



# In Brief



University of Illinois at Urbana-Champaign

## **CAREER PATHWAYS, ACADEMIC PERFORMANCE, AND TRANSITION TO COLLEGE AND CAREERS: THE IMPACT OF TWO SELECT CAREER AND TECHNICAL EDUCATION (CTE) TRANSITION PROGRAMS ON STUDENT OUTCOMES**

**BY DEBRA D. BRAGG & COLLIN M. RUUD**

### **Introduction**

This brief summarizes results of a recently published study that examined the effects of career and technical education (CTE) transition programs on student matriculation from secondary to postsecondary education. The study was conducted through a collaborative arrangement between the University of Illinois at Urbana-Champaign's Office of Community College Research and Leadership (OCCRL) and the Academy for Educational Development and supported by the U.S. Department of Education, Office of Vocational and Adult Education (OVAE).<sup>1</sup> The study was divided into two components. One focused on secondary institutions' CTE transition programs and their effects on secondary student performance and college transition as well as student perceptions of the transition programs. The other component examined the postsecondary effects of the selected CTE programs on student transition and postsecondary outcomes, taking a retrospective look at students who matriculated from the specified high school CTE transition programs and comparing them to non-participants from the same sampled high schools. This analysis examined student persistence in college and whether the transition programs were related to remediation, credit attainment, number of terms attended, and certificate or degree attainment. Both components of the study examined the relationship between student outcomes and institutional engagement in CTE transition programs, a measure of institution-level commitment as evidenced by number of articulation agreements and faculty involvement in delivering CTE transition-related courses, on postsecondary education outcomes.

### **Related Literature**

Though vocational and technical education has a long history in the United States, CTE as a vehicle for college transition is a relatively new concept, becoming especially prominent in the past two decades as transition programs between secondary and postsecondary institutions evolved in association with tech prep, school to work, and related federal policy driven initiatives (Hull, 2005). CTE transition programs are also known as "career pathway" programs, which focus on transitioning students through secondary and into postsecondary education to gain competencies and enter careers that provide a family-sustaining wage. These programs emerged as more attention was placed on PK-20 (pre-Kindergarten through grade 20) education, revealing challenges in transitioning students from high school to college (Kirst & Venezia, 2004; Kazis, Vargas, & Hoffman, 2004; Ewell, Jones, & Kelly, n.d.). Documented challenges to student transition are related to ineffective or nonexistent transition and matriculation programs at the secondary and postsecondary levels. These challenges are particularly alarming since most family-wage sustaining careers are dependent on acquiring some level of postsecondary training (Haycock, 2006).

Community colleges play an important role in implementing and improving such transition programs, serving for decades as the location for technical education and workforce training (Carnevale & Desrochers, 2002). Considering that almost half of all students in public institutions are in community colleges (Almanac, 2005), such programs are vital to the strengthening of the United States' workforce and economy, as well as the country's global impact. CTE transition programs play an increasingly important role within community colleges' curricula by providing an avenue for youth and adults to progress to the postsecondary level and prepare for careers or transfer to four-year college and workforce training (Cohen & Brawer, 2003; Hughes & Karp, 2006).

<sup>1</sup> The 2007 report titled, *Career and Technical Education Pathway Programs, Academic Performance, and the Transition to College and Career* is available on the National Research Center for Career and Technical Education (NRCCTE) website at [www.nccte.org](http://www.nccte.org). The report is authored by Natasha Lekes, Debra Bragg, Jane Loeb, Catherine Oleksiw, Jacob Marszalek, Margaret Brooks-LaRaviere, Rongchun Zhu, Chloe Kremidas, Grace Akukwe, Hyeong-Jong Lee, and Lisa Hood.

The prevalence of CTE programs marks a shift in past vocational education that Bragg (2000) and Lynch (2000) view as the “new vocationalism,” in which greater emphasis is placed on secondary-to-postsecondary transition, and ultimately family-sustaining wage careers. The new vocationalism emphasizes the importance of the two-year associate degree, certification for advancement in employment and higher-wage careers, and transfer to four-year colleges and universities wherein students’ levels of education are extended to the baccalaureate degree and professional-level training. CTE programs that integrate rigorous academic subjects show promising results. Studies using national longitudinal data (see, for example, DeLuca, Plank, & Estacion, 2006) show CTE participants’ educational outcomes match high school college prep participants’ outcomes and exceed the outcomes of traditional CTE program participants.

Few studies demonstrate the effects of CTE transition programs on academic performance and postsecondary retention, although national studies have shown substantial academic course-taking behavior among tech prep participants (Bragg, Loeb, Gong, Deng, Yoo, & Hill, 2002), high rates of transition from secondary to postsecondary education (Bragg et al., 2002; Silverberg, Warner, Fong, & Goodwin, 2004), and significant results on employment for tech prep participants compared to non-participants (Bragg et al. 2002; Silverberg et al., 2004). Although not focusing solely on CTE transition programs, Adelman (2005) found persistence toward a four-year degree was evident among traditional age students who first matriculate to the community college. To facilitate implementation of CTE transition programs, researchers suggest that close communication be held between community colleges and multiple school districts to enhance collaboration and improve transitions for students (Bueschel & Venezia, 2006; Orr, 2000; Rosenbaum, 2002). Despite these insights, more research was needed on the implementation and efficacy of CTE transition programs and the impact of these programs on student outcomes.

## Purpose of the Study

This study examined secondary student matriculation to two selected community colleges offering CTE transition programs through partnerships with K-12 and secondary districts having numerous high schools. Both sites involved CTE transition pathway programs that sought to assist students with the transition from high school to college and into family-wage sustaining careers. One site involved a CTE transition program offering Information Technology/Computer Information Sciences (IT/CIS) curricula, and the other involved a CTE transition program offering the Health Alliance curricula, specifically Emergency Medical Technician (EMT).

## Methods

The study utilized a mixed method design to compare outcomes of participation versus non-participation in the selected IT/CIS and EMT career pathway programs at the secondary and postsecondary levels. The secondary component of the study examined

differences in students’ academic achievement and transition to college and careers between CTE transition participants and non-participants. With respect to the postsecondary component of the study, the experiences of students transitioning from a high school career pathway program to a local community college were studied retrospectively to examine student transition to and through the community college.

Consistent with the mixed method design, the study involved qualitative and quantitative data, with the quantitative segment examining the impact of participation in the CTE transition programs on students’ academic achievement and transition to college, as measured by students’ transcripts, attendance records, and survey data. The qualitative component of the study explored secondary and postsecondary perspectives with respect to core CTE transition practices thought to influence student outcomes. Additional qualitative data were collected from secondary students who participated in CTE transition programs to provide insight into student experiences in such programming and the perceived effect, if any, on academic achievement and preparedness for college.<sup>2</sup>

An important variable was institutional engagement, providing a measure of the level of engagement of the high schools offering CTE transition programs. This measure was based on administrator perception of the level of engagement of the high schools, plus the number of formal articulation agreements (used in the postsecondary component of the study).

## The Study Sites

The IT/CIS curriculum was offered in a total of 52 high schools and affiliated with a large, comprehensive community college with two campuses. The high schools utilized formal articulation agreements offering CTE dual credit courses to link the secondary and postsecondary curriculum. Students who matriculated to the community college’s Associate of Applied Science (AAS) degree programs specialized in application programming, database development, Web development, digital media, network administration, or hardware technical support. Partnerships between the secondary and postsecondary schools made the IT/CIS curriculum possible, largely due to the contributions of an intermediary agency that promoted relationships among educational partners and employers. Both CTE and Running Start (RS), a dual credit program emphasizing academic course work, offered dual credit courses and college placement testing to assess students’ readiness for college.

Within the secondary systems associated with the IT/CIS curriculum, many practices were used to enhance the career pathway system. A majority of high schools studied began the career pathway at the junior high level, offering introductory courses and some specific courses in the pathways. At the high school

---

2 For further discussion of the study methods, readers are asked to acquire the full technical report from the National Research Center for Career and Technical Education (NRCCTE) at [www.ncccte.org](http://www.ncccte.org).

level, students were encouraged to select a career pathway and follow the recommended courses of study, though the schools were careful not to track the students and potentially limit their options. At the postsecondary level, core practices included teaching courses in the home high schools of the students involved. Additionally, students were required to participate in 250 hours of work-based learning and would take college placement exams to address academic deficiencies during the junior or senior year of high school. In the Running Start (RS) program that emphasizes dual credit courses in the academic subjects, college credits were reimbursed with state funding, and courses were offered on the campus of the participating community college.

The Health Alliance curriculum at the second site was comprised of the Emergency Medical Services Technology program consisting of Emergency Medical Technology (EMT) Basic (EMT-Basic) and Paramedic (EMT-Paramedic) programs offered by a large, comprehensive community college serving a five-county region with multiple campuses. Student completers were eligible for EMT certification, and they could continue their study for the Associate of Science degree by taking 20 courses in general education and EMT supervision. The curriculum of particular interest to this study was the EMT-Basic Dual Enrollment program that began in 2000 through a partnership with the community college and one local high school. The program was first offered on the high school campus and later, having spread to three other high schools, was offered at the main community college and a branch campus location. The program consisted of an 11-hour EMT-Basic dual credit curriculum offered over a full academic year, with the high school students participating in classroom instruction during the first semester and work-based learning during the second semester. Contextual teaching and learning and career exploration were integrated into the career pathway curriculum.

## The Findings

Results reveal students' high school academic achievement, their transition from high school to college and careers, and their college performance, retention, and credential attainment. First, with respect to academic achievement, results on the ACT WorkKeys showed secondary CTE transition program students scored significantly higher than their matched non-CTE counterparts on the Reading for Information subtest of the ACT WorkKeys. Group differences were not evident on the ACT Applied Mathematics sub-test or on overall grade point average (GPA) at high school graduation.

Also, with respect to secondary course-taking, results showed CTE transition program students took significantly more CTE courses and course credits than their matched counterparts. A significant difference was also noted between the groups on dual credit courses, with CTE transition program students taking more than those in the non-CTE group. In the IT/CIS-curriculum site, an interaction effect was found between high school IT/CIS participation and math course-taking and also

between IT/CIS and science course-taking, revealing that math and science course-taking differed between the IT/CIS and non-IT/CIS groups, favoring the IT/CIS group, in medium engaged schools but not in high engaged schools. This finding may be attributed to the high engaged schools' involvement in whole school reform that encouraged all students to integrate advanced academic courses into career pathway programs of study. Medium engaged schools offered high school IT/CIS students opportunities to take math and science courses in association with CTE transition program participation that was not evident in the course-taking of non-IT/CIS students.

Results of the postsecondary study, which drew upon a sample of IT/CIS students who had matriculated to the community college from the selected high schools, confirmed no difference in the GPA of IT/CIS transition program students compared to the non-IT/CIS group and also with the Running Start dual credit group. A defining characteristic of the IT/CIS students in the postsecondary study was their participation in CTE dual credit, calling for special attention to dual credit as an aspect of the students' CTE transition program experience. Looking at academic course-taking, results show few students in the three comparison groups (IT/CIS dual credit, Running Start, and non-participant) completed a full college preparatory curriculum; however, despite completion of algebra 2 or higher of students in all three groups, IT/CIS dual credit students averaged about one level higher than the other two groups. IT/CIS dual credit students progressed significantly farther in math than did the non-participants though there were no group differences in science, English, or foreign language.

Extending results on academic performance from high school to college, the postsecondary study found IT/CIS dual credit students were more likely to be college-ready (as determined by placement testing conducted by postsecondary institutions in high schools) than non-participants in communication but not in math or overall, after controlling for other student background characteristics. Since the IT/CIS dual credit students started at a higher level, on the average, in mathematics but not communication than the non-participant group, there is some evidence that IT/CIS dual credit participation may be associated with better college preparation than was the case for non-participants. However, the inability to control for prior academic achievement level lessened the certainty with which a conclusion could be made that dual credit participation had a positive effect. Possibly it is the stronger academic students in these high schools who chose to participate, and who earned a grade of A or B and thus had their participation reflected in the community college record.

With respect to transition to college, the follow-up survey conducted as part of the secondary study revealed CTE transition program participants in both the IT/CIS and EMT sites felt more prepared than their matched non-CTE counterparts to transition to college and careers. CTE students were significantly more likely than non-CTE students to report that their high schools provided them with information on college programs

and courses that follow high school course-taking. At the end of high school, CTE transition program students were also significantly more likely than non-CTE students to report having a clear career goal and a plan to achieve their academic goals. When asked about a series of skills, CTE students were significantly more likely than their non-CTE counterparts to report that they had developed problem-solving, project completion, research, math, college application, work-related, communication, time management, and critical thinking skills during high school.

Also according to the follow-up survey associated with the secondary study, about half of the CTE students reported transitioning from high school to one of the target community colleges. By comparison the postsecondary (retrospective) study showed a more modest transition rate of 33 percent for the high school IT/CIS students (a limitation of this design is the focus on matriculation to the lead community college only). An equivalent percentage of Running Start students and the IT/CIS students, and students in these two groups were more likely to pursue their career path than their matched non-IT/CIS counterparts. Enrollment of high school EMT students at the community college was slightly less than 30 percent; no comparison was possible to a non-participant group because of data limitations. CTE transition program students in both sites displayed a higher rate of self-reported intent to pursue a postsecondary certificate or degree than non-CTE students.

In the IT/CIS curriculum where student records were available for analyzing college persistence, terms enrolled after high school did not differ by comparison group, but there were group differences in college level credits earned. IT/CIS dual credit students earned more credits than did non-participants, the mean difference being 22.3 credit hours. Running Start participants also earned more credits than did non-participants, by 36.4 credits on the average, and participants in Running Start averaged 14.1 more credits than those in the IT/CIS dual credit group.

Last, an interesting finding was revealed with respect to remediation in the postsecondary analysis. Students with higher remedial levels in both math and communication (less remedial need) enrolled in fewer terms than students with a lower remedial level but earned more college level credit, suggesting students are not necessarily hindered in continuing their studies by needing remediation, at least in the short term. This finding may lend support for Adelman's (2006) contention that remediation course-taking does not necessarily diminish college persistence.

## Discussion

This study offers numerous implications for practitioners and policymakers. First, results suggest participation in CTE transition programs does not interfere with academic course-taking in that participants are equally as prepared as matched non-CTE students and other relevant comparison groups. Second, student participation in CTE transition programs is associated with students feeling more prepared for the transition to college, with numerous results pointing to feelings of confidence and satisfaction with choices about college and careers. While the influence of feelings on behaviors is always difficult to predict, the fact that CTE transition program students reported higher levels of preparation for college and careers should be noted as a positive result. Third, despite the rather high incidence of remediation, students who required remedial course work are often retained in college-credit courses and are not impeded in their persistence in college, raising questions about the presumed detrimental impact of remediation on persistence. Finally, these results suggest dual credit plays a role in participants' accelerated progress and success at earning college certificates and degrees, and therefore suggests dual credit in association with academics and CTE may be an incentive to college persistence and completion.

These findings can inform high school-to-college transition policy pertaining to the implementation of CTE transition and career pathway programs. They are particularly meaningful to implementation of the new federal Carl D. Perkins legislation, coined Perkins IV, that calls for an expansion of career-related "programs of study" in that this study shows promising results when academic and CTE curricula are integrated with dual credit. They also suggest CTE transition programs that provide high school students with a dual focus on CTE and academic preparation, and that include accelerated college learning opportunities via dual credit, can facilitate student transition to college and a career without hindering academic performance. They also offer promising opportunities for high school students to develop academic and employability skills that then foster student success in preparing for careers in high demand occupational areas during their college education.

---

### The authors:

Debra Bragg is a professor of higher education in the Department of Educational Organization and Leadership and Director of the Office of Community College Research and Leadership (OCCRL) at the University of Illinois at Urbana-Champaign. She can be reached at [dbragg@uiuc.edu](mailto:dbragg@uiuc.edu).

Collin M. Ruud, Ed.M., is a Ph.D. student in higher education at the University of Illinois at Urbana-Champaign. He can be reached at [cruud2@uiuc.edu](mailto:cruud2@uiuc.edu).



---

## References

- Adelman, C. (2005). *Moving into town—and moving on: The community college in the lives of traditional-age students*. Washington: U.S. Department of Education.
- Adelman, C. (2006). *The toolbox revisited: Paths to degree completion from high school through college*. Washington: U.S. Department of Education, Office of Vocational and Adult Education.
- Almanac. (2005-2006). *The Chronicle of Higher Education*. Retrieved July 03, 2007 from <http://chronicle.com/free/almanac/2005/>.
- Bragg, D. (2000). The new vocationalism in American community colleges. *New Directions for Community Colleges*, no. 115. San Francisco: Jossey-Bass.
- Bragg, D., Loeb, J., Gong, Y., Deng, C., Yoo, J., & Hill, J. (2002, November). *Transition from high school to college and work for tech prep participants in eight selected consortia*. St. Paul: National Research Center for Career and Technical Education, University of Minnesota.
- Bueschel, A. D., & Venezia, A. (2006). Local pathways and state policies aligning standards and curricula. In D. Bragg & E. Barnett (Eds.), *Academic Pathways To and From the Community College* (pp. 29-38), No. 135. *New Directions for Community Colleges*. San Francisco: Jossey-Bass.
- Carnevale, A., & Desrochers, D.M. (2002). *The missing middle: Aligning education and the knowledge economy*. Princeton, NJ: Educational Testing Service.
- Cohen, A., & Brawer, F. (2003). *The American community college*. 4<sup>th</sup> ed. San Francisco: Jossey-Bass.
- DeLuca, S., Plank, S., & Estacion, A. (2006). *Does career and technical education affect college enrollment?* St. Paul: National Center for Career and Technical Education.
- Ewell, P.T., Jones, D.P., & Kelly, P.J. (n.d.). *Conceptualizing and researching the educational pipeline*. The National Information Center for Higher Education. Retrieved November 15, 2004 from <http://www.higheredinfo.org/supinfo/Pipeline%20Article.pdf>.
- Grubb, W.N. (1999). *Edging toward effectiveness: Examining postsecondary occupational education*. Independent Advisory Panel Meeting. National Assessment of Vocational Education. May 6-7. Retrieved February 25, 2005 from <http://www.tc.columbia.edu/ccrc/PAPERS/nave02.pdf>.
- Haycock, K. (2006, August). *Promise abandoned: How policy choices and institutional practices restrict college opportunities*. Washington: The Education Trust.
- Hughes, K., & Karp, M. (2006). *Strengthening transitions by encouraging career pathways: A look at state policies and practices*. New York: Community College Research Center Brief, no. 30, Teachers College, Columbia University.
- Hull, D. (Ed.). (2005). *Career pathways: Education with a purpose*. Waco, TX: Center for Occupational Research and Development.
- Kazis, R., Vargas, J., & Hoffman, N. (Eds.). (2004). *Double the numbers: Increasing postsecondary credentials for underrepresented youth*. Cambridge, MA: Harvard Education Publishing Group.
- Kirst, M.W., & Venezia, A. (Eds.). (2004). *From high school to college: Improving opportunities for success in postsecondary education*. San Francisco: Jossey-Bass.
- Lekes, N., Bragg, D., Loeb, J., Oleksiw, C., Marszalek, J., Brooks-LaRaviere, M., Zhu, R., Kremidas, C., Akukwe, G., Lee, H., and Hood, H. (2007). *Career and technical education pathway programs, academic performance, and the transition to college and career*. St. Paul, MN: National Research Center for Career and Technical Education (NRCCTE), University of Minnesota. (Available at [www.nccte.org/publications](http://www.nccte.org/publications))
- Lynch, R.L. (2000). *New directions for high school career and technical education in the 21<sup>st</sup> century* (Information series no. 384). Columbus, OH: ERIC Clearinghouse on Adult, Career, and Vocational Education. (ERIC Document Reproduction Service No. ED444037). Retrieved February 2, 2005 from <http://SearchERIC.org/ericdc/ED444037.htm>.
- Orr, T. (2000). *Community college and secondary school collaboration on workforce development and education reform: A close look at four community colleges*. New York: Community College Research Center, Brief 7, Teachers College, Columbia University.
- Rosenbaum, J.E. (2002). *Beyond empty promises: Policies to improve transitions into college and jobs*. Washington: U.S. Department of Education, Office of Vocational and Adult Education. Retrieved March 14, 2005 from <http://www.earlycolleges.org/Downloads/EmptyPromisesRosenbaum.pdf>.
- Silverberg, M., Warner, E., Fong, M., & Goodwin, D. (2004). *National assessment of vocational education: Final report to Congress*. Washington: U.S. Department of Education.

---

The work reported herein was supported under the National Research Center for Career and Technical Education Program, PR/Award No. VO51A990006 administered by the Office of Vocational and Adult Education, U.S. Department of Education. However, the contents do not necessarily represent the positions or policies of the Office of Vocational and Adult Education or the U.S. Department of Education, and you should not assume endorsement by the Federal Government.

The Office of Community College Research and Leadership (OCCRL) was established in 1989 at the University of Illinois at Urbana-Champaign. Our primary mission is to provide research, leadership, and service to community college leaders and assist in improving the quality of education in the Illinois community college system. Projects of this office are supported by the Illinois Community College Board (ICCB), and are coordinated with the Illinois State Board of Education (ISBE), along with other state, federal, and private and not-for-profit organizations. Debra D. Bragg, Ph.D. is the Director of OCCRL and is a professor of higher education at UIUC. Catherine Kirby, Ed.M. is Assistant Director of OCCRL and managing editor of the *UPDATE* newsletter. The contents of our Briefs and bi-annual *UPDATE* newsletters do not necessarily represent the positions or policies of OCCRL or the University of Illinois. Comments or inquiries about our publications are welcome and should be directed to [OCCRL@uiuc.edu](mailto:OCCRL@uiuc.edu).



University of Illinois at Urbana-Champaign  
College of Education  
51 Gerty Drive, CRC Room 129 · Champaign, IL 61820  
217-244-9390 · Fax: 217-244-0851  
Website: <http://occrcl.ed.uiuc.edu>