Outcomes of Community-Based Infant/ Toddler Teacher Preparation: Tiered Supports for Pre-service early Childhood Education Teachers in Early Head Start

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Abstract   This study examined results associated with a field-based undergraduate early childhood teacher education program designed as a response to calls for enhanced field experiences and community-situated teacher education that narrows the preparation-to-practice gap. Specifically, classroom observations were used to assess undergraduates' progress in developmentally appropriate adult-child interaction during a portion of a semester-long professional preparation sequence focused on infants and toddlers offered in an urban Early Head Start program serving low-income children. During the sequence, a model relying on guided apprenticeship with classroom teachers and continuous direct supervision from university faculty was employed. In addition, a tiered model including universal, targeted, and intensive supports was implemented in order to support candidates in identifying and developing specific areas of need. The participants in this study demonstrated greater responsivity and intentional engagement with infants and toddlers as a result of this intensive preparation sequence. Participants who did not show an initial increase in skills responded to targeted and and/or intensive intervention strategies. This model suggests that by refocusing early childhood teacher preparation through a lens of partnership between EHS teachers, university faculty, and early childhood special education (ECSE) teacher candidates, significant gains in developmentally appropriate practice can be achieved even for candidates early in a preparation program.

Keywords: teacher education, early childhood, multi-tiered systems of support, infants and toddlers, Early Head Start

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1. Introduction

Bridging the gap between teacher education and practice to improve teacher quality is imperative to the success and retention of beginning early childhood educators; the field of teacher education has been criticized for failing to prepare future teachers for the reality of the diverse classrooms they will face upon entering the field. However, teacher education programs face an evolving context of educational policy. The focus of the preparation they provide has expanded beyond placement and retention of teachers in schools [19]; to a goal of engagement in communities and impact through more authentic preparation practices in those communities throughout preparation [14]. Policies increasingly emphasize that teacher educators must rely upon extended field experiences to develop preservice teachers' understanding of educational theory and employing practices supported by evidence [34]; as well as supporting them through the challenges faced in complex, increasingly diverse classroom and community contexts [48]. One persistent

limitation of traditional university-focused early childhood teacher education is a failure to provide these rich, time-intensive field experiences where candidates address children's educational needs within the context of family and community. This is particularly true in areas of practice for which adequate teacher preparation is lacking - in particular, preparation for work with infants and toddlers and their families [2].

Conversation about teacher education reform to address these larger aims has focused almost exclusively on grades K-12 [25]. Field-based and community partnership models are examples of approaches to teacher preparation that have been identified as holding great potential for strengthening the link between preparation and practice [3,36,49]. Such models are intended to deepen relationships between teacher preparation programs and community, schools, and centers while providing a context within which teacher candidates may learn *through* teaching rather than about it, thus directly influencing their skills and effectiveness over the span of their preparation program rather than preparing them to eventually teach. This type of approach to preparation requires more purposeful connections between university

coursework and classroom field placements; however, such partnerships are largely unexplored in early childhood teacher education literature.

To this end, the present study examined results from a four-year, field-based undergraduate early childhood teacher education program designed at Loyola University Chicago as a response to calls for enhanced field experiences and community-situated teacher education. Specifically, classroom observations were used to assess undergraduates' developmentally appropriate adult-child interactions during a semester-long sequence focused on infants and toddlers. This sequence was offered in partnership with an urban Early Head Start (EHS) program serving diverse young children (birth to five) from families considered low-income. The preparation model was based upon a principle of guided apprenticeship, with classroom teachers and early childhood university faculty providing constant direct supervision. Faculty implemented a system of tiered supports including universal, targeted, and intensive strategies and interventions derived from principles of response-to-intervention (RTI) or multi-tiered systems of support (MTSS) [44,53]. This study assessed the extent to which this type of community-based partnership model (and the supports therein) resulted in increases in the quantity and quality of teacher candidates' intentional, developmentally appropriate adult-child interactions.

2. Context for Collaborative Field-Based Teacher Preparation

Although early childhood teacher educators face unique challenges in addressing the preparation to practice gap (e.g., the diverse pathways by which early childhood educators enter the field), the broader context of teacher preparation in the United States still offers insight for early childhood teacher educators into the key themes and collaborative models characterizing 21st century teacher education. Teacher educators are charged with preparing candidates for the complexity of teaching, balancing theory and classroom practice through authentic experiences in diverse classroom settings [34] The extant literature concurs that providing teacher candidates with experiences in diverse classrooms and communities better prepares them to serve diverse children and families when entering the field [3,36,37,49]. The needs of children and families must also be balanced with increasing expectations related to accountability [42]. When teacher education programs fail to prepare future teachers to balance developmentally appropriate practice (DAP) [39] with the expectations of accountability systems, novice teachers may experience an immediate preparation-to-practice gap that may undermine the quality of their practice [8,11].

Doubts regarding the effectiveness of teacher education institutions to meaningfully link theory and practice have fed the momentum and public approval of accelerated and alternative paths to teaching certification, lessening the perceived credibility and desirability of traditional teacher education programs [20,34]. Teacher education is evolving to address these challenges through a shift from models anchored in university-based coursework to field-based preparation that is collaboratively designed and delivered with community partners, providing teacher candidates with consistent, authentic opportunities to practice their skills in context [3,37,49]. In field-based models, candidates are exposed to diverse schools and communities with continuous opportunities to practice their teaching, linking research and theory to practice with support of practicing teachers and university faculty [56].

The value of authentic field experiences (in culturally, linguistically, and socioeconomically diverse settings) that are closely connected to university coursework is well documented in the literature [1,3,36,37,48,49]. These experiences provide teacher candidates with meaningful opportunities to practice their skills with the support of faculty and community stakeholders, leading to enhanced readiness to teach upon entering the profession [37,56]. Such studies tend to examine the benefit of authentic interactions with diverse children and community members for primarily white, female teacher candidates who have limited experiences in communities different from their own [36,37]. Such work is crucial to developing a responsive structure for field-based teacher preparation, but lacks discussion around the types of feedback and support structures diverse candidates require from university faculty in order to receive the maximum benefit from their field experiences.

While partnership models involve extended field placement, the nature of these field experiences transcends professional development school (PDS) approaches [13] or additional internships, by placing teacher education programs in schools and communities in collaboration with community partners and emphasizing experiences with children and families over coursework. Shifting relationships among universities and early childhood partners is a complex effort. Early childhood programs that have traditionally served as hosts for university-placed teacher candidates must now have a stronger voice in conversations about the redesign of preparation to address children's needs within the context of family and community [17,18]. Partnership models require new roles of university faculty and educators in the field, who must collaborate to not only support the work of teacher candidates but to approach a goal of mutual benefit for university and schools/programs alike [30].

In early childhood settings, these new roles must be examined in light of the continuing need for a highly qualified work force. Early childhood teachers with advanced levels of higher education (i.e. bachelor's degree) are found to be more successful in their use of DAP [20], and higher levels of teacher education are related to higher overall classroom ratings [45,46]. Additionally, teachers with more education have increased awareness and commitment to DAP and significantly impact children's cognitive and social competence during preschool [43]. These findings hold direct implications for field-based teacher education, in that effective teachers are needed to model effective practices and many infant-toddler teachers lack adequate preparation.

The assumption of partnership models is that field experiences are much more likely to directly impact practice when candidates begin their work in authentic contexts early on in their preparation with university faculty working alongside them. Such models also allow for intra- and inter-professional collaboration to occur naturally, rather than emphasizing traditional, discipline-

specific preparation that restricts opportunities to learn through collaborative practice. They also provide a context within which universities and early childhood programs may each benefit. However, evidence of the effectiveness of such programs is scarce [55].

2.1. TLLSC and the Development of a Field-Based 0-3 Sequence

Teaching, Learning, and Leading with Schools and Communities (TLLSC) [49] is a field-based undergraduate early childhood teacher education program collaboratively designed by university, school, and community organization partners with a goal of preparing all early childhood teachers to utilize evidence-based and blended practices in working with diverse children in a variety of urban settings - including infant/toddler programs, inclusive preschool and early elementary settings, community organizations, and homes. TLLSC was developed through transdisciplinary collaboration with community partners in an effort to re-envision teacher education as a partnership between university and community agency/school [26,30]. It is based on the belief that teacher education must be grounded in a practice-based theory of professional learning [7], as well as demonstrating a sensitivity to schools' and community agencies' structure and needs [55]. TLLSC faculty members serve as mentors, facilitating teacher candidates' learning experiences while simultaneously working to support classroom teachers. Some of the key differences between TLLSC and traditional, university-based teacher education program models are presented in Table 1.

Table 1. Comparison of field-based and traditional university-based teacher education programs

Traditional approaches	Dimension	TLLSC
Course-based with clinical experiences	**Format**	Universal continuum of field-based sequences with supporting courses
Foundational coursework with later methods courses and clinical experiences	**Model**	Field experiences address multiple interrelated themes and competencies in authentic settings; field-based learning begins first semester of freshman year
Instructors work largely independently, with assignments and field experiences linked to individual courses	**Integration of knowledge and skills**	University and field-based instructors collaborate regularly and share linked activities and assignments with students via a single shared calendar each semester
Faculty teach university courses	**Faculty supervision**	Faculty travel with candidates to each site every day, and directly supervise field-based sequences
Teachers host pre-service teachers, who complete observation and practicum hours	**Role of teacher mentors**	Teachers meet with faculty throughout and model, support, and provide feedback on a daily basis
School and center administrators approve and place pre-service teachers	**Role of school-based administrator**	Administrators collaborate throughout design and redesign processes to ensure mutual benefit

The study described in this article is a product of the implementation of a semester-long birth-to-three sequence, one of eight in the TLLSC ECSE (early childhood special education) program in which coursework and clinicals

have been nearly completely replaced with field-based experiences focusing on key integrated competencies that translate theory into practice [26,29]. TLLSC faculty and school/center personnel (in this case, Early Head Start) partner during these sequences (composed of shorter, themed experiences called modules) to develop undergraduates' teaching skills; preparation thus takes place alongside practicing professionals through guided apprenticeship [35,36,37] rather than taught at the university and applied later in clinicals and/or student teaching. The ECSE program is aligned with all state standards and the Council for the Accreditation of Educator Preparation (CAEP), and is also approved by the Illinois State Board of Education [28]. The program includes preparation qualifying each undergraduate for teacher licensure in early childhood education and endorsements in early childhood special education and English as a second language; knowledge and skills in these credentialing areas are addressed in an integrated and targeted manner over four years through authentic experiences rather than through compartmentalized or poorly-supervised preparation [8,28,34].

Like all TLLSC sequences over the four-year continuum, the 0-3 module highlighted in this study is held primarily at partner sites rather than on the university campus. The activities which take place in this module are discussed in the Methods section and presented in Table 2. Typically in field-based modules, university faculty and teacher candidates meet for a seminar session at the school or community site before balancing classroom mentoring and observation with teaching and discussion of module content. Each seminar session begins with candidates and faculty coming together as a whole group to establish the focus of candidates' classroom experiences. At this time, candidates may ask questions regarding module content or in-class activities at the field site, and faculty may meet with individual candidates to provide additional feedback or support as the majority of candidates enter classrooms. While candidates work in classrooms with mentor teachers to observe and enact teaching behaviors, university faculty rotate through each of the classrooms to observe and mentor the individual candidates. These visits include traditional clinical supervision with conferencing, as well as modeling and scaffolded supports. Following the time spent in classrooms candidates and faculty meet again as a group to discuss faculty observations and module content (e.g. weekly readings, connecting theory to practice, assignments to be completed with teachers and children). Expectations are then set for the following session and faculty and candidates exit the field site before returning the following session. Throughout this structure, field site administrators and mentor teachers join the whole group sessions or meet with faculty/teacher candidates to discuss the success and challenges of the module and make any necessary adjustments along the way, in order to ensure that all stakeholders maintain a strong voice in the collaborative, field-based model.

2.1.1. Tiered Supports for Teacher Candidates

Systems that support both teacher candidates and teachers themselves are essential to the success of field-based models; in order for teachers to support candidates without diminishing their focus on teaching, those candidates must engage as active members of the

classroom community, rather than observing passively. In the current study, faculty set in place a multi-tiered system of supports (MTSS) for the teacher candidates (see Figure 1). MTSS or Response to Intervention (RTI) approaches involve the use of interventions (adjusted in intensity and frequency to meet individuals' needs) supported by ongoing data which identifies and tracks progress in any area of development/academic competency. Research on tiered models of service delivery in early childhood is limited; this is particularly true for infants and toddlers [23]. The use of MTSS with teachers has previously produced significant effects in a professional development context [38,53] but is still an emerging area of research. Professional development for infant-toddler professionals in the use of data-based decision-making within MTSS is another research area in need of expansion [16]; extant research on MTSS in early childhood has focused exclusively on interventions for children of preschool age [23]. No studies to date have examined the effects of using MTSS with infant-toddler teacher candidates; in addition to emphasizing data-based decision-making and individualized supports, MTSS when applied to teacher candidates holds potential for integrating as many models of clinical supervision as are necessary to address individual candidate needs [12,21].
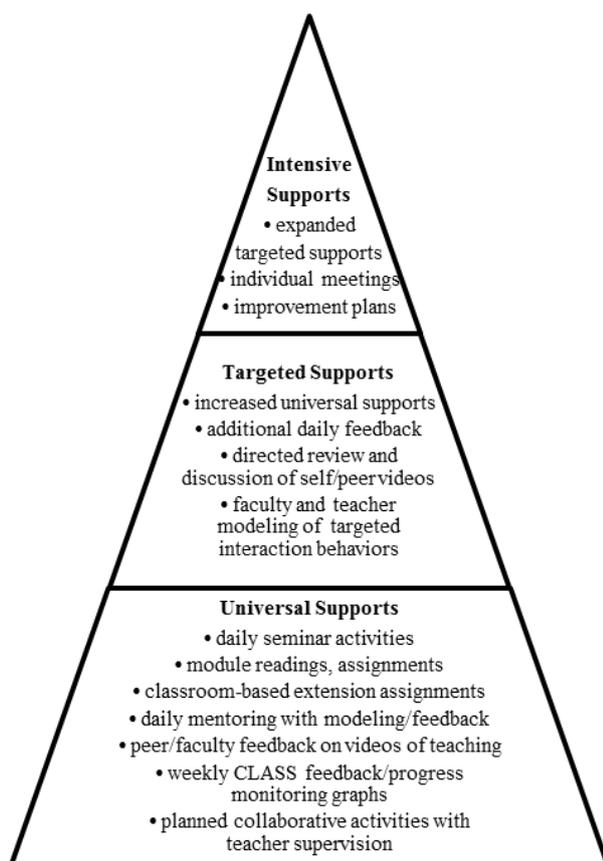

Figure 1. Field-based tiered supports for undergraduate teacher candidates

In the present study, teacher candidates received multi-tiered supports designed and implemented by faculty and EHS teachers. Tiered supports included: a) *Universal supports* to promote candidates' learning of adult-child interaction and the facilitation of learning, language, and development (e.g., on-site seminar and infant/toddler classroom-based learning experiences, explicit feedback on formal and informal activity plans, peer and instructor feedback on shared videos of teaching, daily verbal feedback on classroom observations, weekly written progress summaries); b) *Targeted supports* for candidates who required additional input to make adequate progress (e.g., additional explicit feedback and individual recommendations, faculty/teacher modeling, targeted viewing of candidates' own and peer videos); and c) *Intensive supports* for candidates who continued to make minimal progress despite universal and targeted supports (e.g., individual improvement plans, conferencing, and more frequent/intensive modeling/support). There is no research to date on the development or implementation of tiered supports for early childhood teacher candidates.

As a result, this study aims to examine the effects of the TLLSC model and supports and specifically address the research-to-practice gap in early childhood teacher education, toward the essential goal of preparing high-quality teachers, which is the most critical concern of this field. To date, no studies of entirely field-based early childhood teacher education models have been conducted; therefore, the present study focuses specifically on teacher candidate outcomes. The primary research questions examined here include:

1) Is this field-based 0-3 teacher education sequence associated with significant changes in teacher candidates' developmentally appropriate teaching practices?

2) What responses to intervention are evident as a result of the provision of individualized, tiered supports for teacher candidates?

3. Methods

3.1. Participants

The participants in this sequence included 13 undergraduate teacher candidates (84% Caucasian, 8% Asian, 8% American Indian) in the spring semester of either their sophomore (N=9) or junior year (N=4); both groups had taken prior coursework on learning and developmental theory, and both groups had participated in prior field-based sequences focused on addressing the needs of diverse learners. Neither group had any prior experience in an infant/toddler setting; they participated in this sequence together due to the timing of the first implementation year of TLLSC. For both groups of candidates, this sequence served as their initiation into the field-based early childhood preparation program.

3.2. Setting

This module took place in a NAEYC-accredited, not-for-profit agency in the city of Chicago, Illinois providing Early Head Start (EHS) services to families considered low income. At the time of the current study, the program served approximately 80% African American children for whom English is their first language; 15% children from Cantonese speaking Chinese families; and a small number of children whose families speak Spanish or a variety of African languages. This community-based agency offers a variety of child and family supports within an inclusive and family-centered program model. The collaboration with EHS was initiated because of its commitment to both inclusive education and to the importance of responding to each child's individual characteristics, strengths, and

needs; in this sense, EHS program principles and practices (U.S. Department of Health and Human Services, 2014) are aligned extensively with the principles of blended practice and with DEC's Recommended Practices [15].

3.3. Study Personnel

3.3.1. Faculty Description

The module was co-led by one full-time ECSE faculty member and one part-time clinical instructor, who shared responsibility for instruction and evaluation activities as well as communication with candidates and collaboration with EHS staff. A team teaching model was employed for all seminars and instructional activities, where the faculty members shared responsibility for planning and delivery of content, as well as all candidate supervision and evaluation activities.

3.3.2. Teacher Demographics

This study rested upon EHS teachers' knowledge, skills, and experiences with DAP for infants and toddlers; EHS administrators had previously worked with university faculty during the TLLSC design process. The EHS program manager kept teachers informed about the transition into a field-based approach from what was a more traditional placement model used in the years prior to this study. Loyola University Chicago faculty and EHS administrators met with 12 EHS teachers prior to their hosting the module to share ideas and develop a plan for supervision/co-mentorship of teacher candidates. This time was spent discussing the differences between a clinical placement (in which candidates observe, support teachers, and possibly enlist their help in completing assignments) and apprenticeship within TLLSC modules (in which the teachers' plan and teach while mentoring and evaluating candidates as they learn these practices alongside them). Teachers agreed to support candidates and provide consistent feedback on their interactions with children, as well as to model DAP. They also agreed to provide informal formative assessment of candidates during the module and to identify professional development needs that arose during the module. The participating group of teachers was 58% African American, 17% Asian, 17% Latina, and 8% Caucasian. Each infant/toddler classroom was led by a pair of EHS teachers, with a combination of Associate and Bachelor level degrees in early childhood education or child development. The module was continuously supported by the EHS center program manager, who not only provided input into the TLLSC design process, but also facilitated faculty's collaboration with teachers, managed the documentation process required for faculty and candidates to work directly with children in EHS classrooms, and led candidate orientation activities. Finally, the EHS center's teacher leader supported the module by facilitating communication with teachers and leading a seminar presentation that introduced candidates to the curriculum used at the center.

3.4. Structure of the Infant-Toddler Practice Module

The birth-to-three (B-3) sequence lasted a total of 15 weeks and consisted of three modules. Following an introductory module (Module 1) consisting of three weeks of seminar sessions and visits to diverse B-3 and preschool programs, pairs of sophomore and junior-level teacher candidates then spent a total of 60 hours each in EHS classrooms (total candidate n=13) under the direct supervision of one full-time and one part-time faculty member (Module 2, the focus of the current study). Paired placements are associated with a range of positive benefits, including a more positive and more supportive environment marked by enhanced opportunities for peer modeling and scaffolding [50], and opportunities to develop higher-level collaborative problem-solving both within and outside of the classroom [4,5,50]. Module 2 took place over three mornings per week for between four and five hours per visit. Visits began and ended with brief seminar sessions, and candidates spent the majority of their visits in their classrooms. After the conclusion of Module 2, the candidates transitioned into a third module (Module 3), which focused on early intervention for infants and toddlers with special needs and their families for the remaining weeks of the semester. The sequence of activities for Module 2 (in which the present study tool place) are presented in Table 2.

Table 2. Outline of birth to three semester experiences

Semester Week	Activities
4	• Orientation to EHS site with center administrators, introduction to classroom teacher mentors • Paired classroom placements begin • Teachers explain, model, mentor, and supervise adult-child interaction • Candidates develop first activity plans and submit for feedback for implementation in Week 5 • Faculty each begin daily classroom visits • Pre-assessment using the CLASS
5	• Candidates begin leading one routine per day (e.g., hand washing, snack) under teacher supervision • Candidates begin leading planned activities • Daily instructor visits and feedback continue • Ongoing CLASS assessment; weekly feedback • Candidates upload first classroom video and provide peer feedback in groups of three
6-8	• Candidates continue to lead classroom activities/routines with teacher support • Daily faculty visits/feedback continue; targeted and/or intensive supports implemented as needed • Ongoing CLASS assessment with weekly feedback • Candidates upload weekly classroom videos and provide peer feedback
9	• Candidates lead and video record final activities/routines • Exit EHS site • Candidates upload final video compilation demonstrating individual growth on CLASS domains

While the Module 2 universal curriculum will be described in the next section, candidates' development as teachers was facilitated via three primary mechanisms. First, EHS teachers modeled developmentally appropriate practices through their teaching with consultative support from university faculty; candidates observed and assisted in EHS classrooms but were encouraged to interact with infants and toddlers with immediate and consistent feedback from classroom teachers. Second, faculty provided verbal feedback on a daily basis (during/after classroom visits), and formal narrative and quantitative feedback on a weekly basis for a total of six weeks. Third, candidates began to develop and implement brief activity plans (modeled and supported during seminar sessions) in week 2. Planned activities included supervision of a classroom routine or exploratory center activities, and

activity plans included examples of adult verbalizations and behaviors used to introduce and support activities so that faculty could provide feedback prior to implementation. Activities were video recorded and faculty and peer evaluation were provided.

3.4.1. Tiered Support Structures for Teacher Candidates

In this section, we depict how a multi-tiered system of supports (universal, targeted, and intensive) for candidates, developed and implemented by faculty and teachers, was used to develop candidates' skills; tiered supports from Module 2 are depicted in Figure 1. Efforts were made to ensure that each tier of this model provided robust supports enabling candidates to begin using/increasing skills in adult-child interaction and the facilitation of learning, language, and development immediately upon entering the classroom [29].

3.4.2. Universal Curriculum and Supports

The universal curriculum for candidates consisted of module readings, assignments, and whole group learning experiences at the beginning and end of each session. Candidates completed background readings on DAP, adult-child interaction, planning activities for infants and toddlers, and additional readings selected to familiarize them with the curriculum used in the EHS program, as well as relevant standards and resources. They participated in daily seminars which contained extension assignments to be completed while working in the classroom. Key areas of knowledge and skills addressed during this module included:

- designing and assessing safe, nurturing environments for infants and toddlers
- observation as a formal and authentic assessment of child development
- intentional adult-child teaching interactions
- infant/toddler curriculum
- facilitating semi-structured learning activities
- building self-awareness and resilience as a teacher
- supporting the language development of diverse children
- communicating and collaborating with families.

All candidates were visited by faculty on a daily basis and rated weekly using the Classroom Assessment Scoring System [CLASS] [32]. The CLASS provides systematic data on candidates as they learn to facilitate both social-emotional and cognitive/language development using specific, observable, developmentally appropriate practices and will be discussed in detail in the following section. The CLASS has been used extensively in Head Start research; findings from a sample of approximately 3,000 Head Start preschool classrooms suggest that higher teacher CLASS ratings are associated with greater child gains in social skills, language, early literacy, and math development [47]. The CLASS has also been recommended as a tool for identifying specific aspects of teacher-child interactions to be addressed in professional development [45]. Candidates received both holistic and targeted feedback during each observation, as well as progress monitoring graphs throughout the module with narrative feedback indicating areas of strength with suggestions for further development. In this sense, the universal module curriculum provided opportunities for individualized support but provided for every candidate within the universal structure. Beginning in week two, candidates developed activity plans in collaboration with the other teacher candidates placed in their classroom. Candidates were then responsible for leading a routine (such as hand washing) or activity (formal or informal, such as a song or exploratory art activity) each day under the direct supervision of classroom teachers, who provided modeling, guidance, and feedback. It was at this point that any needs for additional individualized supports were identified and addressed.

In order to ensure that these planned activities were safe, aligned with classroom practices and both culturally and developmentally appropriate, candidates developed activity plans that emphasized co-teaching and co-facilitation and were linked to both specific developmental skills and strategies for adult-child interaction from the Illinois Early Learning Guidelines [27]. Implemented activities provided candidates opportunities to teach through daily routines and offer additional engaging exploratory activities for infants and toddlers. The development of activity plans was modeled by faculty, who provided feedback in advance of candidates forwarding ideas to the classroom teachers and later leading these activities. After activities were implemented, candidates viewed and self-assessed, integrating feedback from peers and mentor teachers, then generating ideas for improving their practice based upon their readings, feedback, and observations of each other. Activity plans, reflections, and feedback were continuously shared via an internet site accessible to all members of the group.

The final universal component of the module consisted of video excerpts of classroom activities, filmed by candidates and uploaded to the web based software *VoiceThread* [52], once consent was obtained from families. Candidates were required to view their own and others' videos, providing real-time structured feedback (on a daily basis) focused on identifying both strengths and opportunities to employ more intentional teaching strategies. These videos also allowed each candidate a direct view into the other classrooms (across which environments, teaching styles, and children varied). The videos also served as a tool for faculty to identify candidates' areas of strength or needed improvements, as well as to check the reliability of their classroom observations.

3.4.3. Targeted Supports

For candidates who required additional input to make sufficient progress, targeted supports were developed. Sufficient progress was defined as an increase in scores on the majority of CLASS dimensions in the low (scores or 1 or 2) or mid range (scores of 3 to 5) by week two. Responding to the needs of individual candidates, faculty increased the intensity of universal supports to develop these interventions. Candidates who made no progress (or whose scores dropped) on CLASS dimensions received additional daily targeted feedback from faculty through the CLASS. Direct feedback during classroom observations also provided candidates with in-the-moment encouragement and specific recommendations for improvement. Candidates in need of targeted supports at times found that explanations and discussions of DAP

were not enough for them to embody these practices, so faculty and classroom teachers modeled that practice with infants/toddlers during each classroom visit, allowing candidates to directly observe and discuss ways to support development by identifying opportunities to add narration, quality feedback, and to actively follow and respond to children's bids for attention and communication. Faculty supported candidates' own self-reflection by directing them to view specific portions of their video-recorded activities that highlight opportunities for DAP and to discuss these the following day. Candidates receiving targeted supports were guided in their observations of peer recorded activities as well; they were directed to view specific portions of peer videos that exemplified effective teaching practices that the candidate was struggling to enact. If candidates responded to targeted supports for two consecutive weeks with improved scores in all areas of concern, these additional supports were removed. If candidates made inconsistent progress or maintained an initial score gain from week one of targeted support, these supports were continued through the end of the module.

3.4.4. Intensive Supports

For candidates who failed to improve or maintain CLASS scores after their third or fourth observation, supports were intensified; the decision to increase supports was made upon visual inspection of CLASS progress monitoring graphs, in response to faculty observations in the EHS classrooms, or upon recommendation from classroom teachers. These candidates continued to receive targeted supports, which were expanded and enhanced with additional strategies (e.g., extended observations with additional modeling and support). Intensive supports included individual meetings with faculty to assist candidates by discussing their classroom experiences and providing insight into their perceived strengths and areas of need, as well as generating strategies that would increase candidates' effectiveness in the classroom. The outcome of each meeting was an individual improvement plan including specific goals (and strategies to achieve the goals). Individual plans were monitored by faculty, EHS teachers, and candidates and were adapted as needed in response to the candidate's growth or continued struggles.

3.5. Measure

As stated previously, the Classroom Assessment Scoring System [CLASS] - Toddler Edition [32] was used to monitor candidate performance, including responses to intervention. The CLASS provides systematic data on the following dimensions of effective teaching for all candidates [32]:

- Positive Climate (PC)
- Negative Climate (NC)
- Teacher Sensitivity (TS)
- Facilitation of Learning/Development (FLD)
- Language Modeling/Support (LM/S)
- Regard for Child Perspectives (RCP)
- Behavior Guidance (BG)
- Quality of Feedback (QF)

The CLASS dimensions are aligned with NAEYC's [39] principles of DAP, as well as DEC's Recommended Practices [15] regarding adult-child interaction and support for social-emotional competence. Feedback using

the CLASS takes the form of a numerical rating for each dimension (on Likert-type scale ranging from 1 to 7). In the present study, the CLASS was used both to provide feedback and to monitor candidate progress through line graphs displaying growth.

The CLASS has been used previously by LaParo and colleagues to evaluate early childhood teacher candidate progress during clinical hours and student teaching with preschoolers [32]. Candidates underwent a video review process, as well as receiving support from their peers and professors in identifying their successes and challenges in using evidence-based practices. However, this example of intense reflection took place in the final stages of teacher education with university faculty working on campus while candidates completed clinical hours independently; in this case, the CLASS data were used as a summative evaluation. In the present study, the CLASS was used to provide consistent formative assessment data and feedback for candidates in the beginning years of their ECSE teacher preparation.

Initial observations using the CLASS were conducted with all candidates in order to establish inter-rater reliability between faculty observers, expressed as the proportion of identical ratings to total ratings across all CLASS dimensions for 13 observations. Inter-rater reliability exceeded .90 for all CLASS dimensions; nevertheless, candidates were observed on every subsequent occasion by both faculty members, who met to discuss ratings after each classroom visit and resolved any differences in ratings by reviewing the CLASS dimension summaries in order to select the most precise rating. Candidates were observed each day for 15-20 minute observation cycles by both faculty members. Observation cycles were scheduled to incorporate structured routines (such as snack, hand washing, clean-up), planned activities, and child-directed play. Paired-sample t-tests were conducted to compare pre-post means across all of the CLASS dimensions.

4. Results

4.1. CLASS Data

Teacher candidates' CLASS scores were analyzed to determine the amount of change from beginning to end of the field-based B-3 module. Table 1 presents descriptive data (means, standard deviations, and ranges) for candidates' teaching at pre and post assessment, as well as the results of analysis of change in pre-post mean scores on the eight CLASS dimensions.

At pretest, candidates scored highest in the area of Negative Climate (M = 5.85, SD = 1.21; this scale was reversed, so higher scores indicate fewer observed instances of negative interaction with toddlers). They scored in the middle range (LaParo et al., 2012) in the areas of Positive Climate (M = 4.13, SD = 1.02), Teacher Sensitivity (M = 4.23, SD = 0.93), Regard for Child Perspectives (M = 4.36, SD = 1.36), and Behavior Guidance (M = 4.20, SD = 1.14). Candidates scored lowest in the highly interrelated areas of Facilitating Learning and Development (M = 3.85, SD = 1.07), Quality of Feedback (M = 3.27, SD = 1.19), and Language Support (M = 3.23, SD = 1.36). No significant differences

were found in pretest scores between sophomore and junior candidates on any CLASS dimensions.

Table 3. Teacher Candidate Pre and Post CLASS Scores (N=13)

CLASS Dimension	Mean score at pretest (SD)	Pre range	Mean score at posttest (SD)	Post range	t (p)
Positive Climate	4.13 (1.02)	2-5	6.69 (0.48)	5-7	10.41 (.000)*
Negative Climate	5.85 (1.21)	4-7	6.92 (0.28)	6-7	3.09 (.009)
Teacher Sensitivity	4.23 (0.93)	3-5	6.38 (0.77)	5-7	7.87 (.000)*
Regard for child perspectives	4.36 (1.36)	3-6	6.36 (0.67)	5-7	6.06 (.000)*
Behavioral Guidance	4.20 (1.14)	3-6	6.20 (0.79)	5-7	5.07 (.001)
Facilitating Learning and Development	3.85 (1.07)	2-6	5.69 (0.75)	5-7	8.31 (.000)*
Quality of Feedback	3.27 (1.19)	2-5	5.91 (0.70)	5-7	9.46 (.000)*
Language Support	3.23 (1.36)	2-6	6.08 (0.64)	5-7	9.61 (.000)*

*p < .001.

Significant increases were evident in nearly all CLASS dimension mean scores by the end of the module; the dimensions in which candidates exhibited the greatest mean growth were Positive Climate, Quality of Feedback, and Language Modeling. An increase was evident in Behavior Guidance, but this change was not significant at the same level as the other differences. Finally, candidates did not exhibit significant growth in the area of Negative Climate; however, their mean scores at pre-test were already in the high moderate range, increasing from a mean of 5.85 to 6.92 at post-test on this 7-point scale. Given that this is dimension in which early childhood teacher candidates have performed less well at post-test in previous research on extended inclusive early childhood field placements [33], this finding indicates that gains in the skills associated with Negative Climate are possible with teacher candidates at a higher initial skill level working with infants and toddlers over a relatively brief time span (as compared to semester-long traditional field placements). At posttest, scores for these teacher candidates on the CLASS Toddler rating scale dimensions of Facilitating Learning and Development, Quality of Feedback, and Language Support ranged from 5.69 to 6.08.

4.2. Response to Intervention and Tiered Supports

Three cases are presented in the following sections in order to illustrate examples of teacher candidates' responses to universal, targeted, and intensive supports.

Single case CLASS progress monitoring graphs are accompanied by complete data and a description of the supports and interventions applied in each case.

4.2.1. Universal Curriculum and Supports

Figure 2 displays an example of a progress monitoring graph for Candidate A, who (along with six other candidates) received only universal supports from the beginning to the end of the module. Score increases were noted in all areas between pretest and Time 1 with the exception of Behavior Guidance and Regard for Child Perspectives. While individual feedback was focused on these areas, no additional support was provided, and all scores had increased by Time 2. Along with the other candidates receiving universal supports, Candidate A maintained her progress in all areas, scoring in the moderately high to high range on all CLASS dimensions by posttest.
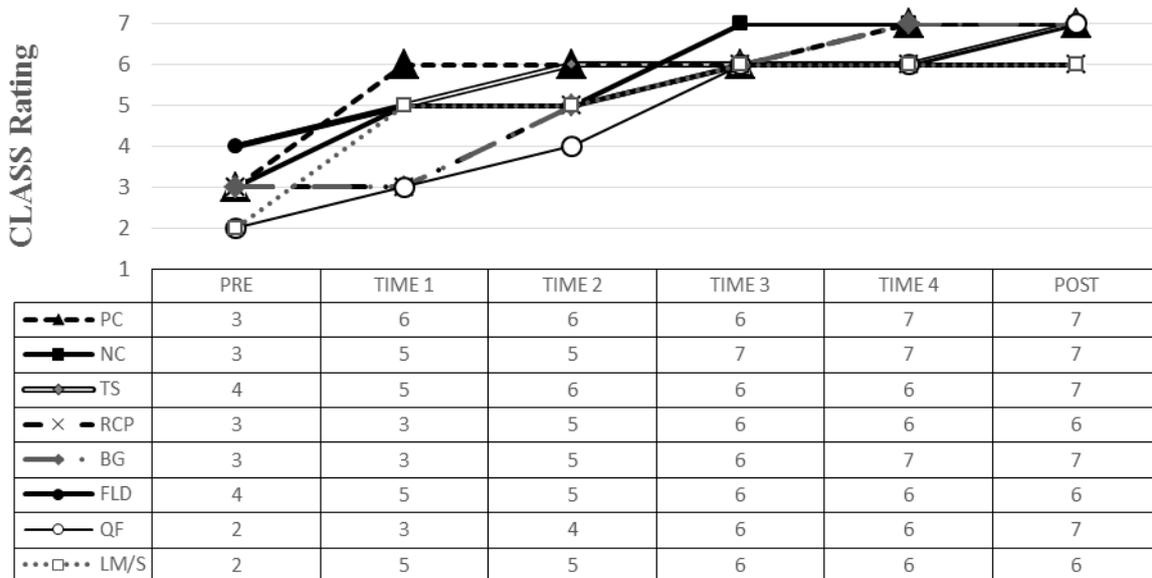

	PRE	TIME 1	TIME 2	TIME 3	TIME 4	POST
PC	3	6	6	6	7	7
NC	3	5	5	7	7	7
TS	4	5	6	6	6	7
RCP	3	3	5	6	6	6
BG	3	3	5	6	7	7
FLD	4	5	5	6	6	6
QF	2	3	4	6	6	7
LM/S	2	5	5	6	6	6

Figure 2. Progress monitoring graph for Teacher Candidate A with universal supports

4.2.2. Targeted Supports

Figure 3 presents the CLASS progress monitoring data for Candidate B who (along with two other candidates) received targeted supports in order to address a failure to demonstrate progress from pretest to Time 1. By the second week of the module, improvement was noted on only one CLASS dimension (Quality of Feedback). While B scored in the moderately high range on Negative Climate at pretest, this score had decreased by Time 1. She received low ratings on all other dimensions and did not show improvement after the first week. Faculty met

with B to discuss observations in the classroom, review the CLASS data, and identify opportunities to enact practices. Supports were then immediately put in place to address B's facilitation of learning and development, support for toddlers' communication, and behavioral guidance for both individuals and groups. These supports took three forms: first, an additional observation was done each day with explicit immediate feedback on B's interactions with toddlers and specific recommendations for improvement. These included increasing responses to children's bids for attention and the use of narration during facilitated play, providing specific positive feedback, and reducing corrective statements. Next, faculty modeled these behaviors in the classroom with B, answering questions and providing support by identifying opportunities to use these skills. Finally, faculty met with the teachers in B's classroom and identified the specific behaviors they should encourage, model, and reinforce. Teachers followed up by providing more direct assistance to B during classroom visits.
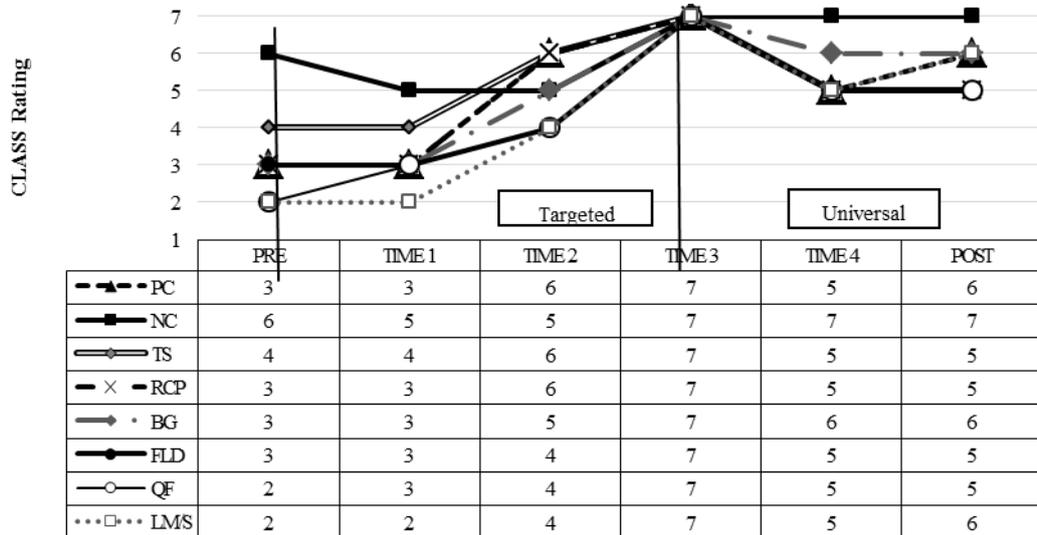

	PRE	TIME 1	TIME 2	TIME 3	TIME 4	POST
PC	3	3	6	7	5	6
NC	6	5	5	7	7	7
TS	4	4	6	7	5	5
RCP	3	3	6	7	5	5
BG	3	3	5	7	6	6
FLD	3	3	4	7	5	5
QF	2	3	4	7	5	5
LM/S	2	2	4	7	5	6

Figure 3. Progress monitoring graph for Teacher Candidate B with targeted supports

As illustrated in Figure 3, after making progress only in the Quality Feedback domain between weeks one and two, B began to make progress in every CLASS domain once targeted supports were implemented. An additional observation was completed by the teacher in B's classroom after targeted supports were implemented. By Time 3, B had received high scores in every CLASS domain. At this point, targeted supports were discontinued, after which B's scores dropped slightly; nevertheless, she maintained scores in the moderate to high range in all CLASS dimensions for the remainder of the module with universal supports.
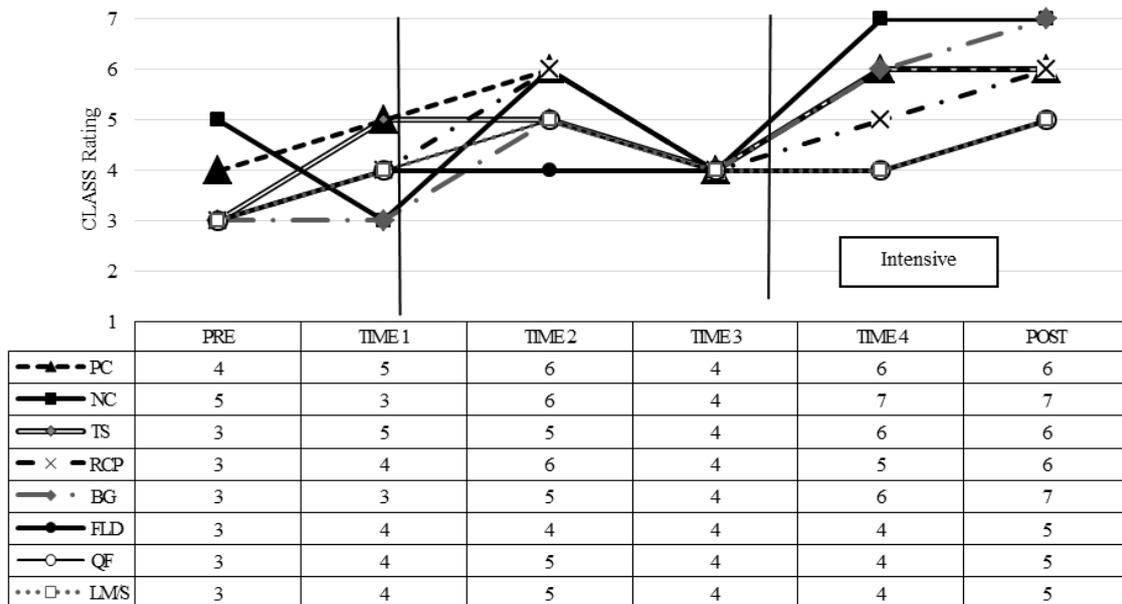

	PRE	TIME 1	TIME 2	TIME 3	TIME 4	POST
PC	4	5	6	4	6	6
NC	5	3	6	4	7	7
TS	3	5	5	4	6	6
RCP	3	4	6	4	5	6
BG	3	3	5	4	6	7
FLD	3	4	4	4	4	5
QF	3	4	5	4	4	5
LM/S	3	4	5	4	4	5

Figure 4. Progress monitoring graph for Teacher Candidate C with intensive supports

4.2.3. Intensive Supports

Two teacher candidates who received targeted supports beginning in week two failed to respond by making sufficient progress. In both cases, some progress was noted following the implementation of these supports but, by Time 3 this pattern of progress was either inconsistent or had reversed. Figure 4 displays the CLASS progress monitoring data for Candidate C, who received targeted support similar to that provided to Candidate B beginning

at Time 1, and initially made progress in most CLASS dimensions. By Time 3, however, nearly all of these scores had decreased. At this point, faculty met again with C to discuss her classroom experiences and develop a plan for improvement. This plan included measurable goals for C to achieve during the module developed by both faculty, and C was also directed to view selected video excerpts from classmates' activity videos; she then discussed observed interaction strategies with faculty to identify specific examples of target behaviors and opportunities to apply these to her own teaching. C was provided with additional supervision in the classroom with modeling and coaching of adult-child interaction. Finally, faculty reviewed C's activity plans and worked directly with her to embed target behaviors (e.g., developmentally appropriate language) into each component of the plan so that they could be carried out successfully in the classroom.

As illustrated in Figure 4, C's progress in response to intensive supports is evident in her CLASS scores. The areas in which C scored lowest at posttest included Facilitation of Learning and Development and Language Modeling/Support. C also made less progress in the area of Quality of Feedback; however, it should be noted that all of C's scores in these areas were in the mid range. C scored in the moderately high to high range in all other areas, which represented a return to a pattern of overall progress and successful achievement of the module objective for improved developmentally appropriate adult-child interaction.

5. Discussion

The results of this study suggest that undergraduate early childhood teacher candidates in a field-based teacher education program can attain moderate-to-high levels of positive, developmentally appropriate interaction with infants and toddlers when provided daily on-site mentorship, direct supervision from classroom teachers, and a tiered system including a variety of faculty supports and approaches to supervision. The promising results here indicate that, given prior (also intensively supervised) field-based learning delivered earlier in their preparation, candidates can make significant gains in critical behaviors related to intentional teaching. For example, CLASS dimensions such as Facilitation of Learning and Development and Language Modeling/Support have been cited previously as the most challenging for early childhood students to enact [33] in field placements. While some candidates in the present study required intensive supports throughout their field-based module, all of these candidates responded to this preparation model with significant growth in these areas.

While national norms are not available for Early Head Start teachers in infant-toddler classrooms, candidates' pretest scores fell below the national average for pre-kindergarten Head Start teachers on equivalent/related CLASS dimensions for that age group, according to a 2013 review of 359 Head Start grantees by the Office of Head Start [47], with the exception of Quality of Feedback, Support for Language Development, and Facilitating Learning and Development (if the preschool Concept Development dimension is considered). These dimensions do not provide a direct comparison; they are only referenced here to suggest that the participating candidates entered this field-based module with a strong foundation of key developmentally appropriate teaching skills that are prioritized by early childhood education programs. By posttest, candidate averages exceeded those of pre-K Head Start teachers in Facilitation of Learning and Development, Quality of Feedback, and Language Modeling, with national averages ranging from 2.42 to 3.02 [47].

These results are not meant to suggest that novice undergraduates can become effective infant-toddler educators after six weeks in the field; in fact, the results of this study suggest quite the opposite – that mastering the fundamental skills of educating the youngest children through field-based preparation programs requires extensive collaboration between university and community-based programs at every stage of the planning and delivery of preparation activities, including the commitment of considerable faculty resources and the support of classroom teachers. Furthermore, Module 2 required a significant time commitment and intensely focused work on the part of teacher candidates. However, given this infrastructure, candidates' developmentally appropriate adult-child interaction (including Facilitation of Learning and Development and Language Support) reached moderate to high levels. The implications of this finding for candidates' performance in their subsequent Sequence 5 (which focuses on preschool) are currently under study.

The benefits of the birth-to-three module cannot be completely isolated from the benefits of the candidates' prior field-based modules and sequences. While none of the participants had worked with infants and toddlers prior to the module, they participated in field-based modules that focused on the needs of children pre-K through grade 12 within the contexts of families and communities. These experiences may provide a partial explanation for some of the dramatic progress candidates made in dimensions of the CLASS that, as evidenced by extant research, are the most challenging to learn or maintain through the professional experience or traditional field and student teaching placements, and which experienced early childhood educators still struggle to develop in practice. One of the most encouraging factors to consider is that this study examined sophomores and juniors with hundreds of hours of additional field-based modules ahead of them in which they continue to develop and deepen instructional and collaborative competencies that address to the needs of diverse young children and their families. Future phases of this research will examine maintenance of these skills (as well as other outcomes) as current and future cohorts continue to advance through the TLLSC continuum and into the field.

The development and implementation of TLLSC provided an opportunity to develop deeper relationships with EHS teachers and to lay the groundwork for a mutually beneficial relationship between university and center. Rather than a traditional model in which teachers allow candidates to help out in the classroom, slowly transitioning them into a teaching role by the end of their placement, teachers in this model supported the work of candidates in intentional adult-child interactions with the constant support of faculty both within and outside of the classroom. This enabled candidates to begin facilitating

activities and taking on greater responsibility soon after entering the classroom when deemed by each classroom teacher to be appropriate, safe, and beneficial to children. EHS teachers were introduced to the foundational principles of tiered models, thus laying groundwork for more direct examination of their understanding and applications of tiered supports to infants and toddlers, a research area in great need of expansion that also holds potential for expanding the range of supports and services available to families served by EHS [16].

The initial and continuing aim of TLLSC is to share the mission and expectations of effective early childhood educators: supporting and serving diverse families and providing high-quality, developmentally appropriate learning environments. To realize this aim, preparation experiences such as Module 2 are constructed atop four programmatic cornerstones: (a) partnerships with schools and community organizations, (b) teacher preparation within/for diverse classrooms, (c) field-based experiences that follow a developmental trajectory (both for candidates and with respect to the populations with whom they work and learn), and (d) stakeholders who are fully engaged in mutual beneficial communities of practice. These cornerstones represent potentially the most impactful replicable components of TLLSC and of the present study, which depicts the first semester of TLLSC as a field-based model for teacher preparation. Ongoing research will focus on the effectiveness of this program to (a) prepare ECSE candidates to serve diverse children and families in schools and communities, (b) address the needs of young children and families, and (c) sustain successful, mutually beneficial partnerships between schools, communities, and universities.

5.1. Limitations

This study occurred within a small early childhood teacher education program at an urban Jesuit Catholic university. Because of the small sample size, the results of this study may not be generalizable to the greater audience of teacher educators and community leaders in varying settings. However, the results are promising and may hold implications for other interested in models of field-based teacher preparation and use of tiered supports with teacher candidates. Additionally, an experimental design inclusive of a control group may have increased the validity of the tiered model as directly impacting candidates' improvement on the CLASS dimensions. Such a design was not suitable for the collaborative nature of this experience, which aimed to serve the needs of the EHS partners, children, and families, as well as developing the skills of all enrolled candidates in TLLSC. However, the seven candidates who succeeded with the universal supports and curriculum demonstrate that a robust curriculum was necessary for progress to be evident. The intensity of targeted and intensive supports required for the other candidates to develop their teaching skills reinforces the idea that field-based preparation is qualitatively different from simply increasing the number of hours preservice teachers spend in the field. None of these candidates would have made substantial progress during their classroom experiences without such supports.

Collaboration with families is a central aspect of teaching practice that proved difficult to address given the structure of Module 2; while caregivers grew familiar with the candidates, their interactions were limited. The module provided all candidates with opportunities to meet caregivers and converse informally about children's experiences during the day, and skills for working with families were addressed by faculty and EHS staff during seminar activities. However, the opportunities to apply and develop these skills in the field are primarily available in later modules in the continuum. For example, following the birth-to-three sequence described in this study, candidates moved into a sequence focused on early intervention with infants and toddlers with special needs, in which they worked closely with families to an extent that was not possible given the structure of Module 2. As a result, this study focuses specifically on developmentally appropriate interactions with children and largely ignores the meaningful involvement of families in infant-toddler programming, a critical component of developmentally appropriate practice.

A final area for future research is the examination of the roles of EI professionals in field-based early childhood teacher education, preparing candidates who are competent in blended practices as well as working with families to support infant/toddler development. Candidates in the TLLSC ECSE program are eligible to apply for an initial early intervention (EI) teaching credential in upon graduation; Module 2 serves as one component of candidates' EI preparation (addressing assessment skills and knowledge of development), which currently takes place at the university and in other field-based modules. EI professionals serving infants and toddlers with disabilities should be included in the team of professionals (university faculty, EHS teacher, families) preparing candidates for their work as ECSE teachers and DTs. Not only would this streamline the experience for candidates, but it would increase the attention to and inclusion of children receiving EI services.

6. Conclusion

Including multiple stakeholders as leaders in teacher preparation will better prepare candidates for the complexity of early childhood teaching and contribute to efforts to bridge the gaps between university, school, and home settings. This transdisciplinary model has the potential to become a source of professional development for EHS, EI, and family partners, upholding a mutually beneficial relationship. This study examined teacher candidate outcomes, while future work is examining the experiences of other stakeholders; specifically, how the partnership benefits their professional practice and the children they serve. Moving forward, partners in this model will identify areas of need within their own practices that may be supported by university resources (workshops, courses, technologies, etc.) to ensure that future iterations of Module 2 benefit all stakeholders.

Continued investigation may assist in developing a clearer understanding of the array of structural and instructional variables that lead to significant long-term learning in teacher candidates, as well as ways in which community and university resources (as well as curriculum and coaching) can be used to develop effective and fully-credentialed early childhood educators. Field-

based partnership models hold great potential for building the knowledge, skills, and structures of effective EC teaching. However, such models must be designed alongside community partners and respond to their needs. While evidence is strong that children's early experiences in infant and toddler classrooms impact their school success in future years [43], infant-toddler teachers often have less preparation and fewer teaching credentials than other early childhood educators (and certainly fewer than K-12 educators). The challenge of maintaining and supporting a highly qualified workforce is an issue that faces not only infant-toddler programs but infant-toddler teacher educators considering field-based approaches as well; as a result, field-based infant-toddler teacher education must be part of a model in which community partners (such as EHS programs) benefit from the same model that prepares teachers through faculty support and professional development.

Acknowledgements

Abbreviations Used

CLASS: Classroom Assessment Scoring System
DAP: developmentally appropriate practice
DEC: Division for Early Childhood of the Council for Exceptional Children
DT: Developmental Therapist
ECSE: early childhood special education
EHS: Early Head Start
EI: Early Intervention
MTSS: Multi-tiered systems of support
NAEYC: National Association for the Education of Young Children
RTI: Response to intervention
TLLSC: Teaching, Learning, and Leading with Schools and Communities.

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