Think College Transition: Developing an Evidenced-based Model of Inclusive Dual Enrollment Transition Services for Students with Intellectual Disabilities and Autism

Evaluation Final Report
December 31, 2018

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1. Introduction

1.1. Evaluator

The Education Development Center, Inc. (EDC) conducted the independent evaluation of the i3 development grant. The evaluation was led by Caroline E. Parker, Ed.D., whose contact information is listed below

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1.2. Intervention background/history

Think College Transition (TCT) is a refinement and more strategic version of college-based dual enrollment transition services for students with disabilities. Dual enrollment programs have been implemented throughout the country and in Massachusetts. In Massachusetts specifically TCT leveraged an existing state grant funded program called the Inclusive Concurrent Enrollment Initiative that supports the creation of partnerships between institutes of higher education (IHEs) and local school systems to serve students with disabilities who are in the process of transition from school to adult life. While these programs each involve college, they are inconsistent in their use of critical components such as person-centered planning, peer mentors, inclusive course access, and customized employment strategies. Additionally there had not been any evaluation conducted on these current practices. The model developed and implemented (TCT model) incorporated each of these essential components as part of a cohesive and inclusive transition program. This represents the first time this intervention has been implemented or evaluated.

1.3. Confidentiality protection

IRB approval was obtained from EDC (evaluator organization), as well as from the three institutes of higher education: Holyoke Community College (HCC), Westfield State University (WSU), and Bridgewater State University (BSU). Research protocols delineated by each of the school districts that indicated their interest in participating in the evaluation were followed. IRB documents were approved by EDC (6/29/15), HCC (8/11/15), WSU (8/24/15), and BSU (5/16/2016). IRB documents were submitted to school districts following the policies in each participating district.

1.4. Independence of evaluation

EDC conducted the evaluation of the TCT model in a manner that meets the standards for independence for i3 grants. Although EDC and UMB (the program developer) worked collaboratively on aspects of the study such as the development of the logic model and the measurement of implementation and fidelity, the program developer was not be involved in the collection of data used in the analysis of confirmatory outcomes. These data were collected directly by EDC researchers on iPads using Qualtrics surveys. Qualtrics is an online survey platform that uses Transport Layer Security (TLS) encryption (also known as HTTPS) for all transmitted data. All Qualtrics surveys and data were password protected. Only the external evaluators had access to the surveys and student data.

2. Brief Summary of Intervention and Evaluation Design

This study was an evaluation of the i3 development grant Think College Transition (TCT), an inclusive dual enrollment transition model to improve achievement and post-school outcomes for students with intellectual disabilities or autism (ID/A). The model offers an innovative approach to transition services for students with intellectual disabilities and autism by providing participation in inclusive academic and social environments of a college campus with same-aged peers rather than continuing to receive transition services in typical high school environments. The TCT model is an inclusive comprehensive college based transition model where students are fully included on campus in all aspects of a complete college experience, receiving supports as necessary (e.g., coaching and/or peer mentor, disability services office). The student's day consists of course participation, social events, and career development activities and integrated competitive employment moving their transition services away from a high school-based approach to a college and community-based approach. TCT includes partnership development and technical assistance for university- and district-level staff in order to implement the model with students with intellectual disabilities and autism. This study examined the impact of TCT services on the job-seeking skills, career readiness, self-determination, college self-efficacy, and employment of ID/A youth.

The study used a quasi-experimental design comparing students with ID/A participating in the TCT model at three universities in Massachusetts with students with ID/A participating in business as usual transition services through their school districts. In Year 1, students in their first year of enrollment in the TCT dual-enrollment programs at Holyoke Community College (HCC) and Westfield State University (WSU) in 2015-2016 were recruited to participate in the intervention condition (students in their second year of enrollment in 2015-2016 were not eligible to participate in the study). Comparison students were drawn from two types of districts. The first type are districts that sent students to HCC and/or WSU (12 districts in total), and so the comparison students have comparable experiences to the intervention students except for participation in the TCT program. The second type are districts that do not send students to HCC and/or WSU and do not participate in any other dual enrollment program.

In Year 2, students in their first year of enrollment in the TCT dual-enrollment programs at Holyoke Community College (HCC), Westfield State University (WSU), and Bridgewater State University (BSU) in 2016-2017 were recruited to participate in the intervention condition. Comparison students were drawn from two types of districts. The first type are districts that sent students to HCC, WSU, and/or BSU (35 districts in total), and so the comparison students have comparable experiences to the intervention students except for participation in the TCT program. The second type are districts that do not send students to HCC, WSU and/or BSU and do not participate in any other dual enrollment program.

This Year 2 sampling process was repeated for two cohorts (2016-2017 and 2017-2018). All students, both intervention and comparison, were 18-22 year-old students enrolled in transition services who had an intellectual disability or had a dual diagnosis of autism and an intellectual disability. Intellectual disability was defined as meeting the definition from the American Association of Intellectual and Developmental Disability (AAIDD): Intellectual disability is characterized by significant limitations both in intellectual functioning and adaptive behavior as expressed in conceptual, social, and practical skills, which are apparent prior to the age of 18. Autism was defined as meeting the definition of ASD as described in the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5; American Psychiatric Association, 2013). Eligible participants in the evaluation had no previous participation in a dual enrollment program. Characteristics such as gender, ethnic background, and health status did not influence subject selection.

Baseline data was collected at the beginning of the each cohort's participation. The impacts on students were assessed in the winter and spring of 2016, 2017 and 2018. Impacts at the end of one year included Cohort 1 students in spring 2016, when they had one year of either business as usual or TCT services,

Cohort 2 students in the spring of 2017, and Cohort 3 students in the spring of 2018. Measures of the impact of two years of TCT included Cohort 1 and Cohort 2 students. Our confirmatory contrasts compared intervention and comparison students on measures of job-seeking skills, career readiness, and self-determination one year after participating. We also conducted exploratory contrasts. One set of contrasts compared the sub-group of students from Cohorts 1, 2, and 3 who completed the transition program on measures of employment six months after exiting transition services. Another exploratory contrast also looked at whether students enrolled in the TCT model for two years had higher levels of college self-efficacy compared to students who participated in the TCT model for one year.

Our analyses used ordinary least squares regression to compare the magnitude and direction of the difference between the post-intervention scores, expressed as a standardized effect size difference, for students in the intervention and comparison conditions, after controlling for pre-intervention scores. Linear growth modeling was used in the exploratory contrasts to determine whether the TCT model had an effect on the three outcomes of interest over time. This analysis procedure allowed us to examine differences among individuals at the start of the intervention, to examine growth in the three outcomes across the three time points (baseline, winter, spring) as a function of students' participation in the intervention, and to determine differences between the intervention and comparison groups in the outcomes of interest. The evaluation planned to also use logistic regression to measure the effect of the TCT model on students' employment 6 months after the completion of the intervention (as an exploratory contrast), but an insufficient sample size precluded formal statistical analysis.

The theory of action underlying the TCT model is that a program of dual enrollment for students with ID/A will lead to greater job-seeking skills, career readiness, self-determination, and college self-efficacy. The components of the TCT model included training provided to both high school and higher education staff involved in the program to provide them with the skills and knowledge necessary to implement the TCT model; the development of a collaborative partnership between the school district, higher education institutions, and local partners; and student activities (person-centered planning, enrollment in college courses aligned with their career interests, participation in employment opportunities, and peer mentors and/or instructional coaches). It was predicted that when the students participate in the TCT model elements provided by the high school and higher education staff, they would experience positive changes in job-seeking skills, career readiness, self-determination, and college self-efficacy. In addition it was predicted, they would be more likely to hold integrated paid employment after completing the TCT model than ID/A students in business as usual transition programs.

The implementation evaluation measured the extent to which each of three components were implemented with fidelity. The i3 indicators of the TCT model (15 indicators in Year 1) which were measured as part of the fidelity of implementation evaluation made up the three major components of the intervention: the technical assistance and coaching that was provided to high school and higher education staff (one indicator); the program structures promoting community collaboration which were measured at the program level (two indicators); and the component of student participation, measured at the student level (twelve indicators in Year 1, ten indicators in Year 2 and Year 3). The implementation data was collected by either the program staff or the transition specialists working with the students, and included attendance records and documentation of student activities. The fidelity measurement was conducted on the TCT program for three years, in 2015-16, 2016-17, and 2017-18.

3. Impact Evaluation

We conducted one study with four research questions.

3.1. Impact Study

We used a quasi-experimental design in which intervention students enrolled in the TCT model at HCC, WSU, and BSU and comparison students received business as usual transition services in their school districts. The study included three cohorts of students. Cohort 1 and Cohort 2 students received either business as usual transition services or up to two years of TCT services. Cohort 3 received either business as usual or one year of TCT services. Our confirmatory contrasts compared intervention and comparison students on measures of job-seeking skills, career readiness, and self-determination one year after participating, as well as on their employment status six months after exiting transition services. The measures of job-seeking skills and career readiness included Cohort 1, Cohort 2, and Cohort 3 students. The measure of self-determination included only Cohort 2 and Cohort 3 because the validated instrument became available for use after Cohort 1 data collection had begun. We also conducted exploratory contrasts. One set of contrasts compared growth over time between intervention and comparison students on the three measures of job-seeking skills, career readiness, and self-determination. A second set of contrasts compared intervention students who completed two years of TCT with intervention students who completed one year of TCT on the three measures of job-seeking skills, career readiness, and self-determination as well as a measure of college self-efficacy. Another exploratory contrast compared intervention and comparison students on a measure of employment six months after exiting transition services.

3.1.1. Research questions

Confirmatory Contrasts
1. Does one year of participation in the TCT model lead to higher levels of job-seeking skills for 18-22 year old students with ID/A compared to job-seeking skills among comparison students receiving the business as usual condition?
2. Does one year of participation in the TCT model lead to higher levels of career readiness for 18-22 year old students with ID/A compared to career readiness skills among comparison students in the business as usual condition?
3. Does one year of participation in the TCT model lead to higher levels of self-determination for 18-22 year old students with ID/A compared to levels of self-determination among comparison students in the business as usual condition?
4. Are students with ID/A enrolled in the TCT model for one year more likely than comparison students in the business as usual condition to be employed in integrated paid employment six months after exiting transition services?

Exploratory Contrasts
1. Does one year of participation in the TCT model lead to higher growth over time in levels of job-seeking skills compared to students in the business as usual condition?
2. Does one year of participation in the TCT model lead to higher growth over time in levels of career readiness compared to students in the business as usual condition?
3. Does one year of participation in the TCT model lead to higher growth over time in levels of self-determination compared to students in the business as usual condition?
4. Do two years of participation in the TCT model lead to higher levels of job-seeking skills for 18-22 year old students with ID/A compared to one year of participation in the TCT model?
5. Do two years of participation in the TCT model lead to higher levels of career readiness for 18-22 year old students with ID/A compared to one year of participation in the TCT model?

6. Do two years of participation in the TCT model lead to higher levels of self-determination for 18-22 year old students with ID/A compared to one year of participation in the TCT model?
7. Amongst those 18-22 year old students with ID/A who exited transition services, are students with ID/A who enrolled in the TCT model more likely than comparison students in the business as usual condition to be employed in integrated competitive employment six months after exiting transition services?
8. Does two years of participation in the TCT model lead to higher levels of college self-efficacy for 18-22 year old students with ID/A compared to one year of participation in the TCT model?

3.1.2. Comparison conditions

Students in the comparison group were recruited from two types of districts. The first type were districts whose ID/A students fed into the three institutes of higher education (IHE) providing the TCT program. The second type were districts whose ID/A students did not feed into the three IHEs. Both types of comparison students received business as usual transition services from their school districts. Business as usual in this case means that students participated in the transition services offered by their school district. This included sheltered work or high school classes that tended to focus on increasing safety and independence. Students had cooking or banking classes, or they worked in the school store, cafe, or business office in a sheltered work environment. The transition services did not include a higher education component. A second and third cohort of comparison students were recruited in 2016-2017 and 2017-2018, respectively using the same criteria as Cohort 1.

Note that while Cohort 1 and Cohort 2 intervention students were studied for up to two years (HCC, WSU, and BSU all offer the TCT program for two years and the majority of students participate for two years), Cohort 1, Cohort 2, and Cohort 3 comparison students were only followed for one year. Comparison students from Cohort 1 and Cohort 2 in the districts that feed into the TCT IHEs were eligible to participate as intervention students in Cohort 2 and Cohort 3, respectively.

3.1.3. Sample identification, selection and assignment

Students eligible to participate in the evaluation were 18-22 year-old students enrolled in transition services in participating school districts in MA who had an intellectual disability or had a dual diagnosis of autism and an intellectual disability. In order to be eligible to participate in the evaluation students had to have no previous participation in a dual enrollment program.

The intervention sample included students from districts which participated in the i3-funded TCT services and who agreed to participate in the evaluation data collection process. Comparison students met the same eligibility criteria as the intervention students but did not participate in TCT, for multiple reasons: their district did not participate in the program; there were insufficient spaces in the program; families did not want them to participate in the program; or an unidentified reason.

We do not believe that there were any serious confounds that could bias the estimated effect of the intervention.

3.1.3.1. Identification/selection of study districts

The intervention was implemented in the pioneer valley and south shore MA for a few reasons. First is proximity. Due to the need for consistent field based coaching, the intervention needed to be implemented in a location that is easily accessed by the program developers. In addition, the project leveraged the existing inclusive concurrent enrollment initiatives that were being implemented with IHEs partnering with pioneer valley and south shore school districts, as start-up program costs would be prohibitive. Finally, dual enrollment programs for students with ID/A serve very small numbers of students. The

chosen programs that partnered with pioneer valley and south shore MA school districts served a large number of students allowing us our best chance of a sufficient sample size to conduct a well-powered study of the intervention.

Three institutes for higher education participated in the i3 evaluation: Holyoke Community College (HCC), Westfield State University (WSU), and Bridgewater State University. Each IHE program worked with multiple districts (7 in HCC, 7 in WSU, 19 in BSU, with 2 districts having students in both HCC and WSU programs). Twenty-one districts agreed to participate in the impact evaluation. Each of the 21 districts were also sites for the selection of comparison students. In order to assure an adequate pool of comparison students, additional, non-i3 districts were identified. The criteria for these districts were: they do not currently offer a dual enrollment program to their students with ID/A; they were within geographical proximity to the study sites and/or the researchers (in Waltham, MA) (for budget and time limitations); and they were interested in participating in the study. One non-TCT district accepted the invitation to participate in Cohorts 2 and 3; a second non-TCT district accepted the invitation to participate in Cohort 2.

3.1.3.2. Identification/selection of study schools

Within districts, transition services were generally located at only one school or site. Thus, there was no selection process for schools or sites. All schools or sites with transition services in each participating district were invited.

3.1.3.3. Identification/selection of students for the impact evaluation

Intervention students: All students who were in their first year of enrollment in the dual enrollment programs at HCC (all Cohorts), WSU (all Cohorts), BSU (Cohort 2 and Cohort 3) were eligible to participate in the study. These students shared the following characteristics: 1) 18-22 years old, 2) enrolled in transition services through their school district, 3) had an intellectual disability or a dual diagnosis of autism and an intellectual disability, and 4) had not previously participated in a dual enrollment program. Student eligibility to participate in the evaluation was determined prior to baseline data collection.

The study examined three cohorts of students. Cohort 1 students were recruited from among students enrolled as new students in the dual enrollment program at HCC or WSU in fall 2015. Cohort 2 students were recruited from among the students enrolled as new students in the dual enrollment program at HCC, WSU, or BSU in fall 2016. Cohort 3 students were recruited from among the students enrolled as new students in the dual enrollment program at HCC, WSU, or BSU in fall 2017. Cohort 1 students in the intervention group were offered TCT services from September of 2015 until June of 2017, two academic years. Cohort 2 students in the intervention group were offered TCT services from September of 2016 until June of 2018, two academic years. Cohort 3 students in the intervention group were offered TCT services for one year, from September of 2017 until June of 2018.

Comparison students: Comparison students met the same four criteria as intervention students: 1) 18-22 years old, 2) enrolled in transition services through their school district, 3) had an intellectual disability or had a dual diagnosis of autism and an intellectual disability, and 4) had not previously participated in a dual enrollment program. They differed from intervention students in that they were not enrolled in any dual enrollment program at the start of the study (2015-2016 for Cohort 1, 2016-2017 for Cohort 2, and 2017-2018 for Cohort 3). Comparison students received business as usual services (enrolled in transition services through their school district) in fall 2015 for Cohort 1, fall 2016 for Cohort 2, and fall 2017 for Cohort 3. Each cohort of comparison students was followed for one year (the exploratory contrasts that used two years of data did not include comparison students). Cohort 1 and Cohort 2 comparison students who were eligible and willing to participate in the TCT dual enrollment program in fall 2016 and fall

2017, respectively, were able to participate. Cohort 3 comparison students received business as usual services in their district in fall 2017 and participated in the evaluation for one academic year.

In order to recruit a sufficient number of comparison students, we recruited students both from the 31 districts that participated in the MAICEI program, as well as from districts that did not send students to HCC, WSU, and/or BSU and did not participate in any other dual enrollment program. We communicated with 10 non-MAICEI districts and two accepted the invitation to participate.

We anticipated that a big challenge to obtaining the target sample size was that of district and IHE capacity. Each program served approximately ten new students per year (all three programs encouraged students to participate for two years). The project addressed this challenge by continuing the evaluation with a third cohort of students, which increased the sample by approximately 75%.

3.1.3.4. Inference space (focal population)

We expected that the results of this study would demonstrate whether the TCT model had the desired impact on the job-seeking skills, career readiness, self-determination, college self-efficacy, and employment of ID/A youth. The results of this study are informative to other school districts and programs focused on supporting ID/A youth.

3.1.3.5. Multi-year interventions

Three cohorts of students received TCT services or business as usual services in their school district. The timing for the intervention activities during the three-year grant cycle progressed as follows:
- Fall 2014-Spring 2015: Pilot year in which the grantee and evaluator refined their intervention design, tested the appropriateness and reliability of outcome measures, and determined the feasibility of the research design.
- Fall 2015-Spring 2016: Cohort 1 intervention students received their first year of services at HCC or WSU and Cohort 1 comparison students received business as usual services. Seven students were enrolled in transition services (business as usual) in their school districts. Thirteen students were enrolled in the HCC or WSU dual-enrollment program (TCT services).
- Fall 2016-Spring 2017: Cohort 1 intervention students received their (optional) second year of intervention services. Cohort 2 intervention students received their first year of services at HCC, WSU, or BSU dual-enrollment program (TCT services) and Cohort 2 comparison students received business as usual services. Twenty-three Cohort 2 students were enrolled in transition services (business as usual) in their school districts. Sixteen Cohort 2 students were enrolled in the HCC, WSU or BSU dual-enrollment program (TCT services).
- Fall 2017-Spring 2018: Cohort 2 intervention students received their (optional) second year of intervention services. Cohort 3 intervention students received their first year of services at HCC, WSU, or BSU dual-enrollment program (TCT services). Twenty-three Cohort 3 students were enrolled in transition services (business as usual) in their school districts. Twenty-four Cohort 3 students were enrolled in the HCC, WSU or BSU dual-enrollment program (TCT services).

Our confirmatory contrasts focused on the effects of the intervention after one year of exposure. We also examined exploratory contrasts that focused on patterns of growth over one year and on the effects of the intervention after two years of exposure. In Table 1, grey cells represent years in which no data was collected on students. Cells shaded in orange represent data that was used to estimate the one-year effects of TCT services, (used in confirmatory analyses), and green shaded cells represent data that was used to estimate the effects of two years of TCT services, exploratory contrasts. The unshaded cells in Year 2 and Year 3 represent data on work status only.

Table 1. TCT Model Study Design

		Pilot (2014-2015)	Year 1 (2015-2016)	Year 2 (2016-2017)	Year 3 (2017-2018)
I1	Intervention cohort 1 (n=13)		x	x	(*work status only)
C1	Comparison cohort 1 from TCT districts (n=7)		x	(*work status only)	(*work status only)
I2	Intervention cohort 2 (n=16)			x	x
C2a	Comparison cohort 2 from TCT districts (n=15)			x	(*work status only)
C2b	Comparison cohort 2 from non-TCT district (n=8)			x	(*work status only)
I3	Intervention cohort 3 (n=24)				x
C3a	Comparison cohort 3 from TCT districts (n=11)				x
C3b	Comparison cohort 3 from non-TCT districts (n=9)				x

*post-program work status data was collected for each student (if applicable) when he/she turned 22.5 years of age.

3.1.4. Data collection for the evaluation of impacts

Instruments

The outcome measures were administered to intervention and comparison students in the same manner. None of the outcome measures were over-aligned with the intervention. The evaluation team conducted all of the outcome measurement individually with students in the comparison and intervention samples. The outcome measures for the evaluation of the TCT model are described below.

Job-seeking skills: Job-seeking skills was measured via a modified version of the Student Career Construction Inventory (SCCI) (Savickas & Porfeli, 2011). The SCCI contains 17 questions regarding specific job-seeking skills, such as using the internet to search for jobs. Responses were measured on a four-point scale. Factor analyses revealed two latent constructs measuring job-seeking skills in our population of students: actions and thoughts. Reliability for these subdomains was calculated with the pre-test scores using Cronbach's alpha estimate of internal consistency. The alpha estimate for "actions" and "thoughts" was .702 and .740, respectively.

Career readiness: Career readiness was measured via a modified version of the Career Maturity Inventory Form C – Screening Form (Savickas & Porfeli, 2011). The original CMI-C Screening Form was developed with 453 students attending Grades 9-12 in a Midwestern urban high school. The alpha for the Screening Form was .83. It correlated .94 with the CMI Form C – Counseling Form (18 items, with 10

overlapping) and .69 with the CMI Form A-2 (50-item form, with 10 overlapping). CMI Form A-2 was the first iteration of the Career Maturity Inventory and was developed with students in Grades 5-12. The CMI-C Screening Form scale is unidimensional based on a factor analysis of the 10 items. A single factor explained 42.8% of the variance. The instrument was modified based on feedback from students in a pilot study (Year 1) and analysis of the pilot students' results. One item was separated into two; another item was replaced to increase comprehension. In addition, rather than asking if students agree or disagree with an item, the instrument was modified to ask students to choose between two oppositely valenced sentences (e.g., "I can…" vs. "I can't…"). The modified CMI-C contained nine items dichotomously measured. A student's career maturity was the sum total of the responses, ranging from 0 to 9. Higher score represent higher levels of career maturity. Factor analyses revealed one latent construct measuring career readiness skills in our population of students. Reliability for this construct was calculated with the pre-test scores using Cronbach's alpha estimate of internal consistency. The alpha estimate was .658.

Self-determination: Self-determination was measured via the Self-Determination Inventory: Student Report (SDI:SR; Shogren, Wehmeyer, Little, Pratt, Palmer, Seo, 2015). The tool contains 45 items that measure self-determination for three essential characteristic described by seven sub-domains: Volitional action (autonomy, self-initiation); Agentic Action (self-direction, pathways thinking) and Acton-Control Beliefs (psychological empowerment, self-realization, control-expectancy). The SDI:SR was developed to measure self-determination in youth aged 12 to 22 with and without disabilities, including those with ID/A. The alpha for the essential characteristics ranged from .720 to .870 for students with disabilities and from .693 to .854 for students without disabilities. This study used the Shogren's online platform via an iPad. Upon reading the each item the student touched a place on a digital line below each sentence to show how much they agreed or disagreed with the item. The line was anchored by the words "disagree" and "agree" to the left and right of each line respectively. Locations on the line were converted computationally to a numeric score between 0 (disagree) to 100 (agree). A student's level of self-determination on each sub-domain is the average score of the responses on each sub-domain, ranging from 0 to 100. Higher scores represent higher levels of self-determination. Factor analyses with our baseline data confirmed the seven sub-domain structure of the SDI in our population of students. Reliability for this construct was calculated with the pre-test scores using Cronbach's alpha estimate of internal consistency. The alpha estimates ranged from was .718 to .935.

College self-efficacy: The College Self-Efficacy Inventory (CSEI) (Solberg, O'Brien, Villareal, Kennel, & Davis, 1993) is a survey designed to measure the degree of confidence students have in their ability to successfully perform a variety of college-related tasks. The research team adapted this instrument to measure self-efficacy for a variety of college-related tasks that are particularly relevant to students with ID/A. The CSEI contained 22 questions. Responses were measured on a 3-point Likert scale ranging from 1 (not at all confident) to 3 (very confident). A student's level of college self-efficacy is the sum total of the responses ranging from 3 to 72. Higher scores represent higher levels of college self-efficacy. Factor analyses revealed three latent constructs measuring college self-efficacy in our population of students: social skills, help-seeking skills, and academic skills. Reliability for these subdomains was calculated with the pre-test scores using Cronbach's alpha estimate of internal consistency. The alpha estimate for "social skills", "help-seeking skills" and "academic skills" was .684, .773 and .740, respectively.

Integrated Paid Employment: To address confirmatory contrast research question 4, we obtained the working status of all students (intervention and comparison) six months after the student exited their transition services (at age 22). Of the 19 students who turned 22.5 years of age by the end of the grant (December 2018), we were able to reach 12 students in order to collect data (two comparison students; three intervention students who participated in one year of the TCT Model; seven students who participated in two years of the TCT Model).

Student demographic variables: Extant data collected at baseline (see Table 2) included: student transition program, TCT Site (if intervention), race/ethnicity, age, gender, disability category, eligibility for Supplemental Security Income (SSI), potential to be referred to adult services (688 referral), and general MCAS (Massachusetts Comprehensive Assessment System) results (pass, not pass). Because of the small sample size, it was not be possible to include these independent variables in the final model – descriptions of the model building are included in the next section.

Table 2. Independent variables: Name, type, and coding.

Variable	*Variable name*	*Variable type*	*Coding*
Intervention status	Intervention	Dichotomous	0=Comparison 1=Intervention
Transition Program	District	Categorical	1=district a 2=district b … 21 = district u
Cohort	Cohort	Categorical	1=Cohort 1 2=Cohort 2 3=Cohort 3
TCT Site	HCC	Dichotomous	0=not HCC 1=HCC
	WSU	Dichotomous	0=not WSU 1=WSU
	BSU	Dichotomous	0=not BSU 1=BSU
Race/ethnicity	AfAm	Dichotomous	0=not African American 1=African American
	Latino	Dichotomous	0=not Latino(a) 1=Latino(a)
	AsianAm	Dichotomous	0=not Asian American 1=Asian American
	NativeAm	Dichotomous	0=not Native American 1=Native American
Age	Age	Continuous	NA
SSI eligibility	SSI	Dichotomous	0=not eligible for SSI 1=eligible for SSI
688 referral	688	Dichotomous	0=no 688 referral 1=688 referral
MCAS result	MCAS	Dichotomous	0=did not pass MCAS 1=passed MCAS
Intellectual impairment	Intellectualdis	Dichotomous	0=no intellectual impairment 1=intellectual impairment
Autism	Autism	Dichotomous	0=no autism 1=autism
Development delay	DevelopDis	Dichotomous	0=no development delay 1=development delay
Neurological impairment	NeuroDis	Dichotomous	0=no neurological impairment 1=neurological impairment
Specific learning disability	SLDdis	Dichotomous	0=no specific learning disability 1=specific learning disability
Other disability*	Otherdis	Dichotomous	0=no other disability

				1=additional disability
Gender	Gender	Dichotomous	0=male 1=female	

Data collection

Administration of the outcome measures occurred three times during each academic year, as noted in Table 3 below. Demographic data was collected during the fall after students were confirmed as participants, in coordination with the districts and IHE sites. Participation logs recorded student participation in TCT activities and were collected from district and IHE staff at the end of the fall and spring semesters. Evaluators collected impact data directly from participants. Implementation data was collected by transition staff in the participating school districts and IHEs (see implementation section). Tables 3 and 4 shows what impact data was collected as well as how and when it was collected. Each of the instruments measuring the four outcomes (job-seeking skills, career readiness, self-determination and self-efficacy) were administered at baseline and were used as pre-tests. The college-self efficacy scale was administered only to the intervention group. Data collection was not "blinded;" because of the nature of the sample, administration of instruments was one-on-one, and for intervention students took place at the TCT sites or in their home districts. The procedures for data collection were the same for intervention and comparison groups; the only difference was in location.

Table 3. Data collection by student sample.

	I1	C1	I2	C2a & C2b	I3	C3a & C3b
Extant data September 2015	x	x				
Outcome measures September 2015; January 2016; May 2016	x	x				
Participation log December 2015; May 2016	x					
Extant data September 2016			x	x		
Outcome measures September 2016; January 2017; May 2017	x (exploratory)		x	x		
Participation log December 2016; May 2017	x (exploratory)		x			
Extant data September 2017					x	x
Outcome measures September 2017; January 2018; May 2018			X (exploratory)		x	x
Participation log December 2017; May 2018			X (exploratory)		x	
Employment Data At student age 22.5 years	x (exploratory)	x (exploratory)	x (exploratory)	x (exploratory)	x (exploratory)	x (exploratory)

Table 4. Data Collection Schedule

Data	Data collection process	Jan-14 Q1	Q2	Q3	Q4	Jan-15 Q5	Q6	Q7	Q8	Jan-16 Q9	Q10	Q11	Q12	Jan-17 Q13	Q14	Q15	Q16	Jan-18 Q17	Q18	Q19	Q20
Student-level data																					
Demographic data	Evaluators collect from school districts							x				x				x					
Self-determination	Evaluators via iPad							x		x	x	x		x	x	x		x	x		
Career readiness	Evaluators via iPad							x		x	x	x		x	x	x		x	x		
Job-seeking skills	Evaluators via iPad							x		x	x	x		x	x	x		x	x		
College self-efficacy (intervention only)	Evaluators via iPad							x		x	x	x		x	x	x		x	x		
Participation log (intervention only)	Evaluators collect from IHE and district transition staff								x		x		x		x		x		x		
Post-employment	Evaluators via email, text or phone contact with student											x					x	x	x	x	x

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3.1.5. Statistical analysis of impacts on students

3.1.5.1. Contrasts

The primary contrast were between the post-intervention scores on the dependent variables for students in the intervention condition and students in the comparison condition.

For the continuous 10 dependent variables within the three outcome domains (job-seeking skills, career readiness, and self-determination) ordinary least squares regression was used to compare the magnitude and direction of the difference between the post-intervention scores, expressed as a standardized effect size difference, for students in the intervention and comparison conditions, after controlling for pre-intervention scores. The dichotomous dependent variable (employment status) was intended to be analyzed via logistic regression to model the probability of being employed six months after existing transition services as a function of and membership in the intervention or comparison group; however, there was not sufficient data to conduct the analysis. Given the small sample size, we did not include student covariates in any of the analyses as originally planned.

Confirmatory contrasts were conducted for each of the three outcome domains after one year, and exploratory contrasts to compare whether students enrolled in the TCT model for two years had higher levels of the dependent variables compared to students who participated in the TCT model for one year, after controlling for pre-intervention scores. An exploratory contrast also looked at whether students enrolled in the TCT model for two years had higher levels of college self-efficacy compared to students who participated in the TCT model for one year. In addition, exploratory contrasts used generalized linear model procedures to estimate the difference in growth between the intervention and comparison conditions for each outcome. Each are discussed in turn.

3.1.5.2. Strategy for dealing with multiple comparisons

Between the four outcome domains of interest, there were 14 sub-domains (job-seeking skills (actions, thoughts), career readiness, self-determination (autonomy, self-initiation, self-direction, pathways thinking, control-expectancy, psychological empowerment, self-realization), and college self-efficacy (help-seeking skills, academic skills, social skills). Conducting many multiple regression models with the same sample is likely to affect the nominal alpha level; therefore, the interpretation of the results focuses on standardized effect size estimates.

Confirmatory Analyses
Ordinary least squares regression modeling was used to address three of the confirmatory research questions and we intended to use logistic regression to answer the fourth. However, the sample size for confirmatory analysis four was too small, which precluded formal statistical analysis. As students were nested within districts, it is possible that there was a clustering effect that led to attenuated standard errors and an increased Type I error rate. Multilevel regression techniques are generally considered appropriate methods for addressing the effects of nesting (Raudenbush & Bryk, 2002); however, in this case the large number of districts and the small number of students in each district precluded its use. Specifically, with only 21 districts and between one and 22 students per district, estimates of the between district effects were unstable.

For the ordinary least squares regression analysis, students' post-intervention scores on the 10 dependent variables from the three outcome domains (job-seeking skills (actions; thoughts), career readiness, and self-determination (autonomy; self-initiation; self-direction; pathways thinking; control-expectancy, psychological empowerment, self-realization), were regressed on an indicator of students' membership in

either the intervention or comparison condition, as well as students' pre-intervention scores on the dependent variable. For each post-intervention measure Y_i, the models were as follows:

(Model 1)
$$Y_i = a + \beta_1(\text{Intervention}) + \beta_2(\text{Baseline scores on Y}) + e_i$$

Where:

Y_i = post-test score

β_1 = Predicted difference between the intervention and comparison groups' post-test score (Y_i)

β_2 = Predicted difference in Y_i associated with 1-unit change in baseline score on Y

e_i = error term

For each Y_i, the magnitude of the regression coefficient β_1, represented as a standardized effect size was be used to evaluate the contrast between the intervention and comparison conditions.

For the final confirmatory contrast (#4), looking at post-intervention employment status there was an insufficient sample size, which precluded formal statistical analysis.

Exploratory analyses

Linear growth modeling and ordinary least squares regression were used to answer the exploratory contrasts. For the linear growth models (exploratory contrasts 1-3), students' scores on the dependent variables were modeled as a function of time (i.e., three measurement time points over one year) and membership in the intervention or comparison condition. For each dependent variable Y for student i at time t, Y_{ti}, the two-level model took the following form:

(Model 2)

Level-1: $\quad Y_{ti} = \pi_{0i} + \pi_{1i}(\text{Time})_{ti} + e_{ti}$

Level-2: $\quad \pi_{0i} = \beta_{00} + \beta_{01}(\text{Intervention})_i + r_{0i}$

$\quad\quad\quad\quad \pi_{1i} = \beta_{10} + \beta_{11}(\text{Intervention})_i + r_{1i}$

The combined form of the model was as follows:

$$Y_{ti} = \beta_{00} + \beta_{01}(\text{Intervention})_i + \beta_{10}(\text{Time})_{ti} + \beta_{11}(\text{Intervention})_i(\text{Time})_{ti} + e_{ti} + r_{0i} + r_{1i}(\text{Time})_{ti}$$

Where:

β_{00} = Predicted value of Y_{ti} at $\text{Time}_{ti} = 0$.

β_{01} = Predicted value of the difference between the intervention and the comparison group on Y_{ti} at $\text{Time}_{ti} = 0$, pre-intervention.

β_{10} = Average slope in the individual growth model of Y_{ti} over the study period for students in the comparison group.

β_{11} = Average difference between the growth rates for the intervention and comparison groups on Y_{ti} over the study period.

$e_{ti}, r_{0i}, r_{1i}(\text{Time})_{ti}$ = Random level-1 and level-2 effects.

For each dependent variable, the magnitude of the regression coefficient B_1, represented as a standardized effect size was be used to evaluate the exploratory contrast between the growth rates for the intervention and comparison groups on Y_{ti} over the study period.

Ordinary least squares regression modeling was used to address exploratory contrasts 4-6 and 8. Students' post-intervention scores on the 13 dependent variables associated with the 4 outcome domains (job-seeking skills (actions, thoughts); career readiness; self-determination (autonomy, self-initiation, self-direction, pathways thinking, control-expectancy, psychological empowerment, self-realization); college self-efficacy (help-seeking skills, social skills, academic skills)), were regressed on an indicator of students' enrollment in the TCT model for either one or two years, as well as students' pre-intervention scores on the dependent variable. For each post-intervention measure Y_i, the models took the following form:

(Model 3)
$$Y_i = a + \beta_1(\text{Enrollment for one v. two years}) + \beta_2(\text{Pre-test scores on Y}) + e_i$$

Where:

      Y_i = Post-test score
      β_1 = Predicted difference in Y_i between students enrolled for one vs. two years, holding pretest scores constant.
      β_2 = Predicted change in Y_i associated with 1-unit change in baseline score on Y, holding enrollment length constant.
      e_i = error term

For each dependent variable, the magnitude of the regression coefficient β_1, represented as a standardized effect size was be used to evaluate the contrast between the students who enrolled in the TCT model for one year compared to those who enrolled for two years.

For the exploratory contrast (#7) looking at post-intervention employment status after two years, there was an insufficient sample size, which precluded formal statistical analysis.

3.1.5.3. Decision rules for inclusion/exclusion of covariates

Given our small size, no student covariates were included in the analyses.

3.1.5.4. Intervention of missing data

There was no imputation of missing data and the study sample was defined as cases with complete information. Only students with pre- and post-intervention scores on the dependent variables were included in the analyses.

3.1.5.5. Calculation of effect size

The magnitude of the differences on the dependent variables between the intervention and comparison conditions, conditional on students' pretest scores, were represented as standardized effect sizes, calculated using the student-level standard deviations measured at pretest (U.S. Department of Education, n.d.). Specifically, standardized effect sizes were calculated by dividing the predicted difference between the intervention and comparison groups on the dependent variable (e.g., β_1 in Model 1 above) by the pooled pretest student-level standard deviation (U.S. Department of Education, n.d.).

3.1.5.6. Minimum detectable effects

Assuming a balanced design (i.e., equal sample sizes for intervention and comparison conditions) and with measures collected at 3 time points, to achieve power of 0.80 (two-tailed, $\alpha = .05$) a total sample size of approximately 420 individuals would have been needed to detect a small effect size of 0.30 standard

deviations (Raudenbush, et.al., 2011). However, given the nature of the intervention and the target population, a cohort of 210 intervention students would have exceeded the capacity of the programs to deliver the intervention. Even assuming larger effect sizes, 240 individuals would have been needed for an effect size of 0.40, and 150 students for an effect size of 0.50. Given this, we reported out on standardized differences of 0.25 or greater, as described in the What Works Clearinghouse guideline on what constitutes a substantively important effect (U.S. Department of Education, n.d.).

3.1.6.   Baseline balance testing

We had planned to match, among the students for whom we had outcome data, intervention and comparison students based on their pretest measures of the outcome, but recruitment of comparison was a bigger challenge than expected and instead all comparison students were included in the analyses.

For each of the outcomes, the pretest measure of the outcome was included as a covariate in the analysis model testing for program effects. For the confirmatory contrasts examining 1-year impacts, we calculated baseline means for the intervention and comparison groups using the following equation:

$$Pretest = \beta_0 + \beta_1 Treatment + e$$

Where
Pretest = the individual student score on the pretest measure of the outcome
β_0 = mean pretest score for comparison group students
β_1 = mean difference between intervention and comparison students in the pretest score

The parameter estimate β_1 represents the mean baseline difference between the intervention and comparison students. Dividing β_1 by the pooled pretest student standard deviation, we calculated the standardized mean difference at baseline. We considered baseline equivalence to have been established if the standardized mean difference was <0.25 standard deviations. The standardized mean difference between pretest means was indeed <.25 standard deviations for all outcome variables, except for two sub-domains of the self-determination measure: autonomy (-0.43 standard deviations) and self-initiation (-0.39 standard deviations).

3.2. *Additional analyses involving outcomes*

In addition to the confirmatory and exploratory impact questions, we had intended to use the fidelity of implementation dosage data (described below) to address the question: *Does the effect of TCT model participation on each of the continuous student outcomes vary by student access to the full TCT model?* However, we had budgetary limitations and were not able to address that questions. The limitations were due to a shift from a single district focus to more than 35 districts in western and southeastern Massachusetts and the addition of a third cohort of students. These elements required greater resources to be used on recruitment and data collection.

4. Implementation Evaluation

4.1. Logic model for the intervention

The theory of action underlying the TCT model (Table 5) was that a program of dual enrollment for students with ID/A would lead to greater career readiness, job-seeking skills, self-determination, and college self-efficacy. As demonstrated in the logic model in Table 5, the components of the TCT model occurred in two phases; the first phase included Key Component I: the development of a collaborative partnership between the school district, institutions of higher education (IHE), and local partners; and Key Component II: training provided to both high school and IHE staff involved in the program to provide them with the skills and knowledge necessary to implement the TCT model. These two components resulted in actions by the high school and IHE staff, which led to Phase II and Key Component III: student participation in the TCT model elements; person-centered planning, enrollment in college courses aligned with their career interests, participation in internships or integrated paid employment, and peer mentors and/or instructional coaches. When the students participated in the TCT model elements provided by the high school and IHE staff, we predicted they would experience positive changes in career readiness, job-seeking skills, self-determination, and college self-efficacy. In addition, they would be more likely to hold integrated paid employment after completing the TCT model program than ID/A students in business as usual transition programs.

Table 5. TCT Logic Model.

Think College Transition Logic Model
August 2015

TCT Model Project Goals

Establish Think College Transition Model that provides inclusive dual enrollment transition program for students with intellectual disabilities and autism to increase their self-determination, career development skills, job readiness skills, college self-efficacy, and their employment or higher education outcomes.

PHASE I Key components	Mediators	PHASE II Key components	Medium term outcomes
If ICI provides:	**Then High School staff, IHE staff, and community partners will:**	**Students will participate in TCT model:**	**If students participate in all the activities, they will:**
KEY COMPONENT I: Tools to develop and foster ongoing **collaborative partnerships** between school districts, IHEs, and community partners that includes	•Understand the purpose and intended outcomes of TCT dual enrollment transition services	•Enroll in IHE for a minimum of one year	•Have improved job-seeking skills
•Understanding of the TCT model and anticipated outcomes	•Conduct and implement person centered planning (PCP) for students	•Participate in person-centered planning at least once per year	•Be more prepared for careers
•Clarification of and agreement on who will be responsible for each TCT component	•Support student access to at least one year in college	•Participate in regular check-ins about goals (2-3 times/semester)	•Have increased self-determination
•Common understanding of and commitment to TCT Model goals	•Support full day inclusion (students either university campus or work site, not in HS)	•Have agreement in place re: support plans (type and frequency)	•Demonstrate increase in college self-efficacy
KEY COMPONENT II: Technical assistance and coaching to high school transition staff, administrators, high school staff and IHE program leads, targeted staff and administrators focused on:	•Ensure students are enrolled in first choice courses	•Enroll in and complete college courses of their choosing (one related to career goal)	•Be more likely to have integrated paid employment or continue higher education
•Identifying, evaluating, and revising relevant policies	•Ensure students enroll in at least one course annually related to career goal(s)	•Participate in career services offerings	
•Developing Work-based Learning plan (including job development, paid internships, paid employment)	•Provide access to existing student services (disability services, tutoring, campus based supports)	•Participate in paid internships on or off campus and/or obtain integrated competitive employment related to career goal	
•Selecting, training, and supervising Coordinator of Peer Mentoring	•Provide academic and social supports		
•Implementing Person Centered Planning (ID student goals and outcomes)	•Link with college career services to coordinate on-campus internships or integrated competitive employment		**Long term outcomes**
•Providing access to academic classes, supports, accommodations, advising	•Collaborate with community partners to support student engagement in integrated competitive employment		**The medium term outcomes will lead to:**
•Promoting and supporting campus and community navigation and engagement			•Higher level of education post high school
			•Career Advancement
			•Higher wages/ Increased work hours/Increased access to benefits
			•Increased self esteem
			•Greater independence and success as adults

Assumptions

•Collaboration: interagency communication (IHEs, school systems, adult agencies, community providers), mutual outreach efforts, accountability for and evaluation of transition services

4.2. Research questions for evaluation of implementation

The 15 indicators of the TCT model which were measured as part of the fidelity of implementation evaluation made up the three major components of the intervention: the program structures promoting community collaboration which are measured at the program level (two indicators); the technical assistance and coaching that was provided to high school and IHE staff (one indicator); and the component of student participation, measured at the student level (twelve indicators for Year 1 of implementation, ten indicators for Year 2 and 3 of implementation). The following research questions were be asked about the fidelity of implementation:

Phase I:
1. Does the TCT model include formal partnerships and community collaboration?
2. Do high school and IHE staff participate in the technical assistance and coaching events?

Phase II:
3. Do TCT students have access to the full TCT model?

4.3. Measuring fidelity of implementation

Table 6 provides information about the three components of fidelity, including the indicators, the data sources, and the thresholds for the units of measure and the program as a whole. We measured fidelity in each of the program sites and in each of the three program years.

Table 6. Key Components and Fidelity of Implementation Measures (Revised after Year 1; revisions in red with explanations in footnotes)

Component	Unit of measure	Indicators	Data source	Definition of fidelity	Indicator threshold	Unit and Program threshold
Technical Assistance/ Coaching	District & IHE sites	District and IHE staff receive TA/coaching	Attendance logs	Each staff member receives TA/Coaching (0/1)	High implementation (site level) =75% of participants participate in at least 75% of TA/coaching events	**Program threshold** = 75% of sites have high implementation
Partnerships	District & IHE sites	Agreement between high school and IHE staff to collaborate on dual enrollment program	Written agreement	Written agreement for TCT implementation plan exists	0=does not meet threshold 1=meets threshold	**Unit threshold:** Range = 0 – 5 0-2= low implementation 3-5 = high implementation **Program threshold:** fidelity = 50% of partnerships have high implementation score
		Establish and operate an interagency team (IHEs, school systems, adult agencies, community providers) to facilitate communication about TCT model across agencies	Quarterly meeting attendance log and meeting notes	The interagency team is formed and meets quarterly	0=no meetings 1=1 quarterly meeting 2=2 quarterly meetings 3=3 quarterly meetings 4=4 quarterly meetings	
Student TCT activities	Students	(1) Student enrollment in program Goal = enrolled in program for 2 semesters	Student schedules	TCT student enrolled in program for less than 1 semester = 0 TCT student enrolled in program for 1 semester only = 1 TCT student enrolled in program for 2 semesters = 2	High implementation = 75% of students with score = 2	
		(2) Student participation in person-centered planning sessions Goal = 1 session annually	Written updated action plan at end of each meeting	TCT student participates in 0 person-centered planning session annually = 0 TCT student participates in 1 person-centered planning session annually = 1	High implementation = 75% of students with score = 1	
		(3) Student participation in check-ins re: goals Goal = 5 sessions annually	Student schedules	TCT student participates in 0-1 goal check-ins annually = 0 TCT student participates in 2 goal check-ins annually = 1 TCT student participates in 3 goal check-ins annually =2 TCT student participates in 4+ goal check-ins annually = 3	High implementation = 75% of students with score = 3	

Component	Unit of measure	Indicators	Data source	Definition of fidelity	Indicator threshold	Unit and Program threshold
		(4) Student in full inclusion in dual enrollment program Goal = 5 days of placements	Student schedules	TCT student scheduled in non-high school placements 1 day = 0 TCT student scheduled in non-high school placements 2 days = 1 TCT student scheduled in non-high school placements at least 3 days = 2	High implementation = 75% of students with score of 2	**Unit threshold [Year 1]:** Range for implementation score for each site 0-14= moderate implementation 15-21= high implementation **Program threshold** = 50% of IHE sites have high implementation
		(5) Student enrollment in first choice course each semester Goal = enrollment in first choice each of two semesters	Student schedules	TCT student not enrolled in first choice course = 0 TCT student enrolled in first choice course in 1 semester only = 1 TCT enrolled in first choice course in 2 semesters = 2	High implementation = 75% of students with score of 2	
		(6) Student enrollment in course aligned with career goal Goal = enrollment in course aligned with career goal once annually	Student schedules	TCT student not enrolled in course aligned with career goal = 0 TCT student enrolled in course aligned with career goal = 1	High implementation = 50% of students with score of 1	
		(7) Student access to existing student services (e.g., disability services, tutoring) Goal = accessing services at least once in each of two semesters	Student activity records	TCT student does not access campus student services = 0 TCT student accesses campus student services in 1 semester only = 1 TCT student accesses campus student services in 2 semesters = 2	High implementation = 50% of students with score of 2	**Unit threshold [Year 2 and Year 3]:** Range for implementation score for each site 0-10= moderate implementation 10-17= high implementation **Program threshold** = 50% of IHE sites have high implementation
		(8) Student attends one career services event annually Goal = attendance at one career services event annually	Student activity records	TCT student does not attend career services event annually = 0 TCT student attends at least one career services event annually = 1	High implementation = 50% of students with score of 1	
		(9) Student has support plan in place Goal = student has support plan defining plan for peer mentors and/or instructional coaches	Support plan	TCT student does not have support plan = 0 TCT student has support plan = 1	High implementation = 50% of students with score of 1	

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Component	Unit of measure	Indicators	Data source	Definition of fidelity	Indicator threshold	Unit and Program threshold
		(10[a]) Student offered on-campus internships or integrated competitive employment Goal = offer of internships/integrated competitive employment for each of 2 semesters	Student record	TCT student not offered on-campus internship or integrated competitive employment = 0 TCT student offered on-campus internship or integrated competitive employment in 1 semester only = 1 TCT student offered on-campus internship or integrated competitive employment in 2 semesters = 2	High implementation = 75% of students with score of 2	
		(11[b]) Student participation in on-campus internships or integrated competitive employment Goal = participation in internships/integrated competitive employment for each of 2 semesters	Student schedule	TCT student does not participate in offer of on-campus internship or integrated competitive employment = 0 TCT student participates in on-campus internship or integrated competitive employment in 1 semester only = 1 TCT student participates in on-campus internship or integrated competitive employment in 2 semesters = 2	High implementation = 60% of students with score of 2	
		(12[a]) Student participation in on-campus internships or integrated competitive employment related to career goal Goal = participation in internships/integrated competitive employment related to career goal for each of 2 semesters	Student schedule	TCT student does not participate in offer of on-campus internship or integrated competitive employment related to career goal = 0 TCT student participates in on-campus internship or integrated competitive employment related to career goal in 1 semester only = 1 TCT student participates in on-campus internship or integrated competitive employment related to career goal in 2 semesters = 2	High implementation = 50% of students with score of 2	
		(13[c]) Student participation in an employment opportunity: paid or volunteer. Goal = participation in an employment opportunity for each of 2 semesters	Student schedule	TCT student does not participate in employment opportunity= 0 TCT student participates in an employment opportunity in 1 semester only = 1 TCT student participates in an employment opportunity in 2 semesters = 2	High implementation = 60% of students with score of 2	

[a]These items were measured in Year 1, but were not measured in Year 2 and Year 3. A "no" response to the first item automatically rendered the other two items regarding employment as a "no" as well. The decision to reduce the number of questions about employment was made to reduce the weight that this measure had on the overall fidelity of implementation.
[b]This item was measured in Year 1, but an edited version was used in Year 2 and Year 3. This decision was made to include all employment opportunities.
[c]This item was measured in Year 2 and Year 3 in order to include all employment opportunities.

4.4. Calculating fidelity scores across the full sample for each key component

Each of the components of the TCT model had a different unit of measure. The partnership component was measured at the partnership level; each IHE is considered a separate partnership. The technical assistance and coaching component was measured at the site level. Each of the three institutes of higher education were a separate site, as was each district; thus, there 24 total sites. The student participation component was measured at the student level, with students nested in higher education sites (n=3). As noted above in Table 6, each of the three components were measured by one to twelve indicators in Year 1 and one to ten indicators in Years 2 and 3. Each component was scored in the following way:

1. Technical assistance and coaching participation included one indicator. For each site, the fidelity threshold was met if 75% of staff participated in 75% of offered activities. The threshold for program fidelity was met if 75% of the sites met the site threshold.
2. Community collaboration included two indicators; one dichotomous (the written agreement exists or does not) and the second a measure of four quarterly meetings, for a total possible score of 5. The program threshold was met if 50% of the partnerships had a score of 3 or above.
3. Student participation was made up of 12 indicators in Year 1 of implementation and 10 indicators in Years 2 and 3 of implementation, measured each semester, for a total possible point value of 21 in Year 1 and 17 points in Years 2 and 3. If a site met 15 out of 21 of the student participation indicators in Year 1 or 10 out of 17 of the student participation indicators in Years 2 and 3, then the fidelity threshold for that site was met. The threshold for program fidelity was met if two of the three sites met the site threshold. (Note that because students were nested in IHE sites, the school districts were not considered sites for this measure.)

4.5. Data collection plan

Table 7 describes how, when and by whom data for each indicator were collected.

Table 7. Data collection plan (responsible entity, format and frequency)

Component	Indicator	Who collected the data	Format of data collection	Frequency
Technical assistance	Site staff technical assistance attendance logs	TCT staff	Attendance logs	Submit to EDC monthly
Community collaboration	High school/IHE agreements	IHE staff	Agreement confirmation	End of each semester
	Quarterly meeting attendance log and meeting notes	IHE staff	Logs	End of each semester
Student participation	Student enrollment status	IHE staff	Student records	End of each semester
	Student PCP participation	IHE staff	Student records	End of each semester
	Student check-in participation	IHE staff	Student records	End of each semester
	Student in full inclusion dual enrollment program	IHE staff	Student records	End of each semester
	Student enrollment in first choice course	IHE staff	Student records	End of each semester
	Student enrollment in career goal course	IHE staff	Student records	End of each semester

	Student access to IHE student services	IHE staff	Student records	End of each semester
	Student attends one career services event	IHE staff	Student records	End of each semester
	Student has support plan in place	IHE staff	Student records	End of each semester
	Student offered internship and/or employment (Year 1 only)	District staff	Student records	End of each semester
	Internship and/or job accepted by student (Year 1 only)	District staff	Student records	End of each semester
	Student participation in an employment opportunity; paid or volunteer (Years 2 & 3)	District staff	Student records	End of each semester

4.6. Fidelity reporting plan

As demonstrated in Table 8 below, the fidelity of implementation of each of the categories had been defined either with a percentage threshold (at least 75% of staff attend 75% of events) or a minimum total number on the individual indicators that make up the component.

Table 7. Fidelity reporting plan

Key Components on Logic Model	Definitions		Findings					
			2015-16 School Year (Year 1)		2016-17 School Year (Year 2)		2017-18 School Year (Year 3)	
	Definition of high implementation	Definition of "implementation with fidelity" at program level	% of sites at high level of implementation OR Program score (based on data collection during school year)	% of sites at high level of implementation OR Program score (based on data collection during school year)	% of sites at high level of implementation OR Program score (based on data collection during school year)	"Implementation with fidelity" for year (calculated based on % or score in definition)	% of sites at high level of implementation OR Program score (based on data collection during school year)	"Implementation with fidelity" for year (calculated based on % or score in definition)
Technical Assistance/ Coaching	Calculation based on 1 indicator	At least 75% of sites have high implementation						
Program structure/ community collaboration	Calculation based on 2 program indicators (total possible value of 5)	Program has high implementation						
Student participation	Year 1: Calculation based on 12 indicators (total possible value 21) Years 2 & 3: Calculation based on 10 indicators (total possible value 17)	At least 50% of sites have high implementation						

5. Results

5.1. *Confirmatory Contrasts Results*

The evaluation activities were focused on three cohorts of students in the 2015-16, 2016-17, and 2017-18 academic years. The final sample included 53 intervention students and 50 comparison students.
For each of the instruments, factor analyses were conducted with the baseline data for all three Cohorts to confirm the dimensionality and reliability of each measure. Findings indicate two sub-domains within the job-seeking skills measure (thoughts and actions), one domain for career readiness, seven sub-domains with the self-determination measure (autonomy, self-initiation, self-direction, pathways thinking, psychological empowerment, self-realization, and control-expectancy), and three sub-domains for the college self-efficacy measure (social skills, help-seeking skills, and academic skills) (see Table 9).

Table 9. Reliability statistics for instrument sub-domains.

Scale	Subscale	KMO	Variance explained	Alpha
Job-seeking skills (SCCI)	Thoughts	.752	44%	.740
	Action	.752	40%	.702
Career readiness (CMI)	Career readiness	.693	43%	.658
Self-determination (SDI)	Autonomy	.724	42%	.718
	Self-initiation	.842	51%	.839
	Self-direction	.826	59%	.855
	Pathways Thinking	.837	77%	.902
	Psychological Empowerment	.806	57%	.874
	Self-Realization	.845	65%	.884
	Control-Expectancy	.911	67%	.935
College self-efficacy (CSEI)	Social skills	.612	61%	.684
	Help-seeking skills	.782	44%	.773
	Academic skills	.794	46%	.740

Results of each confirmatory contrast are presented below, followed by tables with the confirmatory contrast details (see Tables 11-13).

5.1.1. Confirmatory Contrast 1: Job seeking skills

Analyses on measures of job-seeking skills yielded non-significant results (p>.05) and non-substantive effect sizes (<.25 SD).

5.1.2. Confirmatory Contrast 2: Career readiness

Analyses on measures of career readiness yielded non-significant results (p>.05) and non-substantive effect sizes (<.25 SD).

5.1.3. Confirmatory Contrast 3: Self-determination

As shown in Figure 1, self-determination scores were higher for intervention students than for comparison students in all sub-domains at post-test. Results of the regression analyses indicated that, after controlling for student pre-test scores, the transition experience had a significant effect on students' scores

of self-determination at post-test in both sub-domains of Volitional Action: autonomy (R^2=.153, Beta=12.371, $p<.05$) and self-initiation (R^2=.085, Beta=12.214, $p<.05$). Furthermore, effect sizes for all sub-domains, except pathways thinking, were greater than .25 (see Table 10).
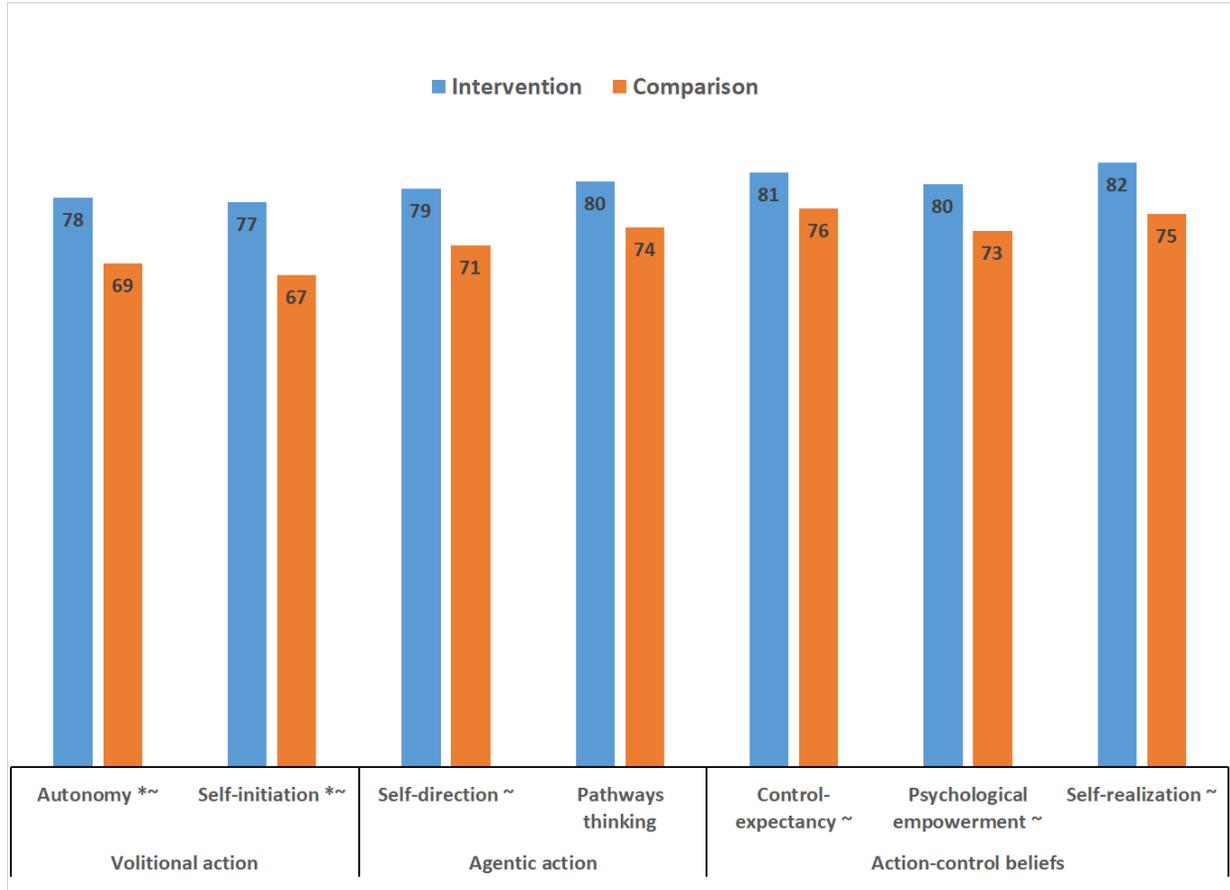
Figure 1. Mean scores at post-test for intervention and comparison students for each SDI sub-domain.
*effect size > .25; $p<.05$
~effect size > .25; p=not significant

Table 10. Conditional effect sizes for SDI sub-domains

Sub-domain	Conditional Effect Size
Autonomy	0.54
Self-initiation	0.54
Self-direction	0.36
Pathways thinking	0.23
Control-expectancy	0.31
Psychological empowerment	0.39
Self-realization	0.37

5.1.4. Confirmatory Contrast 4: Integrated paid employment

Nineteen students exited their program (i.e., turned 22 years old) during the evaluation period. Twelve of these students agreed to participate in a phone interview six months after completion to obtain information about their job status. However, the sample size was too small and disproportionate (10 intervention, 2 comparison) to analyze confirmatory question 4.

Table 11: Confirmatory Contrast Details

| Contrast name | Intervention Group | | | Comparison Group | Outcome | | | Baseline | |
	Condition/ Description	Age/grade during intervention	Exposure	Condition / Description	Outcome Domain: NEi3 [Evaluator Domain]	Unit of observation[a]: Measure [Scale][b]	Timing of measurement	Unit of observation[a]: Measure [Scale][b]	Timing of measurement
RQ#1: Job Seeking Skills	TCT participation and associated supports Fall 2015 (Cohort 1) and Fall 2016 (Cohort 2) and Fall 2017 (Cohort 3) students enrolled in dual enrollment program	18-22	1 year	Business as Usual [BAU] Cohort 1 and Cohort 2 and Cohort 3 comparison students receiving one year of business as usual	No NEi3 Domain [Job seeking skills]	Student: Student career construction inventory [Continuous]	Spring 2016 (Cohort 1) Spring 2017 (Cohort 2) Spring 2018 (Cohort 3)	Student: Student career construction inventory [Continuous]	September 2015 (Cohort 1) September 2016 (Cohort 2) September 2017 (Cohort 3)
RQ#2: Career Readiness	TCT participation and associated supports Fall 2015 (Cohort 1) and Fall 2016 (Cohort 2) and Fall 2017 (Cohort 3) students enrolled in dual enrollment program	18-22	1 year	BAU Cohort 1 and Cohort 2 and Cohort 3 comparison students receiving one year of business as usual	No NEi3 Domain [Career readiness]	Student: Career Maturity Inventory, Form C (CMI-C) - SCREENING FORM [Continuous]	Spring 2016 (Cohort 1) Spring 2017 (Cohort 2) Spring 2018 (Cohort 3)	Student: Career Maturity Inventory, Form C (CMI-C) - SCREENING FORM [Continuous]	September 2015 (Cohort 1) September 2016 (Cohort 2) September 2017 (Cohort 3)
RQ#3: Self-determination	TCT participation and associated supports Fall 2016 (Cohort 2) and Fall 2017 (Cohort 3) students enrolled in dual enrollment program	18-22	1 year	BAU Cohort 2 and Cohort 3 comparison students receiving one year of business as usual	Social Emotional Skills/Development [Self-determination]	Student: Self Determination Inventory (SDI) [Continuous]	Spring 2017 (Cohort 2) Spring 2018 (Cohort 3)	Student: Self Determination Inventory (SDI) [Continuous]	September 2016 (Cohort 2) September 2017 (Cohort 3)
RQ#4: Integrated Paid Employment	TCT participation and associated supports Students from Cohorts 1, 2 or 3 who complete 22.5 years before the end of December 2018	18-22	1 year	BAU Students from Cohorts 1, 2 or 3 who complete 22.5 years before the end of December 2018	Labor Market Outcomes [Integrated paid employment]	Student: Student self-report [Binary]	Six months after turning 22 (Cohorts 1-3)	Student: Student self-report [Binary]	September 2015 (Cohort 1) September 2016 (Cohort 2) September 2017 (Cohort 3)

[a] The 'unit of observation' is defined as the level at which the data are analyzed. For example, 'Student' is listed if each student represents a single case in the dataset (as with individual level state test scores). 'School' is listed if each school represents a single case in the dataset (as with school characteristics like AYP or school means of student test scores).
[b] The measurement scale describes how the measure is constructed. A measure may be categorized as continuous, ordinal, or binary. Please consult with your TA liaison if you have any questions regarding these measurement scales.

Table 12: Impact Estimates

A Contrast ID #	B Contrast Name (Optional)	C Post-test Measure Name	D Intervention Group N of Clusters	E Intervention Group N of Students	F Comparison Group N of Clusters	G Comparison Group N of Students	H Unadjusted Intervention Group SD	I Unadjusted Comparison Group SD	J Standard Deviation Source (Code)	K Comparison Group Mean (Optional)	L Impact Estimate	M Standardized Effect Size (Optional)	N Impact Standard Error	O p-value	P Code for Impact Model Description	Q Degrees of Freedom
C-1	RQ#1: Job Seeking Skills	Student career construction inventory														
	Thoughts		NA	48	NA	37	0.61	0.71	A	2.68	.180	0.274	.136	0.189	A	2, 81
	Actions		NA	47	NA	37	0.71	0.74	A	2.75	-.083	-0.115	.155	0.595	A	2, 80
C-2	RQ#2: Career Readiness	Career Maturity Inventory, Form C (CMI-C) - SCREENING FORM	NA	47	NA	37	0.30	0.34	A	0.71	.029	0.093	.064	0.653	A	2, 80
C-3	RQ#3: Self-determination	Self Determination Inventory (SDI)														
	Autonomy		NA	36	NA	31	15.36	29.27	A	68.80	12.371	0.535	5.420	0.026	A	2, 64
	Self-initiation		NA	36	NA	31	16.28	27.57	A	67.18	12.214	0.540	5.403	0.027	A	2, 64
	Self-direction		NA	36	NA	30	14.31	27.99	A	71.22	7.790	0.358	5.164	0.136	A	2, 63
	Pathways Thinking		NA	36	NA	31	18.02	26.49	A	73.65	5.229	0.234	5.044	0.304	A	2, 64
	Psychological Empowerment		NA	36	NA	31	14.18	24.67	A	73.17	7.817	0.394	4.603	0.094	A	2, 64
	Self-realization		NA	36	NA	30	14.92	26.71	A	75.46	7.928	0.373	4.882	0.109	A	2, 63
	Control Expectancy		NA	36	NA	30	15.33	25.01	A	76.30	6.193	0.305	4.617	0.185	A	2, 63
C-4	RQ#4: Integrated Paid Employment	Student self-report	NA	10	NA	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 13: Baseline Equivalence of Students

A	B	C	D	E	F	G	H	I	J	K	L	M
Contrast ID #	Contrast Name (Optional)	Pre-test Measure Name	Intervention Group N	Comparison Group N	Unadjusted Intervention Group SD	Unadjusted Comparison Group SD	Standard Deviation Source (Code)	Comparison Group Mean (Optional)	Intervention – Comparison Difference	Standardized T-C Difference (Optional)	Pre-test shown in this row was used as a control in the impact model for this contrast ? (Y/N)	Code for T-C Difference Calculation
C-1	RQ#1: Job Seeking Skills	Student career construction inventory										
	Thoughts		48	36	0.58	0.72	A	2.57	-0.02	-0.03	Y	B
	Actions		48	36	0.59	0.76	A	2.28	0.09	0.14	Y	B
C-2	RQ#2: Career Readiness	Career Maturity Inventory, Form C (CMI-C) - SCREENING FORM	47	36	0.31	0.31	A	0.62	0.06	0.19	Y	B
C-3	RQ#3: Self-determination	Self Determination Inventory (SDI)										
	Autonomy		36	31	20.61	17.90	A	75.28	-8.47	-0.43	Y	B
	Self-initiation		36	31	19.86	18.64	A	76.46	-7.68	-0.39	Y	B
	Self-direction		36	31	20.62	21.89	A	74.87	-0.30	-0.01	Y	B
	Pathways Thinking		36	31	25.42	29.25	A	70.38	3.13	0.11	Y	B
	Psychological Empowerment		36	31	23.43	19.76	A	76.59	-4.58	-0.21	Y	B
	Self-realization		36	31	20.83	21.29	A	79.09	-2.79	-0.13	Y	B
	Control Expectancy		36	31	20.88	21.92	A	78.05	-3.21	-0.15	Y	B
C-4	RQ#4: Integrated Paid Employment	Student self-report	10	2	NA	NA	NA	NA	NA	NA	NA	NA

5.2. Exploratory Contrasts Results

The Think College Transition (TCT) Model evaluation included eight exploratory contrasts. Each contrast is listed below in the form of a question. A short answer to the question is provided within each contrast. Detailed descriptive and statistical analyses for all contrasts are presented in Appendices A-C. In short, significant and/or substantive results for exploratory contrasts were found only for EC3, for the measure of self-determination. Results showed a significant medium interaction effect indicating that growth over time was different between intervention and comparison groups for autonomy (p=.011) and self-initiation (p=.008). That is, participants in the TCT model had significant growth over the course of the year while comparison students showed no significant growth (see Table 14)

Table 14: Mean scores and standard deviations on self-determination sub-domains.

Sub-domain	Condition	Time 1 (fall)		Time 2 (winter)		Time 3 (spring)	
		Mean	SD	Mean	SD	Mean	SD
Autonomy	Comparison	75.28	17.90	75.30	16.96	68.80	29.27
	Intervention	67.41	20.57	74.91	16.37	77.38	15.76
Self-Initiation	Comparison	76.46	18.64	71.06	21.24	67.18	27.57
	Intervention	68.78	20.23	74.75	14.54	76.73	16.29

[EC1] Does one year of participation in the TCT model lead to higher growth over time in levels of **job-seeking skills** compared to students in the business as usual condition?

Result	No
Measure	Student Career Construction Inventory (SCCI)
Analyses	See Appendix A

[EC2] Does one year of participation in the TCT model lead to higher growth over time in levels of **career readiness** compared to students in the business as usual condition?

Result	No
Measure	Career Maturity Inventory (CMI)
Analyses	See Appendix A

[EC3] Does one year of participation in the TCT model lead to higher growth over time in levels of **self-determination** compared to students in the business as usual condition?

Result	Yes, for sub-domains of autonomy, self-initiation, psychological empowerment, and self-realization.
	Autonomy & Self-initiation: Results showed a significant medium interaction effect indicating that growth over time was different depending on setting. Participants in the TCT model had significant growth over the course of the year (baseline to end-of-the-year) while comparison students showed no significant growth.

	Psychological Empowerment & Self-Realization: Results showed a small, but not statistically significant, interaction effect indicating that growth over time is different between settings. Participants in the TCT model had significant growth over the course of the year (baseline to end-of-the-year) while comparison students showed no significant growth.
Measure	Self-determination Inventory: Student Report (SDI:SR)
Analyses	See Appendix A

[EC4] Do two years of participation in the TCT model lead to higher levels of **job-seeking skills** for 18-22 year old students with ID/A compared to one year of participation in the TCT model (2016-2017)?

Result	No
Measure	Student Career Construction Inventory (SCCI)
Analyses	See Appendix B

[EC5] Do two years of participation in the TCT model lead to higher levels of **career readiness** for 18-22 year old students with ID/A compared to one year of participation in the TCT model 2016-2017)?

Result	No
Measure	Career Maturity Inventory (CMI)
Analyses	See Appendix B

[EC6] Do two years of participation in the TCT model lead to higher levels of **self-determination** for 18-22 year old students with ID/A compared to one year of participation in the TCT model?

Result	No
Measure	Self-determination Inventory (SDI)
Analyses	See Appendix B

[EC7] Amongst those 18-22 year old students with ID/A who exited transition services after two years, are students with ID/A who enrolled in the TCT model more likely than comparison students in the business as usual condition to be **employed in integrated competitive employment** six months after completion of the intervention?

Result	Inclusive. Statistical analyses were not conducted due to small sample size.
Measure	Interview with students at age 22.5 years.
Data	See Appendix C

[EC8] Does two years of participation in the TCT model lead to higher levels of **college self-efficacy** for 18-22 year old students with ID/A compared to one year of participation in the TCT model?

Result	No
Measure	College Self-Efficacy Inventory (CSEI)
Analyses	See Appendix B

5.3. *Implementation Fidelity Results*

The evaluation also measured Fidelity of Implementation of three planned intervention activities over the three years (Table 15). First, staff at all intervention sites (21 districts and 3 IHEs) participated in technical assistance (TA) workshops throughout the 3 years of the intervention implementation. Staff included transition coordinators, education coaches, job coaches and teachers. A total of 88 staff from the intervention districts and 9 staff from the IHEs engaged in the workshops. An additional 60 staff from 25 districts which did not participate in the evaluation and 5 staff from three districts which provided only comparison students to the study (and no intervention students) participated in the TA workshops. In each of the three years the evaluation measured attendance at the TA workshops and reported on the percent of sites in which 75% of participants from the site participated in at least 75% of TA workshops (Goal = 75%). In each of the three years, the workshop rate did not reach target (year 1 57%, year 2 50%, year 3 41%). However, as described above, the TA efforts successfully reached a broad audience of MAICEI partners, regardless of student participation in the TCT impact evaluation research study, and is commendable. In addition, the calculation of high implementation may have disproportionately affected larger districts. For example, 12 staff from one district were invited to all the workshops and "only" four staff members attended more than 75% of the events. These staff contributed significantly to the conversation and engaged with the full depth of the TCT model, but the district did not hit the target TA participation. In sum, at least one staff member (and often two or more) consistently attended workshops throughout the year(s) in 14 of 21 districts, and thus engaged with the full depth of the TCT Model.

Second, districts and IHEs were expected to form coherent partnerships indicated by formal signed documentation and regular meetings. In all three years, the partnership activities reached the target goal of 50% of the sites having high implementation.

Last, but not least, student activities were measured on 10 indicators (enrollment in program; person-centered planning; goal check-ins; non-high school placement; course selection (first choice & career aligned); student services; career services; support plan; and integrated competitive employment). In each year of the intervention, the student activities were implemented with fidelity – with 100% of sites have high implementation in Years 2 and 3. There remains room for improvement however. Data indicated that implementation fell below the target goal on three indicators in both Year 2 and Year 3: first choice course, use of campus services, and having integrated competitive employment.

Table 15: Fidelity of Implementation of Intervention(s) by Year

Findings from Implementation Year 1: 2015-2016

Intervention Components: Copy from list above	Implementation measure (total number of measurable indicators representing each component	Sample Size at the Sample Level (# of schools, districts, etc)	Representativeness of sample: Measured on All (A) units representing the intervention group in the impact analyses[b]	Component Level Threshold for Fidelity of Implementation for the Unit that is the Basis for the Sample-Level	Evaluator's Criteria for "Implemented with Fidelity" at Sample Level	Component Level Fidelity Score for the Entire Sample	Implemented with Fidelity? (Yes, No, N/A)
Planned Intervention Activities [i.e., key components]							
Technical Assistance/ Coaching	1	7 sites (5 Districts, 2 IHEs)	A	75% of sites have high implementation	High implementation = 75% of participants from a site participate in at least 75% of TA/coaching events	57% of sites have high implementation	No
Partnerships	2	2 IHEs	A	50% of partnerships have high implementation score	High implementation = 3-5 points	100% have high implementation	Yes
Student Activities	12	2 IHEs	A	50% of IHE sites have high implementation	High implementation = 15-21 points	50% have high implementation	Yes

Findings from Implementation Year 2: 2016-2017

Intervention Components: Copy from list above	Implementation measure (total number of measurable indicators representing each component	Sample Size at the Sample Level (# of schools, districts, etc)	Representativeness of sample: Measured on All (A) units representing the intervention group in the impact analyses[b]	Component Level Threshold for Fidelity of Implementation for the Unit that is the Basis for the Sample-Level	Evaluator's Criteria for "Implemented with Fidelity" at Sample Level	Component Level Fidelity Score for the Entire Sample	Implemented with Fidelity? (Yes, No, N/A)
Planned Intervention Activities [i.e., key components]							
Technical Assistance/ Coaching	1	16 sites (13 Districts, 3 IHEs)	A	75% of sites have high implementation	High implementation = 75% of participants from a site participate in at least 75% of TA/coaching events	50% of sites have high implementation	No

Partnerships	2	3 IHEs	A	50% of partnerships have high implementation score	High implementation = 3-5 points	100% have high implementation	Yes
Student Activities	10	3 IHEs	A	50% of IHE sites have high implementation	High implementation = 10-17 points	100% have high implementation	Yes

Findings from Implementation Year 3: 2017-2018

Intervention Components: Copy from list above	Implementation measure (total number of measurable indicators representing each component	Sample Size at the Sample Level (# of schools, districts, etc)	Representativeness of sample: Measured on All (A) units representing the intervention group in the impact analyses[b]	Component Level Threshold for Fidelity of Implementation for the Unit that is the Basis for the Sample-Level	Evaluator's Criteria for "Implemented with Fidelity" at Sample Level	Component Level Fidelity Score for the Entire Sample	Implemented with Fidelity? (Yes, No, N/A)
Planned Intervention Activities [i.e., key components]							
Technical Assistance/ Coaching	1	17 sites (14 Districts, 3 IHEs)	A	75% of sites have high implementation	High implementation = 75% of participants from a site participate in at least 75% of TA/coaching events	41% of sites have high implementation	No
Partnerships	2	3 IHEs	A	50% of partnerships have high implementation score	High implementation = 3-5 points	100% have high implementation	Yes
Student Activities	10	3 IHEs	A	50% of IHE sites have high implementation	High implementation = 10-17 points	100% have high implementation	Yes

6. Conclusion

Overall, this research found that participation in one year of the holistic TCT Model intervention substantively increased self-determination in students with intellectual disabilities and autism (ID/A). Intervention students had higher scores of self-determination at the end of the school year than students enrolled in their districts' non-college-based transition experiences. The holistic nature of the intervention provided ID/A students with a broad and rich experience with opportunities to engage in academic classes, college social life, institutional supports, and employment with their same aged peers. However, this made it difficult to isolate which aspects of the intervention had the most impact, and also made it difficult to determine if one aspect alone would have been sufficient or if the holistic nature was critical. A few key TCT components were applied to both comparison and intervention students alike (e.g., person-centered planning, work experiences, self-determination lessons) because the majority of comparison students were drawn from the same district programs run by the same staff, trained by TCT Model developers. Given this contamination and the study's results, perhaps it was more the college experience and less the community work experiences or technical assistance trainings that specifically influenced student's self-determination.

The college setting seems to have afforded students with authentic experiences to engage in self-determined action. Like their same aged college-enrolled peers, TCT Model students had opportunities to make daily autonomous decisions and initiate actions based on their preferences. For example, they could make choices about where and when to socialize with friends, complete coursework, check their email, eat, etc. The college environment acts as an intermediary between high school and "the real world" where all young adults, including students with disabilities, feel motivated and relatively emotionally safe to try out new things and discover their strengths and areas of growth. TCT Model students may have been able to increase their level of independence by engaging in typical campus life experiences such as joining new clubs or teams, making new friends, and taking college classes. While engaging in these experiences, they likely had organic opportunities to navigate challenges and practice their self-determination skills. (For a specific student example of the full college experience, see Hanson, Elander, Galaska, & Redfern, 2018).

This is one of the first quantitative studies to examine college-based transition programs using a rigorous research design. The overall large effect sizes and statistically significant differences are very encouraging about the positive effect of college-based transition programs on self-determination. Previous research has established that self-determination in students with disabilities is positively associated with post-school employment and education outcomes (Palmer & Bambara, 2014; Powers et al., 2012; Shogren, Wehmeyer, Palmer, Rifenbark, & Little, 2015; Wehmeyer & Palmer, 2003, Wehmeyer & Schwartz, 1997). This evaluation did not have a sufficient sample size to determine if the intervention had a significantly positive effect on students' post-school employment. However, the self-determination result shows promise of the possibility of the intervention to have such an effect. Future research will need to be conducted to learn what TCT Model components specifically affect self-determination and what other long-term effects participation in the TCT Model might have.

With respect to the other confirmatory contrasts, results indicated no significant effect of the intervention on outcome measures associated with employment (job-seeking skills, career readiness). Several factors may have influenced this result and thus the null result should be interpreted with caution. First, unlike the Self-Determination Inventory, which had been previously validated with students with disabilities, the Student Career Construction Inventory (measuring job-seeking skills) and Career Maturity Inventory (measuring career readiness) were modified for this research based on our own pilot research with transition students with ID/A. In addition, reliability statistics demonstrated that the sub-domains were acceptable but not particularly robust. Therefore, our instruments may have been insufficient in measuring the true effect of the intervention on job-seeking skills and/or career readiness.

On the other hand, as described in the Fidelity of Implementation section, implementation sites had room to grow on student participation in integrated competitive employment. That is, the majority of intervention students did not meet the threshold of participation in this indicator in Years 2 and 3. Additionally, comparison students' tended to engage in work opportunities, albeit generally in a sheltered environment. Taken together, it is possible that the intervention as enacted did not provide sufficient employment opportunities to induce a measurable difference.

Every research study conducted on active educational programs includes some tensions that lead to limitations and this impact evaluation was no exception. First, as described above, the holistic nature of the intervention provided ID/A students with a broad and rich experience with opportunities to engage in academic classes, college social life, institutional supports, and employment with their same aged peers. However, this made it difficult to isolate which parts had the most impact. Second, the TCT Model was built upon meaningful partnerships between IHEs and districts such that all parties believed in the merit of the MAICEI program and the TCT Model. The TCT Model also included technical assistance training events and workshops on topics such as employment, student supports, self-determination, and advising for staff from all of the involved institutions. Because comparison and intervention students came from the same districts and were supported by the same staff members, there was almost certainly intervention contamination of unmeasured quantity on the comparison students. Last, the research was limited to three IHEs and partner school districts which limited the sample size.

Overall, this research found that the broad TCT Model intervention substantively affected the self-determination of students with ID/A over the course of one year, as compared to comparison students engaged in their district's transition services. This is one of the first quantitative studies to examine dual enrollment programs rigorously, and despite the limitations, the overall large effect sizes and statistical significant differences are very encouraging about the positive effect of dual enrollment programs on self-determination, and potentially on longer-term outcomes of employment and/or future college enrollment. Future research will need to be conducted to learn what TCT Model components specifically affect self-determination, and what other long term effects participation in the TCT Model might have.

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7. Appendices

7.1. Appendix A: Descriptives and Analyses for Exploratory Contrasts 1-3

Legend	
Partial eta squared (ANOVA)	
< 0.02	small effect size
< 0.06	medium effect size
< 0.14	large effect size
sig	
< 0.05	statistically significant

1. Does one year of participation in the TCT model lead to higher growth over time in levels of job-seeking skills compared to students in the business as usual condition?

DESCRIPTIVES

Sub-domain	Condition	Time 1		Time 2		Time 3		N
		Mean	SD	Mean	SD	Mean	SD	
SCCI_Thoughts	Comparison	2.55	0.73	2.67	0.79	2.63	0.69	35
	Intervention	2.54	0.58	2.73	0.54	2.82	0.61	46
	Total	2.56	0.64	2.71	0.65	2.76	0.66	
SCCI_Actions	Comparison	2.28	0.77	2.51	0.80	2.70	0.72	35
	Intervention	2.38	0.61	2.49	0.63	2.67	0.71	45
	Total	2.33	0.67	2.50	0.70	2.71	0.72	

ANOVA

Sub-domain		df	F	sig	Partial Eta Squared
SCCI_Thoughts	Time	2,158	2.876	0.059	0.035
	Condition	1,79	0.512	0.476	0.006
	Time*Condition	2,158	0.827	0.439	0.010
SCCI_Actions	Time	2,156	9.646	0.000	0.110
	Condition	1,78	0.022	0.884	0.000
	Time*Condition	2,156	0.429	0.652	0.005

POST-HOC T-tests

Sub-domain	Pair	t	df	sig (2-tailed)
SCCI_Thoughts	Baseline-Time2	2.097	80	0.039
	Time2-Time3	0.529	81	0.598
	Baseline-Time3	2.427	83	0.017
SCCI_Actions	Baseline-Time2	2.398	80	0.019
	Time2-Time3	2.523	80	0.014
	Baseline-Time3	3.937	82	0.000

CONCLUSIONS

In short, no.	No effect of setting.
SCCI_Thoughts:	Small (but not statistically significant) effect of time: regardless of setting, students show growth from Time 1 to Time 2 (and then a plateau)
SCCI_Actions:	Significant medium effect of time: regardless of setting, students show continuous growth over the 3 time periods

2. Does one year of participation in the TCT model lead to higher growth over time in levels of career readiness compared to students in the business as usual condition?

DESCRIPTIVES

Domain	Condition	Time 1 Mean	Time 1 SD	Time 2 Mean	Time 2 SD	Time 3 Mean	Time 3 SD	N
CMI	Comparison	0.61	0.31	0.69	0.33	0.70	0.34	35
	Intervention	0.67	0.31	0.72	0.27	0.76	0.30	45
	Total	0.66	0.31	0.70	0.30	0.74	0.31	

ANOVA

Sub-domain		df	F	sig	Partial Eta Squared
CMI	Time	2,156	3.910	0.022	0.048
	Condition	1,78	0.744	0.391	0.009
	Time*Condition	2,156	0.090	0.914	0.001

POST-HOC T-tests

Sub-domain	Pair	t	df	sig (2-tailed)
CMI	Baseline-Time2	2.085	79	0.040
	Time2-Time3	1.130	80	0.262
	Baseline-Time3	2.399	82	0.019

CONCLUSIONS

In short, no.	No effect of setting.
CMI:	Significant small effect of time: regardless of setting, students show growth from Time 1 to Time 2 (and then a plateau)

3. Does one year of participation in the TCT model lead to higher growth over time in levels of self-determination compared to students in the business as usual condition?

DESCRIPTIVES

Sub-domain	Condition	Time 1 Mean	Time 1 SD	Time 2 Mean	Time 2 SD	Time 3 Mean	Time 3 SD	N
SDI_Autonomy	Comparison	75.28	17.90	75.30	16.96	68.80	29.27	31
	Intervention	67.41	20.57	74.91	16.37	77.38	15.76	34
SDI_SelfInitiation	Comparison	76.46	18.64	71.06	21.24	67.18	27.57	31
	Intervention	68.78	20.23	74.75	14.54	76.73	16.29	34
SDI_SelfDirection	Comparison	74.82	22.26	75.27	21.75	71.22	27.99	30
	Intervention	74.22	20.69	75.38	16.95	78.47	14.32	34
SDI_PathwaysThinking	Comparison	70.38	29.25	74.96	24.90	73.65	26.49	31
	Intervention	73.31	25.77	76.10	19.50	79.79	18.11	34

Sub-domain	Condition							N
SDI_PsychEmpower	Comparison	76.59	19.76	77.77	21.37	73.17	24.67	31
	Intervention	71.60	23.93	73.64	18.90	79.32	14.12	34
SDI_SelfRealization	Comparison	78.70	21.54	77.56	20.72	75.46	26.71	30
	Intervention	75.49	21.06	78.92	19.30	81.77	15.03	34
SDI_ControlExpectancy	Comparison	78.33	22.23	78.64	17.41	76.30	25.01	30
	Intervention	74.45	21.32	76.14	18.45	80.67	15.55	34

Sub-domain		df	F	sig	Partial Eta Squared
SDI_Autonomy	Time	2,126	0.986	0.376	0.015
	Condition	1,63	0.001	0.978	0.000
	Time*Condition	2,126	4.716	0.011	0.070
SDI_SelfInitiation	Time	2, 126	0.062	0.940	0.003
	Condition	1,63	0.233	0.631	0.004
	Time*Condition	2, 126	5.067	0.008	0.108
SDI_SelfDirection	Time	2,124	0.038	0.963	0.001
	Condition	1,62	0.317	0.576	0.005
	Time*Condition	2,124	1.110	0.333	0.018
SDI_PathwaysThinking	Time	2, 126	1.182	0.310	0.018
	Condition	1,63	0.539	0.466	0.008
	Time*Condition	2,126	0.293	0.746	0.005
SDI_PsychEmpower	Time	2, 126	0.317	0.729	0.005
	Condition	1,63	0.062	0.805	0.001
	Time*Condition	2, 126	2.425	0.093	0.037
SDI_SelfRealization	Time	2,124	0.153	0.858	0.002
	Condition	1,62	0.135	0.715	0.002
	Time*Condition	2,124	1.383	0.255	0.022
SDI_ControlExpectancy	Time	2,124	0.285	0.753	0.005
	Condition	1,62	0.030	0.864	0.000
	Time*Condition	2,124	1.272	0.284	0.020

POST-HOC T-tests

	Comparison			
Sub-domain	Pair	t	df	sig (2-tailed)
SDI_Autonomy	Baseline-Time2	0.009	30	0.993
	Time2-Time3	-1.553	30	0.131
	Baseline-Time3	-1.316	30	0.198
SDI_SelfInitiation	Baseline-Time2	-1.242	30	0.224
	Time2-Time3	-0.922	30	0.364
	Baseline-Time3	-1.689	30	0.102
SDI_PsychEmpower	Baseline-Time2	0.254	30	0.802
	Time2-Time3	-1.056	30	0.300
	Baseline-Time3	-0.652	30	0.519
SDI_SelfRealization	Baseline-Time2	-0.276	30	0.785
	Time2-Time3	-0.458	29	0.650
	Baseline-Time3	-0.598	29	0.554

	Intervention			
Sub-domain	Pair	t	df	sig (2-tailed)
SDI_Autonomy	Baseline-Time2	1.978	33	0.056
	Time2-Time3	0.796	33	0.432

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	Baseline-Time3	3.071	35	0.004
SDI_SelfInitiation	Baseline-Time2	1.803	33	0.080
	Time2-Time3	0.841	33	0.407
	Baseline-Time3	2.517	35	0.017
SDI_PsychEmpower	Baseline-Time2	0.563	33	0.577
	Time2-Time3	2.253	33	0.031
	Baseline-Time3	2.493	35	0.018
SDI_SelfRealization	Baseline-Time2	0.858	33	0.397
	Time2-Time3	0.923	33	0.363
	Baseline-Time3	2.175	35	0.036

CONCLUSIONS

In short, yes.   Evidence of higher growth over time in levels of SD in 4 sub-domains.

SDI_Autonomy   Significant medium interaction effect: growth over time is different depending on setting: Comparison students did not change over time; Intervention had significant growth from Time 1 (Baseline) to Time 3 (Spring).

SDI_SelfInitiation   Significant medium interaction effect: growth over time is different depending on setting: Comparison students did not change over time; Intervention had significant growth from Time 1 (Baseline) to Time 3 (Spring).

SDI_PsychEmpower   Small (but not statistically significant) interaction effect: growth over time is different between settings; Comparison students did not change over time, Intervention had significant growth from Time 1 (Baseline) to Time 3 (Spring).

SDI_SelfRealization   Small (but not statistically significant) interaction effect: growth over time is different between settings; Comparison students did not change over time, Intervention had significant growth from Time 1 (Baseline) to Time 3 (Spring).

7.2. Appendix B: Descriptives and Analyses for Exploratory Contrasts 4-6, 8

4. Do two years of participation in the TCT model lead to higher levels of job-seeking skills for 18-22 year old students with ID/A compared to one year of participation in the TCT model?

DESCRIPTIVES

Sub-domain	Years in TCT Model	N	Mean	SD
SCCI_Thoughts	One Year	31	2.84	0.66
	Two Years	17	2.76	0.64
SCCI_Actions	One Year	30	2.69	0.71
	Two Years	17	2.57	0.80

PARAMETER ESTIMATES

	Parameter	B	Std. Error	t	Sig.	95% Confidence Interval Lower Bound	Upper Bound
SCCI_Thoughts	Intercept	1.69	0.41	4.15	0.000	0.87	2.51
	Years	0.01	0.18	0.06	0.954	-0.36	0.38
	Baseline	0.44	0.15	2.84	0.007	0.13	0.75
SCCI_Actions	Intercept	1.03	0.41	2.49	0.017	0.20	1.86
	Years	0.15	0.19	0.78	0.437	-0.24	0.54
	Baseline	0.64	0.16	4.01	0.000	0.32	0.96

CONCLUSIONS

No, no evidence of difference

5. Do two years of participation in the TCT model lead to higher levels of career readiness for 18-22 year old students with ID/A compared to one year of participation in the TCT model?

DESCRIPTIVES

Domain	Years in TCT Model	N	Mean	SD
CMI	One Year	26	0.78	0.26
	Two Years	10	0.74	0.31

PARAMETER ESTIMATES

	Parameter	B	Std. Error	t	Sig.	95% Confidence Interval Lower Bound	Upper Bound
CMI	Intercept	0.53	0.11	4.99	0.000	0.32	0.75
	Years	-0.04	0.10	-0.37	0.712	-0.23	0.16
	Baseline	0.40	0.14	2.86	0.007	0.12	0.68

CONCLUSIONS

No, no evidence of difference

6. Do two years of participation in the TCT model lead to higher levels of self-determination for 18-22 year old students with ID/A compared to one year of participation in the TCT model?

DESCRIPTIVES

Sub-domain	Years in TCT Model	N	Mean	SD
SDI_Autonomy	One Year	26	78.47	14.41
	Two Years	10	79.18	11.04
SDI_SelfInitiation	One Year	26	76.05	16.80
	Two Years	10	79.17	13.43
SDI_SelfDirection	One Year	26	77.81	14.70
	Two Years	10	78.67	15.90
SDI_PathwaysThinking	One Year	26	78.74	18.60
	Two Years	10	79.75	18.91
SDI_PsychEmpower	One Year	26	79.18	13.47
	Two Years	10	76.74	14.63
SDI_ControlExpectancy	One Year	26	81.56	14.28
	Two Years	10	78.69	16.61
SDI_SelfRealization	One Year	26	82.26	15.90
	Two Years	10	81.53	14.85

PARAMETER ESTIMATES

	Parameter	B	Std. Error	t	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
SDI_Autonomy	Intercept	67.64	8.89	7.61	0.000	49.55	85.72
	Years	0.19	5.01	0.04	0.971	-10.01	10.38
	Baseline	0.16	0.11	1.48	0.149	-0.06	0.39
SDI_SelfInitiation	Intercept	55.97	10.21	5.48	0.000	35.19	76.74
	Years	-1.82	5.54	-0.33	0.745	-13.08	9.44
	Baseline	0.32	0.13	2.56	0.015	0.07	0.58
SDI_SelfDirection	Intercept	49.15	10.08	4.88	0.000	28.65	69.65
	Years	2.80	5.08	0.55	0.585	-7.53	13.13
	Baseline	0.36	0.11	3.22	0.003	0.13	0.59
SDI_PathwaysThinking	Intercept	41.38	9.62	4.30	0.000	21.80	60.96
	Years	4.96	5.68	0.87	0.388	-6.59	16.51
	Baseline	0.46	0.10	4.57	0.000	0.26	0.67
SDI_PsychEmpower	Intercept	46.93	7.33	6.41	0.000	32.02	61.83
	Years	6.62	4.16	1.59	0.121	-1.85	15.08
	Baseline	0.37	0.08	4.61	0.000	0.21	0.54
SDI_ControlExpectancy	Intercept	45.08	8.81	5.12	0.000	27.15	63.01
	Years	5.58	4.58	1.22	0.232	-3.74	14.90
	Baseline	0.42	0.10	4.24	0.000	0.22	0.63
SDI_SelfRealization	Intercept	41.17	8.52	4.83	0.000	23.83	58.50
	Years	3.47	4.39	0.79	0.434	-5.45	12.39
	Baseline	0.50	0.10	5.26	0.000	0.31	0.70

CONCLUSIONS
No, no evidence of difference

8. Does two years of participation in the TCT model lead to higher levels of college self-efficacy for 18-22 year old students with ID/A compared to one year of participation in the TCT model?

DESCRIPTIVES

Sub-domain	Years in TCT Model	N	Mean	SD
CSEI_Social	One Year	30	2.39	0.57
	Two Years	17	2.47	0.44
CSEI_HelpSeeking	One Year	30	2.54	0.45
	Two Years	17	2.54	0.35
CSEI_Academic	One Year	30	2.51	0.50
	Two Years	17	2.31	0.44

PARAMETER ESTIMATES

	Parameter	B	Std. Error	t	Sig.	95% Confidence Interval Lower Bound	Upper Bound
CSEI_Social	Intercept	1.35	0.35	3.82	0.000	0.63	2.06
	Years	-0.02	0.14	-0.17	0.869	-0.32	0.27
	Baseline	0.46	0.13	3.40	0.001	0.19	0.73
CSEI_HelpSeeking	Intercept	0.82	0.28	2.95	0.005	0.26	1.39
	Years	-0.09	0.10	-0.89	0.381	-0.28	0.11
	Baseline	0.71	0.11	6.42	0.000	0.49	0.94
CSEI_Academic	Intercept	1.04	0.41	2.52	0.016	0.21	1.88
	Years	0.16	0.14	1.19	0.242	-0.11	0.44
	Baseline	0.53	0.16	3.22	0.002	0.20	0.86

CONCLUSIONS
No, no evidence of difference

7.3. Appendix C: Descriptives and Analyses for Exploratory Contrast 7

7. Amongst those 18-22 year old students with ID/A who exited transition services after two years, are students with ID/A who enrolled in the TCT model more likely than comparison students in the business as usual condition to be employed in integrated competitive employment six months after completion of the intervention?

	Employed	Not Employed
Comparison	2	0
Intervention 1 year	0	3
Intervention 2 years	2	5

NOTE: too few participants to run statistical analysis.