

Learning Outcomes of School Leaders in Experienced Ci3T Schools: Exploring the Impact of the Enhanced Ci3T Professional Learning Series and Delivery

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ABSTRACT

We conducted this study to examine usability of an Enhanced Ci3T Implementation and Series and Delivery (E-Ci3T ISD) experience designed to support school leaders implementing a Comprehensive, Integrated Three-tiered (Ci3T) model of prevention, the extent to which leaders participated, and their associated professional development learning outcomes achieved. Results from quantitative and qualitative data indicated participants viewed their E-Ci3T ISD experiences as highly acceptable. In terms of views on specific features of the E-Ci3T ISD, participants indicated the Ci3T Implementation PL Series designed for school-site teams provided a valuable context for collaborative planning and accessing coaching supports, as well as instilling a sense of motivation and direction. In terms of engagement, we observed relatively low attendance by Ci3T Leadership Team members at Ci3T Implementation PL Series sessions. In Year 1 (2022–2023) attendance waned substantially over the year, whereas in Year 2 (2023–2024) attendance was steady but low. Yet, overall, participants reported relatively high perceived knowledge, confidence, and usefulness at Time 0, an expected finding due to the highly experienced nature of this sample (e.g., Ci3T experience, $M = 6.07$ years). Though already high at the beginning of the study, we observed a positive, statistically significant increase in perceived knowledge and perceived confidence over time. We discussed educational implications, limitations, and future directions.

Keywords: professional learning; tiered systems; elementary; adult learning outcomes

Across the United States, educational leaders have prioritized building integrated tiered systems of support to meet students' multiple needs in an integrated fashion while also protecting teachers' well-being (Gandhi et al., 2026; Oakes et al., 2022). The Comprehensive, Integrated, Three-tiered (Ci3T) model of prevention is one example of such a system. Ci3T is a data-informed model designed as part of a manualized, six-part series (Lane, Menzies et al., 2020; Lane, Oakes et al., 2019) to address students' academic, behavioral, and social and emotional well-being learning needs. Ci3T involves data-informed decision-making at multiple levels, including collection of treatment integrity, social validity, and systematic screening to inform (a) professional learning (PL) targeting needs evident in school-wide data, (b) classroom instruction at the teacher-level (e.g., use of low-intensity strategies to bolster engagement), and (c) the provision of Tier 2 (e.g., Check-in/Check-out; Bernard et al., 2025) and Tier 3 (e.g., functional assessment-based interventions; Sarasin et al., 2025) interventions across learning domains.

Designing, implementing, and evaluating integrated tiered systems in K-12 schools is complex. This work requires coordination of multiple instructional and organizational strategies, practices, and programs situated in school settings where students' unique needs, educators' perspectives, and community contexts continuously intersect (Menzies et al., 2023). To guide this work, schools form a Ci3T Leadership Team (Ci3T LT) comprised of leaders across disciplines, including administrators, general educators, special educators, counselors, social workers, school psychologists, and a parent or family member. The Ci3T LT participates in the manualized, six-part Ci3T Professional Learning (PL) Series (Lane et al., 2019) to build their school's Ci3T model over one academic year. The same team leads implementation in subsequent years while participating in the Ci3T Implementation PL Series (Lane, Menzies et al., 2020). Both initial training and ongoing PL are grounded in practice-based PL (Ball et al., 2009) and applied behavior analytic principles (Cooper et al., 2020). Further, these experiences are designed to prioritize Ci3T LT learning outcomes (Lane, Oakes et al., 2020), supporting school leaders in developing content knowledge and organizational management skills necessary to implement and sustain Ci3T with fidelity.

SCHOOL-SITE LEADERS' VIEWS AND LEARNING OUTCOMES DURING Ci3T DESIGN

When designing integrated tiered systems, it is important to examine school-site leaders learning outcomes throughout the design process as these same leaders are called upon to collaborate with district leaders and provide leadership in implementation efforts with faculty, staff, students, and family members (Lane, Menzies et al., 2020). Previous studies have examined learning outcomes for school-site leaders designing a Ci3T model of prevention. Lane, Oakes et al. (2020) examined changes in 53 Ci3T LT members' learning outcomes of Ci3T model concepts, before and after participating in the year-long, six-part Ci3T PL Series. Participants, representing 10 schools in a southern state, completed the Knowledge, Confidence, and Use (KCU; Lane & Oakes, 2010) survey at pre- and post-intervention. Results indicated statistically significant gains in all measured areas—perceived knowledge, confidence, usefulness, and actual knowledge—with large effect sizes (0.96 perceived usefulness—1.90 actual knowledge). This PL series was delivered by Ci3T model developers, and authors emphasized the need for future studies to assess outcomes when implementation support is provided by alternative facilitators (e.g., research teams, technical assistance providers, district leaders) and in varied geographic contexts. Lane et al. (2025) found similar outcomes in a sample of 91 school leaders participating in the Ci3T PL Series led by district-leaders with university partnership support (e.g., $g = .85$ increased actual knowledge).

Collectively, results suggest positive learning outcomes for Ci3T LT engaging in the Ci3T PL Series. This series represents the first step in a school's Ci3T implementation journey and provides a systematic process for school leaders to design their content knowledge while creating implementation plans detailed in each school's Ci3T Implementation Manual. These manuals make transparent the full set of data-informed practices to be implemented, including: (a) primary (Tier 1) prevention plans, (b) reactive plans for responding to challenging behaviors, (c) school-wide expectations for students, (d) assessment schedules describing the full scope of data to be collected (e.g., student-level and programmatic measures), (e) secondary (Tier 2) intervention grids, and (f) tertiary (Tier 3) intervention grids. In the year following the Ci3T PL Series, school-site Ci3T LT support their colleagues' implementation of the practices, strategies, and programs indicated in the Ci3T Implementation Manual.

Foundational Ci3T implementation and PL activities (e.g., communication and meeting structures, PL offerings) are organized to constitute the Ci3T Implementation Series and Delivery (E-Ci3T ISD) journey, a multi-component approach to providing research-informed, data-informed PL for a range of implementers including school leaders, classroom teachers, instructional support staff, families, and community members (Buckman, Oakes et al., 2024). As part of the E-Ci3T ISD, Ci3T LTs participate in the Ci3T Implementation PL Series (Lane, Menzies et al., 2020)—the focus of this study—which prioritizes refining team members' perceived and actual knowledge, perceived confidence, and perceived usefulness of the concepts and strategies for facilitating data-informed instruction for students and data-informed PL for adults. Given their strategic leadership role in the school's implementation of their Ci3T model of prevention, an important next step in the Ci3T programmatic line of inquiry is examining educators' views and use of PL venues as well as their learning outcomes as they lead implementation efforts at their respective schools.

Ci3T IMPLEMENTATION SERIES AND DELIVERY: A JOURNEY TOWARD BUILDING CAPACITY

In the early years of Ci3T inquiry (1995–2014), implementation supports were highly individualized for each school, with coaching activities (e.g., delivery, in part) to support implementation often taking place during monthly Ci3T LT meetings, monthly faculty meetings, and during district-wide PL series sessions (Lane, Menzies et al., 2020). As

states and districts began to scale toward state-wide delivery systems to support Ci3T implementation, a need for more standardized, manualized data-informed PL efforts arose. This led to the development of the initial (referred to as traditional) Ci3T Implementation PL Series. In brief, school-site Ci3T LTs attended five, 2-hour sessions during the academic year, along with one summer session to prepare for the coming academic year. During these sessions—led by district leaders or university partners—Ci3T LTs from each K-12 school engage in data-informed PL efforts using Tier 1 treatment integrity, Tier 1 social validity, and school-site student outcomes to inform instructional decisions for students, as well as needed PL for adults (Lane, Carter et al., 2015). See OSF Supplemental Materials (Lane et al., 2022) for a more detailed description of the Ci3T Implementation PL Series.

This need for scaling up implementation supports coincided with lessons learned through an Institute of Education Sciences (IES) funded Practitioner-Researcher Partnership Grant. Namely, participating district and school leaders identified a need to build capacity for sustaining systems amid ongoing transitions in district and school leadership, faculty, staff, families, and students. This led to a conversation—“wouldn’t it be great if ...” (Lane, 2017)—Ci3T implementation efforts could be enhanced by developing on-demand, free-access PL resources. This conversation led to IES-funded Project ENHANCE (Lane, 2019–2024), one of four network grants focused on integrated tiered system of supports (Gandhi et al., 2026).

In its first year, the project focused on understanding school and district leaders’ learning needs (Royer et al., 2022), identifying needs related to building faculty and staffs’ capacity (Common et al., 2021), and empowering educators to use systematic screening data to inform instruction (Briesch, Chafouleas et al., 2022; Briesch, Lane et al., 2022). Lessons learned from these studies, conducted in partnership with five districts across three states, informed design inquiry conducted during subsequent years of Project ENHANCE (Buckman, Lane et al., 2024).

As a result of this design inquiry, the Project ENHANCE Ci3T Research Team produced 40+ Enhancing Ci3T Modules. Each module constitutes an on-demand PL experience targeting a topic from one of seven areas: (a) serving as a Ci3T leader, (b) selecting and installing behaviors screeners; (c) primary (Tier 1) prevention efforts, (d) low-intensity, teacher-delivered strategies, (e) implementing secondary (Tier 2) interventions, (f) implementing tertiary (Tier 3) interventions, and (g) building foundational knowledge about Ci3T. As members of the Project ENHANCE Ci3T Research Team from six universities developed and tested Enhancing Ci3T Modules (see OSF Supplemental Materials, module list; Lane et al., 2022), we collaborated with experienced Ci3T LTs to explore utility of an “enhanced” version of the Ci3T Implementation Series and Delivery (E-Ci3T ISD), which embedded these newly developed resources. Initial inquiry with school-site leaders focused on their learning outcomes, recognizing their perceived knowledge, confidence, and usefulness as well as actual knowledge of Ci3T strategies, practices, and concepts would influence their capacity to support their colleagues’ Ci3T implementation.

PURPOSE

We conducted this study to examine experiences of Ci3T LT members from schools with 4+ years of Ci3T experience as they participated in the E-Ci3T ISD over two years (2022–2024). The purpose of the study was to gain insights into whether the newly developed E-Ci3T ISD—an experience comprised of traditional, synchronous PL events combined with on-demand, asynchronous resources in the form of Enhancing Ci3T Modules—met the needs of participants with existing Ci3T knowledge and implementation experience. Insights from this inquiry are vital for the field as researchers and policy makers seek ways to move beyond initial implementation toward sustainable, scalable approaches for supporting implementation of integrated tiered systems (Gandhi et al., 2026). Accordingly, we prioritized participants’ self-reported views of usability (e.g., acceptability, feasibility), engagement (e.g., use) as a marker of social validity

(Gresham & Lopez, 1996), as well as learning outcomes. Prior to analyzing data, we pre-registered study procedures on Open Science Framework (OSF; Lane et al., 2022) and made subsequent modifications to the pre-registration to reflect updated study procedures and data analytic plans. We address three research questions:

RQ1. How did Ci3T LT members view the usability of the E-Ci3T ISD for supporting Ci3T implementation?

RQ2. To what extent did Ci3T LT members engage in the E-Ci3T ISD with integrity (e.g., attending sessions, using materials with faculty and staff)?

RQ3. What were the PL outcomes of Ci3T LT members participating in the E-Ci3T ISD, including (a) shifts in perceived knowledge, confidence, and usefulness of Ci3T concepts and strategies over time?

METHOD

Participants and Setting

Participants included 127 Ci3T LT members from 21 elementary schools representing four districts from two geographical locales (Midwest & Northeast; see school characteristics in OSF Supplemental Materials; Lane et al., 2022). The sample included Ci3T LT members starting the study during the 2022–2023 academic year who continued in this leadership role through the 2023–2024 academic year. We also note four principals withdrew for various reasons (e.g., time, preferences for self-guided experiences, limited access to district coaches, and being new to the principal role). All data up to withdrawal are included in the analyses presented.

Most Ci3T LT members were general educators ($n = 34$), followed by administrators ($n = 25$) and related service providers ($n = 25$), special educators ($n = 16$), staff ($n = 13$), and district administrators ($n = 8$). Their reported teaching experience ranged from 1–40 ($M = 15.39$; $SD = 8.82$) years, and an average of 6.07 ($SD = 3.27$) years of experience with Ci3T (Table 1). Six team members also participated in semi-structured interviews. Half were general educators ($n = 3$), two were building administrators, and one was a related service provider (Table S1).

All participating schools were implementing Ci3T separate from this study as part of regular school practices. This work was led by each school-site Ci3T LT as well as a District Ci3T LT (see OSF Supplemental Materials for implementation activities). Ci3T years of implementation ranged from 3–9 years across all schools ($M = 6.73$, $SD = 1.80$).

Procedures

As part of an IES-funded Network Grant, university researchers from six universities partnered with three school districts (three in Kansas, one in Vermont) after securing university and district approvals. District leaders engaged in the planning process for this study, working within each district's current Ci3T implementation procedures. For example, district Ci3T LTs engaged in monthly meetings, collected programmatic measures as part of school-wide practices (e.g., social validity and treatment integrity measures; fall and spring), coordinated systematic screenings (academic and Student Risk Screening Scale for Internalizing and Externalizing behaviors Drummond, 1994; Lane & Menzies, 2009), and coordinated ongoing PL efforts (e.g., district-wide, those involving partnering agencies). Ci3T researchers coordinated common PL dates and times with district leaders for school-site Ci3T LTs as well as Project EMPOWER PL sessions for faculty, staff, families, and community members. Due to time zone differences and district preferences for start and end times for E-Ci3T Implementation PL Series sessions, we hosted two series (see OSF) using approved remote technology available from the University of Kansas as part of the overall E-Ci3T ISD (described subsequently).

Inviting Faculty and Staff and Ci3T LT Members

We invited faculty, staff, and administrators from participating districts, including each school's adult Ci3T LT members (see introduction for description of team makeup) following IRB-approved procedures (e.g., informational videos). We provided informational letters for faculty and staff and obtained active consent from Ci3T LT members.

Participating Ci3T LT members agreed to (a) attend PL offerings with other team members (5–6 sessions per year, 2–3 hours each), with the option to provide feedback at the end of each session, (b) communicate regularly with their faculty and staff during scheduled meetings or through other mechanisms (e.g., email communication), (c) complete a confidential survey of their perceived and actual knowledge of Ci3T concepts and practices as well as their perceptions of confidence and usefulness of these same concepts and practices (Ci3T KCU; measures described below), (d) share their view about feasibility and usability of the PL experiences and resources by completing the Ci3T Usage Rating Profile (Ci3T URP) and possibly participating in a semi-structured interview using remote technology, (e) complete a demographic form, and (f) complete two brief surveys about their own professional well-being (analyzed in a separate study). We invited consented Ci3T LT members to attend Ci3T Implementation PL Series. Those who did not consent continued serving on their school's team.

Participant Selection Procedures and Consenting for Qualitative Inquiry

For qualitative inquiry, we invited participants who (a) served as a school-site Ci3T LT member, district leader, or implementing faculty and staff member, and (b) completed the Ci3T Usage Rating Profile (Ci3T-URP) measure to provide feedback on their PL experiences. From this pool, we used purposive sampling to invite 1–3 Leadership Team members per school by reviewing all Ci3T-URP responses to identify participants representing a range of scores on the usage subscales (i.e., feasibility, system climate, system support, understanding, acceptability). Ci3T researchers contacted each potential participant via email to assess their interest. Then we scheduled semi-structured interviews with interested participants, who consented to participate. This process resulted in six participants completing interviews in summer 2023 following Year 1, with three of these individuals participating again in summer 2024 at the close Year 2. We provided participants with \$25 in appreciation for their time.

Enhanced-Ci3T Implementation Series and Delivery (E-Ci3T ISD)

As noted in the introduction, the E-Ci3T ISD is a comprehensive PL journey featuring three core facets: (a) foundational Ci3T implementation, (b) data collection and data-informed decision-making, and (c) Ci3T district decision makers and school principals. Foundational Ci3T implementation involves communication and meeting structures (e.g., Ci3T LT meetings at each school-site, school-based collaboration and information sharing, PL communities), as well as PL (e.g., multiple parallel series led by Ci3T researchers as well as district-provided offerings). Series include the Ci3T Implementation PL Series for Ci3T LT members (a focus of this paper), Ci3T EMPOWER sessions, stand-alone topical, 2-hour sessions, for all faculty and staff and community members, and Ci3T Trainers and Coaches Calls, 1-hour monthly, for system leaders (e.g., Ci3T Coaches). Districts incorporated other PL activities such as training opportunities for district-selected Tier 2 and Tier 3 interventions. The remaining two facets of the E-Ci3T ISD support the aforementioned structures. Data collection and data-informed decision-making involves ongoing data collection adhering to district assessment schedules. This involves conducting academic and behavioral screening three times per year, collecting data from faculty and staff regarding treatment integrity and social validity of Ci3T practices two times per year, and ongoing analysis of these and other data sources to inform instruction and subsequent PL (i.e., data-informed PL). Lastly, the final facet focuses on supporting district and school administrators to build expertise and maintain alignment of district strategic goals and initiatives with Ci3T. These activities are supported through use of specific Enhancing Ci3T Modules (descriptions to follow; see OSF).

Ci3T Implementation PL (PL) Series. In this study, we focus primarily on Ci3T LT members' experiences and learning outcomes in the context of the E-Ci3T ISD, with a particular focus on the Ci3T Implementation PL Series. This series is the component of the E-Ci3T ISD most closely aligned to experiences of Ci3T LT members, though we did not limit data collection to *only* the Ci3T Implementation PL Series as these school leaders' experiences span multiple other activities (e.g., participating in monthly school-site Ci3T LT meetings, leading school-based PL). The Ci3T Implementation PL Series consists of five, 2-hr sessions hosted over the school year, with an optional summer symposium offered to assist Ci3T LT in preparing for the next year. We scheduled sessions to align with key milestones and data collection activities. For example, sessions three and five provide time to create action plans based on their recently collected treatment integrity and social validity data. Sessions were led by the Ci3T Research Team on Zoom. We hosted each Ci3T Implementation Series session twice, with one series for Kansas districts and another series for the Vermont district. Sessions were identical across the two series, both of which took place in the late afternoon after school. Districts requested this timing due to sub shortages, creating challenges with PL held during the school day.

Session format involved teams joining the Zoom meeting either individually or in a shared meeting location (e.g., school conference room). Sessions typically involve a whole-group presentation format covering timely topics and connecting participants to resources ($\approx 60\%$ of session duration) and breakout rooms in which teams review their school's data and collaborate on action plans ($\approx 40\%$ session duration). Ci3T Research Team members coach during breakout rooms periods, rotating through rooms offering guidance and answering questions. We monitored procedural integrity of the Ci3T Implementation PL Series using detailed agendas with action items, session pacing sheets (i.e., detailed timelines of content & activities), and communication (i.e., monitoring of week-before, day-before, and follow-up communications).

Enhancing Ci3T Modules. Enhancing Ci3T Modules served as a frequent supplement to PL activities engaged in by Ci3T LT members. Some activities in the Ci3T Implementation PL Series involved reviewing content from specific modules covering topics tied into session content (e.g., low-intensity strategies to support student engagement, integrating behavioral, and social skill instruction into academic lessons). Session presenters and Ci3T Coaches encouraged Ci3T LT members to utilize these modules with their faculty and staff, both by sharing specific resources contained therein (e.g., infographics, videos) or by supporting their colleagues in reviewing the module in full. See Buckman, Lane et al. (2024, 2025) for more comprehensive descriptions of the design and content of Enhancing Ci3T Modules, and OSF Supplemental Materials (Lane et al., 2022) for a complete listing of modules.

Measures

Ci3T-Usage Rating Profile: Ci3T LT (Ci3T-URP: LT)

The *Ci3T-Usage Rating Profile: Ci3T LT* (Ci3T-URP: LT; Briesch & Chafouleas, 2022) is a measure adapted from the Usage Rating Profile-Intervention, Revised (URP-IR; Chafouleas et al., 2011). The URP-IR was designed to measure factors related to intervention usage, and included factors across the following domains: Acceptability, Feasibility, Understanding, System Climate, System Support, and Family-School Collaboration ($\alpha = 0.67\text{--}0.95$; Briesch et al., 2013). The Ci3T-URP: LT adapts items from the URP-IR to assess usage factors related to Ci3T PL experiences from the perspective of school and district leadership team members. The rating scale is consistent with the original URP-IR (i.e., 1 = *strongly disagree*–6 = *strongly agree*). Authors abridged the measure to limit completion time (~ 15 min) to encourage participation in fall and spring during this two-year study. The Ci3T-URP: LT included 17 items: (a) nine adapted from the URP-IR's Acceptability subscale (summed for an overall Acceptability score; range 6–54), (b) one adapted global item for each construct, with the System Climate construct divided into two items (climate related to administrators; climate related to non-administrative faculty and staff), and (c) one additional Opportunities for Use item to determine how educators viewed opportunities to access the module in their school context. For the Acceptability score, higher scores indicate higher acceptability ($\alpha = 0.84\text{--}0.94$).

Directions to the recipient provided context for raters, with variation in wording for measures delivered at the onset and end of an academic year. For example, directions at the onset of the academic year were as follows: *When answering these questions, please consider the usability of the Ci3T Implementation Series and Delivery that you have received this year – which includes the 6-part implementation series, monthly meetings, time with coach, and access to online materials. Select the answer that best agrees with each statement, using the scale provided.* The measure also included an open-ended item about usability factors (perceived facilitators and barriers). Specifically, directions provided included: *Thinking about your setting, provide a brief narrative of the usability factors that may influence success or present a challenge to your engaging in the Ci3T implementation series and delivery. Usability factors might include personal acceptability, feasibility of the strategy, system climate in terms of support from administrators or colleagues, coaching supports, or family-school collaboration.*

The Ci3T-URP: LT required ~15 min to complete, including the open-ended item. To reduce burden for Ci3T LTs, we did not administer this measure in fall 2022. This measure was completed by team members three times: spring 2023, fall 2023, and spring 2024.

E-Ci3T ISD Session Attendance

To assess engagement in the E-Ci3T ISD, project staff recorded Ci3T LT members' attendance across all PL series. For example, during Zoom-hosted Ci3T Implementation PL Series sessions, a project staff checked-in participants on an Excel spreadsheet and another staff member checked reliability during the session. This process was replicated across other series as well (i.e., Ci3T EMPOWER, Ci3T Trainers and Coaches Calls).

Enhancing Ci3T Module Access

To track participant use of E-Ci3T ISD materials, project staff monitored participants' access of Enhancing Ci3T Modules. Prior to accessing any modules, participants completed a one-time registration process on ci3t.org/enhance by entering their district email. Every login attempt was recorded via Qualtrics as a unique observation and was retained in this data set. Data for this study are limited to July 1, 2022 (beginning of academic Year 2022–2023) through June 20, 2024, when we exported access data from Qualtrics. For this study, we limited the sample to Ci3T LT members. We examined the number of total users and unique users for each module in this time frame. Then, we calculated an average monthly rate of total access and unique users using the number of days the module was available divided by 30.42, the average number of days in a month.

Ci3T Knowledge, Confidence, and Use (Ci3T KCU v2.0)

The Ci3T Knowledge, Confidence, and Use (Ci3T KCU v2.0; Lane & Oakes, 2010) survey, adapted from Borthwick-Duffy et al. (2002), examined participants' learning throughout the E-Ci3T ISD across two academic years. Participants independently completed the Ci3T KCU survey at the onset and end of the Ci3T Implementation PL Series each academic year to rate their perceived knowledge, perceived confidence, perceived usefulness, and actual knowledge of key concepts and strategies constituting the Ci3T model of prevention. The Ci3T KCU survey consisted of a rating scale component and open-ended responses. First, participants rated their knowledge of, confidence in, and perceived usefulness of 16 core components of Ci3T using a 4-point rating scale ranging from 0 (*I have no knowledge of this concept or strategy; I am not confident in my ability to use or implement this concept or strategy; I do not view this concept or strategy as useful and/or relevant in my teaching*) to 3 (*I have a substantial amount of knowledge about this concept or strategy; I am very confident in my ability to use or implement this concept or strategy; I view this concept or strategy as highly useful and/or relevant in my teacher*). For each construct, we summed all items to create a total score. Scores ranged from 0–48, with higher numbers reflecting greater levels of perceived knowledge, confidence, or usefulness of each Ci3T concept or strategy.

Next, participants responded to the prompt: *Tell us what you know about these topics in the space provided, for each of the 16 core components of Ci3T*, followed by a listing of terms matched to the previously described rating scales. Each open-ended response was rated on a 4-point rating scale (see subsequent description) to gauge actual knowledge. After inspecting the data we observed many participants completed the rating scale portion of the measure but answered no open-ended items. This response pattern, which was not as prominent in previous KCU studies, created artificially low sum scores for these participants, and substantially influenced means. Rather than interpreting non-response as equivalent to having no knowledge of an item, we elected to score the actual knowledge portion for participants with $\geq 75\%$ of items completed (i.e., 12 of 16). We maintained the scoring approach of previous inquiry of summing all items to create an actual knowledge composite score. See Design and Analysis for further details, and Discussions for limitations related to this change in procedure.

We note the Ci3T KCU survey used in this study (v2.0) was an updated form, adding two additional items to the version used in previous studies (e.g., Lane, Oakes et al., 2020). Additionally, in the previous version of the Ci3T KCU, participants' actual knowledge was assessed for only a subset ($n = 8$) of items to limit completion time, whereas v2.0 assessed actual knowledge for all 16 items. The Ci3T KCU v2.0 required ~15 min to complete.

Coder Training. Three research team members—a senior scholar and developer of the original KCU survey, an associate professor of special education, and a doctoral student in research, measurement and evaluation—coded each open-ended response for all four time points. At the end of each academic year (Time 0 and 1 for 2022–2023; Time 3 and 4 for 2023–2024), the project director randomized open-ended responses across time points before coding. To become reliable, three coders reviewed the scoring rubric for each item, clarifying language and examples, and practiced scoring. Coders independently rated approximately five responses for each item, discussing and reconciling differences, with the senior scholar providing summative decisions. This process continued for each item until all three coders reached 90% agreement.

Interrater Reliability. Following this calibration process for each individual item, two coders independently scored all responses (100%) in the data set to check reliability. We computed Pearson correlation coefficients in SAS 9.4 for open-ended responses for each item at each time point. Correlations ranged from $r = .94$ –1.00 at Time 0 (Fall, 2022), $r = .94$ –1.00 at Time 1 (Spring, 2023), $r = .95$ –.99 at Time 2 (Fall, 2023), and $r = .92$ –.99 at Time 3 (Spring, 2024).

Demographic Form

Participants completed a confidential Ci3T Demographic form at least once per year. Demographic items included sex, age, ethnicity and race, experience, role, certification, educational attainment, and PL history (e.g., familiarity with Ci3T-related PL). Each measure included the demographic items at the end to be able to describe the sample for each measure.

Qualitative Inquiry

Two Project ENHANCE primary investigators developed a semi-structured interview protocol to explore Ci3T LT members' perceptions of the usability of the key components of the E-Ci3T ISD. We used semi-structured interviewing techniques to balance covering pre-determined topics and eliciting information of particular concern or interest to the participants. Participants reflected on their experiences participating in the Ci3T Implementation Series and Delivery in the spring of each academic year. The interview protocol included seven questions asking participants about their overall impressions, what they perceived to be the most effective features, what components they accessed most often, what components they found most useful, and what suggestions they had for enhancing usefulness of the Ci3T Implementation Series and Delivery. Interviews lasted an average of 13 min (Range = 8–21) in 2023 and 17 min (Range = 8–21) in 2024. Research staff who did not lead PL series offerings conducted semi-structured interviews to reduce the likelihood of social desirability effects.

Design and Analyses

We conducted a descriptive study, more specifically a single group longitudinal study involving a sample consisting of data from Ci3T LT members who participated over both project years (2022–2024). We examined their (a) views (quantitative and qualitative data), (b) engagement, and (c) learning outcomes.

To examine views of the Ci3T Implementation Series and Delivery journey, we analyzed Ci3T-URP: LT scores over time: Spring 2023, Fall 2023, and Spring 2024. We computed descriptive statistics (e.g., *M*, *SD*) to examine their views of feasibility and usability by examining the overall acceptability composite score (sum of eight items) as well as single item measures of Use, Acceptability, Feasibility, Understanding, System Climate: Administrator, System Climate: Colleagues, System Support: Coaching, and Family-School Collaboration. We computed Hedges' *g* effect sizes using the pooled standard deviation in the denominator to address unequal sample sizes. We interpreted effect sizes as follows: 0.2 = small, 0.5 = medium, and 0.8 = large effects (Cohen, 1988). We also simultaneously collected and analyzed qualitative data collected from semi-structured interviews to further examine Ci3T LTs' views on usability. Subsequent to transcription, we integrated all participant responses to each question into a single document. Research team members then conducted reflexive thematic analysis using techniques recommended by Braun and Clarke (2021). That is, after reading through the transcripts to become familiar with underlying content, we sought to identify pieces of text within the deidentified transcripts we believed to be relevant to the concept of usability (e.g., acceptability, feasibility, understanding). We applied a label (i.e. code) to each piece of text to describe the underlying idea. Once we coded all transcripts, both researchers independently and inductively grouped codes with similar meanings into broader categories (i.e., initial themes) to answer the question of how Ci3T LT members viewed the usability of different components of the E-Ci3T ISD. After both coders reviewed and confirmed themes, they met to cross-check the identified themes, discuss any discrepancies, and refine and finalize themes. As a final step, researchers revisited the original transcripts to verify that the identified themes accurately reflected the underlying data.

For Ci3T LT member engagement in the E-Ci3T ISD, we assessed attendance of team members across PL offered. We anticipated attendance of team members would be concentrated in the Ci3T Implementation PL Series, as this event is specifically designed with these users in mind. We also monitored whether members joined other events, including Ci3T EMPOWER and Ci3T Trainer and Coaches Calls to determine whether these were accessed as a supplemental resource. We also assessed the degree to which Ci3T LT members accessed Enhancing Ci3T Modules. Use of these modules was sometimes included in Ci3T Implementation PL Sessions, and Ci3T coaches encouraged team members to use these resources throughout the year to address specific implementation needs and share embedded content (e.g., videos, infographics) with colleagues. Consistent with previous design inquiry (see Buckman, Lane et al., 2024) we calculated descriptive statistics including frequency counts, means, standard deviations, minimum and maximum values for unique users and total users per module to examine frequency and usage patterns of module access. We reported the number of unique users as well as total module access numbers, to account for repeated module use by Ci3T LTs. Given modules released at different times, we reported rate of module access (i.e., total access frequency divided by the number of months the module was available).

For each Ci3T KCU construct, we began by descriptively analyzing Ci3T LT members' learning outcomes from four time points (Fall, 2022; Spring, 2023; Fall, 2023; & Spring, 2024) during their two years participating in the E-Ci3T ISD, including the Ci3T Implementation PL Series. We analyzed learning outcomes within a multilevel modeling framework using SAS PROC MIXED (version 9.4) for univariate analyses. In this design, for Ci3T LT member outcomes—which included perceived knowledge, perceived confidence, perceived usefulness, and actual knowledge—we nested observations (level 1 units) within Ci3T LT members (level 2 units) who were nested within schools (level 3 units). While schools were nested within districts, given the participation of only four districts, we modeled this dependency by including a fixed effect for district resulting in models with appropriate standard errors for the clustered sample. We selected District 2

(Midwest; see OSF Supplemental Materials in Lane et al., 2022 for additional details) to serve as the reference group for the district fixed effect. The basic model equation for Ci3T LT outcomes with all possible random effects was:

$$Y_{tfs} = \beta_{000} + \beta_{100}(Time_{tfs}) + \epsilon_{tfs} + U_{0fs} + U_{1fs}Time_{tfs} + \eta_{0s}$$

When interpreting the model, Y_{tfs} is the outcome at time t for Ci3T LT adult members (referred to as f) in school s , $Time_{tfs}$ takes on value of '0' for fall and then positive integers for subsequent observations indicating time point (0, 1, 2, 3), β_{000} is the average fall outcome for teams, β_{100} is the typical change in outcome at adjacent time points, ϵ_{tfs} is a time-specific residual, u_{0fs} , u_{1fs} are random Ci3T LT members' effects in fall and growth in outcomes over time, η_{0s} is the random school effect.

We began by analyzing unconditional models with no fixed effects to determine which random effects were needed, comparing models with random Ci3T Leadership Team members intercepts only to models with random school intercepts and/or random Ci3T Leadership Team members' slopes. After adding fixed effects for district and a linear time slope, we re-examined the random effects to determine if the addition of random slopes would improve the model which included the fixed effects. We modeled time as 0 (Fall, 2022), 1 (Spring, 2023), 2 (Fall, 2023), and 3 (Spring, 2023). We initially preregistered the model to have Time modeled in months since baseline assessment and centered on 18 months (~ two academic years) such that intercepts will reflect outcomes at the end of the trial. Yet, in collaboration with our senior statistician we shifted to Time (0, 1, 2, 3) given the relatively equal intervals between assessments, similarity in outcomes using both approaches, and greater ease of interpretation for readers. We were most interested in determining whether there is a significant positive linear slope indicative of increases in perceptions of knowledge, confidence, and usefulness over time. For each KCU construct we computed effect sizes between Time 0 and Time 3 using Hedges' g by dividing the difference in model-estimated mean scores by the standard deviation of pre-training raw scores. We interpreted effect sizes as follows: $d \geq .20$ = small; $\geq .50$ = medium; $\geq .80$ = large (Cohen, 1988).

RESULTS

RQ1: Views

Based on quantitative data from the Ci3T-URP, Ci3T LT members who participated across both project years (2022–2024), indicated ratings of acceptability were stable from spring 2023 ($M = 47.47$, $SD = 5.35$) to spring 2024 ($M = 47.03$, $SD = 5.10$). Participants consistently rated *System Climate (Administrator)* highest among usage factors across time points. Family-School Collaboration was rated lowest across usage factors, with mean scores falling slightly below the scale midpoint in two of three time points (e.g., $M = 3.65$; $SD = 1.55$ in spring, 2024). Overall, Ci3T LT members continued to report ample opportunities to engage in E-Ci3T ISD, with mean ratings ranging from 5.20 (fall, 2023) to 5.41 (spring, 2024). Effect sizes comparing Ci3T-URP: LT ratings one year apart (spring, 2023 to spring 2024) were small and not statistically significant (Table 4), indicating no meaningful changes over time.

Qualitative analyses of semi-structured interviews provided insights about the usability of multiple components of the E-Ci3T ISD through four primary themes. The first theme, *Implementation PL Series Provides Purposeful Learning and Structured Collaboration*, consisted of two sub-themes. First, participants described the Implementation PL Series as having practical utility and providing professional recentering. Multiple participants indicated the series supplied research-based, actionable information, as well as a refresher to re-center themselves in their work. For example, one participant noted:

I just like every time I go... I leave with something that I can implement the next day, or that I can use to revamp my manual... yeah, I just feel like I leave with something every time. And it's powerful stuff. It's not just like, Oh, here's another copy you can use. It's here's what you can do for the next two months to keep going.

Additionally, the Implementation PL Series was described as providing structured opportunities for team collaboration. Specifically, participants indicated PL sessions were useful for providing focused time to discuss data, reflect on school practices as a leadership team, and create collaborative action plans for responding to needs identified in their data. One participant noted the time to talk with their leadership team in the breakout rooms “has been really helpful to [our] cause. It guided us to conversations we needed to have.”

Although there were insufficient data to classify as a theme, we did note salient barriers to the usefulness of the series described by interviewees. Two interviewees reflected on the challenge of maintaining participation and engagement in PL offered at the end of the school day (e.g., “I wish there was a way we could do it during the day, because that’s always been our leadership teams, like, drawback... they don’t want to stay”). Other interviews suggested some content of the series was less relevant for experienced teams (e.g., “I think that probably it is less effective for people that have been implementing Ci3T over time, and maybe more effective for people ... newer to Ci3T”). One participant suggested potential for differentiation based on team experience, such as having different learning pathways for beginning and experienced teams.

The second theme, *Coaching Support Provides Individualized Guidance and Confidence Building*, spoke to the importance of coaching support provided by research staff as part of the E-Ci3T ISD. Participants indicated this support was helpful for interpreting data sources, guiding team collaborative conversations, and offering an outside perspective:

I think sometimes we think one way, and then like another perspective, brings it into us. I found that they [Ci3T Coaches] were really useful because we were able to talk about our vision of where we saw where we were going, and then we were able to let [the coach] know this is what we’re thinking. Are we on the right track? She [the coach] was able to then like offer suggestions. “Yup, you’re on the right path here.”

The third theme, *Monthly Meetings Serve as Catalysts for Team Action*, highlighted the importance of monthly Ci3T LT meetings, another component of foundational Ci3T implementation and PL activities (see OSF Supplemental Materials). Participants indicated these monthly meetings were vital for continuing work begun during breakout rooms from the Ci3T Implementation PL Series. One participant felt monthly meetings provided a necessary, more action-oriented experience than breakout sessions during the PL series. They noted that “...the meetings are just so helpful for putting actual things into place and being able to really move forward with things instead of just discussing and thinking and reading. They’re a lot more productive.” Yet, at the same time, some participants expressed disappointment at barriers to effective meetings, such as a lack of administrator involvement (e.g., “we don’t have the leadership in place”) and inconsistent scheduling (e.g., “we didn’t meet as often”).

The final theme, *Enhancing Ci3T Modules Help to Address Implementation Needs*, spoke to the value of newly available PL resources. Participants expressed appreciation for the format of the modules, including having on-demand access and utilizing different learning formats. As one participant noted, “when I have a particular need then I can just access it when I need it, and I don’t have to wait for somebody else to respond. I can just go straight to the resource.” Additionally, multiple participants noted the utility of having ready-made materials and being able to share these quickly with faculty and staff. For example, one Ci3T LT member described “shar[ing] some of those videos at faculty meetings” whereas another emphasized the value of putting research-based resources such as these in the hands of school leaders. This participant described,

Teachers come to me for resources, and it is great to have [the modules] and not be like, ‘well, I don’t have any books.’ Where am I going to go, or Google, something that you don’t even know if it’s going to be a valid resource?

VARIABLE LEVEL	Ci3T LEADERSHIP TEAM MEMBERS <i>N</i> = 127
District <i>n</i> (%)	
1 (KS)	19 (14.96)
2 (KS)	31 (24.41)
3 (KS)	52 (40.94)
4 (VT)	25 (19.69)
Role <i>n</i> (%)	
General educator	34 (26.77)
Special educator	16 (12.60)
Building administrator	25 (19.69)
Related service provider	25 (19.69)
Staff	13 (10.24)
District administrator	8 (6.30)
Not reported	6 (4.72)
Sex <i>n</i> (%)	
Male	15 (11.81)
Female	100 (78.74)
Prefer not to answer	5 (3.94)
Not reported	7 (5.51)
Hispanic <i>n</i> (%)	7 (5.51)
Race <i>n</i> (%)*	
White	110 (86.61)
Native Am./Alaska Native	3 (2.36)
Asian/Pacific Islander	1 (0.79)
Black	5 (3.94)
Other	2 (1.57)
Declined	1 (0.79)
Age <i>M</i> (<i>SD</i>)	41.39 (9.73)
Educ. experience <i>M</i> (<i>SD</i>)	15.39 (8.82)
Ci3T experience <i>M</i> (<i>SD</i>)	6.07 (3.27)
Degree <i>n</i> (%)	
Associate's degree	0 (0)
Bachelor's degree	27 (21.26)
Master's degree	51 (40.16)
Master's degree +30	31 (24.41)
Doctorate degree	12 (9.45)
Not reported	6 (4.72)
Ci3T familiarity <i>M</i> (<i>SD</i>)	4.14 (0.93)

Table 1 Participant Characteristics.

Note. KS = Kansas, VT = Vermont. *Race collected as non-mutually exclusive categories (i.e., participants could select multiple races). Familiarity ratings provided on a five-point scale (1 = *Not familiar at all* to 5 = *A very familiar*). Ci3T = Comprehensive, Integrated, Three-Tiered.

See OSF Supplemental for school characteristic tables: Schools 2, 3, 4, and 7 withdrew during the first project year; School 1 elected not to participate in the second project year; School 8 closed at the end of the first project year. Participants from these schools are not included in the reported sample.

RQ2: Engagement

Of available E-Ci3T ISD activities, Ci3T LTs mostly engaged with Ci3T Implementation PL Sessions. In Year 1 (2022–2023), attendance was most dense at the beginning of the year, with a decelerating trend in attendance as the year proceeded. Within each district, Districts 3 and 4 had relatively high attendance throughout the year, whereas District 2 had relatively low attendance. We note attendance from District 1 dropped from Session 3 to Session 4 as two schools' teams elected to withdraw from the study between those sessions (see Method for information on withdrawals), reducing the number of participants available to attend. In some instances, specific dates were untenable for members from some districts to attend (e.g., re-scheduled district meetings for District 3 prevented a block of members from attending Session 5). In Year 2, attendance was more consistent across sessions throughout the course of the year. District 1's number of members again dropped due to the withdrawal of another school following a change in principal, whereas, Districts 3 and 4 maintained a relatively high level of participation. Outside of team-focused Ci3T Implementation PL Sessions, team members rarely attended peripheral PL sessions (e.g., EMPOWER, Ci3T Trainers and Coaches Calls; see Table 2).

VARIABLE LEVEL	YEAR 1 ATTENDANCE COUNTS (2022–2023)					YEAR 2 ATTENDANCE COUNTS (2023–2024)				
	DIST. 1	DIST. 2	DIST. 3	DIST. 4	TOTAL	DIST. 1	DIST. 2	DIST. 3	DIST. 4	TOTAL
Ci3T Imp. PL Series <i>n</i>										
Session 1	34	11	42	22	109	4	5	28	19	56
Session 2	29	9	36	20	94	6	8	22	17	53
Session 3	22	13	37	-	72	8	8	29	19	64
Session 4	14	5	42	17	78	2	7	26	16	51
Session 5	9	4	11	19	43	7	5	23	15	50
Empower Enhanced <i>n</i>										
Session 1	3	1	3	0	7	0	2	1	0	3
Session 2	0	0	4	0	4	0	0	0	0	0
Session 3	16	1	7	0	24	5	2	9	0	16
Session 4	1	0	2	0	3	0	1	4	0	5
Session 5	2	0	5	0	7	0	1	4	0	5
Session 6	0	0	4	0	4	0	0	4	0	4
Empower Traditional <i>n</i>										
Session 1	0	0	5	0	5	0	0	0	0	0
Session 2	0	0	5	0	5	0	0	0	0	0
Session 3	10	0	5	0	15	0	0	0	0	0
Session 4	0	1	1	0	1	0	2	0	0	2
Session 5	0	0	8	0	8	0	1	0	0	1
Session 6	0	0	4	0	4	0	0	0	0	0

(Contd.)

VARIABLE LEVEL	YEAR 1 ATTENDANCE COUNTS (2022–2023)					YEAR 2 ATTENDANCE COUNTS (2023–2024)				
	DIST. 1	DIST. 2	DIST. 3	DIST. 4	TOTAL	DIST. 1	DIST. 2	DIST. 3	DIST. 4	TOTAL
Ci3T TCC <i>n</i>										
Session 1	0	0	1	0	1	0	0	0	0	0
Session 2	0	0	1	0	1	0	2	0	0	2
Session 3	0	0	1	0	1	0	0	0	0	0
Session 4	0	0	0	0	0	0	0	0	0	0
Session 5	0	0	1	0	1	0	0	0	0	0
Session 6	0	0	0	0	0	0	0	0	0	0
Session 7	0	0	0	0	0	0	0	0	0	0
Session 8	0	0	0	0	0	0	0	0	0	0
Session 9	0	0	0	0	0	0	0	0	0	0
Session 10	0	0	0	0	0	0	0	0	0	0

Table 2 Participant Engagement in Ci3T Implementation Professional Learning Series and Delivery.

Note. Session 3 for District 4 was cancelled due to inclement weather. Dist. = district; Ci3T = Comprehensive, Integrated, Three-Tiered; PL = professional learning; E = Enhanced Ci3T; T = Traditional Ci3T; Ci3T TCC = Ci3T Trainers and Coaches Calls.

In terms of engaging with other activities as part of the E-Ci3T ISD, Ci3T LT members accessed Enhancing Ci3T Modules a total of 1,547 times between July 1, 2022–June 20, 2024. By module, average monthly access rates for individual modules ranged from 0.38 total users and 0.34 unique users (*Aligning Strategic Goals and Initiatives with Ci3T*) to 5.86 total and 2.70 unique users (*6-step Process for Responding to Challenging Behavior*). In all four metrics evaluated, four modules were the most popular: *6-step Instructional Approach*, *Managing Acting-Out Behavior at Tier 3*, *Behavior-Specific Praise*, and *Tier 1: Practical Strategies* (Table 3). Each of these modules was accessed over 100 times by leadership team members and had 1.90 to 2.70 unique users per month on average. These four modules, along with four others—*Using Data to Set Goals and Monitor Implementation*; *Ci3T as a Structure to Create Positive, Productive, Safe Learning Environments*; *Principles of Behavior Science*; *Universal Reinforcement System*—saw the greatest repeated use with a ratio of at least two to one total access points to unique users. The most accessed modules tended to be behaviorally focused, particularly at Tier 1. Notably, modules in the *Serving as a Ci3T Leader* series (e.g., *Effective Team Meetings*, *Roles and Responsibilities*, *Enhancing Ci3T Overview*) were minimally accessed in this sample of Ci3T LT members except for *Effective Onboarding Processes*.

RQ3: Learning Outcomes

Perceived Knowledge

Neither the addition of a random intercept for school, $-2\Delta LL(1) = 2.40, p = .12$, nor addition of a random slope for Ci3T LT members, $-2\Delta LL(1) = 0.5, p = .48$ resulted in a significant improvement in model fit. Therefore, we modeled only a random intercept for participants. The two-level empty means model indicated 66% of variance between participants. The linear slope for time indicated a significant increase in perceived knowledge across the school years, $F(1,189) = 57.42, p < .01$. The fixed effect for district was not statistically significant, $F(3,189) = 2.31, p = .08$, but was retained to model variability across districts. Table 6 provides parameter estimates for the 1.82 increase in perceived knowledge across each time point and the difference between District 2 and each of the other districts at pretest. Comparison of model-estimated mean perceived knowledge scores indicated a medium magnitude difference ($g = .69$) from Time 0 to Time 3 (Table 5).

MODULE SHORT NAME	RELEASE DATE	TOTAL ACCESS		MONTHLY ACCESS RATE	
		TOTAL USERS	UNIQUE USERS	TOTAL USERS	UNIQUE USERS
Enhancing Ci3T Overview	10/20/20	27	17	1.14	0.72
Roles and Responsibilities	08/26/21	31	19	1.31	0.80
Effective Onboarding Practices	08/26/21	53	35	2.24	1.48
Aligning Goals and Initiatives with Ci3T	12/08/21	9	8	0.38	0.34
Effective Ci3T Leadership Team Meetings	08/30/21	38	26	1.60	1.10
Mapping your PL Journey	09/02/22	20	16	0.92	0.74
Supports for Behavior Screening	05/01/24	5	3	2.98	1.79
Ci3T Intro: Creating positive...learning environments	07/18/22	48	27	2.08	1.17
Ci3T as a structure to create positive...environments	07/18/22	59	26	2.55	1.12
Integrating Ci3T Domains into Daily Instruction	07/18/22	43	25	1.86	1.08
Using data to set goals and monitor implementation	07/18/22	61	26	2.64	1.12
Tier 1 Practical Strategies	12/15/21	111	45	4.69	1.90
6-step Instructional Approach	03/07/22	139	64	5.86	2.70
Pre-referral Intervention Process in Ci3T	08/12/22	33	19	1.48	0.85
Behavior-specific Praise	07/26/22	116	53	5.08	2.32
Instructional Choice	11/29/21	70	39	2.96	1.65
Active Supervision	12/25/22	33	19	1.85	1.06
High-P Request Sequences	01/20/23	14	11	0.82	0.65
Instructional Feedback	01/30/23	15	13	0.90	0.78
Opportunities to Respond	10/12/22	37	24	1.82	1.18
Precorrection	11/22/22	33	20	1.74	1.05
Tier 2 Process	12/24/20	57	31	2.41	1.31
Self-Monitoring for Reading	06/30/21	33	24	1.39	1.01
Direct Behavior Rating	06/18/21	70	41	2.96	1.73
Behavior Contracts	06/08/21	45	24	1.90	1.01
SRSD for Writing	05/16/23	8	8	0.61	0.61
Social Skills Interventions	03/20/23	17	11	1.13	0.73
Self-monitoring Interventions	08/18/23	18	11	1.78	1.09
Managing Acting Out Behavior at Tier 3	06/30/22	134	63	5.65	2.66
Tier 3 Supports for Internalizing Concerns	05/25/22	49	32	2.07	1.35
Tier 3 Reading Supports	09/08/23	13	13	1.38	1.38
Principles of Behavior Science	08/26/21	38	19	1.60	0.80
Universal Reinforcement System	01/14/22	40	20	1.69	0.84
Understanding Consequences in a Ci3T Model	07/01/22	30	18	1.27	0.76

Table 3 Enhancing Ci3T Module Usage by Ci3T Leadership Team Members: User Access by Module.

Note. LT = leadership team. Modules listed in order in which they appear on ci3t.org for reader convenience. Monthly access rate calculated as follows: users/(number of days available/30.42). 30.42 is the average number of days in a month. Data are based on module access from July 1, 2022 through June 20, 2024. Ci3T = Comprehensive, Integrated, Three-Tiered; PL = professional learning; SRSD = self-regulated strategy development.

ITEMS	TIME			HEDGES' G [CI]
	SPRING 2023 <i>M (SD)</i> <i>N = 47</i>	FALL 2023 <i>M (SD)</i> <i>N = 35</i>	SPRING 2024 <i>M (SD)</i> <i>N = 36</i>	
Acceptability Items				
1. Effective for addressing needs	5.30 (0.83)	5.29 (0.52)	5.33 (0.76)	0.04 [-0.39, 0.48]
2. Fair way to address needs	5.32 (0.75)	5.31 (0.58)	5.31 (0.82)	-0.02 [-0.45, 0.42]
3. Not interested in engaging*	5.26 (1.36)	5.23 (1.11)	5.28 (1.23)	0.02 [-0.42, 0.45]
4. Positive attitudes about engaging	5.45 (0.65)	5.20 (0.58)	5.28 (0.78)	-0.24 [-0.67, 0.20]
5. Good way to address needs	5.30 (0.72)	5.29 (0.52)	5.31 (0.71)	0.01 [-0.42, 0.44]
6. Engaged with enthusiasm	5.28 (0.71)	5.03 (0.66)	5.08 (0.81)	-0.26 [-0.69, 0.18]
7. Not disruptive to responsibilities	5.02 (0.85)	4.80 (0.99)	4.94 (0.92)	-0.09 [-0.52, 0.35]
8. Committed to engaging	5.30 (0.69)	5.29 (0.52)	5.22 (0.68)	-0.11 [-0.54, 0.32]
9. Fits within current practices	5.26 (0.74)	5.17 (0.71)	5.28 (0.66)	0.03 [-0.40, 0.47]
Acceptability Composite Score	47.47 (5.35)	46.60 (4.03)	47.03 (5.10)	-0.06 [-0.50, 0.37]
Global Constructs: Single Items				
1. Acceptability	5.19 (0.74)	5.26 (0.56)	5.31 (0.67)	0.16 [-0.27, 0.60]
2. Feasibility	4.98 (0.90)	4.86 (0.77)	5.11 (0.71)	0.16 [-0.27, 0.60]
3. Understanding	5.17 (0.67)	5.29 (0.57)	5.36 (0.64)	0.29 [-0.15, 0.73]
4. System Climate (Admin)	5.32 (0.93)	5.43 (0.65)	5.39 (0.96)	0.07 [-0.36, 0.51]
5. System Climate (Colleagues)	4.98 (0.90)	4.91 (0.95)	4.97 (1.18)	-0.01 [-0.44, 0.43]
6. Systems Support	5.11 (1.03)	5.09 (0.95)	4.97 (1.28)	-0.12 [-0.55, 0.32]
7. Family-School Collaboration	4.09 (1.46)	4.14 (1.26)	3.61 (1.55)	-0.32 [-0.75, 0.12]
Opportunities for use	5.32 (0.66)	5.20 (0.72)	5.42 (0.60)	0.15 [-0.28, 0.59]

Table 4 Ci3T-Usability Rating Profile (URP): Leadership Team Usage Ratings of the Enhanced-Ci3T Implementation Series and Delivery.

**Note.* Acceptability, global items, and opportunity for use item scored on a scale of 1 (*strongly disagree*) to 6 (*strongly agree*), with the exception of *Not interested* (*), which is reverse scored so greater levels of disagreement are represented by greater values. Acceptability composite score ranges from 9 to 54. Effect size represents difference from spring 2023 to spring 2024; Ci3T = Comprehensive, Integrated, Three-Tiered; URP = Usage Rating Profile.

CONSTRUCT	TIME				HEDGES' G*
	T0 <i>n = 157</i> <i>M (SD) LSM</i>	T1 <i>n = 85</i> <i>M (SD) LSM</i>	T2 <i>n = 79</i> <i>M (SD) LSM</i>	T3 <i>n = 52</i> <i>M (SD) LSM</i>	
Perceived knowledge	36.32 (8.60) 35.67	40.49 (6.81) 39.93	40.34 (7.95) 39.05	42.58 (6.28) 41.58	0.69
Perceived confidence	35.58 (8.66) 34.91	39.44 (7.18) 38.86	39.44 (7.93) 38.38	41.62 (6.79) 40.59	0.66
Perceived usefulness	41.28 (6.34) 41.01	42.13 (6.47) 41.28	42.06 (7.92) 40.94	43.37 (6.46) 42.66	0.26
Actual knowledge	27.14 (8.76) 26.45	29.56 (8.91) 28.65	29.10 (8.02) 28.48	29.69 (8.40) 28.85	0.27

Table 5 Knowledge, Confidence, and Use (KCU) Scores: Least Squares Means.

Note. T0 = Time 0 (Fall, 2022); T1 = Time 1 (Spring, 2023); T2 = Time 2 (Fall, 2023); T3 = Time 3 (Spring, 2024); scores for each construct range from 0 to 48, with higher scores indicating greater levels of perceived knowledge, confidence, and use, as well as actual knowledge. Analysis included all available data from participants present at T0. * Effect size between T0 and T3; ** Actual knowledge *n* counts are T0 = 83, T1 = 45, T2 = 41, T3 = 32.

Perceived Confidence

Neither the addition of a random intercept for school, $-2\Delta LL(1) = 1.30$, $p = 0.25$, nor addition of a random slope for Ci3T LT members, $-2\Delta LL(1) = 0.1$, $p = 0.75$ resulted in a significant improvement in model fit so only a random intercept for participants was modeled. The two-level empty means model indicated 65% of variance was between participants. The linear slope for time indicated a significant increase in perceived confidence across the school year, $F(1,189) = 51.13$, $p < 0.01$. The fixed effect for district was not statistically significant, $F(3,189) = 2.52$, $p = .06$, but was retained to model variability across districts. Table 6 provides parameter estimates for the 1.79 increase in perceived knowledge across each time point and differences relative to District 2 at pretest. Comparison of model-estimated mean perceived confidence scores ($g = .66$) indicated a medium magnitude difference from Time 0 to Time 3 (Table 5).

VARIABLE	PERCEIVED KNOWLEDGE		PERCEIVED CONFIDENCE		PERCEIVED USEFULNESS		ACTUAL KNOWLEDGE	
	<i>B (SE)</i> <i>P</i>	<i>B (SE)</i> <i>P</i>	<i>B (SE)</i> <i>P</i>	<i>B (SE)</i> <i>P</i>	<i>B (SE)</i> <i>P</i>	<i>B (SE)</i> <i>P</i>	<i>B (SE)</i> <i>P</i>	<i>B (SE)</i> <i>P</i>
	MODEL 1	MODEL 2	MODEL 1	MODEL 2	MODEL 1	MODEL 2	MODEL 1	MODEL 2
Fixed Effects								
Intercept	38.25 (0.57) <.0001	36.35 (1.31) <.0001	37.41 (0.57) <.0001	35.94 (1.32) <.0001	41.38 (0.46) <.0001	40.92 (1.11) <.0001	27.81 (0.83) <.0001	26.88 (1.96) <.0001
Time slope		1.82 (0.24) <.0001		1.79 (0.25) <.0001		0.37 (.24) .1223		0.80 (0.38) .039
District*								
1		1.17 (1.60) .47		0.81 (1.61) .62		0.59 (1.35) 0.97		2.30 (2.46) .35
3		1.09 (1.61) .50		0.55 (1.62) .74		0.85 (1.35) 0.53		0.10 (2.40) .966
4		-2.84 (1.87) .13		-3.51 (1.89) .06		-1.01 (1.57) 0.52		-2.64 (2.67) .32
Random effects								
Intercept (T)	44.64	43.05 (5.83) <.0001	44.59	43.02 (5.90) <.0001	27.43	26.88 (4.13) <.0001	60.42	57.68 (10.70) <.0001
Residual	22.87	18.27 (1.88) <.0001	24.23	19.80 (2.03) <.0001	19.05	18.91 (1.93) <.0001	23.80	23.04 (3.61) <.0001
Model Fit								
AIC	2509.3	2460.3	2522.7	2478.6	2400.2	2403.9	1394.4	1394.8
BIC	2519.5	2484.0	2532.8	2502.3	2410.4	2427.7	1402.7	1413.8

Table 6 Learning Outcomes.

Note. District 2 was used as reference group; *Actual Knowledge model reported for participants who answered <75% of open-ended questions. See Table S2 for results from model including all participants. AIC = Akaike Information Criterion, BIC = Bayesian Information Criterion. Analysis included all available data from participants present at T0.

Perceived Usefulness

Neither the addition of a random intercept for school, $-2\Delta LL(1) = 1.80, p = .18$, nor the addition of a random slope for Ci3T LT members, $-2\Delta LL(1) = 1.2, p = .27$ resulted in a significant improvement in model fit. Thus, we modeled only a random intercept for participants. The two-level empty means model indicated 59% of variance was between participants. The linear slope for time was not significant, $F(1,189) = 2.41, p = .12$. The fixed effect for district was not statistically significant, $F(3,189) = 0.62, p = .60$. Table 6 provides parameter estimates for time and district. Comparison of model-estimated mean perceived usefulness scores ($g = .26$) indicated a small magnitude difference from Time 0 to Time 3 (Table 5), though we note this effect should be interpreted with caution due to the statistically insignificant finding for time.

Actual Knowledge

Neither addition of a random intercept for school, $-2\Delta LL(1) = 0.4, p = 1.00$, nor addition of a random slope for Ci3T LT members, $-2\Delta LL(1) = 0.0, p = .53$ resulted in a significant improvement in model fit. Therefore, we modeled only a random intercept for Ci3T LT members. The two-level empty means model indicated 74% of the variance was between Ci3T LT members. The linear slope for time was statistically significant, $F(1,88) = 4.39, p = .04$. The fixed effect for district was not statistically significant, $F(3,88) = 1.46, p = .23$. Table 6 provides parameter estimates for time and district. Comparison of model-estimated mean actual knowledge scores ($g = .27$) indicated a small magnitude difference from Time 0 to Time 3 (Table 5).

DISCUSSION

As integrated tiered systems become widely adopted to support students' multiple learning needs (Gandhi et al., 2026), a need exists to create and evaluate systems for supporting multiple stakeholder groups' capacity to lead and implement these models (Common et al., 2021; Royer et al., 2022). The E-Ci3T ISD is one such approach, with an emphasis on providing a range of PL opportunities matched to implementers' roles. A particular emphasis of the E-Ci3T ISD is supporting school-site Ci3T LTs. Previous inquiry suggests the leadership of this team is critical to successful implementation (Menzies et al., 2023). To address this need, the E-Ci3T ISD includes the Ci3T Implementation PL Series for Ci3T LT members. It also includes Enhancing Ci3T Modules (Buckman, Lane et al., 2024; Buckman et al., 2025), which address leadership topics and provides leaders with a bank of resources for providing PL in response to their school's specific needs. We conducted this study to examine the usability of the E-Ci3T ISD for supporting school leaders, the extent to which leaders participated in the series, and PL learning outcomes achieved. We investigated these questions from a sample of Ci3T LT members from schools experienced in Ci3T implementation ($M = 6.73$ years per school). We studied outcomes for Ci3T LT members who participated over the course of two academic years (2022–2024).

Results from quantitative and qualitative data indicated participants viewed their E-Ci3T ISD experiences as highly acceptable (RQ1). Further, usage of available PL was supported by feasibility of available PL experiences and resources, and a strong System Climate supported by administrators. In terms of perspectives on specific features of the E-Ci3T ISD, participants indicated the Ci3T Implementation PL Series provided a valuable context for collaborative planning and accessing coaching supports, as well as instilling a sense of motivation and direction (e.g., "it's powerful stuff...here's what you can do for the next 2 months to keep going"). Beyond team-based sessions, participants also highlighted the usefulness of other Ci3T structures and resources, including Enhancing Ci3T Modules ("I can access it when I need it, and I don't have to wait for somebody else to respond"). Overall, findings echoed results from design inquiry used to develop and refine components of the E-Ci3T ISD. Similar to results from initial design inquiry (Buckman, Lane

et al., 2024) and efforts to scale up creation of resources for the E-Ci3T ISD (Buckman et al., 2025), participants in the current study indicated a supportive system climate driven by administrators was an important factor related to PL usage, as was the acceptability of the available resources for addressing a variety of needs in Ci3T. Also consistent with earlier studies, participants indicated family-school collaboration was the factor least related to usage. It may be family-school collaboration is not a simply not a significant driver of PL resource usage (e.g., it appears PL usage is driven more by school-based climate [e.g., administrator support]). Or it may be PL materials need to create a greater context to make such collaborations more central to schools' Ci3T work (see educational implications).

With respect to engagement (RQ2), we analyzed participant attendance and use of Enhancing Ci3T Modules. With respect to the former, we observed relatively low attendance by Ci3T LT members at Ci3T Implementation PL Series sessions. In Year 1 (2022–2023) attendance waned substantially over the year ranging from 43–109 of 220 eligible attendees, whereas in Year 2 (2023–2024) attendance was steady but low (50–64 attendees). There also appeared to be different levels of attendance across districts (e.g., Districts 3 and 4 evinced relatively high attendance throughout). Though qualitative and quantitative data did not specifically elaborate on session attendance, it is possible attendance was lower than expected from this sample due to participants' long-standing implementation of Ci3T. For example, one participant indicated: "I think that probably it [Ci3T Implementation PL Series] is less effective for people that have been implementing Ci3T over time, and maybe more effective for people that have a newer to Ci3T." Thus, it is possible participation in implementation support for experienced implementers may wane if leaders feel they have already mastered the necessary skills and concepts needed. It is also possible that extenuating circumstances contributed to low session attendance (e.g., conflicts with family and personal commitments after work hours). Though we did not systematically evaluate contributing factors, we anecdotally note Districts 3 and 4 have a history of encouraging team members to attend evening PL sessions. This is in contrast to other districts, which have preferred PL provided during the school day but found it difficult to secure substitutes. Also, there may be other factors impeding engagement may have contributed to some participants decisions to withdraw from the study altogether as mentioned in the method (e.g., availability of district coaches, shifts in district and school leadership)—all areas important to explore in future studies.

Regarding Ci3T LT members' engagement with Enhancing Ci3T Modules, the top six most accessed modules covered specific instructional techniques (e.g., *Behavior-specific Praise*) and behavior management strategies (e.g., *6-Step Instructional Approach for Responding to Challenging Behavior*). In contrast, modules focused on specific topics for Ci3T LT members (e.g., *Effective Onboarding Practices*, *Mapping your PL Journey*) were accessed much less frequently (see Table 3). This is somewhat surprising, given the role-specific nature of the latter modules. We hypothesize several possible explanations for this pattern. It may be that Ci3T LT members' usage patterns emphasize their role as a broker of research-based resources (e.g., accessing PL to share with colleagues in response to data or requests for assistance). This interpretation aligns with anecdotes shared in the semi-structured interviews about locating Enhancing Ci3T Modules to share with colleagues as part of ongoing implementation coaching (e.g., "Teachers come to me for resources, and it's great to have that not be like, 'well, I don't have any books'"). Alternatively, team members with a high degree of Ci3T experience may feel leadership-focused topics have been adequately addressed during Ci3T Implementation PL Series sessions, decreasing the perceived need for modules. Or perhaps the appeal of leadership modules is actually narrower than the full team, instead appealing primarily to those serving in a team leader capacity (e.g., school principals). As inquiry on use of Enhancing Ci3T Modules continues, it will be important to learn more about what these usage patterns signify, and whether further refinements are needed to maximize impact of these PL resources. For example, resources on the topic of onboarding new teachers were highly requested during preliminary design inquiry (Royer et al., 2022), so the lower usage rate requires investigation to identify how the module could be improved—or, more effectively recommended—to encourage use commensurate with the evidence of need in this area. Or it may be more apt to be used at the onset of the school year, rather than later in an academic year.

Lastly, we assessed Ci3T LT members' PL outcomes (RQ3). This study used an updated version of the Ci3T KCU measure studied elsewhere (e.g., Lane, Oakes et al., 2020). The updated measure added new items to gauge learning relative to critical Ci3T concepts not previously assessed (e.g., Data-informed PL) and included one open ended item to correspond to each perceived knowledge item. Overall, participants reported relatively high perceived knowledge, confidence, and usefulness at Time 0, a finding not unexpected due to the highly experienced nature of this sample. Though already high, we nevertheless observed a positive, statistically significant fixed effect for time on perceived knowledge and perceived confidence. Across both constructs, fixed effects for slope were comparable (e.g., perceived knowledge $B = 1.82$ and perceived confidence $B = 1.79$ across four time points), suggesting similar trajectories (see Figure 1). We did not observe a statistically significant fixed effect for time on perceived usefulness, though usefulness scores were noticeably higher than other KCU constructs at Time 0, suggesting a ceiling effect. The observed growth of perceived KCU constructs over the course of this study has some correspondence with previous findings. Lane, Oakes and colleagues (2020) assessed Ci3T LT members going through a manualized process of building their Ci3T model (Lane, Oakes et al., 2019). As expected, those participants had much lower baseline scores given they were new to Ci3T as they engaged in the building process. By the end of the training series, those participants had scores similar

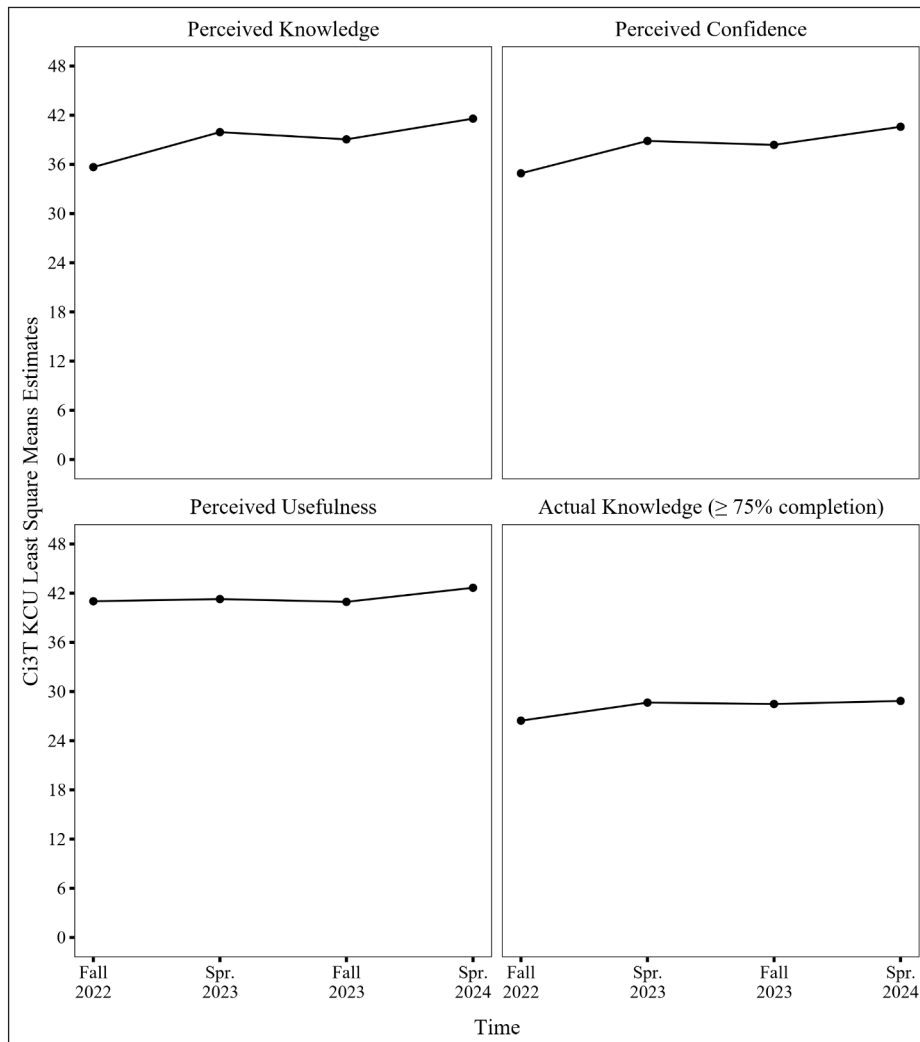


Figure 1 Least Squares Mean Scores across KCU Constructs.

Note. Ci3T = Comprehensive, Integrated, Three-Tiered; KCU = knowledge, confidence, use.

to those observed at the end of each year of the E-Ci3T ISD (noting direct comparisons are not possible due to score differences related to modifications in the current measure; see Measures and subsequent discussion). It appears Ci3T LT members make the most growth during their initial Ci3T training experiences, though there is still room for learning in the context of ongoing Ci3T PL, as indicated by medium growth in perceived knowledge ($g = 0.69$) and confidence ($g = 0.66$) in the present sample.

Findings in this study related to actual knowledge reflect challenges, perhaps related to adding the length of the original tool. First, participant response patterns on the updated Ci3T KCU measure yielded an important preliminary finding: it appeared the response effort required to complete the constructed response items constituting the actual knowledge component of the Ci3T KCU may have dissuaded participants from completing this portion of the measure. Namely, attempts to replicate previously used scoring procedures resulted in artificially low actual knowledge scores (see Table S2). Many participants completed the rating scale portion of the Ci3T KCU (i.e., perceived knowledge, confidence, usefulness) but answered fewer actual knowledge constructed response items (which followed the discrete responses for perceptions), resulting in low scores (and in many cases 0) for those participants and producing a commensurately low overall mean scores for this sample. We hypothesize this result could be a product of multiple factors, including administering the KCU via online survey (rather than paper-pencil form, as was done in Lane, Oakes et al., 2020) making it easier to skip items, or perhaps participants were more likely to skip items if they had completed the measure multiple times previously. Or, perhaps increasing from 8 to 16 open-ended items was simply an unreasonable increase in response effort for participants, resulting in them being less willing to complete the open-ended items relative to earlier studies.

Rather than interpreting non-response as an indication of a complete lack of knowledge, we elected to conduct a more conservative approach for analysis including only participants who attempted to answer 75% of actual knowledge questions to avoid creating artificially low mean levels. From this subset, we observed a statistically significant fixed effect for time. Compared to increases observed following initial training in Ci3T ($g = 1.90$), gains in actual knowledge were smaller in the current study. This is most likely a product of the high degree of experience in Ci3T by most participants, though we note actual knowledge scores suggest only modest levels of Ci3T knowledge (e.g., least square mean estimate of 26.45 at Time 0 and 28.85 at Time 3 on a scale of 48). Based on previously described challenges collecting completed data via open-response items, there is cause to interpret this finding as potential test fatigue. Even participants who responded to >75% of questions may not have provided answers fully representing their breadth of knowledge given the length of the revised survey. This would indicate a need to potentially return to the earlier version of the Ci3T KCU, with fewer open-ended items to more efficiently assess actual knowledge. Alternatively, it is possible the E-Ci3T ISD may need to be strengthened in some areas to more effectively impart knowledge and skills if participants do not yet show mastery of most concepts over the course of multiple years of exposure.

Educational Leadership Implications

The current study provides valuable insights for school and district leaders committed to supporting meeting students' multiple needs through implementation of integrated tiered systems. First, involvement of administrators at the school level is a critical factor associated with using PL materials to support implementation, and the absence of administrator engagement may lead to a perception implementation is not a priority. Thus, we encourage district leaders to prioritize supporting administrators in leading this work (Menziez et al., 2023). This includes providing coaching and targeted PL to assist these leaders in conceptualizing how such models can be advantageous in their role as instructional leader (e.g., setting expectations for faculty and staff, a basis for providing school-specific PL, using data to identify areas to celebrate and refine).

Further, Ci3T LT members' tendency to access PL (e.g., Enhancing Ci3T Modules) targeting instructional strategies and behavioral techniques over leadership concepts (e.g., host effective meetings) signifies a major role played by these leaders is as a PL broker, identifying and sharing research-based, effective resources with colleagues. Given the importance of peer recommendations for resources, and the potential risks of educators seeking strategies and advice from non-research-based sources (Beahm, Cook & Cook, 2019; Beahm, Yan & Cook, 2021), a major implication of the current study is the importance of scaling up use of PL materials such as Enhancing Ci3T Modules in educational settings. In a similar vein, throughout design inquiry on creating E-Ci3T ISD PL materials we have consistently observed school-family collaboration as a lower-rated factor related to using Ci3T PL (Buckman, Lane et al., 2024; Buckman et al., 2025). This may reflect a need to hone the focus on this type of collaboration within PL materials. Perhaps school leaders guiding Ci3T implementation may be focused on other priorities, or some combination of factors. Regardless, an important implication for researchers, PL developers, and school leaders is to increase focus on collaborations with parents and family members, a critical stakeholder group for supporting students' development across learning domains (Lane, Baldy et al., 2024).

Lastly, the uneven participation of Ci3T LT members over the course of this study, evident in attendance data and reasons provided by school leaders who elected to withdraw from the study, suggests school systems may need more flexible mechanisms to provide ongoing implementation and leadership support. The flexibility needed may be in terms of time, such as finding ways to minimize after-school PL (which is routinely identified as less desirable than in-school PL; Common et al., 2021), but also content, as more experienced implementers may need less—or different—support. District leaders may therefore need to seek ways to differentiate experiences; perhaps using learning management systems to assign and evaluate various PL opportunities. When exploring alternative avenues for PL, it will be important to collect data from leaders to ensure these adaptations are effective and viewed as acceptable to promote engagement (Lane, Carter et al., 2015).

Limitations and Future Directions

There are several limitations to consider alongside findings from this study, some of which have been previously discussed. First, data from this study may reflect a response bias (e.g., differences in experiences for participants who did and did not complete the Ci3T KCU survey). This possibility arises from relatively low response rates observed, including partial completion of measures that required secondary analyses of only participants who completed 75% or more of actual knowledge KCU items. We may have been more likely to receive data from participants with positive attitudes toward Ci3T and E-Ci3T ISD experiences. Although we took measures to mitigate this potential confound (e.g., authors who conducted interviews were not familiar to participants and were not developers of the Ci3T model). Similarly, it is important to recall four schools from one district withdrew from the study, meaning they did not contribute to data sources beyond the first data collection timepoint and did not complete any interviews. Future studies can take further steps to mitigate the impact of response bias by conducting random sampling to gather feedback (e.g., survey, interview) or purposively select individuals with less favorable attitudes toward Ci3T PL experiences to ensure viewpoint plurality.

While not a limitation specifically, it is important to recall this study involved experienced Ci3T LT members. Thus, it will be important to avoid generalizing findings beyond experienced Ci3T implementers. For example, new Ci3T implementers may be much more inclined to regularly attend sessions and demonstrate different patterns of PL access (e.g., selecting Enhancing Ci3T Modules focused on leadership topics), as the novelty of both the experience of leading implementation and the PL experiences themselves may influence use. Therefore, an important next step in this line of inquiry is to study acceptability, participation, and PL outcomes of new implementers, and also to engage in experimental tests (e.g., randomized-controlled trials) to determine whether these outcomes may differ based on exposure to different PL resources (e.g., access to newly developed Enhancing Ci3T Modules as part of the E-Ci3T ISD). Although challenging to conduct randomized control trials of integrated tiered systems, such experimental studies would provide important information regarding the social validity of PL offering as well as the impact on adult learning outcomes.

Lastly, as previously described we experienced some challenges in analyzing actual knowledge as a PL outcome using the revised Ci3T KCU tool as discussed. Namely, many participants did not answer open-ended questions, and we were unable to differentiate between cases when (a) participants skipped responses due to fatigue, or (b) did not answer because they truly did not know. Given the number of open-ended items doubled from the previous version, we anticipate the former. Though participants broadly reported high degrees of perceived knowledge, perceived knowledge can be an unreliable indicator of actual knowledge (e.g., Kadluba & Obersteiner, 2024; Stark et al., 2016). Yet, in previous studies using the Ci3T KCU survey to assess adult learning did establish statistically significant, positive correlations between perceived and actual knowledge scores suggesting the psychometric strength of the KCU tool. Thus, an important future direction is continuing to explore balanced approaches for assessing adult learning, prioritizing response effort. In this case, it may be the briefer version was more reasonable, and therefore more likely to be completed. Also, it may be wise to explore other test formats (e.g., scenarios, multiple choice), multiple form options to reduce measurement fatigue and practice effects, practice-based assessment (e.g., looking for behavioral markers of knowledge acquisition), or some combination thereof. It will be important to design tools with strong psychometric properties while also prioritizing feasibility to evaluate PL outcomes.

Summary

In this study we examined Ci3T LT members' views on the E-Ci3T ISD, as well as their engagement and PL outcomes resulting from these PL experiences. Overall, participants were largely positive about overall acceptability and usability of the E-Ci3T ISD to support a variety of needs in a Ci3T framework, particularly in terms of opportunities created through the Ci3T Implementation PL Series to collaborate with their team and locating Enhancing Ci3T Modules to share with colleagues. Usage and engagement data suggested the potential need for further differentiation based on school teams' experience, expertise, and preferences, and highlighted time as a potential limiting factor (e.g., limited time to use for collecting data, time for attending PL). PL outcomes showed small to-medium gains in Ci3T LT members' perceived knowledge and confidence in Ci3T strategies, practices, and programs over the course of the PL series—noting participants started with relatively positive views at the onset, and small gains in actual knowledge.

ADDITIONAL FILE

The additional file for this article can be found as follows:

- **Supplementary file.** Table s1 and Table s2. DOI: <https://doi.org/10.25894/rise.2969.s1>

COMPETING INTERESTS

Authors have no conflicts of interest associated with conducting this study or in the preparation of this manuscript, the funding agency is listed in the acknowledgements, and all APA ethical standards were followed.

AUTHOR CONTRIBUTIONS

Mark Matthew Buckman: conceptualization, data curation, formal analysis, investigation, methodology, project administration, software, validation, visualization, writing—original draft, writing—review and editing; **Kathleen Lynne Lane:** conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, software, supervision, validation, writing—original draft, writing—review and editing;


Amy M. Briesch: conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, resources, validation, writing—original draft, writing—review and editing; **Rebecca Lee Sherod:** data curation, investigation, project administration, validation, writing—review and editing; **Wendy Peia Oakes:** conceptualization, data curation, funding acquisition, investigation, project administration, resources, supervision, validation, writing—review and editing; **David James Royer:** conceptualization, funding acquisition, investigation, writing—review and editing; **Eric Alan Common:** conceptualization, data curation, funding acquisition, investigation, validation, writing—review and editing; **Sandra Chafouleas:** conceptualization, funding acquisition, investigation, writing—review and editing; **Nathan Allan Lane:** data curation, formal analysis, methodology, software, visualization, writing—review and editing; **Elise Sarasin:** data curation, investigation, software, validation, writing—original draft, writing—review and editing; **Grant E. Allen:** data curation, investigation, validation, writing—review and editing; **Katie S. Lane Pelton:** data curation, software, validation, writing—original draft, writing—review and editing; **Kandace Fleming:** conceptualization, formal analysis, methodology, software, writing—original draft, writing—review and editing; **Kate Williamson:** data curation, investigation, software, validation, writing—review and editing.


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