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Main and Moderating Effects of an Online Transition Curriculum on Career Readiness

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Abstract

In this study, students with and without disabilities ($n = 816$) in general and special education settings in Grades 9 through 12 were participants in a quasi-experimental design to examine the main effects of an online curriculum intervention with transition-related content on career readiness. Setting and teacher characteristics were examined for moderating effects. Results showed a main effect across settings (general and special education, self-contained, resource rooms) as well as differentiating effects based on teacher fidelity and the number of lessons taught. Implications are discussed with regard to the need for further examination of these contextual factors in high schools so all students, with and without disabilities, are provided career readiness opportunities.

Keywords

career readiness, vocational education, high-incidence disabilities, high school, digital learning, blended learning, secondary intervention

In the 21st century, many jobs depend on the ability to communicate and solve problems using technology (Coiro, 2012; Izzo et al., 2010; Lombardi, Izzo, Gelbar, et al., 2017). Most information–economy jobs require that workers have information technology (IT) literacy skills to extract information from online texts, which is a major reason why college and career readiness standards include expectations for IT literacy (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010). Adolescents who do not acquire these skills often earn low wages and receive few opportunities for career advancement (Conceição, 2016). Those with disabilities, in particular, remain at high risk of these outcomes and many end up with low-wage jobs with little evidence they will be able to transition to higher earning careers (The National Collaborative on Workforce and Disability for Youth, 2014; Sanford et al., 2011).

According to the Individuals with Disabilities Education Improvement Act (IDEA, 2004), high school students with disabilities must have transition services that address preparation for adult life specified in their Individualized Education Programs (IEPs) that may be carried out in a variety of general and special education classrooms as well as outside of the classroom. Blended or digital learning may offer new and practical options for students with disabilities to receive transition-related content in the classroom. As such, in the current study, we examined the main and moderating effects of an online curriculum intervention on the career readiness of high school students with and without disabilities. The intervention was focused on the delivery of transition-related content via blended learning opportunities.

Career Readiness

Career readiness, often combined with college and career readiness, continues to persist as a policy priority for all students, with and without disabilities. Even so, career readiness remains loosely defined. In this study, we used current law and policy to guide our understanding of career readiness. Specifically, three laws shape the discussion of career readiness: (a) the IDEA (2004), (b) the Every Student Succeeds Act (ESSA, 2015), and (c) the Strengthening Career and Technical Education for the 21st Century Act (commonly referred to as Perkins V, 2018).

Transition services are defined by IDEA (2004) as "a coordinated set of activities" that are aimed at improving postsecondary outcomes for individuals with disabilities, with a specific focus on postsecondary education or

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training, employment, and independent living skills (IDEA, 2004). The first element of this definition is the phrase, "coordinated set of activities," suggesting transition services should not be provided in isolation. Special educators should make connections with other key personnel in the high school that may assist individual students in becoming career ready. Importantly, secondary special education and transition stakeholders have advanced a wide array of evidence-based interventions that facilitate positive postschool outcomes among students with disabilities (Mazzotti et al., 2016; Test, Fowler, et al., 2009; Test, Mazzotti, et al., 2009).

In an effort to continue the mission of the original law, the Elementary and Secondary Education Act (ESEA) of 1965, ESSA (2015) outlines a number of provisions that require schools to provide *all* students, including traditionally underserved populations like students with disabilities, a high-quality education (Malin et al., 2017). ESSA (2015) moves past access to college and employment and places a strong emphasis on preparation to succeed in postsecondary and workplace settings. Also prioritized in ESSA, Title IV states digital or blended learning is "any instructional practice that effectively uses technology to strengthen a student's learning" (ESSA, 2015, Section 4001). This could include digital learning content, access to online databases, use of data to personalize learning, online and computer-based assessments, and enhanced collaboration between users. Blended learning, or embedding online experiences into the curriculum and classroom, continues to become increasingly relevant and necessary in high schools. Thus, digital and blended learning is prioritized in current policy, yet loosely defined with no distinction between "digital" and "blended." As such, in the current study, the focus is son the ESSA prioritization on digital and blended learning coupled with the emphasis on successful outcomes in college and careers suggesting a career readiness definition that includes technology exposure and skills. Most recently, Perkins V (2018) was signed into law as a reauthorization of the Carl D. Perkins Career and Technical Education Improvement Act (2006) and authorizes the use of federal funds to prepare all students for careers. Perkins V also has a specific focus on increasing student readiness for both college and careers through strengthening partnerships between secondary and postsecondary settings (Perkins V, 2018). Both ESSA and Perkins V support and promote career readiness opportunities for all students, with and without disabilities, in high schools.

As such, career readiness for all students is a theme across the three laws to some extent, yet remains loosely defined. Unfortunately, rather than supporting the convergence of career readiness and transition practices, some efforts to advance transition services occur separately and, at worst, lead to conflicting and contradictory efforts (Morningstar et al., 2012). For example, career education programs, community-based experiences, social–emotional development, and behavioral interventions often are developed separately for youth with and without disabilities (Dougherty & Lombardi, 2016). Improving postschool outcomes for youth requires engaging all secondary staff, including general and special educators. Given the majority of youth with disabilities are primarily served within general education (McLeskey et al., 2012), embedding transition services within broader schoolwide career readiness efforts is critical. As a result, teaching transition-related content that promotes career readiness across a variety of general and special education settings may be a viable approach. Furthermore, given the prioritization of digital and blended learning in ESSA (2015), it is important for career readiness to include an online learning component.

General Education Settings

Although students with IEPs are entitled to transition services in and out of the classroom, some amount of transition-related content can be delivered in general education settings. In fact, prior studies show inclusion in general education settings, particularly in specific core subject areas (e.g., math or Language Arts), positively affects postsecondary participation (Doren et al., 2013; Joshi & Bouck, 2017). Additional studies show academic gains in math and reading for students with disabilities who learn in inclusive settings (Cole et al., 2004; Manset & Semmel, 1997; Rea et al., 2002; Westling & Fox, 2009). Furthermore, students who learn in general education classrooms have demonstrated improved social and communication abilities (Calabrese et al., 2008; Foreman et al., 2004; Katz & Mirenda, 2002). As such, evidence shows positive effects of inclusion in general education classes on longer term postschool outcomes (e.g., postsecondary education pursuits). There are promising findings on inclusion in general education courses in specific core subjects and postsecondary outcomes. We know less about settings in which transition-related content could be delivered (e.g., general education class, resource room, self-contained class), and how these settings may moderate the effect of transition-related content on student outcomes.

The potential of blended or digital learning opportunities intersecting with transition content across a variety of settings is important to further explore. In more recent years, blended or digital learning has been a federal policy priority (ESSA, 2015). In addition, many state laws require schools to begin planning the postsecondary transition of students in the sixth grade. Examples include Ohio's Policy on Career Advising and Connecticut's Student Success Plan (Connecticut State Department of Education, 2010; Ohio Revised Code, 2014). In Ohio, the law promotes technology interventions, and the Connecticut law recommends that each student's success plan be saved as a digital portfolio. Thus, federal and state policies promote blended and digital learning for all high school students, and IEP teams should consider how this might be integrated into transition services.

Transition Content Delivered Online

Although scarce, one example of a technology-based transition curriculum is EnvisionIT (EIT). As an online curriculum, EIT helps to foster technology skills in students through their completion of portfolio products and was designed to deliver transition-related content, such as career awareness and exploration in a blended, digital learning environment. For example, students complete assignments on the computer using Schoology© and Microsoft Office products, internet browsers, online databases, and they are expected to store work in Google Drive. The goal is for participating students to become more fluent with these tools and to simulate a typical adult workplace environment, and as such have more confidence and readiness for a wide range of workplace settings where computer skills are required. Across 12 curricular units, example student activities include (a) creating a high school course schedule, (b) completing online learning and transition assessments, (c) researching careers and postsecondary programs, (d) developing a resume and cover letter and participating in mock interviews, (e) writing a personal statement and career narrative, (f) completing employment and college applications. More information about the content covered in EIT is available online (http://go.osu.edu/eit).

The evidence base for EIT includes two recent studies (Lombardi, Izzo, Gelbar, et al., 2017; Lombardi, Izzo, Rifenbark, et al., 2017). In one study, Lombardi, Izzo, Rifenbark, et al. (2017) examined the effects of EIT on students' reading comprehension and found a significant and large intervention effect. In another study, Lombardi, Izzo, Gelbar, et al. (2017) found students made significant gains in technology skills. Both of these studies involved implementing a transition curriculum into general and special education classrooms; yet, setting was not a measured variable in either study. Although this preliminary evidence is promising, there is a need to further study the variety of the general and special education settings in which students with disabilities could receive transition services to better understand which delivery method is most effective. Research suggests student academic and behavioral outcomes are related to teacher practices, which may include instructional quality (Simonsen et al., 2008; Swanson, 1999; White, 1988). Furthermore, although special education teachers' technology integration is an emerging area of research (Courduff et al., 2016), application to secondary transition is less prevalent. In light of variation in teachers' instructional practices in secondary transition, additional research is needed especially considering this variability could affect the implementation of transition services and ultimately the outcomes of secondary students with disabilities.

Table 1. Student Sample Characteristics From Study on Use of Online Curriculum Intervention.

Characteristic	Overall (n = 816)	Intervention (n = 593)	Comparison (n = 233)
Grade			
9	0.31	0.37	0.15
10	0.2	0.18	0.24
11	0.19	0.2	0.17
12	0.31	0.25	0.44
Gender			
Male	0.57	0.55	0.62
Female	0.43	0.45	0.38
Lunch			
Not eligible	0.72	0.68	0.75
Eligible	0.28	0.32	0.25
Ethnicity			
Other	0.24	0.26	0.22
White	0.76	0.74	0.78
Disability status			
No	0.3	0.27	0.39
Yes	0.7	0.73	0.61

Note. Values are proportions and may exceed 1.0 due to rounding.

As such, the purpose of this study was to examine the effectiveness of an online transition curriculum (i.e., EIT) on student career readiness outcomes. A secondary objective was to determine whether the intervention effect was moderated by type of setting, as well as the amount of the curriculum the teacher taught and the quality of the instruction. The research questions were as follows:

> **Research Question 1:** What was the effect of the intervention on career readiness gains?

Specifically, we examined whether the effect differed between settings and whether the effect remained while controlling for disability status and other demographic covariates.

> **Research Question 2:** Were there differential effects based on dosage and fidelity?

Method

Participants

Table 1 shows the student characteristics of the sample. Notably, students with and without disabilities participated in the current study ($n = 816$), nested within 29 teachers in 14 high schools across two states. Eighteen teachers implemented the curriculum (intervention group, $n = 593$) and 11 teachers did not (comparison group, $n = 233$). Among the students with disabilities ($n = 334$), the following disability categories were represented, listed from most to least prevalent: specific learning disability (SLD; 33%), attention-deficit/hyperactivity disorder (ADHD (17%), other health impairment (OHI; 17%), speech or language disorder (11%), autism spectrum disorder (9%), and emotional disturbance (7%), with the remaining categories representing 2% or less (deaf/hard of hearing, intellectual disability, traumatic brain injury, multiple disabilities), and 30% of the sample were students without disabilities.

Procedures

School partners were recruited through state-level administrators who distributed recruitment fliers via email listservs and state transition and high school networks. Participating teachers were trained on how to use EIT in a 1-day, in-person training session held prior to the start of the school year. During this session, teachers were allowed to set up their online accounts and arrange their classroom space, orient themselves with the curriculum, lesson planning, and troubleshoot technology issues with the research team. Students who were in the classes of the participating teachers were deemed intervention students. At the same time, comparison teachers were recruited from the same districts as the participating teachers. Comparison teachers did not receive the 1-day training, nor did they have access to the online system via user account. Students, who were in the classes of comparison teachers, were assigned to the comparison group and did not receive transition-related content in blended learning settings. Research team members visited the classrooms of both intervention and comparison teachers to collect pretest and posttest data as well as conduct classroom observations to measure fidelity of implementation. Research team members were trained to administer all types of measures. Pretest and posttest measures were administered via online surveys.

Measures

We used a combination of student- and teacher-level variables in this study, which are described below. Student-level measures were self-report career readiness measures as well as academic setting and disability information gathered from school records. Teacher-level variables were instructional quality, and dosage, which we intentionally measured to provide information regarding the differential effects of these variables on student performance.

Student Career Construction Inventory. Research team members administered the Student Career Construction Inventory (SCCI) to students in their classrooms, which is an instrument designed to assess vocational concept, including willingness to explore and commit to a career path, at pretest and posttest (Savickas et al., 2018). The SCCI contains 25 Likert-type items with five response options each (1 = *little confidence*, 5 = *very confident*). The observed summed score at pretest ranged from 25 to 125 ($n = 790$, $M = 81.82$, $SD = 20.54$); at posttest, these summed scores ranged from 25 to 125 ($n = 678$, $M = 89.86$, $SD = 20.23$), informing gain scores that ranged from −58 to 75 ($n = 663$, $M = 8.22$, $SD = 18.97$). Cronbach's alpha was estimated to be .94 and .95 at pretest and posttest, respectively.

Vocational Skills Self-Efficacy. Research team members administered the Vocational Skills Self-Efficacy scale (VSSE; McWhirter et al., 2000) to students in their classrooms, which is a tool to assess their level of confidence related to establishing and working toward job goals, at pretest and posttest. The VSSE contains 29 Likert-type items with five response options each (1 = *strongly disagree*, 5 = *strongly agree*). At pretest, the summed scores ranged from 29 to 145 ($n = 789$, $M = 103.28$, $SD = 23.24$); at posttest, these scores ranged from 29 to 145 ($n = 676$, $M = 110.37$, $SD = 23.27$), leading to gain scores that ranged from −70 to 89 ($n = 661$, $M = 7.44$, $SD = 19.37$). Cronbach's alpha was estimated to be .96 and .97 at pretest and posttest, respectively.

Disability. We investigated disability via indicator variables using two coding strategies: (a) whether or not students were on an IEP or 504 plan and (b) by highest categorical representation (i.e., SLD, ADHD, OHI, other). Disability data were collected from teachers who accessed participating student IEPs, and then, reported data using online forms prepared by the research team.

Academic setting. Students were coded as receiving the intervention in one of three types of setting, including (a) integrated classrooms, (b) dedicated classrooms, and (c) resource rooms. Integrated classrooms were those settings in which EIT was taught along with other curricula. Dedicated classrooms were those settings in which EIT was the sole curriculum used in the class period. Resource rooms were those settings in which multiple objectives occurred, including support for other content-area classes, along with the EIT curriculum. All settings contained both comparison and intervention students and were modeled via indicator variables.

Fidelity. Participating teachers' instructional quality was measured with a fidelity checklist that was developed by the research team. This checklist was based on a rubric referred to as the Common Core of Teaching (Connecticut State Department of Education, 2010). Trained members of the research team visited intervention classrooms and used the checklist multiple times throughout the duration of the study. Teachers were observed between two and six times. Overall, the fidelity checklist included items within specific areas: (a) materials used in each classroom, such as functional assistive technology and computer printers; (b) teacher performance and behaviors, including classroom environment, student engagement, commitment to learning, instruction for active learning, lesson delivery, and EIT-specific items; and (c) student behaviors, such as student engagement during class instruction, independent work, or group work. For the teacher performance and behavior items, an observable teaching behavior is stated as an item followed by a specific definition. For example, the item "Feedback to student during the lesson" was followed by "Teacher provides immediate, meaningful feedback to students on their work that is actionable." Raters used a 3-point scale (3 = *yes*, 2 = *partially*, and 1 = *no*, with an N/A option in the event the observable behavior did not occur) to rate the teaching behavior. For the EIT-specific items, an example item was "Did students log into the online EIT course within 5 minutes of being instructed to do so?" Points were calculated and equally weighted to create a total score. Fidelity was observed for all 18 intervention teachers ($M = 0.885$, $SD = 0.097$, minimum = 0.067, maximum = 0.980). As such, the mean-level fidelity score of participating teachers was 88%.

Dosage. The dosage score represented the number of lessons taught by the participating teacher, or the amount of the curriculum delivered by the teacher to the students. The score was calculated with the frequency of teacher-reported lessons divided by the number possible (over the course of the semester or year). Dosage was observed for 434 of the 593 intervention students ($M = 0.563$, $SD = 0.197$, minimum = 0.317, maximum = 0.933), and dosage was a teacher-level variable. As such, the mean level of lessons taught by participating teachers was 56%.

Data analysis. Due to the nested data structure, multilevel linear modeling (MLM; Snijders & Bosker, 1999) was used as the analytic approach, where students (Level 1, L1) were nested in teachers (Level 2, L2). Upon inserting student- and/or teacher-level predictors, their respective variance components should decrease, relative to their baseline estimates if it was a meaningful covariate (e.g., student disability status: $\sigma^2_{alt} < \sigma^2_{base}$; teacher intervention status: $\tau_{00.alt} < \tau_{00.base}$). We examined model variance components, to calculate a pseudo-R^2, representing proportion of variance explained by a covariate. We also employed chi-square difference tests where the null hypothesis states that the parsimonious model (i.e., with fewer predictors) fits the data just as well as the alternative, more complex model.

Results

All models were estimated in the R environment using the lme4 package (Bates et al., 2015) and employed full-information maximum likelihood estimation. Using this approach, all information available was utilized to simultaneously inform the treatment of missing data while estimating all model parameters in a single step. Models differ with respect to the number of students observed due to attrition and/or missing responses on covariates; therefore, chi-square difference tests were not always warranted.

Research Question 1: What Is the Effect of the Intervention on Career Readiness Gains?

The intervention effect was assessed via an *intercept-as-outcome model*, where intervention status was entered as a teacher-level predictor of the intercept (γ_{01}). This term represents the expected difference on the gain score for students taught by intervention teachers, over those taught by comparison teachers.

SCCI (I = 663, J = 28). On average, comparison students were expected to gain just above 4 points between test administrations ($\gamma_{00} = 4.331$, $SE = 2.024$, $t = 2.14$), whereas intervention students were expected to gain an additional 5 points ($\gamma_{01} = 5.48$, $SE = 2.52$, $t = 2.17$). This model provided better fit to data: $\Delta\chi^2_{df=1} = 4.05$, $p = .04$, and produced a pseudo-R^2 of .306 (i.e., τ_{00} reduced from 25.4 to 17.6).

Academic setting (I = 663, J = 28). In an initial model, a significant main effect for integrated classrooms resulted ($\gamma_{10} = 6.775$, $SE = 2.347$, $t = 2.886$), as did the main effect of the intervention ($\gamma_{01} = 5.298$, $SE = 2.218$, $t = 2.389$). Therefore, we collapsed dedicated classrooms and resource rooms prior to reestimating the model. The main effect for integrated classrooms was significant ($\gamma_{10} = 6.946$, $SE = 2.101$, $t = 3.306$), providing the interpretation that, only in integrated classrooms, comparison students were expected to make significant gains between test administrations, as the intercept was not significantly different from zero ($\gamma_{00} = 1.570$, $SE = 1.916$, $t = 0.819$). However, intervention students were expected to make significant gains, irrespective of academic setting ($\gamma_{01} = 5.232$, $SE = 2.182$, $t = 2.398$). Therefore, intervention students, on average, earned roughly 5 more points on their gain score, and those in integrated classrooms earned an additional 7 points between test administrations. This model was a better fit to the data relative to the intercept-as-outcome model ($\Delta\chi^2_{df=1} = 9.624$, $p < .01$) and resulted in a pseudo-R^2 of .46 for the teacher variance component ($\tau_{00} = 17.6$ reduced to 9.4).

VSSE (I = 661, J = 28). On average, intervention students were estimated to attain an additional 7 points ($\gamma_{01} = 6.60$, $SE = 2.69$, $t = 2.451$) than their comparison student counterparts, whose estimate was not significantly different from zero (γ_{00} = 2.715, *SE* = 2.154, *t* = 1.261). Controlling for intervention status provided better fit to the data ($\Delta\chi^2_{df=1} = 5.35$, $p = .02$) and produced a pseudo-R^2 of .31 (i.e., τ_{00} decreased from 31.1 to 21.5). Therefore, it was expected that intervention students will gain, on average, 9.3 on the VSSE between test administrations.

Academic setting. A similar pattern emerged for the VSSE; therefore, we combined dedicated classrooms and resource rooms and estimated a main effects model. The effect of the intervention was significant (γ_{01} = 6.297, *SE* = 2.415, *t* = 2.607), and those in integrated classrooms earned an additional 6 points (γ_{10} = 6.366, *SE* = 2.341, *t* = 2.719). Due to the intercept being nonsignificant (γ_{00} = 0.318, *SE* = 2.135, *t* = 0.149), only comparison students from an integrated classroom were expected to have a significant gain between test administrations. In sum, intervention students from integrated classrooms were expected to gain nearly 13 points between pretest and posttest, producing a pseudo-R^2 of .34 (i.e., τ_{00} reduced from 21.5 to 14.1). There were no significant interaction effects based on setting.

Disability status (I = 391, J = 26). For both the SCCI and VSSE gain scores, the main effect of disability, as measured by IEP/504 status, was found to be nonsignificant, as was the interaction effect between intervention and disability and within disability categories.

Research Question 2: Are There Differential Effects Based on Dosage and Fidelity?

To elicit whether dosage and/or fidelity moderate the intervention effect on gain scores, an interaction between intervention status and dosage/fidelity was entered into the model, while omitting the main effect of dosage/fidelity. Both dosage and fidelity were centered with respect to their grand mean. With respect to interaction effects, intervention-by-dosage was represented by γ_{11}, whereas for intervention-by-fidelity is captured by γ_{02}; in both instances, these parameters represented the expected rate of change associated with being ±1 *SD* from mean dosage/fidelity.

SCCI (I = 536, J = 26). The expected gain score for comparison students was estimated to be approximately 4 points between test administrations (γ_{00} = 4.049, *SE* = 1.728, *t* = 2.343), whereas intervention students with mean-level dosage (56% of the curriculum) earned 5 points more than their comparison counterparts (γ_{01} = 5.474, *SE* = 2.216, *t* = 2.470). The rate of change per standard deviation in dosage was significantly different from zero (γ_{11} = 18.724, *SE* = 6.421, *t* = 2.916); therefore, students receiving ~19% more of the curriculum earned an increase of 4 points on their gain score (e.g., 18.724 × 0.197) over those with mean dosage. Including this predictor explained 50% of the variance between teachers after taking intervention status into account.

With respect to fidelity, the expected gain score for comparison students was 4 points (γ_{00} = 4.075, *SE* = 1.766, *t* = 2.307) from pretest to posttest, whereas intervention students taught by teachers with mean-level fidelity were expected to attain an additional 6 points (γ_{01} = 5.680, *SE* = 2.182, *t* = 2.603) between test administrations. The rate of change associated with a one standard deviation increase in fidelity was significant (γ_{02} = 40.150, *SE* = 14.232, *t* = 2.821); therefore, intervention students taught by teachers one standard deviation above the mean were expected to attain an additional 4 points on their gain score (e.g., 40.150 × 0.097) over those taught by teachers with mean-level fidelity. Including this predictor explained 46% of the variance between teachers after taking into account intervention status.

VSSE. The difference in gain scores between comparison and intervention students with mean-level dosage was significantly different from zero (γ_{01} = 7.332, *SE* = 2.238, *t* = 3.277), as was the rate of change per standard deviation in dosage (γ_{11} = 21.898, *SE* = 6.482, *t* = 3.378). Therefore, the expected gain score for an intervention student with dosage one standard deviation above the mean earned an additional 4 points over those with mean-level dosage (e.g., 21.898 × 0.197). The expected gain score for comparison students was not found to be significantly different from zero (γ_{00} = 2.701, *SE* = 1.748, *t* = 1.545). Including this predictor explained approximately 61% of the variance between teachers after taking intervention status into account.

With respect to fidelity, the estimated difference in gain scores between comparison and intervention students taught by teachers with mean-level fidelity was significant (γ_{01} = 6.508, *SE* = 2.330, *t* = 2.793), as was the rate of change per standard deviation change in fidelity (γ_{02} = 37.870, *SE* = 15.355, *t* = 2.466). Therefore, students taught by a teacher one standard deviation above the mean were expected to experience a boost of nearly 4 points on their gain score (e.g., 37.870 × 0.097) over those taught by teachers with mean-level fidelity. The expected gain score between test administrations was not significant for comparison students (γ_{00} = 2.718, *SE* = 1.882, *t* = 1.445). Insertion of this interaction effect resulted in a pseudo-R^2 of .437.

Final Models

We settled on an identical set of fixed and random effect structure for both the SCCI and the VSSE. For both outcomes, gains were significantly higher for students taught in integrated classrooms (SCCI γ_{10} = 7.31; VSSE γ_{10} = 5.30), irrespective of intervention status; the estimated

Table 2. Main and Moderating Effects of Online Curriculum Intervention on SCCI.

Parameter	Estimate	*SE*	*t*
(Intercept) γ_{00}	1.20	1.45	0.83
(Integrated) γ_{10}	7.31*	2.07	3.53
(Resource) γ_{20}	2.59	2.51	1.03
(Int. status) γ_{01}	4.80*	1.65	2.91
(Int. status × Dosage) γ_{31}	12.34*	5.48	2.25
(Int. status × Fidelity) γ_{02}	53.157*	10.818	4.914

Note. SCCI = Student Career Construction Inventory (Savickas et al., 2018).
*$p < .05$.

Table 3. Main and Moderating Effects of Online Curriculum Intervention on VSSE.

Parameter	Estimate	*SE*	*t*
(Intercept) γ_{00}	1.04	1.50	0.70
(Integrated) γ_{10}	5.30*	2.14	2.48
(Resource) γ_{20}	0.23	2.59	0.09
(Int. status) γ_{01}	6.80*	1.70	3.99
(Int. status × Dosage) γ_{31}	15.60*	5.66	2.76
(Int. status × Fidelity) γ_{02}	48.21*	11.1679	4.316

Note. VSSE = Vocational Skills Self-Efficacy (McWhirter et al., 2000).
*$p < .05$.

difference between comparison students and intervention students with mean-level dosage, taught by teachers with mean-level fidelity was significant (SCCI $\gamma_{01} = 4.80$; VSSE $\gamma_{01} = 6.80$), irrespective of academic setting. With respect to dosage and fidelity, we determined the effect of the intervention was amplified by increased levels of dosage (SCCI $\gamma_{31} = 12.34$; VSSE $\gamma_{31} = 15.60$) and fidelity (SCCI $\gamma_{02} = 53.16$; VSSE $\gamma_{02} = 48.21$). Tables 2 and 3 show the parameter estimates of the final models for the SCCI and VSSE outcomes. Figures 1 and 2 show visual representations of the moderating effects of dosage and fidelity on SCCI and VSSE scores.

Discussion

The purpose of this study was to examine the effect of an online transition curriculum intervention (i.e., EIT) on the self-reported career readiness of students with and without disabilities across a variety of general and special education settings in Grades 9 through 12. Furthermore, we sought to better understand the differential effects of the intervention according to setting in which the intervention was delivered and selected teacher characteristics. Overall, we found a significant main effect across settings, which were integrated classrooms, dedicated classrooms, and resource rooms. Notably, students with disabilities were included within each setting type. For both students with and without disabilities, the intervention effect was significant across all three setting types.

All students who received the intervention showed significant gains in self-reported career readiness scores as compared with their peers who did not receive the intervention. Furthermore, students showed the largest gain in career readiness scores when they were taught more of the curriculum (e.g., 1 *SD* higher than the average dosage score) and were taught by a teacher with high fidelity (e.g., 1 *SD* higher than the average score as measured by the fidelity checklist) as illustrated in Figures 1 and 2. These findings imply that the effect of the intervention on career readiness will be further amplified if more of the curriculum is taught and with higher fidelity. Also, we tested several disability categories as covariates in the models and did not find category made a significant contribution. Thus, the main effect was significant for students with and without disabilities and across a variety of disability types.

These findings build upon several important areas of special education and career readiness. Within secondary transition, there are multiple established evidence-based interventions that focus on preparation for the IEP meeting (e.g., Allen et al., 2001; Arndt et al., 2006; Martin et al., 2006) and building skills relevant to adult life and the workplace (e.g., Doren et al., 2013; Murray & Doren, 2013; Wehmeyer et al., 2011). Our study findings are unique, in that, an online curriculum intervention was tested for students with and without disabilities across general and special education settings, a combination of factors that is not well established. There are few studies that address the actual setting in which transition-related content is delivered, including the impact of particular instructional decisions made by the teacher. Although preliminary, these findings begin to unpack the complexities around delivering interventions with an online platform that address transition content and career readiness.

With regard to the selected teacher-level variables in the current study, the findings suggest that better student outcomes may occur if teachers implement the intervention as intended. This finding is contrary to some prior research primarily conducted in high school general education settings, which show teacher implementation is not related to student outcomes for math (Chavez et al., 2013) and reading (Cantrell et al., 2013). These authors note, however, that measuring curriculum implementation is complex, and that future studies should examine this concept using a range of frequently collected measures to provide additional insight into how implementation affects student learning (Cantrell et al., 2013). However, other findings show higher curriculum implementation may be related to positive student outcomes (George et al., 2000; Ysseldyke et al., 2003); more specifically, structured teacher training prior to carrying out the curriculum intervention also affects student outcomes

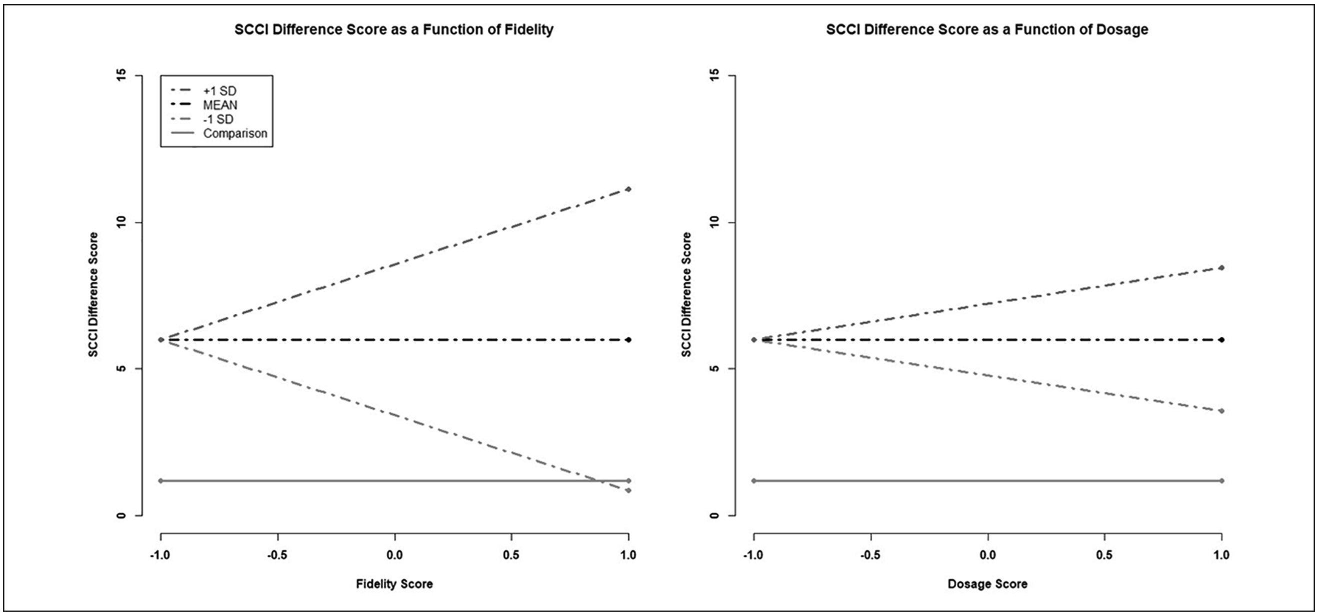

Figure 1. Moderating effects of teacher instructional quality and dosage on SCCI.
Note. SCCI = Student Career Construction Inventory.

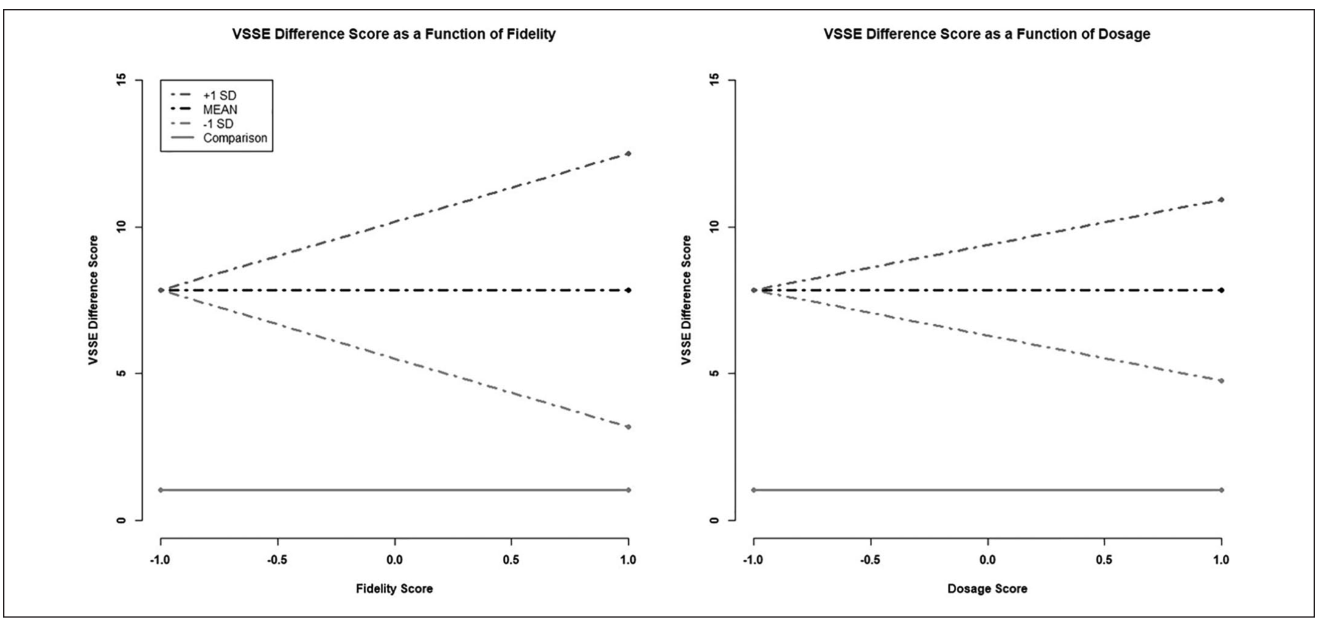

Figure 2. Moderating effects of teacher instructional quality and dosage on VSSE.
Note. VSSE = Vocational Skills Self-Efficacy.

(Schoen et al., 2003). Although these studies examined math content and high school settings, none focused on effects on students with and without disabilities and career development interventions in particular.

As such, the current study provides some insight on the moderating effects of the setting and teacher characteristics on implementation of transition curriculum for students with and without disabilities. There are few previous studies that combine these factors in career development research, although there is one example of a curriculum study that focused on gender, self-determination, and career exploration (Doren et al., 2013). In this study, Doren and colleagues (2013) found that students who received more of the curriculum content showed higher career readiness gains, also measured by the VSSE. The current study is similar, in that, career readiness outcomes were the focus;

yet, the curriculum content was slightly different but somewhat overlapping. For example, both curricula included self-awareness lessons to help facilitate identification of student strengths and preferences that inform career search and exploration activities. However, EIT integrates facets of digital learning and the other curriculum does not.

Study Limitations

Although the current study yields some promising findings, there are several limitations to consider. First, the design was quasi-experimental and the group sizes were not equal. Although we controlled for these differences by using demographic variables as covariates in the models, there are potential confounding factors that may affect generalizability. With regard to recruitment, participating schools largely volunteered and were potentially motivated by the appeal of delivering transition services in a blended learning approach. As such, there are threats to internal validity to consider in the interpretation of the findings.

Second, although teacher characteristics (e.g., dosage, fidelity) were included, there were potentially more teacher variables that could have affected the study results. In particular, teacher familiarity and comfort level with technology were not measured because it was outside of the scope of the current study. The fidelity measures we selected for this study had some limitations as well; in particular, the dosage score was based on teacher self-report, and rater effects were not extensively studied on the fidelity checklist. Also, outcome variables were self-report scale scores, and could be influenced by respondent bias. Other methods of measuring career readiness, aside from self-report scales, should be considered. Furthermore, some disability categories were more represented than others in the study sample. Among the students with disabilities in the sample, the majority were those with SLD or ADHD, and thus, the sample could be thought of as representing high-incidence disability categories.

Finally, the EIT curriculum was delivered by general and special education teachers during a designated class period. There was no supplemental career counseling and/or collaboration with school counselors in carrying out the intervention study, even though collaborations of this nature may be important to consider. This type of collaboration was outside of the scope of the current study.

Implications for Future Research and Practice

In future research designs, it will be critical to rely on more than convenience sampling methods. More rigorous randomized control trials will be an important next step in advancing the evidence of effectiveness of the EIT curriculum. With regard to teacher-level variables, future research studies could build on the current study findings by better understanding teacher comfort level with technology tools, ease at which technology is integrated into the classroom, and ultimately how this might affect student career readiness skills. It will be critical for future studies to include more extensive teacher-level variables to better understand the feasibility of delivering transition content in a blended learning environment. Finally, fostering collaborative relationships with other school personnel involved in schoolwide college and career readiness efforts will be an important consideration in future study designs. For example, we know very little about the extent to which a school counselor may amplify intervention effects of EIT, and this gap warrants more attention in future research.

Implications for future research should target the development of teacher supports in the implementation of online curricula. Possibly, providing more supports that are ongoing in nature and use the same online tools to build fluency, teachers will become more comfortable delivering the curriculum, which will, in turn, positively affect student outcomes. Ultimately, findings from this study suggest that receipt of some transition services in general education settings and with a blended learning approach might allow for more flexibility to meet the needs of students with disabilities while ensuring they receive similar career readiness opportunities as their peers without disabilities.

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