

# *Nurturing Responsive Connections* (CFDA#84.411C)

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## A. Significance

**A1. Alignment with Competitive Program Requirements.** The Osborn School District (OSD), in partnership with the Arizona Teacher Residency (AZTR) of Northern Arizona University (NAU) and the independent evaluator American Institutes for Research (AIR), proposes *Nurturing Responsive Connections: Recruiting, Preparing, Supporting, and Retaining Diverse Teachers to Meaningfully Connect with and Serve High Needs Students* for the Early-Phase Education Innovation and Research competition. This project has three goals that directly align with the competitive program requirements: 1) to **recruit diverse educators from traditionally underrepresented backgrounds and/or the communities they serve (AP 5, CP 2)**, 2) to thoroughly **prepare and certify effective educators** in culturally responsive teaching to **adequately serve high-needs students in hard to staff schools (AP 5)**, and 3) to **retain** fully-certified, experienced, and effective educators in high-needs schools through **early career support, mentoring, financial incentives, and additional leadership roles and responsibilities in the district (AP 5, CP 2)**. The fourth project goal relates to the evaluation of the project and to the **dissemination of results** to expand knowledge around effective residency structures to advance the education of **high-needs and underserved learners**.

Located in the heart of Phoenix, Arizona, OSD is a public school system serving more than 2,800 learners in grades preK-8. **Eighty-eight percent of learners in OSD identify as people of color** (Hispanic, black, Indigenous, Asian/Pacific Islander, or multiple races), **77% of learners come from low-income families, and 13.9% are English Learners**. OSD will serve as the primary applicant on this grant and will partner with NAU, through the NAU Foundation. NAU is a public university and a Hispanic serving institution, fulfilling **Competitive Preference Priority 1 (Promoting Equity: Implementers and Partners)**. *Nurturing Responsive*

*Connections* meets **Absolute Priorities 1 (Demonstrates a Rationale) and Absolute Priority 5 (Promoting Equity: Educator Recruitment and Retention)** through a research-based, field-initiated teacher residency program that offers **promising new structures and systems that build upon existing residency models**. This project also meets **Competitive Preference Priority 2 (Supporting a Diverse Educator Workforce)** by creating a research-based partnership between a university and a school district with a significant proportion of **high needs students** to thoroughly prepare, support, and retain diverse and effective new teachers, while also training and financially compensating the Supervising Teachers (STs) who mentor residents.

**A2. Program Significance: The Problem & Rationale.** Teacher *recruitment, preparation, and retention* affect student engagement and achievement on a national scale. Title-I schools, especially those predominantly serving students of color, disproportionately employ less-experienced teachers and face higher teacher attrition (Carver-Thomas & Darling-Hammond, 2017). The COVID pandemic exacerbated these issues, further burdening our **high-needs students** with learning disruptions, social isolation, and personal loss (Garcia & Weiss, 2020; Meckler & Natason, 2020; Dorn, Hancock, Sarakatsannis et al., 2020). In order to recover from these profound losses, students need **qualified, experienced, and diverse** teachers who can understand, connect with, engage, and challenge them. They also need teachers who will remain in the profession and in their schools over time.

The germination for this project began with the examination of the crushing teacher shortage in the state of Arizona, where urban and rural public schools primarily serve **high-needs and underserved students**. This project defines “**high needs students**” as students who come from lower income backgrounds as indicated by their eligibility for Free and Reduced-Price lunch (FRL), English Language Learners (ELLs), those with disabilities, and/or students of

color who have traditionally been underserved. This project also addresses the **educational equity and adequacy in resources related to Arizona's teacher shortage for underserved students**. The definition for underserved students used in this project aligns with the description put forth in the federal registrar for this competition (focusing specifically on subgroups a, b, c, d, e).

A significant number of classrooms in **high-poverty districts** in Arizona are either filled by an unqualified teacher or sit vacant. A statewide survey of 194 districts and charter schools revealed that halfway through the 2022-2023 school year there were still 2890 vacant teaching positions, and 5036 classrooms were filled with teachers who do not meet Arizona Department of Education standard requirements (Arizona School Personnel Administrators Association Human Resources Professionals in Arizona Schools, 2023). Arizona has the highest rates of teacher turnover and attrition in the nation, with 24% of all teachers leaving their schools and 19% leaving the profession each year (Stewart, Rotherham-Fuller & Liou, 2021). Without thorough pre-service preparation, teachers are 2.5 times more likely to leave teaching in their first year than well-prepared teachers (Podolsky et al., 2016). Because teacher turnover can have “marked, lasting and negative consequences” for students (Sorensen & Ladd, 2020), and turnover disproportionately impacts Title-I schools, especially those serving predominantly students of color (Carver-Thomas & Darling-Hammond, 2017), Arizona’s teacher retention crisis further marginalizes our most **vulnerable, high-needs, and underserved students**.

Teacher residencies have been hailed as a higher quality solution to the national teacher shortage. Research indicates these programs effectively recruit more teachers of color (Levay & Scheib, 2020), advance teacher retention above other preparation models (Guha, Hyler, & Darling-Hammond, 2016), and improve student outcomes, including academic performance in

the residency year and over time (Bohra-Mishra, Casciano & Puma, 2019; Papay, West, Fullerton & Kane, 2012; Yan & Koedel, 2021). Residency programs improve outcomes for students through a required yearlong clinical apprenticeships with students in **high-poverty and hard to staff schools**, coupled with the coursework that aligns with teaching high-needs learners. Given this extensive fieldwork and aligned coursework, teacher residency programs are also well-positioned to prepare teachers in culturally responsive teaching, including the formation of responsive relationships with students. However, there is limited research on how such programs effectively prepare teachers to build and sustain culturally responsive relationships - specifically with **high-needs and underserved** students (Theisen-Homer, 2020). *Nurturing Responsive Connections* proposes a **field-initiated, innovative solution** to this gap in research through the construction of a responsive and relational residency program that directly aims to align university teacher preparation with district and community needs.

**A3. Arizona Teacher Residency: A Potential Solution.** A feasibility study demonstrated both the need for, and potential of, a relationship-based teacher residency in Arizona (Theisen-Homer, 2021). The Arizona Department of Education provided the initial funding for the creation of the Arizona Teacher Residency (AZTR) by leveraging Elementary & Secondary School Emergency Relief (ESSER) SEA set-aside funds as a strategy to address the impact of the pandemic. AZTR launched in the fall of 2021, and intentionally recruits, prepares, and supports educators from **diverse and underrepresented backgrounds** who want to work with traditionally underserved and learners. AZTR placed its first cohort in their residency in summer 2022 and its second cohort is just starting their residency. OSD has served as an anchor district for AZTR, housing residents from cohorts 1 and 2 and has been instrumental in the creation of systems and structures that increase the transfer of university coursework to the K-8 classroom. AZTR is also

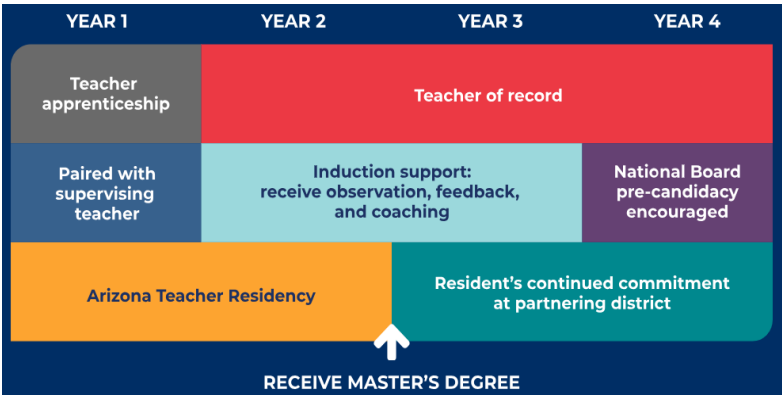
partnered with 4 other local school districts in the Phoenix area that serve large populations of **high-needs learners**. The demographics of cohort 1 & 2, as well as district demographic information, are provided in Appendix J (J-1 & J-7). The *Nurturing Responsive Connections* project is seeking additional funding to continue AZTR’s innovative residency approach, and rigorously study it to inform program improvements, teacher preparation nationally, and the research base on preparing teachers for relationship-based work with **high-needs students** to increase their engagement and achievement.

**A4. A Unique Approach to a Residency Program: Field-Initiated Innovations.** The *Nurturing Responsive Connections* project **advances and extends** existing residency structures for recruitment, preparation, and retention and builds on these with innovative and/or novel approaches to better serve the **high-needs students** in Arizona and specifically in OED:

Residency Structures	AZTR Replications	AZTR Innovations	AZTR Novel Approaches
Culturally responsive recruitment strategies	Community outreach, and social media campaigns	Networking with other educational organizations (e.g. <i>Arizona Alliance for Black School Educators</i> )	Creation of an alumni board of past residents to advise recruitment efforts
Community and district partnerships	Placement of residents in Title-I schools	Recruiting partner district paraprofessionals, aides, and parents as residents	Creation of District Program Coordinator (DPC) position, to observe/ liaise with AZTR
Year-long clinical apprenticeship with an expert	Residents spend 4 days a week with an expert ST in the field	ST application process that assesses their use of culturally responsive practices	Probationary period for resident/ST pairings, ensuring alignment of ST w/AZTR values
Coursework aligned to fieldwork placement	Application of assignments from coursework into fieldwork	Integration of culturally responsive practices into coursework and observation protocols	3 course series on responsive & relational teaching; integration of these tenets into all program coursework; creation of relational High Leverage Practices
Compensation packages for residents/STs	Stipends for STs	Opportunities for residents to become STs after their third-year teaching	Support from the Arizona K12 Center to pursue National Board Certification

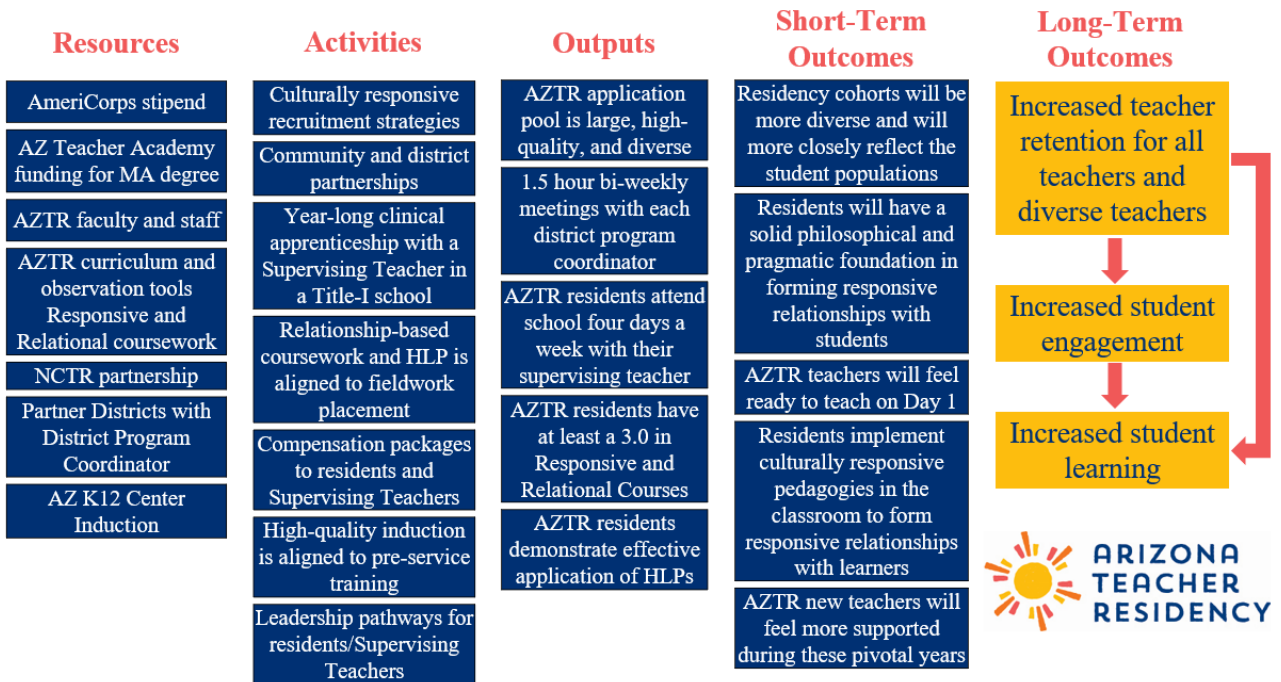
Induction support for new teachers	Induction support provided for new teachers after their residency ends	Partnership with the AZK12 to provide research-based structures and strategies for induction directly aligned to residency coursework	Induction mentors hired by the school district and trained by AZTR and the AZK12 on relational competencies
Leadership pathways for residents/STs	Mentor training for STs	Ongoing professional learning through AZK12 for residents/STs	Support hiring of full-release induction mentor & DPC from districts' teachers

The programmatic scope and sequence of AZTR is designed specifically to address the *recruitment, preparation, and retention* of **diverse teachers to ultimately impact high-needs students**. Residents engage in a year-long clinical apprenticeship, two years of aligned induction, and ongoing professional learning. During the apprenticeship, residents may have the option to receive a living stipend, healthcare, and childcare stipends as needed, and **additional financial and professional support** (see Appendix J-2) to enable them to focus on completing their residency program. The program will seek outside funding to continue offering these additional supports. Residents also qualify for Arizona Teachers Academy (ATA) scholarships, which covers the full cost of tuition for their graduate Education degree. Residents must then commit to teach in a **Title-I school** in OSD or their selected partner school district for at least 4 years (the residency year, plus three years as a teacher of record). Data from the first cohort of residents shows evidence of positive gains in building relationships with students and a strong commitment to their school district and the teaching profession (Appendix J-3: summary of AZTR pilot data). The following figure details the trajectory of the resident experience:



## A. Quality of the Project Design

**B1. Conceptual Framework: A Culturally Responsive & Relational Residency.** AZTR is the first and only teacher residency program in Arizona affiliated with the National Center for Teacher Residencies (NCTR). As such, it meets key requirements of the teacher residency model identified by the Learning Policy Institute (Guha, Hyler, & Darling-Hammond, 2016), including: **strong district/university partnerships**; coursework aligned with clinical practice; full-year residency teaching alongside an expert mentor teacher; the recruitment of high-ability, **diverse candidates to meet specific district hiring needs**; **financial support** for residents in exchange for a three to five year teaching commitment; and ongoing **mentoring and support** for graduates. *Nurturing Responsive Connections* primarily seeks to 1) **replicate** existing research-based residency structures related to the recruitment of diverse educators, 2) **innovate upon existing structures for coursework and fieldwork placements**, and 3) **build a novel package of incentives and supports to aid in teacher retention**. The logic model (included as Appendix G) demonstrates AZTR’s project activities are aligned with these three priorities, and the project’s goals and outcomes:























NAU College of Education	Faculty	The NAU College of Education faculty expertise will be leveraged as guest speakers and instructors in this project.
<b>3. Fieldwork Supervising Team</b>		
DPCs	1 per district	Each partner district employs a District Program Coordinator (DPC) with 10+ years of teaching experience.
<b>4. Recruitment and Operations Team</b>		
Recruitment & Operations Coordinators	██████████ ██████████	██████████, the Operations Coordinator, has a Master’s in Library Sciences, a law degree, and most recently worked for the Arizona School Boards Association. AZTR is currently hiring a new Recruitment Coordinator.
<b>5. Induction and Professional Advancement Team</b>		
AZ K12 Center	██████████ ██████████ / AZK12	██████████ ██████████ Program Directors at the Arizona K12 Center – Coordinate pathways for AZTR residents and graduates to incentivize retention.
<b>6. Independent Evaluation Team: AIR</b>		
AIR	PI, Impact Lead, and Study Lead	██████████, PhD - Principal Investigator and Project Director, and primary point of contact between AIR and OSD.
		██████████, PhD - Evaluation Impact Study Lead.
		██████████, MA - Qualitative Data Analysis and Implementation Study Lead.

## D. Quality of the Management Plan

**D1. Strengths of Organizations & Partnerships.** The project staffing is represented in an organizational chart found in Appendix J-10. Our partners (listed below) have a shared and vested interest in improving the academic engagement and achievement of **high-needs learners** in OSD and Arizona. Each organization listed below has the experience, expertise, personnel, and infrastructure to perform the proposed project work on time and on budget, as evidenced through their longstanding and impeccable reputation as educational institutions in Arizona: Osborn School District, Northern Arizona University (NAU Arizona Teacher Residency (AZTR), Arizona K-12 Center, American Institutes for Research® (AIR®) and 4 partner school districts (Cartwright Elementary, Roosevelt Elementary, Scottsdale Unified, Tempe Elementary school districts).

**D2. Timelines, Milestones, and Responsibilities.** Within 60 days post award, OSD will complete formal agreements with NAU, Arizona K12 Center, and AIR. The plan includes clearly defined responsibilities, timelines, and milestones for accomplishing key project activities and deliverables on time and within budget to meet the goals and objectives outlines in Section B2. The Table below highlights the core activities and milestones for this project. An extended version of all activities is in Appendix J-14. The following are acronyms for responsible personnel: **PD**: AZTR Program Director, **OSD**: Osborn School District, **CT**: Coursework Team, **DPCs**: District Program Coordinators, **RT**: Recruitment & Operations Team, **IT**: AZK12 & Induction Team, and **ET**: AIR Evaluation Team.

<b>Arizona Teacher Residency EIR Early-Phase Application Management Plan</b>					
	<b>Activities Descriptions</b>	<b>Personnel</b>	<b>Start Date</b>	<b>End Date</b>	<b>Ye ars</b>
<b>Goal 1</b>	<b>Goal 1: Recruit teachers from underrepresented groups, especially teachers of color, in multiple districts</b>				
<b>Objective</b>	<b>1.1 Enroll cohorts of residents that are more than 50% individuals from underrepresented and/or underserved backgrounds based on race/ethnicity, color, national origin, gender, age, or disability.</b>				
<b>Measures</b>	<b>Performance Measure 1.1a Self-reported resident demographics</b>				
1.1.1	Targeted community outreach	<i>RT</i>	September	February	1-5
1.1.5	Culturally responsive recruitment & enrollment strategies	<i>RT</i>	October	April	1-5
<b>Objective</b>	<b>1.2 Increase cohort size each year, with the goal of ultimately reaching 40 residents.</b>				
<b>Measure</b>	<b>Performance Measure 1.2a Number of residents in cohort</b>				
1.2.1	Expand outreach to a wider audience through social media, advertising	<i>PD, RT</i>	September	March	1-5
1.2.5	Hold open house meetings for interested candidates	<i>RT, CT, DPCs</i>	September	February	1-5
1.2.8	Invite qualified candidates to participate in Selection Day	<i>PD, RT, CT</i>	March	April	1-5
<b>Objective</b>	<b>1.3 Expand to new partner districts including a pilot in rural areas and areas outside of the Phoenix metro area</b>				
<b>Measure</b>	<b>Performance Measure 1.3a Number and locations of partner districts</b>				
1.3.1	Outreach to new potential district partners and presentations to district leaders on program	<i>PD</i>	September	May	1-4

1.3.4	Districts complete all program requirements (signed MOUs, select school sites, SPCs and begin identifying STs)	<i>PD</i>	November	June	1-4
<b>Goal 2</b>	<b><i>Goal 2: Thoroughly prepare effective teachers in culturally responsive teaching practices, especially relationships</i></b>				
<b>Objective</b>	<b>2.1 Integrate culturally responsive and relational teaching pedagogies into teacher preparation coursework</b>				
<b>Measure</b>	<b>Performance Measure 2.1a Resident grades in responsive and relational teaching course</b>				
2.1.1	Design and teach 3-part Responsive and Relational Teaching course	<i>PD</i>	August	May	1
2.1.4	Integrate culturally responsive and relational teaching into coursework	<i>CT</i>	August	May	1
2.1.7	Score resident assignments and provide residents final grades	<i>PD, CT</i>	September	May	1-5
2.1.9	Create a graduate capstone project on responsive and relational teaching	<i>CT</i>	September	May	1-2
<b>Objective</b>	<b>2.2 Facilitate development of residents' confidence in implementing responsive and relational teaching</b>				
<b>Measure</b>	<b>Performance Measure 2.2a Resident survey responses on culturally responsive teaching construct</b>				
2.2.1	Train DPCs to observe for responsive/relational teaching	<i>PD, CT</i>	June	February	1-4
2.2.2	Hold bi-weekly meetings with DPC's to check in on resident progress	<i>PD, CT, DPCs</i>	August	May	1-4
2.2.5	Survey residents on responsive/relational competency growth	<i>PD, CT, ET</i>	April	May	1-5
2.2.6	Survey STs on resident growth in responsive/relational competency growth	<i>PD, CT, ET</i>	April	May	1-5
<b>Objective</b>	<b>2.3 Select and pair residents with Supervising Teachers who implement culturally responsive teaching</b>				
<b>Measure</b>	<b>Performance Measures 2.1a Supervising Teacher Application &amp; 2.1b AZTR end-of-year ST survey</b>				
2.3.1	Screen STs for culturally responsive teaching	<i>RC, FT</i>	February	May	1-4
2.3.3	Hold 8 mandatory ST forums	<i>PD, CT</i>	June	May	1-5
2.3.6	Generate a pool of qualified and culturally responsive STs	<i>CT, DPC's</i>	June	May	1-4
<b>Goal 3</b>	<b><i>Goal 3: Advance the retention of new and experienced teachers, especially teachers of color</i></b>				
<b>Objective</b>	<b>3.1 Provide on-going and integrated induction support during years 2 &amp; 3 of the program</b>				
<b>Measure</b>	<b>Performance Measure 3.1a District teacher retention data</b>				
3.1.1	Coordinate with AZK12 Center to align induction training to responsive & relational teaching	<i>PD, IT, CT</i>	September	May	1-4
3.1.2	Deliver culturally responsive teaching training to induction mentors	<i>IT</i>	September	April	1-4
3.1.4	Assign each Year 2 candidate an induction mentor	<i>IT</i>	August	May	1-5
<b>Objective</b>	<b>3.2 Establish financial incentives for residents to remain in their placement districts.</b>				

<b>Measure</b>	<b>Performance Measure 3.1a District teacher retention data</b>				
3.2.3	Create a financial pathway for new teachers with NBC & ST stipends	<i>PD</i>	August	May	2-5
3.2.4	Offer on-going professional development opportunities for graduates	<i>IT</i>	June	May	2-5
<b>Objective</b>	<b>3.3 Provide leadership pathways for residents and Supervising Teachers within their schools and districts.</b>				
<b>Measure</b>	<b>Performance Measure 3.1a District teacher retention data</b>				
3.3.3	Deliver rigorous professional learning toward NBC and other	<i>IT</i>	June	May	2-4
3.3.4	Create new teacher support groups	<i>DPCs</i>	August	May	2-5
<b>Goal 4</b>	<b>Goal 4: Conduct a program evaluation</b>				
<b>Objective</b>	<b>4.1 Evaluate the effectiveness of AZTR program structures.</b>				
<b>Measure</b>	<b>Quarterly reports delivered to AZTR</b>				
4.1.2	Collect and analyze implementation data	<i>ET</i>	June	May	1-5
4.1.3	Communicate results with AZTR each quarter with report & meeting	<i>ET</i>	August	May	1-5
<b>Objective</b>	<b>4.2 Disseminate study findings</b>				
<b>Measure</b>	<b>Publish results in What Works Clearinghouse</b>				
4.2.1	Complete ED annual and summative reporting	<i>OSD, ET</i>	June	May	1-5
4.2.2	Present findings at conferences & in peer-reviewed journals	<i>OSD, ET</i>	January	July	2-5

**D3. Costs are Reasonable and Appropriate** The costs outlined in the budget are reasonable and appropriate for the programming and evaluation of a two-year graduate teacher residency program. To execute this plan, we will leverage other funding sources, including: 1) AmeriCorps funding to help cover resident stipends, 2) Arizona Teacher’s Academy (ATA) scholarships to cover residents graduate tuition, 3) OSD and partner district financial supplementation (per resident placement fee, partial salary/ERE for DPC and induction coach), 4) Arizona K12 Center resources for infrastructure, induction and National Board, 5) Private foundation funding for supplemental expenses.

**D4. Dissemination of Findings.** AIR will provide evaluation services and will meet with AZTR quarterly to share results for continuous program improvement. AZTR and OSD will ensure compliance with ED annual federal reporting requirements. Reports will be shared with ED, our partner districts, and the AZTR Advisory Board. AIR and AZTR faculty will present results at local, state, and national conferences and publish in peer-reviewed journals. A final report highlighting longitudinal data of teacher recruitment, preparation, and retention on students' academic achievement in Arizona will be published in ERIC and the WWC.

### **E. Quality of the Project Evaluation**

The American Institutes for Research® (AIR®) will conduct an independent evaluation of the AZTR program. The evaluation will provide rigorous evidence to inform immediate program improvement and assess program impact in OSD and the four Arizona school districts across three cohorts of teachers and students. The impact evaluation study will use a matched comparison quasi-experimental design (QED), with a process to establish baseline equivalence, and valid and reliable measures that will meet WWC standards with reservations. The study will generate evidence for AZTR's impacts on teacher practice and retention as well as on student learning and attendance. The formative evaluation study will provide timely evidence of the implementation quality and fidelity, describe AZTR participant experiences, and examine the extent to which residents understand and develop HLPs.

**E1. Methods to Generate Evidence That Meets WWC Standards With Reservations** AIR will use a matched comparison QED, with a process to establish baseline equivalence, and use valid and reliable outcomes to ensure the impact study produces evidence of effectiveness that **meets WWC evidence standards with reservations.** Empirical within-study comparisons demonstrate that studies using propensity score methods can reproduce the results of randomized

experiments (Pohl et al., 2009; Shadish et al., 2008). Exhibit 1 summarizes the three research questions for the impact evaluation, tied to the program outcomes and proposed data sources. AZTR participants (“treatment”) will receive preservice training during their residency year, ongoing support during their first year as a teacher of record, and enhanced induction support during their second year as a teacher of record. Comparison teachers will receive business-as-usual preservice training - including traditional and nontraditional pathways- and district-provided induction and support during their first and second years as teachers of record. The design will yield effects on the impact of AZTR on teacher and student outcomes.

Program outcome	Research questions (RQs)	Data sources
Measure of knowledge and practice of Culturally Responsive and Relational Teaching (RRT)	RQ 1 (Impact). What is the impact of AZTR on teachers’ knowledge and use of Culturally Responsive and Relational Teaching (RRT)?	First-year and second-year teacher survey from 2024–25 to 2026–27
Measure of retention, increased retention of AZTR completers in school/partner districts	RQ 2 (Impact and moderation). What is the impact of AZTR on teacher retention in their residency placement school, local education agency, and the state? Are impacts moderated by teacher characteristics?	Teacher assignment and administrative data from 2024–25 to fall of 2027 <sup>a</sup>
Measure of student outcomes: Increased student achievement in math and English language arts (ELA), student attendance and student grade point average (GPA)	RQ 3 (Impact, mediation, and moderation). What is the impact of AZTR on student achievement in ELA and math, daily attendance, and end-of-year class GPA? Are impacts on student achievement outcomes mediated by impacts on RRT knowledge and teaching and on responsive relationship building? Are impacts moderated by student race/ethnicity, and teacher race/ethnicity?	Student ELA and math test scores from 2024–25 to 2026–27 <sup>a</sup> Student GPA and attendance records from 2024–25 to 2026–27 First-year and second-year teacher survey

<sup>a</sup>AZTR has data sharing agreements in place with partnering LEAs, which AIR will leverage to collect data for this evaluation.

**Propensity Score Matching.** For each outcome, AIR will create analytic samples to ensure a valid contrast between (a) AZTR residency completers and comparison teachers and

(b) students of AZTR residency completers (treatment students) and students of comparison teachers (comparison students). For each outcome, following Rickles and Seltzer (2014), AIR will conduct a **two-stage** propensity score matching that first seeks to match teachers within the same school and then with similar teachers in similar schools within the same LEA. Each treatment teacher will be matched with two comparison teachers who (a) were not trained by AZTR; (b) have the same number of years of teaching experience; (c) teach in same grade bands and subjects; (d) share similar demographics (e.g., race/ethnicity and gender); (e) teach similar students (i.e., similar average prior-year achievement scores and prior-year attendance, gender, race/ethnicity, English learner status, free or reduced-price lunch status, and learning disability status, aggregated to teacher-level); and (f) teach in the same or similar schools (i.e., prior-year achievement scores and attendance, and demographic composition, aggregated to school-level) as AZTR completers. AIR will assess balance on all baseline variables used in this matching process, including moderators, at the teacher level for each teacher outcome and at both the teacher and student levels for each student outcome, to meet the baseline equivalence requirement (below 0.25 SMD) of the WWC standards (WWC, 2022).

**Strategies for Establishing Baseline Equivalence and Mitigating Attrition and Missing Data.** Selection bias is the main threat to internal validity for a QED. To mitigate this threat, AIR will use a comprehensive list of school-level demographic variables and prior achievement scores to ensure baseline equivalence on theoretically and empirically important confounders. **To mitigate attrition**, all AZTR participants are financially incentivized to complete all 4 years of the program (1 year of residency and 3 years as a teacher of record). If a participant leaves early, they are required to repay the tuition for their coursework (nearly \$30,000). Even if a teacher withdraws from the profession, AIR will be able to track outcomes

for the students they taught through administrative data shared by partner districts. AIR plans to use multiple strategies to minimize missing data by providing monetary incentives to teachers to complete teacher surveys. In our analyses, AIR will use missing data strategies accepted by the WWC for QEDs.

**Power analyses** indicate that the study will have an estimated minimum detectable effect size (MDES) of 0.24-.46 for all teacher outcomes. Recent meta-analytic estimates of teacher practice intervention effects (Garrett et al., 2019; Kraft et al., 2017) report average effects between 0.4 SD and 0.5 SD, suggesting that the proposed sample will be large enough to detect effects (see Appendix B for power analysis details). Power analyses indicate that the study will be able to detect an estimated MDES of 0.10 and .18 for student outcomes. Prior studies reported approximate effects of 0.10 SD for improvement on student outcomes by teacher practice intervention effects (e.g., Clark et al., 2013), suggesting that the proposed sample will be large enough to detect effects.

### **Outcomes and Impact Analysis**

**Teacher Knowledge and Practice of Culturally Responsive and Relational Teaching (RRT) (RQ 1).** AIR will administer an online knowledge and practice survey to all first- and second-year teachers in partner districts—in the fall and spring of their first year of teaching and in the spring of their second year of teaching—thereby creating a rich pool of potential matched comparisons. AIR will work with AZTR to create constructs with customized Likert-scale items based on prior constructs that measure teacher knowledge and practices of RRT as well as information about teacher preparation experiences. AIR has identified constructs that align to AZTR’s five domains of RRT and responsive relationship building; more detail on these can be found in Appendix J. **Teacher retention (RQ 2).** AIR will use district human resources records



to identify whether teachers remain in teaching roles in their school as well as teaching roles in their district. AIR will be able to examine retention after 1, 2, and 3 years of teaching. **To conduct the impact analysis for RQs 1 and 2**, AIR will estimate mean differences between treatment and matched comparison teachers on RRT instructional practices, responsive relationship building, and teacher attrition. Teachers' knowledge and practices of RRT and responsive relationship building will be scaled using a Rasch analysis. Regression models will control for teacher background characteristics, grades and subjects taught, school characteristics, and LEA and cohort fixed effects. To assess differential program impacts on teacher outcomes, AIR will incorporate a treatment-by-moderator interaction term to the models as exploratory analyses, where the moderator is teachers' race/ethnicity (see Appendix J for details of all analytic models).

**Student Outcomes (RQ 3).** Student math and ELA achievement will be measured with the Arizona statewide math and literacy assessment, which all students in Grades 3–8 take annually each spring. Student class-specific GPA will be students' GPA in the class of the treatment or comparison teacher; it will be standardized across districts to be a 100-point scale. Student attendance will be measured by the proportion of school days attended. **To conduct the impact analysis for RQ 3**, AIR will estimate mean differences between students taught by treatment teachers and students taught by matched comparison teachers on the students' standardized ELA and math test scores, GPA, and percentage of days present. Analytic models will be random effects regressions that account for the nesting of data within teacher, with school and cohort fixed effects. We will also control for student-level and teacher-level background characteristics, and baseline values of outcome measures. AIR will use multilevel mediator models with the mediator at the teacher level to assess the extent to which the impacts of AZTR

on student outcomes are mediated by the effectiveness of instructional practices. To evaluate moderators - differential program impacts on student outcomes by characteristics of the student or teacher - AIR will also incorporate a treatment-by-moderator interaction term to the models as exploratory analyses, where the moderator is teachers' race/ethnicity or students' race/ethnicity.

**E2. Methods That Provide Performance Feedback and Periodic Assessment of Progress**

The evaluation will include an in-depth, mixed-methods implementation study that includes regular collections of implementation data from a variety of sources that will permit **periodic assessment of progress toward the program’s intended outcomes and formative feedback**.

Exhibit 2 summarizes the implementation evaluation questions, aligned to program outcomes and data sources:

Program outcome	Research questions (RQs)	Data sources
Residents, mentors, and school leaders have consistent experiences with key program supports and elements	<b>RQ 4 (Formative and implementation).</b> Has AZTR been implemented as intended (with fidelity)? What challenges and barriers exist to implementation?	AZTR resident and mentor survey; Resident, mentor, NAU staff and faculty interviews; Program records, attendance, coach logs, course grades; AZTR teacher observation data
Residents demonstrate self-efficacy; plan to remain in the teaching profession; and are prepared to teach as full-time classroom teachers	<b>RQ 5 (Formative).</b> To what extent do residents and teachers perceive that AZTR improved their self-efficacy, preparedness to teach, and willingness to remain in the teaching profession?	AZTR resident survey data AZTR completer survey data AZTR resident interviews
Residents feel confident in and effectively use HLPs and RRT	<b>RQ 6 (Formative).</b> To what extent do residents, mentors, and AZTR faculty and staff perceive that AZTR improved residents’ knowledge and confidence to use HLPs and RRT? To what extent do residents use HLPs and RRT as intended?	AZTR resident survey data; Resident, mentor, and AZTR staff and faculty interviews AZTR observation data

**Mixed-Methods Implementation Study.** AIR will use a mixed-methods approach to analyze qualitative (e.g., interviews) and quantitative (e.g., surveys, observation scores, attendance) implementation data to generate a deep understanding of AZTR participants' experiences and whether they experienced the program as intended. AIR will conduct annual interviews with AZTR participants in their residency year (in grant years 1–4), with eight AZTR participants who have become full-time teachers (grant years 2–4), with eight mentor teachers who work with AZTR residents (grant years 1–4), and with NAU faculty and staff who oversee the AZTR program (grant years 1–4). AIR will ensure that the participants interviewed reflect a diversity of background characteristics and levels of implementation. The interviews will ask stakeholders to describe how they interacted with AZTR programming and the perceived successes and challenges they encountered (RQ 4); their perceptions of how AZTR has improved participants' self-efficacy, preparedness, and likelihood to remain in the profession (RQ 5); and the ways in which the program has improved their knowledge and confidence to use the HLPs and RRT (RQ 6). AIR will complement findings from these interviews with surveys of residents, mentors, and AZTR participants who are first- or second-year teachers in the partnering districts. AIR will additionally collect program data from AZTR to better understand whether the program is being implemented as intended (RQ 4). This will include application and enrollment data (to better understand program diversity), course grade data (to ensure participants are making expected academic progress), certification exam results (to ensure that participants are progressing through the educator pipeline), Supervising Teacher logs and Induction Mentor logs (to ensure that AZTR residents were getting the support that the program designed), and data from observations that AZTR staff conduct weekly of residents and first-year teachers (to examine how participants demonstrate HLPs and RRT).

AIR will monitor implementation progress and report performance feedback back to AZTR staff during scheduled meetings, sharing informal findings on at least a quarterly basis. Additionally, AIR will create annual implementation briefs that summarize findings across the three implementation questions and provide recommendations for improvement.

**E3. Clear Articulation of Components, Mediators, Outcomes, and Thresholds** The design of the proposed evaluation and its RQs are informed by the logic model that AIR and AZTR cocreated. The program involves the recruitment and selection of diverse, qualified residents; financial support to encourage persistence; comprehensive graduate-level coursework, including coursework that embeds the HLPs and RRT; training for mentor teachers; a yearlong residency in partner districts; induction support; and support for earning NBC. Taken together, these activities should result in a pipeline of more diverse educators, an increased sense of self-efficacy, and use of RRT and HLPs in the classroom—resulting in increased levels of educator retention, student engagement, and student achievement. Our evaluation will examine whether these outcomes are mediated by participants’ diverse backgrounds, their sense of self-efficacy, and use of RRT and HLPs. As teacher and student outcomes rely on standardized administrative records, they are considered valid and reliable by WWC standards.

**Fidelity of Implementation.** To determine the extent to which AZTR has been implemented with fidelity, AIR support NAU staff and faculty to establish quantifiable indicators for all program activities displayed in the project’s logic model, to include developing indicators to determine whether participants received all supports they were supposed to receive, how valuable they perceived those supports to be, and whether they were able to apply that knowledge in the classroom. AIR will examine how these ratings vary across cohorts and districts.