Journal of The First-Year Experience & Students in Transition, 2011, Vol. 23, No. 2, pp. 75-91

Career and Technical Education Students Who Transition to Four-Year Institutions: An Exploratory Study

Wen Qi
James S. Cole
Indiana University

Abstract. Each year more students with career and technical education (CTE) backgrounds are transitioning to four-year institutions. This exploratory study investigated differences between CTE, community college transfers and native (nontransfer) students at four-year institutions in regard to how they balance their time and their academic engagement patterns. An important finding of this study was that CTE students, when compared to traditional nontransfer students and community college transfers, spent equal amounts of time studying and demonstrated equal or significantly greater levels of academic engagement. The findings also provide the higher education community much needed information regarding the CTE students' transition to college.

A recent report released by National Center for Education Statistics (NCES) indicates that the number of students enrolled in career and technical education (CTE) fields at the postsecondary level increased by about one-half million students between 1990 and 2005 (Levesque et al., 2008). The National Research Center for Career and Technical Education points out that in some districts more students were enrolled in CTE programs at both the secondary and postsecondary levels during the recent economic recession (Stone, 2009). Also, NCES reports that 71% of all sub-baccalaureate students (those enrolled in two-year or shorter postsecondary programs) are enrolled in CTE fields

(i.e., vocational education; NCES, 2000, 2004). Moreover, the total number of sub-baccalaureate institutions offering CTE declined in the late 1990s, then increased each year between 2001 and 2006, resulting in a net increase of 3% over the nine-year period between 1997 and 2006 (NCES, 2008); therefore, it is highly likely that the number of students enrolled in CTE programs offered by sub-baccalaureate institutions is also increasing and will continue to do so in the near future.

CTE Students and Baccalaureate Programs

One phenomenon that is not well understood is how many of these CTE students eventually find their way to a baccalaureate program. A recent *Beginning Postsecondary Students Longitudinal Study* (Berkner & Choy, 2008) shows that 81% of students who enroll in two-year postsecondary institutions and 37% of students who enroll in less than two-year postsecondary institutions plan to transfer from their first institutions for the purpose of pursuing a bachelor's degree. As a result it is likely that two trends will continue in the coming years: (a) the total number of students enrolled in CTE fields at both high school and postsecondary levels will continue to increase and (b) the number of students transitioning from postsecondary CTE institutions to baccalaureate-degree granting institutions will also rise. However, little is known about the experience of these students after they have transferred to a four-year institution. Extant literature about the postsecondary experiences of CTE students either does not take into consideration the type of institutions they enroll in or groups them with other transfer students in four-year institutions.

The traditional belief that CTE programs at the secondary level are merely an alternative to traditional academic/college-prep courses is changing. For example, the majority (85%) of high school CTE concentrators now complete a full academic program, with approximately 60% eventually enrolling in postsecondary education (Gray, 2004). Lichtenberger (2004) notes that CTE students are often stereotyped as (a) not being leaders in school, (b) not having college-educated parents, (c) being motivated by material rewards, (d) enjoying nonacademic classes more than academic ones, (e) being easily influenced by peers, and (f) not being from middle to upper socioeconomic classes. These negative stereotypes are being challenged. For example, a 2003 report from the National Research Center for Career and Technical Education found that during the 1990s, CTE concentrators participated in more rigorous academic coursework, and, when compared with general students, CTE students were taking more and higher level math and science courses (Stone & Aliaga, 2003). Also, CTE students have shown significantly higher student achievement in reading, math, and science than students at schools with less integrated programs (Southern Regional Education Board, 2004). Most importantly, in terms of postsecondary achievement, reports have shown that high school students who took most of their credits in occupational courses were more likely to aspire to earn bachelor's degrees, and among those CTE high school students who later enrolled in college, more students have attained a bachelor's degree (or higher) than either an associate degree or postsecondary certificate (Levesque et al., 2008; DeLuca, Plank, & Estacion, 2006).

The above findings lead us to consider the important and unique contribution of CTE education at the postsecondary level. As Gray (2002, 2004) points out, historically CTE at the secondary level has effectively prevented students from dropping out of high school. At the postsecondary level, CTE also plays an important role in preparing students to succeed in the workforce or transfer to four-year institutions to pursue a baccalaureate degree (Association for Career and Technical Education, 2007). Further, as recent reports indicate, it is likely that CTE students have higher academic achievement than their peers in a general education track in both two-year and four-year institutions. If these hypotheses are true, the fact that nearly 50% of transfer students actually come from technical programs in community colleges (Eggleston & Laanan, 2001), and that more CTE students from sub-baccalaureate institutions are planning to transfer to a four-year institution warrants the exploration of post-transfer experiences.

Limited research is available on the learning experiences of CTE students who have transferred to a four-year institution. In a study of the retention of first-time college students who were originally CTE high school graduates, Ko (2005) found that retention rates were lower than those of general students in both two- and four-year public colleges and universities. Other studies have investigated whether students from sub-baccalaureate institutions, including both CTE institutions and general community colleges, are transfer ready when they move to a four-year institution (Johnson-Benson, Geltner, & Steinberg, 2001) and the potential barriers that might occur during the transfer process (e.g., Rendón & Valadez, 1993; Townsend, 1995). The question that emerges is, What happens to CTE students after they have transferred from sub-baccalaureate institutions to four-year institutions?

To explore this question, this study focused on students' academic engagement patterns after transfer, including hours per week spent on academic and nonacademic tasks, as a way to understand their college experiences. As many scholars have indicated, the time and energy students devote to educationally purposeful activities is the single best predictor of their learning and personal development (Astin, 1993; Pascarella & Terenzini, 2005). In addition, students

Journal of The First-Year Experience & Students in Transition, 2011, Vol. 23, No. 2, pp. 75-91

who are actively involved in both academic and cocurricular activities gain more from the college experience than those who are not so involved (Pascarella & Terenzini). This exploratory study, therefore, compared the engagement patterns of college students who had career and technical education (CTE) experience before transferring to a four-year institution with those students who transferred solely from a community college or were native students (nontransfer). For clarification, CTE students are those students who have attended a postsecondary vocational/technical school or vocational program in a community college prior to transferring to a bachelor's program at a four-year institution.

The primary research questions that guided the study were

- (RQ1) Is there a difference in how CTE students balance their time compared to traditional nontransfer students?
- (RQ2) What are the similarities and differences in the engagement patterns of CTE students and nonCTE students?

Method

Sample

Data for this study were collected from higher education institutions in the United States that participated in the National Survey of Student Engagement (NSSE) in 2009. NSSE, administered annually by the Center for Postsecondary Research at Indiana University, collects data from hundreds of thousands of students enrolled at baccalaureate colleges and universities regarding their participation in programs and activities that promote their learning, personal, and professional development. NSSE does not collect data regarding student learning *per se*, but rather collects data regarding the processes that contribute to student learning and academic success. In 2009, there were 363,379 full-time, first-year or senior students who completed NSSE from 640 four-year institutions in the United States and Canada. The target population included full-time, first-year and senior students who indicated that they were previously enrolled at a vocational or technical school (CTE) before transferring to a four-year institution. Two other groups were created for purposes of comparison: (a) CC (respondents who transferred from a community colleges and who indicated they were not previously enrolled in a CTE school) and (b) NT (traditional, nontransfer students). Respondents who indicated that they previously attended both a CTE school and a community college were excluded from the analysis. Also excluded from the comparison groups were students who attended institutions that did not enroll transferred CTE students, as identified in the study. Therefore, the respondents in the comparison groups and the CTE group were enrolled at the same institutions.

The CTE sample included 1,150 first-year, full-time students (62% female; 20% African American; 66% first-generation; 45% age 30 or older), and 5,285 senior year, full-time students (60% female; 14% African American; 66% first-generation; 59% age 30 or older) enrolled at 302 and 430 four year institutions, respectively (Table 1). Overall, there seemed to be little difference regarding the proportion of females across the groups. However, proportionately there were far more African American, first-generation, and older adult students represented in the CTE groups compared to other groups.

Table 1
Characteristics of Respondents by Group

		First-year students			Senior students		
		CTE	**CC**	**NT**	**CTE**	**CC**	**NT**
Gender	Female	62%	66%	65%	60%	66%	63%
	Male	38%	37%	35%	40%	34%	37%
Ethnicity/ race	Asian	3%	4%	5%	3%	4%	5%
	Black	20%	12%	8%	14%	8%	6%
	Hispanic	7%	8%	6%	6%	8%	5%
	White	54%	64%	69%	64%	68%	77%
	Other	6%	4%	5%	5%	5%	2%
	Unknown	10%	8%	7%	8%	7%	5%
First-generation	Yes	66%	56%	44%	66%	58%	36%
	No	34%	44%	56%	34%	42%	64%
Age	19 or younger	13%	39%	92%	0%	0%	0%
	20-23	20%	29%	5%	12%	41%	91%
	24-29	22%	13%	1%	29%	31%	6%
	30 or older	45%	19%	2%	59%	28%	3%
	Total	1,150	3,215	59,481	5,285	25,951	54,548

The target sample of CTE students was proportionately small compared to the comparison groups, and this was at least partly due to the fact that the samples were limited to include only full-time enrolled students. However, due to the paucity of research on CTE students who transfer to four-year institutions, this study provided much needed information regarding CTE students and their experience in four-year colleges.

Variables

NSSE is comprised of 85 items, including hours per week spent on specific activities and the extent to which students are engaged in educationally relevant activities. A total of 14 additional items collect student background characteristics.

Six NSSE variables ask students to estimate the number of hours per week they spend studying or preparing for class (STUDY), working for pay on and off campus (WORK), participating in cocurricular activities (COCUR), providing care for dependents (DEPEND), commuting to class (COMM), and relaxing/socializing (SOCIAL). Response categories for these items are zero, 1-5, 6-10, 11-15, 16-20, 21-25, 26-30, and more than 30. Though these are ordinal responses, for purposes of comparing average hours spent per week in the activities, mean scores were calculated using the mid-point of each category. This allowed for the assumption that the respondents' true responses were randomly distributed within each category and thus the midpoint for each category was also the mean.

NSSE Benchmarks of Effective Educational Practice

Four scales (Benchmarks of Effective Educational Practice) were created using items from NSSE:

1. Level of Academic Challenge (LAC): Eleven items that represent challenging intellectual and creative work such as reading, writing, and higher-order mental activities
2. Active and Collaborative Learning (ACL): Seven items about how students take initiative for their own learning and working with others in solving problems
3. Supportive Campus Environment (SCE): Six items that ask students to rate their campus environments and their relationships with other students, faculty, and administrative offices
4. Student-Faculty Interaction (SFI): Five items about interacting in meaningful ways with faculty members inside and outside the classroom

Internal consistencies for the scales used in this study were 720 (LAC), .680 (ACL), .766 (SCE), and .730 (SFI). Skewness and kurtosis did not exceed accepted levels and were deemed adequate for analysis. Other psychometric properties of the NSSE are reported in detail by Kuh (2002).

Analysis

The original intent was to use MANCOVA with three institution-level covariates and three student level covariates to produce adjusted means. However, with the inclusion of any of the covariates, the assumption for homogeneity of regression could not be met. Therefore, for RQ1 and RQ2, MANOVA with post hoc comparisons using a Bonferroni adjustment was used to investigate mean differences between the three groups (Tabachnick & Fidell, 2001). Homogeneity of variance was evaluated by Levene's test of equality of error variances (Tabachnick & Fidell). Given that is a very conservative test, the probability was evaluated greater than .001. In addition, the Fmax ratio was calculated to check that the smallest variance is not greater than 10 times the largest variance (Tabachnick & Fidell). In both tests and in all instances, the assumptions for homogeneity of variance were met.

Results

(RQ1): Is there a difference in how CTE students balance their time compared to traditional non-transfer students?

Overall, CTE first-year students spent on average approximately 63 hours per week studying, engaging in cocurricular activities, socializing and relaxing, providing dependent care, commuting, and working. CC and NT students spent approximately 54 and 46 hours per week in these same activities, respectively. MANOVA results for first-year students found significant overall main effects for group membership on COCURRICULAR ($F = 205.40$, $p < .01$, omega2 = .007), SOCIAL ($F = 172.283$, $p < .001$), omega2 = .006), DEPEND ($F = 2097.22$, $p < .01$, omega2 = .063), COMMUTE ($F = 19.30$, $p < .05$, omega2 = .001), and WORK ($F = 1236.92$, $p < .001$, omega2 = .038). There were no significant differences between the groups for STUDY ($F = .30$, $p > .05$, omega2 = .000). The mean scores and standard errors are reported in Table 2.

Table 2
Mean Hours Per Week by Activity (Study, Cocurriluar, Socializing, Dependent Care, Commuting, and Working) for First-Year Students

	CTE	CC	CC
Study M(SE)	13.85(.241)	13.72(.144)	13.84(.033)
Cocurricular M(SE)	2.21(.219)	3.44(.131)	5.41(.030)
Socializing M(SE)	8.99(.243)	10.19(.145)	12.21(.034)
Dependent Care M(SE)	13.56(.210)	7.83(.125)	2.62(.029)
Commuting M(SE)	5.29(.154)	5.02(.092)	4.60(.021)
Working M(SE)	18.86(.316)	14.08(.188)	7.29(.044)

Using the nontransfer students (NT) as the reference group, the post hoc results in Table 3 reveal that the largest mean difference for first-year CTE students was providing dependent care and working. CTE students spent approximately 11 hours more per week providing care and working compared to traditional, nontransfer students. CC students also spent significantly more time providing dependent care and working compared to NT students, but the difference was about half compared to CTE students. CTE and CC students spent significantly more time commuting compared to NT students, but the effect size was quite small. There was no significant difference between CTE and NT or CC and NT students for hours studying. NT students spent significantly more time in cocurricular activities and socializing/relaxing compared to CTE or CC students.

Overall, CTE senior students spent on average approximately 66 hours per week studying, engaging in cocurricular activities, socializing/relaxing, providing dependent care, commuting, and working. CC and NT students spent approximately 59 and 53 hours per week in these same activities, respectively. MANOVA results for senior students found significant overall main effects for the group membership on STUDY ($F = 87.98$, $p < .01$, omega2 = .002), COCURRICULAR ($F = 2637.35$, $p < .001$, omega2 = .059), SOCIAL ($F = 911.04$, $p < .001$, omega2 = .021), DEPEND ($F = 6756.03$, $p < .001$, omega2 = .139), COMMUTE ($F = 696.78$, $p < .001$, omega2 = .016), and WORK ($F = 1175.28$, $p < .001$, omega2 = .027). The mean scores and standard errors are reported in Table 4.

Table 3
Activity Mean (Study, Cocurriluar, Socializing, Dependent Care, Commuting, and Working) Post hoc Comparison Results (Bonferroni Adjustment) for First-Year Students

DV	Comparisons		Mean Difference	Sig
Study	CTE	NT	0.01	1.00
	CC	NT	-0.11	1.00
Cocurricular	CTE	NT	-3.20	.000
	CC	NT	-1.97	.000
Socializing	CTE	NT	-3.21	.000
	CC	NT	-2.01	.000
Dependent Care	CTE	NT	10.94	.000
	CC	NT	-5.21	.000
Commuting	CTE	NT	0.69	.000
	CC	NT	0.42	.000
Working	CTE	NT	11.57	.000
	CC	NT	6.79	.000

Table 4
Mean Hours Per Week by Activity (Study, Cocurriluar, Socializing, Dependent Care, Commuting, and Working) for Senior Students

	CTE M(SE)	CC M(SE)	NT M(SE)
Study	15.93(.122)	14.73(.055)	14.32(.038)
Cocurricular	2.05(.101)	2.76(.045)	6.39(.031)
Socializing	8.74(.106)	9.55(.048)	11.71(.033)
Dependent care	14.32(.132)	9.42(.060)	2.69(.041)
Commuting	5.69(.068)	5.79(.031)	4.45(.021)
Working	19.08(.169)	17.03(.076)	13.26(.053)

Using the nontransfer students (NT) as the reference group, the post hoc results in Table 5 reveal that the largest mean difference for senior CTE students was again providing dependent care and working. CTE students spent approximately 6 to 12 hours more per week providing care and working compared to traditional, nontransfer students. CC students also spent significantly more time providing dependent care and working compared to NT students, but the difference was about half compared to CTE students. Unlike the results with first-year students, CTE and CC students spent significantly more time studying compared to NT students. NT students spent significantly more time in cocurricular activities and socializing/relaxing compared to CTE or CC students.

Table 5
Activity Mean (Study, Cocurriluar, Socializing, Dependent Care, Commuting, and Working) Post hoc Comparison Results (Bonferroni Adjustment) for Senior Students

DV	Comparisons		Mean Difference	Sig
Study	CTE	NT	1.20	.000
	CC	NT	0.41	.000
Co-curricular	CTE	NT	-4.35	.000
	CC	NT	-3.64	.000
Socializing	CTE	NT	-2.97	.000
	CC	NT	-2.15	.000
Dependent Care	CTE	NT	11.64	.000
	CC	NT	6.73	.000
Commuting	CTE	NT	1.23	.000
	CC	NT	1.33	.000
Working	CTE	NT	5.82	.000
	CC	NT	3.78	.000

(RQ2): What are the similarities and differences in the engagement patterns of CTE students and nonCTE students?

MANOVA results for first-year students found significant overall main effects for group membership on LAC ($F = 12.65, p < .001$, omega2 = .000), ACL ($F = 19.67, p < .001$, omega2 = .001), SFI ($F = 4.82, p < .01$, omega2 = .000), and SCE ($F = 21.22, p < .001$, omega2 = .001). The adjusted mean scores and standard errors are reported in Table 6.

Table 6
Engagement Mean (LAC, ACL, SFI, SCE) for First-Year Students

Engagement	CTE M(SE)	CC M(SE)	NT M(SE)
LAC	55.71(.388)	53.94(.233)	53.76(.054)
ACL	45.76(.473)	44.54(.284)	43.39(.066)
SFI	35.84(.530)	35.34(.318)	34.63(.074)
SCE	60.63(.546)	60.48(.328)	62.42(.076)

The post-hoc comparisons (Table 7) revealed that the largest adjusted mean difference between the CTE transfer students and the nontransfer students (NT) was in the perceptions of supportive campus environment (SCE) where CTE students perceived the campus to be significantly less supportive (mean difference = -2.0, $p < .001$). Similarly, CC students also reported lower SCE compared to NT students (mean difference = -1.9, $p < .001$). However, regarding academic engagement, CTE students reported being significantly more engaged in LAC (mean difference = 1.8, $p < .001$) and SFI (mean difference = 1.8, $p < .01$). CTE students did not report significantly different levels of engagement in ACL. CC students also reported significantly higher levels of engagement with faculty (mean difference = 1.3, $p < .001$). However, unlike CTE students, they did report significantly higher levels of engagement in ACL (mean difference = .07, $p < .05$), but not in LAC.

Table 7
Engagement Mean (LAC, ACL, SFI, SCE) Post hoc Comparison Results (Bonferroni Adjustment): First-Year Students

DV	Comparisons		Mean Difference	Sig
LAC	CTE	NT	1.96	.000
	CC	NT	0.18	1.00
ACL	CTE	NT	2.38	.000
	CC	NT	1.16	.000
SFI	CTE	NT	1.22	.069
	CC	NT	0.71	.087
SCE	CTE	NT	-1.79	.004
	CC	NT	-1.93	.000

MANOVA results for senior students found significant overall main effects for the group membership independent variable on LAC ($F = 57.60, p < .001$, omega2 = .001), ACL ($F = 15.42, p < .001$, omega2 = .000), SFI ($F = 423.97$, $p < .001$, omega2 = .010), and SCE ($F = 43.69, p < .001$, omega2 = .001). The adjusted mean scores and standard errors are reported in Table 8.

The post-hoc comparisons (Table 9) reveal that the largest adjusted mean difference between the CTE transfer students and the nontransfer students (NT) was in SFI. In stark contrast to the differences reported by first-year students, senior CTE (and CC) students reported significantly less interaction with faculty than NT students (mean difference = -2.9, $p < .001$ for both CTE and CC senior students). Also, unlike their first-year counterparts, senior CTE and CC students reported significantly less engagement in ACL compared to NT students. Senior CTE students, on the other hand, did report significantly less support from their campus (SCE) (mean difference = -1.9, $p < .001$), similar to first-year CTE students. However, regarding engagement in academically challenging activities (LAC), CTE students reported being significantly more engaged (mean difference = 0.7, $p < .01$; mean difference = 0.6, $p < .05$).

Table 8
Engagement Mean (LAC, ACL, SFI, SCE) for Senior Students

Engagement	CTE M(SE)	CC M(SE)	NT M(SE)
LAC	59.36(.192)	58.16(.086)	57.46(.060)
ACL	52.91(.233)	52.33(.105)	53.04(.072)
SFI	40.82(.286)	41.45(.129)	45.63(.089)
SCE	59.16(.262)	58.98(.118)	60.28(.082)

Table 9
Engagement Mean (LAC, ACL, SFI, SCE) Post hoc Comparison Results (Bonferroni Adjustment) for Senior Students

DV	Comparisons		Mean Difference	Sig
LAC	CTE	NT	1.90	.000
	CC	NT	0.70	.000
ACL	CTE	NT	-0.13	1.000
	CC	NT	-0.71	.000
SFI	CTE	NT	-4.81	.000
	CC	NT	-4.18	.000
SCE	CTE	NT	-1.12	.000
	CC	NT	-1.29	.000

Discussion

The results of this exploratory study provided much needed information regarding the characteristics of CTE students and how they may be different from community college transfer students and native (nontransfer) students. Some limitations should be noted, however. One is that the analysis was limited to only those students who enrolled full-time at a baccalaureate institution. Since many CTE transfer students are enrolled part time and/or at community colleges, it may not be appropriate to generalize the results of this study to all CTE transfer students. In addition, this study relied on students to accurately self-report their transfer status. Some CTE programs are located at community colleges, and it may have been difficult for these students to distinguish their status as a community college transfer or a CTE transfer.

Despite these limitations, important results from this study include the idea that the traditional negative academic stereotype of CTE students may not be warranted. The results showed that compared to traditional nontransfer college students, first-year students who transferred with CTE background spent equal amounts of time studying and had equal or significantly greater levels of engagement in academically challenging activities and student-faculty interaction. Therefore, first-year CTE students are on par, if not exceeding, the academic engagement of their nontransfer peers. However, CTE students reported significantly lower levels of support from the campus. Senior CTE students reported significantly higher engagement in academically challenging activities, but also significantly

lower levels of engagement in active and collaborative learning, and student-faculty interaction. Overall, the negative academic stereotype that sometimes accompanies CTE students is not supported by the results of this study. There were several indicators of student engagement where the CTE students are equivalent to, or surpass the traditional, nontransfer student. This is an important outcome that should be reinforced within the four-year college community. Many CTE students are bright, capable, motivated students who can perform at the same level as other college students. Further, after they transfer to four-year institutions, they are equally prepared as their peers in terms of academic engagement.

The second important result was the hours CTE students reported working and providing dependent care. First-year CTE students reported working twice as many hours and four times more hours providing dependent care compared to their nontransfer peers. This is likely due to the fact that a large portion of CTE students are older than traditional nontransfer students, and compared with other credential-seeking undergraduate students, a relatively higher percentage of this group are from low-income families (NCES, 2008). By the senior year, CTE students still spend significantly more hours working and providing dependent care, but the gap was narrowing. These older CTE students are clearly entering baccalaureate programs with more family and work obligations. Though many institutions are adapting, baccalaureate institutions were historically designed to accommodate the traditional age students. This may explain why these first-year and senior CTE students reported significantly lower levels of support from their campus environment. They are studying as much as their peers, are in many ways equally as engaged, but at the same time have many more obligations to fill their time. Flexibility is critical for these students.

One of the major challenges faced by CTE students is time management since they might have more financial and family obligations. Although this study did not investigate the time management skills of CTE students, it is reasonable to assume that such skills for first-year CTE students would be crucial to their persistence and academic success. Time management skills are often included in first-year programming (Upcraft, Gardner, Barefoot, & Associates, 2005), but it may be in the institutions' interest to make sure these skills are being targeted at older, CTE students. A related result is that CTE students reported feeling less supported by their campus to be successful. Feeling less supported along with the increased hours working and providing dependent care is troubling. Therefore, college staff and faculty in four-year institutions should be particularly sensitive to the time constraints of CTE students; efforts to enhance their interaction with faculty as well as improve relevant campus support services are also necessary.

Finally, another important finding is the comparison with community college transfers. In almost all cases, the community college transfer fell somewhere in between the CTE student and the nontransfer student experiences. The implications are that CC students are different from their CTE counterparts and that there is a need to distinguish these two groups to ensure better transition experiences for these students.

Overall, this exploratory study provided the higher education community with much needed information regarding the transition of CTE students to baccalaureate level institutions. Additional research, particularly regarding the factors that undermine the successful persistence and degree completion of these students, will further the knowledge base and help CTE students as they transition into and through college.

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Note

A previous version of this paper was presented at the Association for Institutional Research annual convention in Atlanta, GA, June, 2009.

Reader May Respond:

Wen Qi
Center for Postsecondary Research
Indiana University
1900 East 10th Street, Suite 419
Bloomington, IN 47406
E-mail: weqi@indiana.edu