2001-2004

Dual enrollers, Fall 2001- Spring 2004		Matriculation Status: Did not Matriculate		Matriculated into PSE		Total	
		Number	Percent	Number	Percent	Number	Percent
Did Not Take Any Courses for Dual Credit	**Four-year public**	773	32.3%	1,621	67.7%	2,394	100.0%
	Two-year public	2,725	46.8%	3,094	53.2%	5,819	100.0%
	Independent	514	50.8%	497	49.2%	1,011	100.0%
	Total	4,012	43.5%	5,212	56.5%	9,224	100.0%
Took One or More Course for Dual Credit	**Four-year public**	255	48.3%	273	51.7%	528	100.0%
	Two-year public	21,137	78.4%	5,840	21.6%	26,977	100.0%
	Independent	1,275	52.5%	1,154	47.5%	2,429	100.0%
	Total	22,667	75.7%	7,267	24.3%	29,934	100.0%

Missing data: 23 students were missing sector data and were excluded. Includes students matriculating as degree or non-degree undergraduates in the next academic year only.

Table 18 presents the pooled one-year matriculation rates for students who dually enrolled in dual credit courses and those who did not (pooling the one-year rates of the 2001-02, 2002-03, and 2003-04 AYs). The two totals are comparable to the average matriculation rate given at the bottom of Table 17, and show that matriculation rates vary considerably depending on the dual credit status of the students. A little over half of dual enrollment students who did not take courses for dual credit had matriculated within one year (56 percent), while only one-quarter (24 percent) of those in dual credit courses had matriculated. These results are pooled for simplicity of presentation, but the same overall pattern of matriculation rates falling over time seen among all dual enrollment students in Table 17 was also present among both dual credit enrollers and non-dual credit enrollers.

But what happens to this picture if students are given more than one year to matriculate? Tables 19 and 20 give the three-year matriculation rates for students who dually enrolled in the 2001-02 academic year. Any student who matriculated into regular college study anytime between summer 2002 and spring 2005 is included. This three-

year matriculation rate helps compensate for the possibility of high school juniors and sophomores dually enrolling, and for students who don't matriculate immediately after high school graduation. These matriculation rates are considerably higher than the one-

Table 19. Three-Year Matriculation Rate of Students Dually Enrolled in the 2001-02 Academic Year

Sector of Dual Enrollment		Matriculation Status					
		Did not Matriculate		Matriculated into PSE by 2004-05		Total	
		Number	Percent	Number	Percent	Number	Percent
2001-02	Four-year public	146	19.2%	616	80.8%	762	100.0%
	Two-year public	3,579	48.2%	3,854	51.8%	7,433	100.0%
	Independent	202	23.1%	674	76.9%	876	100.0%
	Total	3,927	43.3%	5,144	56.7%	9,071	100.0%

Missing data: 250 students dually enrolled in more than one sector or with missing data were excluded.

Table 20. Three-Year Matriculation Rate of Students Dually Enrolled in the 2001-02 Academic Year by Dual Credit Status

Sector of Dual Enrollment in 2001-02		Matriculation Status by 2004-05					
		Did not Matriculate		Matriculated into PSE by 2004-05		Total	
		Number	Percent	Number	Percent	Number	Percent
Did Not Take Any Courses for Dual Credit	Four-year public	96	17.1%	467	82.9%	563	100.0%
	Two-year public	434	24.2%	1,356	75.8%	1,790	100.0%
	Independent	31	19.5%	128	80.5%	159	100.0%
	Total	561	22.3%	1,951	77.7%	2,512	100.0%
Took One or More Course for Dual Credit	Four-year public	50	25.1%	149	74.9%	199	100.0%
	Two-year public	3,145	55.7%	2,498	44.3%	5,643	100.0%
	Independent	171	23.8%	546	76.2%	717	100.0%
	Total	3,366	51.3%	3,193	48.7%	6,559	100.0%
Total		3,927	43.3%	5,144	56.7%	9,071	100.0%

Missing data: 250 students dually enrolled in more than one sector or with missing data were excluded.

year rates given above, rising approximately 16 percentage points among those dually enrolled in the public sectors and more than 30 percentage points among those dually

enrolled at independent institutions. The overall rate has increased from 38 to 57 percent. The large difference in matriculation by dual credit status in the one-year rate can be seen in the three-year matriculation rate as well in Table 20. Rates have increased for both groups, but the gap remains large. Forty-nine percent of dual credit students had matriculated within three years, compared to 78 percent of those who took postsecondary courses for postsecondary credit only.

Tables 21 through 26 present more detailed information about matriculation among the dual enrollment cohort of 2003-04. This cohort includes all those who were dually enrolled in 2003-04 and who matriculated in 2003-04 or 2004-05. Table 21 gives the sectors in which these students dually enrolled and matriculated. Overall, most matriculating students (72 percent) had dually enrolled in the KCTCS. The public four-year sector received the largest number of students at 2,592, which was roughly half of the total.

The column percentages in the table show where students matriculated by their sector of dual enrollment. As would be expected from the overall numbers, the majority of students matriculating at four-year institutions had dually enrolled in the KCTCS, while very few dual enrollers at four-year institutions moved the opposite direction to matriculate into the KCTCS.

Table 21. Sectors of Dual Enrollment and of Matriculation

Sector of Dual Enrollment, 2003-04		Sector of Matriculation, 2003-04 or 2004-05			
		Four-year public	Two-year public	Independent	Total Students
Four-year public	**Number**	701	57	69	827
	Column Percent	27.0%	2.6%	11.0%	15%
Two-year public	**Number**	1,448	2,049	373	3,870
	Column Percent	55.9%	95.2%	59.3%	72%
Independent	**Number**	443	47	187	677
	Column Percent	17.1%	2.2%	29.7%	13%
Total	**Number**	2,592	2,153	629	5,374
	Column Percent	100.0%	100.0%	100.0%	100%

Note: Totals are higher than given for the 2003-04 AY in Table 13 because students who matriculated in both 2003-04 and 2004-05 are included.

It is important to also consider the types of courses students took while dually enrolled when looking at matriculation rates. Table 22 does just that, showing a large difference in matriculation rates between students in occupational fields and students

studying academic disciplines. Keep in mind that matriculation includes matriculation into the KCTCS as well as at four-year institutions.

Table 22. Matriculation by Students' Course-Taking Patterns, 2003-04

Courses taken while dually enrolled	Matriculation Status					
	Did not Matriculate		Matriculated into PSE		Total Students	
Academic (PCC and other)	937	31.8%	2,010	68.2%	2,947	100.0%
Tech/Occ. only	5,442	83.2%	1,097	16.8%	6,539	100.0%
Bus/IT/Pre-prof. only	2,261	80.9%	534	19.1%	2,795	100.0%
Other combinations	1,886	64.1%	1,056	35.9%	2,942	100.0%
Total	10,526	69.1%	4,697	30.9%	15,223	100.0%

Missing data: Courses taken by 420 students dually enrolled in more than one sector and 1,352 students with missing course data are excluded. Note: Independent institutions do not report class types, accounting for most of the missing course data.

Table 23. Matriculation by Students' Course-Taking Patterns and Dual Credit Status, 2003-04

Courses taken while dually enrolled		Matriculation Status					
		Did not Matriculate		Matriculated into PSE		Total	
Did Not Take Any Courses for Dual Credit	**Academic (PCC and other)**	669	30.6%	1,517	69.4%	2,186	100.0%
	Tech/Occ. only	281	75.1%	93	24.9%	374	100.0%
	Bus/IT/Pre-prof. only	125	39.4%	192	60.6%	317	100.0%
	Other combinations	160	36.0%	284	64.0%	444	100.0%
	Total	1,235	37.2%	2,086	62.8%	3,321	100.0%
Took One or More Course for Dual Credit	**Academic (PCC and other)**	268	35.2%	493	64.8%	761	100.0%
	Tech/Occ. only	5,161	83.7%	1,004	16.3%	6,165	100.0%
	Bus/IT/Pre-prof. only	2,136	86.2%	342	13.8%	2,478	100.0%
	Other combinations	1,726	69.1%	772	30.9%	2,498	100.0%
	Total	9,291	78.1%	2,611	21.9%	11,902	100.0%

Missing data: Courses taken by 420 students dually enrolled in more than one sector and 1,352 students with missing course data are excluded. Note: Independent institutions do not report class types, accounting for most of the missing course data.

Table 23 gives matriculation rates by the type of courses taken and by their dual credit status. The positive relationship between academic course-taking and matriculation remains, regardless of dual credit status, but a majority of non-dual credit

students who took courses in business and other categories matriculated, unlike the dual credit takers. This suggests that the type of courses taken may have less influence on matriculation among students who dually enrolled outside a dual credit program than among dual credit students, possibly reflecting a higher underlying level of interest and motivation for postsecondary education.

Table 24 examines which aspect of dual enrollment was more closely associated with matriculation: a student's sector of dual enrollment or the courses they took. The answer is that they are both important. Matriculation rates were high among students dually enrolled in the four-year public sector regardless of course type, although very few students took non-academic courses while dually enrolled in this sector. While overall matriculation rates from the two-year public sector are low, it is interesting that a

Table 24. Matriculation by Students' Dual Enrollment Course-Taking Patterns and Sector of Dual Enrollment, 2003-04

Dual Enrollment Sector and Courses Taken		Matriculation Status					
		Did not Matriculate		Matriculated into PSE		Total Students	
Four-year public	**Academic (PCC and other)**	367	34.7%	692	65.3%	1,059	100.0%
	Tech./Occ. only	9	37.5%	15	62.5%	24	100.0%
	Bus./IT/Pre-prof. only	9	15.8%	48	84.2%	57	100.0%
	Other combinations	28	28.0%	72	72.0%	100	100.0%
	Total	413	33.3%	827	66.7%	1,240	100.0%
Two-year public	**Academic (PCC and other)**	570	30.2%	1,318	69.8%	1,888	100.0%
	Tech./Occ. only	5,433	83.4%	1,082	16.6%	6,515	100.0%
	Bus./IT/Pre-prof. only	2,252	82.2%	486	17.8%	2,738	100.0%
	Other combinations	1,858	65.4%	984	34.6%	2,842	100.0%
	Total	10,113	72.3%	3,870	27.7%	13,983	100.0%
Total Public PSE	**Academic (PCC and other)**	937	31.8%	2,010	68.2%	2,947	100.0%
	Tech./Occ. only	5,442	83.2%	1,097	16.8%	6,539	100.0%
	Bus./IT/Pre-prof. only	2,261	80.9%	534	19.1%	2,795	100.0%
	Other combinations	1,886	64.1%	1,056	35.9%	2,942	100.0%
	Total	10,526	69.1%	4,697	30.9%	15,223	100.0%

Missing data: Courses taken by 420 students dually enrolled in more than one sector and 1,352 students with missing course data are excluded. Note: Independent institutions do not report class types, accounting for most of the missing course data.

higher percentage of students who took academic courses in this sector matriculated than did those who took academic courses at four-year institutions. It appears that both dual enrollment at a four-year school and academic course-taking (regardless of sector) are correlated with college matriculation.

Into what sectors did students who took different types of courses matriculate? Table 25 presents students' sector of matriculation by the type of postsecondary courses they took while in high school. Three-quarters of students who took academic courses matriculated into four-year schools; the remaining quarter matriculated into the KCTCS. What is most interesting is the sizable number of students who took technical and occupational courses and matriculated into four-year sectors (30 percent). Clearly, academic courses are not the only dual enrollment pathway to matriculation into baccalaureate study.

Table 25. Sector of Matriculation by Type of Courses Taken While Dually Enrolled, 2003-04

Courses taken while dually enrolled	Matriculation sector							
	Four-year public		Two-year public		Independent		Total Students	
Academic (PCC and other)	1,279	63.6%	506	25.2%	225	11.2%	2,010	100.0%
Tech./Occ. only	321	29.3%	703	64.1%	73	6.7%	1,097	100.0%
Bus./IT/Pre-prof. only	216	40.4%	249	46.6%	69	12.9%	534	100.0%
Other combinations	333	31.5%	648	61.4%	75	7.1%	1,056	100.0%
Total	2,149	45.8%	2,106	44.8%	442	9.4%	4,697	100.0%

Missing data: 122 students with missing data are excluded. Note: Independent institutions do not report types of classes and are not included.

The definition of matriculation used in this study includes students who entered for both degree and nondegree study. Table 26 examines the degree-seeking status of matriculated students by sector and by the type of courses taken. Almost all students in every category matriculated for degree study, regardless of sector of dual enrollment or type of courses taken. The technical and occupational course-takers in the KCTCS have the lowest rate of degree matriculation, but it is still high at 90 percent.

Table 26. Degree-Seeking Status of Matriculated Dual Enrollment Students by Type of Courses Taken and Sector of Dual Enrollment, 2003-04

Dual Enrollment Sector and Courses Taken		Degree Status					
		Nondegree Seeking		Degree Seeking		Total Students	
Four-year public	**PCC & other academic**	16	2.3%	676	97.7%	692	100.0%
	Tech./Occ. only	.	.	15	100.0%	15	100.0%
	Bus./IT/Pre-prof. only	1	2.1%	47	97.9%	48	100.0%
	Other combinations	.	.	72	100.0%	72	100.0%
	Total	17	2.1%	810	97.9%	827	100.0%
Two-year public	**PCC & other academic**	42	3.2%	1,276	96.8%	1,318	100.0%
	Tech./Occ. only	106	9.8%	976	90.2%	1,082	100.0%
	Bus./IT/Pre-prof. only	15	3.1%	471	96.9%	486	100.0%
	Other combinations	42	3.2%	1,276	96.8%	1,318	100.0%
	Total	207	5.3%	3,663	94.7%	3,870	100.0%
Total Public PSE	**PCC & other academic**	58	2.9%	1,952	97.1%	2,010	100.0%
	Tech./Occ. only	106	9.7%	991	90.3%	1,097	100.0%
	Bus./IT/Pre-prof. only	16	3.0%	518	97.0%	534	100.0%
	Other combinations	58	2.9%	1,952	97.1%	2,010	100.0%
	Total	224	4.8%	4,473	95.2%	4,697	100.0%

Missing data: 122 students with missing data are excluded. Note: Independent institutions do not report types of classes and are not included.

Were Dual Enrollment Students more Successful in College?

From the postsecondary perspective, an important question about dual enrollment is whether or not it enhances student performance in later postsecondary study. To answer this question, the last section of this report examines the impact of dual enrollment on retention and students' GPA at the end of the sophomore year.

This set of tables draws on a different data source. Public institutions submit a student feedback file each year which tracks the entering cohort of degree-seeking undergraduates. This file tracks student progress through their first two years of postsecondary study, providing information on students' admissions and placement exam scores, their grades in certain courses, and their GPA at the end of their sophomore year. The 2002 cohort, which was tracked through spring 2004, is used here because this cohort had the most complete data as of this writing. For this study, a subset of the entering class was selected to include only those students who graduated from Kentucky high schools in 2002. Excluding adult and out-of-state students removes the students who could not have dually enrolled in Kentucky in 2001-02 and provides a better comparison group.

This analysis is also limited to students who entered public four-year institutions in 2002. In the course of conducting this study, it was discovered that many students who had dually enrolled in the KCTCS institutions while in high school and who later matriculated into the KCTCS after graduation were not being identified appropriately as first time students when they matriculated, and therefore were not included in the KCTCS's student feedback file. Because the data needed for this analysis was only available for a small number of former dual enrollment students who matriculated at the KCTCS, this sector has been excluded. Also, the independent sector is not included because too few independent institutions submitted student feedback files.

Table 27 gives an overview of the dual enrollment status of the entering freshman class of fall 2002. Thirteen percent of students entering public four-year institutions in that year had dually enrolled the previous year. UK enrolled the largest number of former dual enrollment students, while Murray State had the highest percentage, with almost one-fifth of their first year students. It is important to note that dual enrollment has increased considerably since this 2002 cohort was in high school, so it would be expected that the percent of incoming students involved in dual enrollment in high school has also grown. Table 28 presents the dual credit status of the students who dually enrolled.

Table 27. Students Entering Four-Year Public Universities in Fall 2002: Dual Enrollment Status by Institution

Institution of matriculation, Fall 2002	Had dually enrolled in 2001-02 school year?					
	Not dually enrolled		Dually enrolled		Total	
Eastern Kentucky University	1,117	87.3%	163	12.7%	1,280	100.0%
Kentucky State University	116	94.3%	7	5.7%	123	100.0%
Morehead State University	745	86.3%	118	13.7%	863	100.0%
Murray State University	679	81.4%	155	18.6%	834	100.0%
Northern Kentucky University	1,142	96.3%	44	3.7%	1,186	100.0%
University of Kentucky	2,394	83.9%	458	16.1%	2,852	100.0%
University of Louisville	1,542	83.0%	315	17.0%	1,857	100.0%
Western Kentucky University	1,762	89.7%	203	10.3%	1,965	100.0%
Total	9,497	86.7%	1,463	13.3%	10,960	100.0%

Note: Includes all students graduating from Kentucky high schools in 2002 who entered degree programs at four-year public postsecondary institutions in fall 2002.

Table 28. Students Entering Four-Year Public Universities in Fall 2002: Dual Enrollment Status by Institution

Institution of matriculation, Fall 2002	Dually enrolled for dual credit in 2001-02 school year?					
	Courses for postsecondary credit only		Dual credit courses		Total	
Eastern Kentucky University	102	62.6%	61	37.4%	163	100.0%
Kentucky State University	1	14.3%	6	85.7%	7	100.0%
Morehead State University	46	39.0%	72	61.0%	118	100.0%
Murray State University	86	55.5%	69	44.5%	155	100.0%
Northern Kentucky University	12	27.3%	32	72.7%	44	100.0%
University of Kentucky	216	47.2%	242	52.8%	458	100.0%
University of Louisville	139	44.1%	176	55.9%	315	100.0%
Western Kentucky University	98	48.3%	105	51.7%	203	100.0%
Total	700	47.8%	763	52.2%	1,463	100.0%

Note: Includes all students who dually enrolled in the 2001-02 AY and who entered degree programs at four-year public postsecondary institutions in fall 2002.

Table 29 presents the types of courses students took while they were dually enrolled. The majority of students took academic courses while in high school, with the next largest group taking a combination of course types ("other combinations").

Table 29. Students Entering Four-Year Public Universities in Fall 2002: Type of Courses Taken while Dually Enrolled

Type of Courses Taken	Number	Percent
PCC & other academic	860	58.8%
Tech./Occ. only	131	9.0%
Bus./IT/Pre-prof. only	74	5.1%
Other combinations	398	27.2%
Total	1,463	100.0%

But how did students' dual enrollment impact their performance in college? Two outcomes were examined to answer this question: students' probability of retention to the second year, and students' GPA at the end of their second year. If dual enrollment helps students perform better in college, it would be expected that students who dually enrolled in high school would be more likely to be retained and have higher GPAs than their peers.

Preliminary analyses by Council staff suggested that students who had dually enrolled were indeed more likely to be retained and had a higher mean GPA than their peers. But these analyses also found that students who dually enrolled had higher ACT scores than students who had not dually enrolled. This raised an important question: Was the success of dually enrolled students due to their experiences with dual enrollment, or was it due to their higher ACT scores? The better performance of dually enrolled students may be a selection effect whereby better-prepared students (who also perform well on the ACT) were more likely to dually enroll, and would have done well in college regardless of whether or not they had dually enrolled. Put another way, was dual enrollment *in and of itself* adding to students' postsecondary success, or is it simply reflecting other advantages that these same students were already receiving?

To consider this important question, an OLS regression was performed on students' ACT composite scores and logistic regression analyses were performed on students' retention at their starting institution and systemwide. These methods permit the examination of the affect of dual enrollment on GPA and retention while controlling for the effect of ACT. Detailed results are presented below, but in essence, these analyses show that dual enrollment, in and of itself, has a moderate positive impact on GPA but not on retention.

Table 30 presents the results from the regression of ACT comp score and dual enrollment status on students' GPA at the end of their sophomore year in college[1]. An interaction term was included to isolate the effect of the interaction between these two factors. No other covariates were included, so it is important to note that this analysis is not a model meant to predict a student's GPA, but simply an examination of the impact of dual enrollment on GPA while controlling for students' ACT scores. The low overall explanatory power of this model, which accounts for only 15 percent of the overall variation in GPA, underlines this point.

Looking at the parameter estimates in Table 30, both the ACT composite score and dual enrollment have statistically significant, positive effects on GPA. Students who dually enrolled while in high school had GPAs that were 0.37 points higher (on a 4.0 scale) than students who had not dually enrolled, independent of any differences in ACT score. This difference in GPA which is attributable to dual enrollment is roughly equivalent to the difference between a B and a B+, a B+ and an A-, etc. Also, for every additional one-point increase in ACT composite score, students' GPA at the end of the sophomore year was predicted to be 0.09 points higher, independent of their dual enrollment status. Therefore, compared to a student who got a 20 on the ACT, a student who got a 21 would have a GPA 0.09 points higher, while a student with a 30 on the ACT would have a GPA 0.9 points higher, almost a full letter grade. The interaction term was not significant, implying that there is no "multiplier" effect for students who had both a higher ACT score and had dually enrolled.

Table 30. OLS Regression of ACT Composite Score and Dual Enrollment on GPA at End of Sophomore Year of Students Entering Four-Year Public Universities in Fall 2002

N = 10,240
R-Square = 0.1

Parameter	Parameter Estimate
ACT composite score	0.09 **
Dual enrollment	0.37 **
Interaction term	-0.01

** Statistically significant at the $p < 0.01$ level.
Missing values: 720 students were missing GPA data and were excluded.

But what about the impact of dual enrollment on retention? Table 31 presents results for the logistic regression of dual enrollment and ACT comp score on two different measures of retention: retention to a second year of study at the same institution

[1] There is some disagreement among statisticians about the appropriateness of applying tests of statistical significance to population-level data such as the data used in this report. With that caveat, regression models are used in this report because they are the best currently available tools for weighing the relative impact of competing influences on an outcome.

at which students started and retention at any public or independent postsecondary institution in the state. As with the OLS regression, an interaction term was included. The parameters for dual enrollment and the interaction term were not significant; only students' ACT comp scores had a significant effect on their likelihood of retention at either their native institution or statewide. Therefore, the effect of dual enrollment in and of itself was negligible.

Table 31. Logistic Regression of ACT Composite Score and Dual Enrollment on Retention

Retention at Starting Institution
N = 10,741

Parameter	Maximum Likelihood Estimates	Odds Ratio Estimates
ACT composite score	0.114 *	1.21 *
Dual enrollment	-0.222	0.80
Interaction term	0.019	1.02

Retention at Any Public or Independent Institution in Kentucky
N = 10,741

Parameter	Maximum Likelihood Estimates	Odds Ratio Estimates
ACT comp score	0.133 *	1.142 *
Dual enrollment	-0.0337	0.712
Interaction term	0.034	1.035

* Statistically significant at the $p < 0.05$ level.
Missing values: 219 students were missing retention data and were excluded.

In conclusion, these multivariate analyses suggest that among students who matriculated into Kentucky's four-year public institutions, dual enrollment has a positive effect on GPA, but not on retention. While the reasons for this difference are unknown, this finding does suggest that dual enrollment has a modest positive influence on student success in regular postsecondary study, at least at the four-year level. It is important to note, however, that these findings do not necessarily apply to dual enrollment students who matriculated into the KCTCS or independent four-year institutions. Further research would be needed to determine the impact of dual enrollment on student success in these other postsecondary sectors.

The same models were also run to compare students who dually enrolled for dual credit with students who did not dually enroll at all, and to compare students who dually enrolled outside of dual credit programs with those who did not dually enroll at all. The results for neither of these groups differed substantially from the results described above, suggesting that both types of dual enrollment had the same effects on student success.

Summary and Next Steps

The growth of dual enrollment in recent years has prompted increased interest in this educational option and reignited discussion of dual enrollment policy. Discussion of dual enrollment policy quickly becomes complicated, however, because dual enrollment has been proposed to serve a wide range of educational goals, including reduction of high school drop-out rates, and improved workplace readiness. At this point, however, we do not have the data needed to evaluate these possibilities.

This research report has examined the primary questions about dual enrollment from a postsecondary perspective. Does dual enrollment increase college participation after high school and does it enhance student success? On the whole, this study finds that dual enrollment did not enhance college matriculation. 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 much lower rates. And it is these technical and occupational courses in which the greatest dual enrollment growth has occurred. These findings suggest that the development of more dual credit programs that provide academic rather than technical coursework may increase the matriculation rates of dually enrolled students.

As for dual enrollment's effect on student success, among students who matriculated into four-year public institutions, dual enrollment students had higher GPAs at the end of their second year of college -- a difference of about one-third of a letter grade. However, dual enrollment had no independent impact on retention. Overall, dual enrollment seems to have had a small, positive effect on student success, at least among students who matriculated into public, four-year institutions.

The Council staff will continue to study dual enrollment. A survey of postsecondary institutions' dual enrollment policies has recently been concluded. Also, Council staff will continue to examine postsecondary data with an eye toward the outcomes of dual enrollment. However, like any policy that involves P-16 education, some of the most interesting research about the possible outcomes of dual enrollment requires data matching across P-12, postsecondary, and even workplace systems. Kentucky's proposed P-16 data warehouse will help tremendously to fill this gap.