The Engagement of Career and Technical Education Students Who Transfer to Four-Year Institutions

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Introduction and Literature Review

The purpose of this study is to examine the engagement pattern of college students who have career and technical education (CTE) experience (aka, vocational education) before transferring to a four-year institution. These students either have attended a post-secondary vocational/technical school or vocational programs in a community college before transferring to a bachelor’s program at a four-year institution.

According to the Beginning Postsecondary Students Longitudinal Study 04-06 (Berkner, L., & Choy, S., 2008), 81% of students who enroll in two-year post-secondary institutions plan to transfer from their first institutions for the purpose of pursuing bachelor’s degree; and an average of 37% of students who enroll in less-than-two-year post-secondary institutions plan to transfer for the same goal. In addition, pursuing bachelor’s degree is shown as the most likely reason to transfer. Since CTE students constitutes a high percentage in the enrollment of the above two types of non-four-year institutions, it is likely that a significant number of transferred students in four-year institutions have a CTE background. However, extant literature about the post-secondary experience of CTE students either does not take into consideration the type of institutions they enroll in, or group them with other transferred students in four-year institutions; nearly no comprehensive research has been done about CTE students’ experience in four-year institutions.

What we do know about CTE students is that the curricular and career orientations of CTE programs on all levels are traditionally different from general academic programs (Hyslop-Margison, 2001). Associated with this feature is a mainly negative stereotype about the group of CTE students in general. For example, they are recognized as less academically successful, lower educational aspirations, no plan to go to college or less likely to adapt to college environment, etc (Arum & Shavit, 1995; Eggleston & Laanan, 2001; Gamoran, 1987; Lichtenberger, 2004; Rojewski, 1997). These students are believed to have more explicit personal and career goals (Green, 1998), which is often explained by their elder age compared with traditional non-transfer college students. Recent studies have presented some new findings about CTE students. For example, among high school students, those who take most of their credits in occupational course have shown highest aspiration to a bachelor’s degree; and among those CTE high-school students who later enroll in college, more students have attained a bachelor’s or higher degree than either an associate’s degree or postsecondary certificate (Levesque, K. et al, 2008; DeLuca S. et al, 2006). These findings challenge the present stereotype in two ways: first, it contradicts the notion that all CTE students have lower aspiration about their academic career; and second, the statement that CTE students are less academically successful in college may not be accurate.

The findings discussed above also indicate that CTE students in colleges may have different experiences compared with traditional non-transfer students and students who have transferred from non-CTE background. Therefore, it is the purpose of this study to try to explore more about the experience of CTE students in four-year institutions. Due to the data availability, this study will focus on the college experience of CTE students who have transferred to four-year institutions from other less-than-two-year and two-year post-secondary institutions.

This study will focus on students’ academic engagement pattern as a way to understand their college experience. As many scholars have pointed out, 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 who are actively involved in both academic and out-of-class activities gain more from the college experience than those who are not so involved (Pascarella & Terenzini, 1991). Therefore, the primary research questions guiding this study are:

1. Is there a difference in how CTE students balance their time compared to traditional non-transfer students?
2. What are the similarities and differences in the engagement patterns of CTE students and non-CTE students?
3. Is there any difference between CTE and non-CTE students in the relationship of engagement with outcomes?

Method

Sample
This study will use data from the 2008 National Survey of Student Engagement (NSSE). In 2008, 469,339 full-time first-year or senior students completed NSSE from 774 four-year institutions in the US. Our target population includes full-time first-year students who indicated that they had post-secondary vocational or technical education background before transferring to a four-year institution. For a better understanding of CTE students’ college experience, we include three samples from the whole student population in NSSE 2008 database: CTE (all the students who fit the criteria of the target population), CC (a random sample from students who transfer from non-CTE programs in community colleges), and NT (a random sample of traditional non-transferred students). To protect against violation of homogeneity of variance due to vastly unequal sample sizes, the two other samples are randomly selected and are proportionately similar to the CTE group regarding gender and enrollment status. Our analysis will use the non-transferred students sample as the reference group, and compare CTE and CC with the reference group respectively for the three research questions.

The CTE sample includes 1650 first-year, full-time students (61% were female), and 6071 senior-year, full-time students (60% were female) enrolled at 272 four-year institutions. We recognize that our target sample is small. However, due to fact that there is a paucity of research on CTE students that transfer to four-year institutions, this study provides much needed information regarding CTE students and their experience in four-year colleges. The following table contains a general description of all the three sample groups (Table 1):
Table 1: Sample Characteristics

<table>
<thead>
<tr>
<th>Gender</th>
<th>Ethnicity/Race</th>
<th>First Generation</th>
<th>Age (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Asian</td>
</tr>
<tr>
<td><strong>First year</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE</td>
<td>3.6%</td>
<td>4.3%</td>
<td>2.7%</td>
</tr>
<tr>
<td>CC</td>
<td>21.0%</td>
<td>20.5%</td>
<td>24.8%</td>
</tr>
<tr>
<td>NT</td>
<td>75.4%</td>
<td>75.2%</td>
<td>72.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>112699</td>
<td>63544</td>
<td>7496</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>Ethnicity/Race</th>
<th>First Generation</th>
<th>Age (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Asian</td>
</tr>
<tr>
<td><strong>Senior year</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE</td>
<td>3.6%</td>
<td>4.3%</td>
<td>2.7%</td>
</tr>
<tr>
<td>CC</td>
<td>21.0%</td>
<td>20.5%</td>
<td>24.8%</td>
</tr>
<tr>
<td>NT</td>
<td>75.4%</td>
<td>75.2%</td>
<td>72.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100482</td>
<td>57063</td>
<td>6031</td>
</tr>
</tbody>
</table>

Variables

NSSE obtains information from students enrolled at baccalaureate institutions regarding their engagement in enriching educational practices. The results provide an estimate of how undergraduates spend their time and what they gain from attending college. In this study, several scale and item variables were used from the NSSE data. These included four of the benchmarks of effective educational practice (a–d) and three self-reported outcomes (e–g). These variables include:

(a) Level of Academic Challenge (LAC, \( \alpha = .726 \))
(b) Active and Collaborative Learning (ACL, \( \alpha = .650 \))
(c) Student-Faculty Interaction (SFI, \( \alpha = .747 \))
(d) Supportive Campus Environment (SCE, \( \alpha = .766 \))
(e) Gains in General Education (GGE, \( \alpha = .895 \))
(f) Gains in Practical Competence (GPC, \( \alpha = .812 \))
(g) Gains in Personal and Social development (GPS, \( \alpha = .890 \))

Other student-level variables used in the analysis include gender, first generation status, age, and institution-reported SAT/ACT scores. Institution level variables include Barron’s selectivity index, enrollment size, and public/private control. These student and institution level variables were included as covariates in the models based on prior research that found they were associated with student engagement (Pascarella & Terenzini, 2005).

Results

Research question 1: Is there a difference in how CTE students balance their time compared to traditional non-transfer students?

The mean comparison results (Figure 1) have shown that among the first-year students, transferred students who have vocational and technical education background (CTE) spent more time than non-transferred students (NT) in work, and less time in socializing,
co-curricular activities, and academic study. Although the actual hour difference seems to be small (ranges from 0.2 to 5 hours), they are statistically significant except in academic study. A similar pattern is shown in the comparison between students who transferred from non-CTE programs in community colleges (CC) and NT, and the differences in all four areas are statistically significant.

For senior-year students (Figure 2), CTE students began to spend more time in academic study compared with NT students and the difference is significant. In addition, CTE students remain to spend significantly more time on working than NT, and less time in social and co-curricular activities.

Research question 2: What are the similarities and differences in the engagement patterns of CTE students and non-CTE students?

Research question 2 uses MANCOVA to examine differences in mean scores on NSSE Benchmarks variables (Figure 3 & 4). Important institutional-level covariates also included in the model are institution selectivity (Barron’s Index), control (private/public), and enrollment size. As Figure 3 shows, compared with NT students, CTE students scored significantly lower in Active and Collaborative Learning and Supportive Campus Environment in their first year.
of college.

As for the senior-year students, Figure 4 shows that CTE students still scored significantly lower in Academic and Collaborative Learning and Supportive Campus Environment. In addition, CTE students scored lower in Student and Faculty Interaction. CC students have shown a similar pattern in their senior year of college. Also, it is worth noting that in both first year and senior year, there is no significant difference between CTE and NT students in Level of Academic Challenge.

Research question 3: Is there any difference between CTE and non-CTE students in the relationship of engagement with outcomes?

Research question 3 employs separate hierarchical regression analysis for each group (CTE, CC, and NT). The dependent variables (DV) in the regression models include gains in general education, practical competence, and personal/social development. The independent variables (IV) include institution and student-level characteristics, followed by scores for
each of the NSSE benchmarks. The purpose of the regression is two-fold: to examine how much of the variance in the DVs can be explained for each group; and to determine the difference or similarity of influence each IV has on the DV between groups. The results of regression results for both first-year and senior-year students in three gains is summarized in Table 2.

Table 2: A summary of regression results of predicting gains

<table>
<thead>
<tr>
<th>Dep. Variables</th>
<th>Adjusted R² by group and FY/Senior</th>
<th>CTE</th>
<th>CC</th>
<th>NT</th>
<th>CTE</th>
<th>CC</th>
<th>NT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical Competence</td>
<td></td>
<td>.441</td>
<td>.429</td>
<td>.423</td>
<td>.417</td>
<td>.426</td>
<td>.387</td>
</tr>
<tr>
<td>General Education</td>
<td></td>
<td>.387</td>
<td>.396</td>
<td>.392</td>
<td>.362</td>
<td>.372</td>
<td>.364</td>
</tr>
<tr>
<td>Personal/Social</td>
<td></td>
<td>.360</td>
<td>.393</td>
<td>.399</td>
<td>.358</td>
<td>.390</td>
<td>.379</td>
</tr>
<tr>
<td>Development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hierarchical Regression
Block 1: Barron's Selectivity; Public/Private control; Enrollment
Block 2: Gender; Age; First-Generation Status
Block 3: Academic Challenge; Active & Collaborative Learning; Student-Faculty Interaction; Supportive Campus Environment

Table 2 indicates that IVs seem to have similar power in explaining the variance of the three DVs across the groups. Therefore, further analysis is needed to examine whether the way each IV influences DV within each group is different. For this purpose, we used a two-sample t-test to determine if there are any statistically significant differences in how each IV contributes to the explanation of the DV. The NT students remain to be the reference group. Using a two-sample t-test, we calculated the t-value for each difference score (Figure 5). However, since we have three comparisons we have an increased chance of a Type 1 error. We calculated a new, more conservative critical value to compare the calculated t-values for each test. We used a table that contains the critical values of the Sidak-Bonferroni t. This table indicated that for our analysis, the new critical values are 2.39 (p<.05) and 2.93 (p<.01).

Figure 5: Formula for two sample t-test

\[ t(df_1 + df_2) = \frac{\hat{\delta}_1 - \hat{\delta}_2}{\sqrt{\frac{s^2_1}{df_1} + \frac{s^2_2}{df_2}}} \]
We calculated the differences in unstandardized coefficients of the three dependent variables for both first-year and senior students. As shown in Figure 6, ACL is significantly more predictive of gains in practical competence for NT students than it is for CTE or CC students. This result is interesting since in the mean comparison (research question 2), we found that CTE students scored significantly lower on ACL compared to NT students in their first year of college. This graph shows that these lower ACL scores have significantly less impact on reported gains in practical competence. In other words, lower levels of active and collaborative learning may be undermining reported gains in practical competence. For first-year CC students, they did report lower levels of ACL compared to NT students but not significantly lower. This graph shows that even non-significant lower amounts of ACL will contribute to lower gains.

In addition, previously we also found that both CTE and CC first-year students reported significantly lower support from their campus (SCE). This lower level of SCE however, does not seem to significantly undermine gains in practical competence. For first-year students, we also calculated the difference in unstandardized coefficients for gains in General Education and Personal/Social Development. However, this paper will not discuss the results in this section since the differences were not statistically significant.

**Figure 6: Difference in unstandardized coefficient: Gains in Practical Competence of First-year students**

![Graph showing differences in unstandardized coefficients for gains in Practical Competence of First-year students.](image)

**Previously in the mean comparison both CTE and CC senior students reported significantly lower levels of ACL, SFI, and SCE compared to NT senior students. Comparing the differences of the regression coefficients for gains in Practical Competence of senior students reveals several interesting findings. First, as Figure 7 shows, even though there was no significant mean score difference in LAC, the regression analysis has shown that for both CTE and CC students LAC had a significantly larger impact on practical competence compared to NT. Second, similar to first-year students, lower ACL scores have significantly**
less impact on reported gains in practical competence. In other words, lower levels of active and collaborative learning may be undermining reported gains in practical competence for senior students as well. Third, in the mean score comparison, SCE means were also significantly lower for both CTE and CC groups; however, Figure 7 shows that SCE scores for CTE and CC students were significantly more predictive of practical competence compared to NT. Finally, CTE and CC students did report significantly lower levels of SFI; however, this did not seem to undermine practical competence in the regression analysis.

**Figure 7: Difference in unstandardized coefficient: Gains in Practical Competence of Senior-year students**

As Figure 8 shows, comparing the coefficient differences for gains in General Education of senior students shows again that even though CTE and CC students reported significantly lower mean score on SCE, this variable was significantly more important for CC students in predicting gains in general education.
Figure 9 has shown that ACL score is again undermining gains in personal/social development for CC senior students. Also, even though both CTE and CC students reported significantly lower mean scores in SFI and SCE, these benchmarks played a significantly more important role in predicting their gains in personal/social development.

Figure 9: Difference in unstandardized coefficient: Gains in General Education of Senior-year students
Discussion

The results of this exploratory study provide much needed information regarding the characteristics of CTE students and how they may be different than their peers. It is commonly agreed that earning a college degree plays a significant role in occupational choice and personal development (Morales, 2000), and this is especially important for CTE students that end up transitioning to a baccalaureate institution. Due to the limitation of the data, we mainly discussed their college experience based on self-reported behavior with little information about their aspiration and expectation. However, the differences we see in the results between CTE students and other students still have several implications.

Overall, the results showed that compared to traditional non-transferred college students, students who transferred with CTE background spend equal amounts of time studying, work more hours each week, but spend less time in co-curricular activities and socializing. On one hand, this time distribution pattern tells us that CTE students might have more financial or family obligations but still manage to attend to their academic study, which is also consistent with the results that CTE students reported significantly less engagement in active and collaborative learning activities, and this decreased level of ACL suppresses important gains. On the other hand, advising and support from faculty members and administrators on time management may be very helpful to this group of students.

However, the results from senior students showed that students transferred from CTE post-secondary institutions report less student-faculty interaction and significantly less support from their campus environment. This indicates that CTE students may be somewhat similar to their community college counterparts who also transferred in that these students in particular might need more attention from their institutions. Moreover, the results further showed that their low levels of student-faculty interaction and less support from campus does not suppress their gains as expected; instead, these lower scores had no effect or even significantly positive impact on gains. This interesting result has two implications: first, given the fact that CTE students are generally older than their peers, this group of students may be more independent in their study, and may have different perception of student-faculty interaction or supportive campus environment, which requires more work in institutional research; second, the fact that this group of senior students have transferred from CTE background and survived the college experience make them a self-selected group whose characteristics are mostly opposite to the stereotype, and this is another reason that this group deserves the attention of post-secondary professionals not only in four-year institutions, but also those who work in non-four-year institutions in order to better help these students with their plan to transfer.

Reference


