ED-GRANTS-040319-001

# Metro Detroit Teaching Residency for Urban Excellence (TRUE) Project
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**Metro Detroit Teaching Residency for Urban Excellence (TRUE) Project**

Wayne State University's College of Education is proud to present Metro Detroit Teaching Residency for Urban Excellence (TRUE) Project, an accelerated graduate-level certification and residency program for mid-career professionals in science, technology, engineering and mathematics (STEM) and computer science (CS) fields. The Metro Detroit TRUE Project aims to improve student academic achievement, especially in STEM and computer science areas, by leveraging the residents' content expertise and integrating research-proven strategies, such as culturally responsive teaching and trauma-informed, socio-emotional learning, to become effective urban school teachers.

The project's offerings are as unique as the geographic area it serves. It has been developed with an eye on our region's current economic and employment situation. The precarious nature of the automobile and technology industries leaves many highly skilled professionals with the threat of layoffs or displacement. For many, the project will provide a pathway to a rewarding new career in STEM and CS teaching. We are keenly aware that our pool of applicants will not just be highly skilled, they may also be dealing with economic circumstances beyond their control. We will offer each TRUE resident a 12-month living stipend of $40,000. Residents will commit to working in one of our partner districts for not less than three years after graduating from the program.

The TRUE Project will prepare teachers to work with students in two high-need local education agencies: Detroit Public Schools Community District (DPSCD) and Dearborn Public Schools (Dearborn PS). The majority of students come from racially diverse and economically disadvantaged backgrounds. Many have experienced several adverse childhood experiences (ACEs), which are associated with higher rates of mental health problems, and behavioral and

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learning problems (Blodgett & Lanigan, 2018). Research has shown that ACE ratings are significantly higher among low-income residents of Detroit due to the stress resulting from poverty and violence (Goldman et al., 2011). Dearborn, meanwhile, has a large population of students who were born in Middle Eastern countries such as Iraq or Syria, and have immigrated to the United States as refugees (Coloma, 2017). As such, many may have higher levels of depression or anxiety (Pampati et al., 2018). We are committed to preparing teachers who will take a trauma-informed, socio-emotional approach that promotes both learning and healing.

TRUE is not just a name. It is a set of values and goals – each one reflective of our commitment to education, student achievement, and workforce development in metro Detroit.

**Teaching (Goal 1):** to recruit, prepare, and graduate diverse and highly qualified STEM, including computer science, teachers to work in high-need urban schools

**Residency (Goal 2):** to immerse participants in year-long residencies in Michigan's largest urban, high-need school districts

**Urban (Goal 3):** to upskill mid-career professionals with STEM and CS expertise to transition as school teachers with competencies in culturally responsive pedagogy and trauma-informed, socio-emotional learning

**Excellence (Goal 4):** to positively impact student achievement in high-need districts and schools

Residents will participate in an 18-month graduate-level teaching certification, which includes a full-year, immersive school placement and is followed by a two-year induction period. They will undergo an innovative curriculum and residency, with ongoing comprehensive support from course faculty, staff advisor, residency and induction coaches, and mentor teachers. Ultimately, the project aims to prepare diverse and highly-qualified teachers to bring STEM learning to students in Michigan's largest urban, high need school districts.

# A. QUALITY OF THE PROJECT DESIGN

**A.i. – The extent to which the proposed project demonstrates a rationale.**

Though many factors go into student learning, teacher quality is perhaps the most important (Darling-Hammond, 2000; Darling-Hammond & Youngs, 2002; Looney, 2011). These are teachers who are able to translate content knowledge in ways that engage students to be active learners. The last couple decades have seen more demands put on teachers, with state testing requirements, updated content requirements and school funding cuts impeding their ability to connect and engage students. As employment forecasts continue to show high demand for employees with STEM and CS knowledge, school districts find they must produce students with math, science, and computer science skills who can navigate the 21st century workforce. Moreover, the nation's science standards have expanded to include engineering process skills that require a more specific form of scientific inquiry than that taught in previous years (Antink-Meyer & Brown, 2017). As a result of these new demands, school districts, especially those in high-need areas, grapple with teacher shortages, funding cuts, and low-performing schools.

**Teacher shortage:** There is a great shortage of science, mathematics, and computer science teachers, even though the demand for these teachers continues to grow (Sutcher, Darling-Hammond & Carver-Thomas, 2016; U.S. Department of Education, 2015). Research has indicated that the shortage of qualified STEM and CS teachers at least partially contributes to the overall low science and math scores for students (Hutchison, 2012). Michigan has experienced critical teacher shortages for several years, with many qualified teachers – especially those with science, mathematics, and computer science backgrounds – opting out of the profession in favor of more lucrative careers in the private sector (Carlson, 2018). Though a statewide problem, teacher shortages impact low-income, racially and linguistically diverse urban areas the hardest.

School districts in high-need urban communities like Detroit and Dearborn had four times as many uncertified teachers as those in more affluent communities (Sutcher et al., 2016). The most qualified teachers often seek employment in schools that serve more affluent children (Clotfelter et al., 2008). When there are not enough qualified STEM and CS teachers in the workforce, those schools with the fewest amount of resources and least desirable working conditions experience the highest number of vacancies (Sutcher et al., 2016).

**Need for STEM and computer science learning:** The Michigan Student Test of Educational Progress (M-STEP) is administered to Michigan students in grades 3 to 8 and grade 11. In 2018, only 32.7% of eighth-graders in the state were proficient in mathematics. M-STEP did not administer the science portion of the test in 2018, but in 2017, only 22.7% of state's seventh-graders and 33.6% of 11th-graders were proficient in science. The largest disparity in student scores in standardized tests can be attributed to socioeconomic conditions (Barnum, 2018). When it comes to student performance on M-STEP, the starkest contrast can be seen between low-income students and upper/middle-class students. For example, in math, just 22% of low-income students were proficient, compared with 54% of those who were upper/middle-class (French et al., 2018).

**Need for upskilled workers:** Despite a currently healthy economy, southeast Michigan still faces the precarious nature of the automobile and technology industry and instability due to corporate restructuring, variable sales trends, and global competition. For example, in 2018, the General Motors Company announced it was reducing its salaried workforce by 8,000. GM began enacting layoffs in early 2019, with 2,250 workers volunteering to take a buyout (LaReau, 2019). According to the *Detroit Free Press*, there is no timeline when these layoffs will happen, but the threat looms over many white-collar workers still employed (LaReau, 2019). Many of these

displaced workers may have to relocate in order to find employment, which is not always desired or feasible. A residency project like TRUE intends to "upskill" workers – that is, it will equip them with additional and transferrable skills. By providing opportunities for displaced workers in the auto and technology industries to make a career change, we are creating a way to keep talent in the region. In this way, TRUE could be seen as having an economic impact on the southeast Michigan region, as well as an academic one.

**High-need LEAs:** DPSCD and Dearborn PS are the largest and third-largest school districts in the state, respectively. They both qualify as "high-need local education agencies" because of the large percentage of economically disadvantaged families they serve (see Table 1 below and Appendix C). DPSCD serves over 50,000 students, 85.3% of whom meet the federal definition of low-income and qualify for free or reduced-priced lunch. Dearborn PS serves over 20,000 students, 76.4% of whom are considered low-income and qualify for free or reduced-priced lunch. The state average of students eligible for free or reduced-priced lunch is 46.5%.

**Table 1: High-Need School District Partners**

|  | **Detroit Public Schools Community District** | **Dearborn Public Schools** |
|---|---|---|
| **Student Population** | 50,176 | 20,740 |
| **% Eligible for Free or Reduced-Priced Lunch** | 85.3% | 76.4% |
| **Race & Ethnicity** | Black 88%<br>Latino 9.58%<br>White 2.4%<br>Other 0.02% | Middle Eastern 57%<br>White 33%<br>Black 6%<br>Other 4% |

As the largest district in Michigan, DPSCD has 106 schools, including a number of STEM-focused schools. Reflecting the city's predominantly African American population, the students' racial/ethnic composition in DPSCD consists of 88% Black, 9.58% Latino, 2.4%

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White, and 0.02% other. During the 2017-18 school year, the district's graduation rate is 77.27% and dropout rate is 10.37%.

DPSCD has a high annual teacher turnover rate in comparison to the state rate (see Appendix C). More specifically, it has higher rates of new hires (less than one year of experience in the district). During the 2017-18 school year, 17.7% of its total teachers are new hires, compared to the state's rate of 12.9%. The following year in 2018-19, 15.6% of its total teachers are new hires, compared to the state's rate of 13.7%. At the same time, the district has lower percentages of teachers with "longevity" or years of experience in the district in relation to the state's respective percentages. For example, during the 2017-18 school year, teachers with 1-2 years of experience in the district consist of 11.2% of the district's total teachers, compared to the state's 14.4%. Those with 3-5 years of experience are 7.2%, compared to the state's 12.8%, and those with 6-10 years of experience are 4.7%, compared to the state's 11.3%. In sum, data for the 2017-18 school year indicates that DPSCD hires more new teachers, yet retains less of them, compared to the state data, thereby indicating high teacher turnover.

As the third largest district in Michigan, Dearborn PS has 32 schools, including a few STEM-focused schools. Mirroring the area's large Middle Eastern community, the students' racial/ethnic composition in Dearborn PS consists of 57% Middle Eastern, 33% White, 6% Black, and 4% other. During the 2017-18 school year, the district's graduation rate is 94.70% and dropout rate is 1.24%.

Dearborn PS also has a high teacher turnover rate, but not as pronounced as Detroit's (see Appendix C). Compared to the state, it has a higher rate of new hires (less than one year of experience in the district). During the 2017-18 school year, 13.3% of its total teachers are new hires, compared to the state's rate of 12.9%. At the same time, the district has lower percentages

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of teachers with "longevity" or years of experience in the district in relation to the state's respective percentages. For example, during the 2017-18 school year, Dearborn PS teachers with 1-2 years of experience in the district consist of 12.3% of the district's total teachers, compared to the state's 14.4%. Those with 3-5 years of experience are 12.4%, compared to the state's 12.8%, and those with 6-10 years of experience are 8.9%, compared to the state's 11.3%. In sum, Dearborn PS hires more new teachers, yet retains less of them, compared to the state data. Although not as intense as DPSCD's situation, Dearborn PS also has a teacher turnover problem.

**Best practices:** In 2016, the Michigan Department of Education (MDE) published the "Top 10 in 10 Years" strategic plan in order to push Michigan as a top 10 education state in the country. To achieve this, MDE developed an education plan that acknowledges the role poverty plays in how children in high-need districts learn and develop. The plan presented seven goals to challenge and reshape the existing educational structure in the state, including: (1) providing every child access to an aligned, high-quality education system through post-secondary level; (2) implementing a child-centered instructional model where students meet their highest potential; (3) developing, supporting, and sustaining a high-quality education workforce; (4) reducing the impact of high-risk factors like poverty and providing equitable resources to meet the needs of all students; (5) ensuring that parents/guardians are supported partners in their children's education; (6) creating a strong partnership with job providers, community colleges, and higher education to ensure a prepared workforce; and (7) further developing a cohesive state education agency that supports a coherent education system at all levels.

MDE's strategic plan aligns with the Metro Detroit TRUE Project's goals, including developing, supporting, and sustaining a high-quality education workforce, which will result in providing every child with access to a high-quality education system, implementing high-quality

instruction in every classroom where students reach their highest potential, and reducing the impact of risk factors like poverty to meet the needs of all students. The project's culturally responsive and trauma-informed approach to teacher preparation will help create a workforce of urban educators who are in tune with the needs of their students.

**A.ii. – The extent to which the goals, objectives, and outcomes to be achieved by the proposed project are clearly specified and measurable.**

*Goal 1 – Teaching: to recruit, prepare, and graduate diverse and highly qualified STEM, including computer science, teachers to work in high-need urban schools*

The Metro Detroit TRUE Project will recruit two cohorts of 20 teaching residents (n=40) for an accelerated 18-month graduate-level teaching certification program, including coursework and residency in our school district partners DPSCD and Dearborn PS.

*Recruitment:* The first goal is to prepare career changers from math, science, and computer science disciplines who are passionate about becoming high school teachers in high-need districts. To be eligible, interested individuals must submit an application to the university's Graduate School and include at least one letter of recommendation. They will have academic background and professional experience in a STEM field, including computer science, with an undergraduate GPA of 3.0 or higher. Applicants will also undergo an in-person interview with project team members.

Once accepted, each resident will receive a $40,000 living stipend for a 12-month period. Residents will also sign an agreement on the following: to serve as a full-time teacher for a total of not less than three years in DPSCD or Dearborn PS immediately after graduation; provide a certificate of employment from the partner district's chief administrative officer at the beginning, and completion, of each year of service; to obtain teaching certification for the state of Michigan;

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to teach STEM or computer science subjects; and to agree to repay full or partial stipend if they do not complete the service obligation to the district partner. If a resident is not able to complete the service obligation due to health, injury, inability to secure unemployment from district partners, active military duty, or other special circumstances, the project will allow for a deferral of the service obligation or repayment for a specified time. Funds that are repaid will be reported to the U.S. Department of Education, which will determine their use (see Appendix E).

*Pedagogy and curriculum:* We will provide residents with coursework that will align with the residency experience and allow residents to acquire (1a) strong content knowledge to meet rigorous academic standards; (1b) training in trauma-informed pedagogy; (1c) training in culturally responsive STEM and computer science education; (1d) state endorsement for computer science teaching competency; and (1e) preparation for teaching certification tests.

*1a. Strong content knowledge to meet rigorous academic standards:* Residents will identify their intent to complete either a math sequence or science sequence in secondary education (see Table 2 below). The coursework and residency are designed to be completed in 18 months, after which residents will receive a Master of Art in Teaching and teaching certification.

The first cohort of 20 residents will have coursework from Spring 2020 to Fall 2021, with their residency taking place in Fall 2020 and Winter 2021. By the end of Spring 2021, they will complete courses needed for certification. Once they pass the state certification test, they are eligible to be hired as full-time teachers. In Fall 2021, when they start working as teachers, they will complete their graduate coursework for the master's research project. The second cohort of 20 residents will begin their coursework in Spring 2021 and their residency in Fall 2021, and will complete their master's research projects in Fall 2022 (also see Work Plan on page 39).

The project's curriculum is grounded in a residency model, which weaves educational theory with classroom practice so that residents learn how to transform knowledge gained from coursework into skilled practice. It emphasizes the use of technology, research, inquiry, and data analysis as tools to continuously reflect on and improve practice. Residents take discipline-based teaching methods course alongside their residency. They will work together in a Community of Learners (CoL), bringing data and insights gained in residency back for discussion with course instructors and other residents and examine implications for teaching and learning.

**Table 2. Master Schedule of Classes**

| | Mathematics Education (30 credits total) | Science Education (30 credits total) |
|---|---|---|
| **Spring & Summer** (9 credits) | **Community of Learners (CoL) Seminars**: orientations to Wayne State University and school districts; lesson/unit planning and classroom management<br>**Diverse Learners, Families, and Communities** (TED 6370 \| 4 credits)<br>**Teaching Reading in the Content Area** (RLL 6121 \| 3 credits)<br>**Adolescent Psychology** (EDP 5480 \| 2 credits) | |
| **Fall** (5 credits) | **Mathematics Methods #1** (MAE 5150 \| 3 credits) | **Science Methods #1** (SCE 5060 \| 3 credits) |
| | **Residency + CoL Seminars** (TED 5780 \| 2 credits) | |
| **Winter** (4 credits) | **Mathematics Methods #2** (MAE 6050 \| 3 credits) | **Science Methods #2** (MAE 5070 \| 3 credits) |
| | **Residency + CoL Seminars** (TED 5780 \| 1 credit) | |
| **Spring** (1 credit) | **Residency + CoL Seminars.** (TED 5780 \| 1 credit) | |
| **Summer** (5 credits) | **Introductory Master's Seminar** (TED 7000 \| 3 credits)<br>**Local School Curriculum Planning** (TED 6140 \| 2 credits) | |
| **Fall** (6 credits) | **Master's Seminar Essay or Project** (ED 7999 \| 3 credits)<br>**STEM Integration** (TED 6380 \| 3 credits) | |

**Table 3. Courses and Descriptions**

| Courses | Descriptions |
|---|---|
| Diverse Learners, Families, and Communities (TED 6370 \| 4 credits) | Using inclusive instructional practices for all students including, but not limited to, students with disabilities, English language Learners, and other populations, such as at-risk, and gifted and talented, in urban settings. |
| Teaching Reading in the Content Area (RLL 6121 \| 3 credits) | Teaching reading across all content areas, with particular attention to readers with special needs. |
| Adolescent Psychology (EDP 5480 \| 2 credits) | Basic concepts, research findings and problems regarding early adolescent and adolescent developmental needs as they apply to school and home environments; includes study of exceptional children and those with cultural differences. |
| Methods and Materials: Secondary School Mathematics (MAE 5150 \| 3 credits) | Mathematics in secondary school; major concepts of secondary school mathematics; methods and instructional materials; classroom administration; modern trends. |
| Teaching Mathematics in the Middle Grades (MAE 6050 \| 3 credits) | Creative use of resources and materials for improving the mathematics competencies of middle school and junior high school students; organizing the mathematics classroom for effective instruction; promising trends; related research. |
| Methods and Materials of Instruction in Secondary School Science I (SCE 5060 \| 3 credits) | Role of science in the secondary curriculum. Problems and techniques of teaching science in the secondary schools; objectives, planning laboratory experiments, demonstrations, directed study, student projects, text and reference material, audio-visual resources, evaluation. |
| Instruction in Secondary School Science II (SCE 5070 \| 3 credits) | Problems of selecting and organizing teaching-learning materials in secondary school science. Development of illustrative instructional units. Resources for professional growth of science teachers; professional literature and organizations. |
| Directed Teaching and Conference – Residency + Seminars (TED 5780 \| 4 credits) | Directed teaching in schools at level for which students are preparing for certification. Includes regular conference in which teaching methods in various fields are explored. |
| Introductory Master's Seminar (TED 7000 \| 3 credits) | Skill development in the three primary areas: information access through the variety of resources available in a university library; comprehension and evaluation of technical literature; employment of APA style in technical writing. |
| Master's Seminar Essay or Project (ED 7999 \| 3 credits) | Supervised professional study in field situations. |
| School Curriculum Planning (TED 6140 \| 2 credits) | For classroom teachers and teacher educators. Consideration of local problems in secondary school programs. Planning for better teaching and learning. |
| Integrating Content: Math, Science and Technology (TED 6380 \| 3 credits) | Current issues and trends related to integrating content areas; theory, methods, materials, and strategies. This specific section integrates mathematics, science and technology. |

For the mathematics or science sequence, the curriculum will include in-depth analysis of standards-based teaching procedures, constructivist models that reveal and promote student understanding, and materials for selecting and organizing instruction. Residents will learn to develop units/lessons that incorporate these aspects of teaching and learning, and the use of technology, multicultural and exceptional learner issues, authentic assessment, and current educational research (Coloma, 2015).

*1b. Trauma-informed, socio-emotional learning:* Students in our district partners are at risk for experiencing significantly higher rates of trauma than the general population. For example, Dearborn PS serves a large number of children who came to the United States with their families to escape war and violence in Syria and Iraq. In 2016, Michigan was the fourth-largest state for resettlement, and has resettled over 34,000 refugees over the last decade (Global Detroit, 2016). More than 1,100 refugees from the Middle East live in Dearborn and Dearborn Heights. Refugees have significantly higher rates of depression and anxiety than the general population (Pampati et al., 2018), and students from countries that are experiencing war face difficult familial, emotional, and financial circumstances, resulting in higher rates of depression (Dessoff, 2011).

Detroit students are more likely to experience trauma due to high rates of poverty, violence, and crime. One study indicates that 87.2% of people living in Detroit have a lifetime prevalence of exposure to at least one traumatic event, and 17.1% of them experienced a traumatic event that meets the criteria for post-traumatic stress disorder (Goldman et al., 2011). In addition to traumatic events, the accompanying stress of poverty causes toxic stress on a child's developing brain. A growing body of research has shown the negative effects that the stresses commonly associated with children growing up in poverty – chronic noise, community

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violence, household chaos, conflict among family members, and parenting stress – have a negative impact on children's cognitive, behavioral and emotional development (Blair et al., 2016). As the amount of trauma and stressors increase, so does the risk for academic failure, chronic attendance problems, and behavior and emotional problems (Blodgett & Lanigan, 2018). Emotional and behavior problems are the primary risk for school dropout, academic failure, and discipline problems (Blodgett & Dorado, 2016; Alexander et al., 2001; Loeber & Farrington, 2000; Kutash et al., 2006).

Consequently, the TRUE Project will integrate a trauma-informed, socio-emotional learning into the curriculum and more specifically in the Adolescent Psychology course, during the residency seminars, and as short modules throughout the program. Having a trauma-informed approach means that we will train residents to respond and adapt to the needs of students by recognizing the prevalence of trauma; recognize how trauma affects students and their families; and avoid re-traumatizing by reducing stress and/or triggers (Wilson, 2016). In our curriculum, we will draw insights from the National Child Traumatic Stress Network (McInerney & McKlindon, 2014):

Learn to recognize the signs and symptoms of trauma in students: fear and anxiety, changes in behavior, increased complaints about headaches, stomachaches and other somatic complaints, absenteeism, and difficulty responding to redirection or authority

Obtain a trauma history: standardized screening procedures to assess trauma and the effects of trauma

Avoid re-traumatizing: learn a student's triggers and avoid the need for punitive action

Create an environment that helps them feel safe: build school-community partnerships with mental health organizations; connect students to additional support services, if needed

Take care of your yourself: exposure to others' trauma can lead to vicarious trauma; identify

self-care activities that help relieve stress

• Empower students by offering choices and praising positive choices: avoid power struggles

by offering choices for participation

Check in with students: simply asking how a student is doing can open up a dialogue

Be sensitive to the fact that students' parents/caregivers may also be trauma survivors: build

trusting relationships and make sure the school is a safe place to foster collaboration

*1c. Culturally Responsive STEM and computer science education*: Residents will be

prepared to become teachers in two of the most racially, economically, linguistically, and

spiritually diverse school districts in the state of Michigan. The large Arab American population

in Dearborn PS and the predominantly African American population in DPSCD offer

opportunities to utilize students' cultural backgrounds as rich resources for teaching and

learning. These experiences are unique to communities that have carved out cultural identities in

the face of enduring oppression. Coloma (2006) states that students from diverse backgrounds

may not receive the academic support needed because of teachers' preconceived notions about

nationality, race, or culture. If we are to cultivate highly-qualified urban educators who respond

to the needs of students and communities, we must equip them with cultural knowledge, skills,

and dispositions.

The TRUE Project will incorporate culturally responsive teaching, a research-proven

pedagogy that integrates students' cultural identities and funds of knowledge in teaching and

learning (Ladson-Billings, 1995). It is not just the acknowledgement of students' cultural

backgrounds; it is the active inclusion of their culture in teaching skills and concepts (Wilson-

Lopez, 2016). Culturally responsive educators engage students in critical reflection of their own

lives and societies, and cultivating students' cultural competence – that is, encouraging them to embrace their cultural identities while allowing themselves to learn about the wider culture (Wilson-Lopez, 2016; Ladson-Billings, 2006). According to Ladson-Billings (2006), teacher education programs have an important role in helping prospective teachers become culturally responsive. One way is for curriculum to help prospective teachers understand their own culture as well as other cultures and the ways these cultures function in education. Rather than instruct teachers in multicultural education, a culturally responsive teaching curriculum asks teachers to question and reflect on the teacher-student relationship, the curriculum, and the school environment (Coloma, 2012; Ladson-Billings, 1995). This self-analysis will be undertaken in the Diverse Learners, Families, and Communities course and reinforced during residency seminars.

The concept of culturally responsive teaching stretches across all subjects, meaning that STEM and computer science education is congruent with its application; hence, its practices will be explored in the Math and Science methods courses and school-based residencies. Indeed, Wilson-Lopez (2016) offers examples of how teachers can use culturally responsive teaching:

- Students use mathematical analyses to study social inequalities or concerns, such as racial profiling during traffic stops

- Students launch their own lines of scientific inquiry, which reflect subjects that are relevant to their experiences

- Students learn from elders in their communities about traditional ways of solving problems, and then design new ways to use technology and engineering to solve similar problems

It is important to recognize and honor students' backgrounds and histories they bring with them to school. As with trauma-informed pedagogy, we will embed culturally responsive teaching into the curriculum.

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*1d. Computer Science:* Computer science-related jobs are among the fastest-growing job sectors in Michigan. The median annual wage for jobs in computer and information technology occupations was more than $84,000 in 2017, much higher than the national median annual average. The Michigan Department of Education recently approved the K-12 Standards for Computer Science, which aim to promote the instruction of computer and computational thinking skills in elementary, middle, and high schools. These standards outline core practices in the teaching of computer science: fostering an inclusive computing culture; collaborating around computing; creating computational artifacts; test and refining computational artifacts; recognizing and defining computational programs; communication about computing; and developing and using abstractions. Educators have written these standards for various stakeholders, including teachers, administrators, and policy makers (MDE, 2019).

In 2011, the Michigan State Board of Education approved an Industrial and Technology Education endorsement that can be used to ascertain computer science teaching competency. The TRUE project team will collaborate with the College of Engineering and the Department of Computer Science in particular to develop a curriculum for the Industrial and Technology Education endorsement (see Work Plan on page 39). The curriculum design and development as well as the program submission to the Michigan Department of Education (MDE) will occur during the first year of the grant. After receiving feedback and approval from MDE, we will move forward with the university's curriculum approval process during the second year. With the new endorsement potentially ready by the third year, Wayne State University will be taking the lead as one of the first teacher education programs in Michigan to offer this vital new opportunity to its residents.

*1e. Michigan Test for Teacher Certification (MTTC)*: We will prepare two cohorts of urban educators who will positively impact student learning and the teaching profession. At least 80% of TRUE residents will pass the MTTC. The College of Education will help residents prepare for the MTTC by incorporating exam preparation and practice tests into the bi-monthly seminars. Residents will meet with the lead advisor to determine when to take the MTTC and how best to prepare for it. A Success Coach from the Division of Academic Services in the College of Education will be available to help residents prepare for the exam by developing intervention strategies, determining areas of difficulty, and identifying support resources.

**Goal 2 – <u>R</u>esidency: to immerse participants in year-long residencies in Michigan's largest urban, high-need school districts**

*Residency:* TRUE residents will begin their year-long, full-time teaching resident placement in the fall following the start of the program in May 2020 for Cohort #1 and May 2021 for Cohort #2. Because most, if not all, of the TRUE residents will not have prior experience in a classroom, an almost immediate immersion in a classroom environment will help them acclimate more quickly. During the residency period, residents continuously reflect on their practice, collecting data to be used to develop and implement instructional changes, thus realizing the role that research plays in educational practice. Innovative technologies are woven throughout these experiences so that fellows gain skills in the use of various technology tools for communication, to prepare and deliver instruction, and to foster personal and professional growth. It is our belief that this method will be more beneficial than if they were to complete it following their coursework.

In a traditional model of student teaching, residents spend the first semester observing mentor teachers for an extended period of time, gradually moving toward teaching small portions

of the lesson, before "taking over" the class on his/her own in the second semester. This "hands-off" method may cause anxiety in teaching residents, which would undermine their confidence in the classroom. Therefore, the TRUE Project will use a co-teaching model for our residency. Co-teaching involves the resident working together with the mentor teacher from the outset, planning lessons and delivering instruction in a collaborative partnership with benefits for both mentor and mentee. As the resident progresses to take over more classroom instruction, the mentor teacher continues to work in the classroom providing and modeling support, and assisting in lesson planning. Together, they actively plan lessons and discuss classroom management practices around what meets the needs of as many students as possible. One study at an elementary school in St. Cloud, MN, found that students in a co-teaching classroom performed better on state tests in math and reading (Heck & Bacharach, 2016). In the co-teaching model, students get questions answered faster and behavioral problems are addressed by virtue of having two instructors in the classroom. Residents, meanwhile, are empowered in their roles as educators early in their teacher preparation. By identifying as teachers early, residents are more likely to be retained.

The project's curriculum will prepare residents to use high-leverage practices to become effective urban educators (Ball & Forzani, 2009; Ball et al., 2009). These are skills/instructional strategies that support the teaching and learning of content for all students no matter their conceptual level. They are known as "high-leverage" because they matter to advancing skill in teaching and to student learning. At their core, high-leverage practices reflect the basic fundamentals of teaching. They are critical to helping students learn important content and are also central to supporting students' social and emotional development. They are used across subject areas, grade levels, and contexts. We will embed the following four high-leverage

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practices identified by MDE into the TRUE project curriculum: leading a group discussion; explaining and modeling content, practices, and strategies; eliciting and interpreting individual student thinking and building respectful relationships with students.

Our residency will also draw from the work of Hollins (2011) that use the practices of guided practice, focused inquiry, and directed observation:

Guided practice is a process for residents to learn from teaching under the careful supervision of more accomplished and experienced teachers who provide opportunities for rehearsal of routines and procedures, scaffolded planning, engagement in practice in authentic contexts, and focused reflection. These practices are interrelated, overlapping and integrated. Focused inquiry and directed observation involve approaches to learning for and about teaching. Guided practice involves learning in and from practice, which simultaneously integrates focused inquiry and directed observation (Hollins & Crockett, 2012).

• Mentor teachers provide co-planning and co-teaching to include modeling and feedback to teaching residents on a daily basis-in the moment

• Residency coaches provide feedback and support to residents as they meet for coaching conversations; evaluative observations and follow up with coaching conversations and written feedback on lessons observed

Focused inquiry is the examination and analysis of teaching practices, and the conditions within and outside of schools that influence teaching practices in different contexts, using different tools such as published research, document analysis, interviews conducted with participants, and observations (Hollins & Crockett, 2012). Focused inquiry will be integrated into twice-monthly seminars for our teaching residents, which will be held on the WSU campus. These Community of Learner (CoL) seminars will be interactive and include role-plays,

problem-solving scenarios, and discussion about effective practices and possible concerns residents may have with their placement. The seminars will provide information and reflect what is being learned during residency. In addition, the seminars will be an opportunity for teaching residents to find support from other members of their cohort. By facilitating discussion and encouraging expression of feelings and communication, the seminars will be a safe space for residents to find support and guidance. They will help build a sense of camaraderie among cohort residents, which can be sustained after the residency program ends. These seminars align with coursework: discussions and activities to include culturally relevant practices; case studies; reading and discussing relevant research and articles; formative and summative assessments; teaching and learning cycle; and reflective practice.

Directed observation is an extension of focused inquiry that engages residents in examining particular phenomena such as conditions, behaviors, practices, procedures, and routines for particular purposes and through particular perspectives (Hollins & Crockett, 2012).

For this component, the project will use what is known as residency rounds. Residency coaches will collaborate with school district staff to take small groups of residents on regular instructional rounds, in which they visit a partner school and observe a high-performing teacher conduct class. After observation, a small group discussion with residents about the teacher's performance and how it can be a model for the residents. These rounds will be conducted monthly. In addition to the instructional rounds, the directed observation component will use videos of practice as a tool to gain insights of teaching and learning practices and review resident videos to make application of theory to teaching practices.

Both the instructional rounds and CoL seminars will adhere to a continuous improvement model, in which feedback and communication is frequent and teaching residents feel safe to

express their concerns and criticisms of the program. In this model, there is multi-directional

feedback, between teaching residents, mentor teachers, and residency program administrators.

**Table 4. Residency Activities**

| Residency | Activities |
|---|---|
| Residency Placement: Orientation with residents and residency coaches | • Purpose, goals, and expectations of TRUE Project<br>• What is the model of residency in partnership with districts, schools, and teachers?<br>• Who will be in your schools from WSU? What are their roles and responsibilities?<br>• Why does coaching matter so much?<br>• What are expectations for residents?<br>• What are the responsibilities of mentor teachers and residency coaches? |
| Co-Planning and Co-Teaching with mentor teachers | • Application of learning in classroom<br>• Mentor teacher model and provide feedback<br>• Resident begins "hands-on" immediately in co-planning and co-teaching |
| Seminars: Alternate weeks with seminar and residency coaches | • Interactive Seminars<br>• Videos of practice<br>• Instructional rounds<br>• Case studies<br>• Incorporate topics with high leverage practices |
| Residency Coaches | • Meet prior to the start of the placement with residents and mentors teachers to discuss process and collaborative work<br>• Meet monthly to collaborate with mentor teachers<br>• Application of learning in classroom<br>• Review lesson plan and prepare for pre-conference for observation; revise lesson plans for observations<br>• Observations and coaching conversations |
| Journal | • Residents journal their experiences for practice with reflection |

*Certification and induction:* Residents will complete the coursework and residency with

at least a 3.0 cumulative GPA and satisfactory evaluations from mentor teachers. We expect at

least 80% of our residents to pass the Michigan Test for Teacher Certification (MTTC).

Graduates will commit to working in district partners for not less than three years. During the

first two years of this induction period, graduates will receive ongoing mentoring and support. The induction will include:

collaborating with districts to offer onboarding strategies for TRUE completers

offering support for completers as new teachers within the context of their school and district

WSU takes responsibility for inducting new teachers to the profession allowing for continuity during the first two years of teaching

induction coaches will meet with completers on a bi-weekly basis during the first year and monthly in the second year, and will make themselves available on an as needed basis

induction coaches will meet for observation and coaching conversation two times each month on an individual basis

professional development will be offered through induction seminar meetings with fellow graduates

*Mentor Teachers:* It is critical that residents spend time with excellent veteran teachers who are themselves improving student achievement despite challenging conditions. The project will work closely with partner districts to choose high-performing teachers as mentors for our residents. Partner districts will ensure mentor teachers will be provided ample time to be effective teacher leaders for residents and new teachers. In addition to teaching in STEM-related subjects, all potential mentors must meet or exceed the following criteria:

identified as effective and high performing by school district evaluations for teaching and by their students' academic growth and data

have demonstrated knowledge of STEM and/or computer science teaching content

school administrators must agree to the mentor arrangement

have a positive classroom climate and culture and instruction that engages students

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deeply reflective about their teaching practice, collaborative with colleagues to improve instruction, and view teaching as a profession that requires ongoing inquiry into practice for professional growth

willing to open their teaching practice to residents as co-teaching colleagues

willing to participate in professional development to learn how to be effective mentors

willing to partner with university residency coaches to support residents

model positive professional dispositions and commitment to the teaching profession

One of our district partners, DPSCD, has already prioritized developing mentor teachers through a unique master teacher initiative launched in early 2018. Through this initiative, DPSCD has identified 200 high-performing teachers who demonstrate a high level of expertise in their content areas of English language arts or math. These master teachers receive a $5,000 annual stipend for supporting struggling or new teachers. The master teachers are chosen by a committee of district officials, principals, and union representative.

*Residency Coaches:* The project team will identify coaches who have STEM content knowledge and have experience teaching in urban schools. These coaches will observe residents co-teaching; co-plan lessons with residents; provide feedback on course-related assignments; teach seminar courses related to evidence-based teaching practices; lead residents on instructional rounds for observation and reflection on teaching practices.

*Induction Coaches:* By working closely with our district partners, the project team will match completers of the program with induction coaches who will provide support and guidance during the first two years of teaching. These induction coaches will be crucial to helping acclimate the new teachers into their careers. In DPSCD, they will work with mentor teachers who have been cleared by their administrators and given release time to provide this service.

**Goal 3 – <u>U</u>rban: to upskill mid-career professionals with STEM and CS expertise to transition as school teachers with competencies in culturally responsive pedagogy and trauma-informed, socio-emotional learning**

There are compelling reasons for mid-career professionals to choose second careers in teaching. Mid-career professionals, especially those with experience in fields requiring specialized knowledge in math, science, or technology, choose teaching because they desire to make a difference in children and youth. Others with unforgiving corporate schedules choose teaching to strike a better work-life balance. Still others find personal fulfillment in what they perceive as giving back to society and/or serving a civic duty (Bauer et al., 2017). A study by Baeten and Meeus (2016) finds that "second-career teachers" tend to be older with high levels of intrinsic motivation; that is, their desire to become teachers is driven by wanting to contribute to society and give back by helping young people succeed. Many second-career teachers also find teaching more exciting than their previous careers, with more opportunities to be creative, sociable, and interactive. This study indicates that intrinsic motivations outweigh external factors like employment situation, burnout, or financial concerns. Another crucial factor in determining the satisfaction of new teachers is in the preparation they receive from teacher education programs (Green & Munoz, 2016). Second-career teachers, specifically, benefit from programs that show how to transfer their expertise into the teaching profession, provide peer support, integrate coursework and residency, and offer field experience with strong mentor support (Baeten & Meeus, 2016).

The TRUE Project is committed to providing mid-career professionals with the tools they need to become successful urban educators. Our curriculum is designed to build on the strengths of residents' existing STEM knowledge. As residents join the project with considerable

professional skills, we view our role as helping cultivate their passion for teaching, and giving them additional tools to impart their knowledge to the next generation of learners. These tools will include culturally responsive teaching and trauma-informed, socio-emotional learning, discussed in previous sub-sections above. Residents will agree upon admission that, upon graduation, they will work as teachers in one of our partner school districts. DPSCD and Dearborn PS will in turn agree to hire these graduates, which may include consideration of applicants who reflect their communities and individuals from underrepresented populations.

**Goal 4 – Excellence: to positively impact student achievement in high-need districts and schools**

Through its research-based approaches to teacher education, culturally responsive teaching, and trauma-informed, socio-emotional learning, the project will cultivate a diverse and highly-qualified cohort of urban teachers who will help improve student learning. Residents will commit to teaching in district partners for a period of no less than three years after completing their coursework and residency and passing the required certification test. During the first two years of induction, residents/completers will receive ongoing mentorship and professional development. As they hone their teaching skills, completers will apply their content pedagogy knowledge in teaching STEM content. With a strong emphasis on mentorship and professional development, the project will produce a workforce of teachers who are confident and passionate about their new roles. We expect completers will remain in urban schools for the remainder of their careers, thereby becoming mentors and high-performing teachers.

Consequently, project completers will positively impact student learning and achievement for three reasons: (a) their strong knowledge of STEM and computer science will be juxtaposed with culturally responsive pedagogy that will make content more engaging and

relevant to urban students; (b) their preparation on trauma-informed, socio-emotional learning will enable them to connect with students undergoing personal challenges that negatively shape their school participation and experiences; and (c) ongoing teacher support through induction and professional development will increase teacher retention, confidence, and content mastery, thereby benefitting student learning and academic attainment.

**A.iii. – The extent to which the proposed project is designed to build capacity and yield results that will extend beyond the period of Federal financial assistance.**

The College of Education is currently undergoing a transformative revision of its teacher certification program – a process that is expected to be completed in 2021. This revision is also undertaken by other educator preparation programs across the state, as mandated by the Michigan Department of Education. The TRUE Project will help inform future revisions to the certification curriculum, including STEM education, culturally responsive teaching, and trauma-informed, socio-emotional learning. It will serve as a prototype for the alternative teaching certification in STEM education at WSU. The project will also create a new model for teacher induction. We will inquire into how to better track and support recent graduates of our teacher certification programs. As the project develops a clear and comprehensive induction plan, we will use its implementation as a model for future induction support for new teachers. Finally, it will offer lessons into how we hold ourselves accountable as an institution of higher education. By tracking our graduates and evaluating their impact on the teaching profession and student learning and achievement, we will be able to identify areas of strength and opportunities for improvement. Thus, the project will be integral to our continuous improvement process, which will help us move forward as a premier teacher education program.

**A.iv. – The extent to which the proposed project represents an exceptional approach for meeting statutory purposes and requirements.**

The TRUE Project is unique in that it addresses two challenges facing metro Detroit: STEM education and workforce development. As stated above, DPSCD and DPS face teacher shortages that threaten to undermine the education quality of secondary students. With a shortage of highly qualified teachers, there is the threat that our next generation of workers and leaders will be unprepared for the high-demand environment of a global economy. By taking action to improving the quality of STEM education, including computer science, we are doing our youth a great service by giving them ample opportunity to compete in a 21st century workforce. Concurrently, the high-tech, professional workforce in metro Detroit is changing as restructuring and layoffs continue in automobile and technology companies. Since last year, the auto companies have announced layoffs of thousands of salaried workers (LaReau, 2019). The project connects these two realities, addressing the needs of both displaced professionals and students in high-need districts that do not have access to quality STEM education. The residency program contributes to workforce development for the state as well as meeting the needs of the schools. We are upskilling professionals to give back, thus creating a mutually beneficial cycle of knowledge, learning, and success.

## B. ADEQUACY OF RESOURCES

**B.i. – The adequacy of support, including facilities, equipment, supplies, and other resources, from the applicant organization or the lead applicant organization.**

*Organizational information:* Founded in 1868, Wayne State University is a nationally recognized metropolitan research institution offering more than 340 academic programs through 13 schools and colleges to nearly 27,000 students. Wayne State is dedicated to preparing students

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to excel by combining the academic excellence of a major research university with the practical experience of an institution that, by its history, location, and diversity, represents a microcosm of the world we live in.

Out of the conviction that education is the means by which human circumstances can be improved, the WSU College of Education prepares professionals who have the commitment and competence needed to help people acquire the knowledge, skills, and understandings enabling them to participate in and contribute to a complex, changing society. To achieve this mission, the college is committed to excellence in teaching, research, and service. The Metro Detroit TRUE Project identifies fully with the university's vision to be "a pre-eminent, public, urban research university known for academic and research excellence, success across a diverse student body, and meaningful engagement in its urban community." Our goals are consistent with the college's theme of "The Urban Educator: Reflective, Innovative, and Committed to Diversity."

*Existing STEM programming and funding:* Wayne State University has experience in receiving and managing large grants from numerous external funders to fund its STEM-related initiatives. Several grants from the Michigan Department of Education have helped establish two Collaborative Opportunities for Reaching Excellence in Mathematics (CORE) programs and the Project REALM (Realizing Equity and Achievement for Learning Mathematics) program. In 2015, WSU received a grant from the National Science Foundation (NSF) to fund the Robert Noyce Teaching Fellows, which provides scholarships to teacher candidates who are becoming mathematics teachers in Detroit schools. The program, funded through 2020, redesigned the curriculum for prospective elementary mathematics teachers, placed them in high-quality residency settings in Detroit schools, and continues to support their initial teaching years through

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significant induction support. As the Noyce Teaching Fellows is an elementary education program, it complements the secondary education focus of the Metro Detroit TRUE Project.

*Facilities:* In collaborating with partner districts, some of the TRUE courses will be held in district locations, while other courses will be held at the university. DPSCD has a dedicated Office of Professional Development, located at Northwestern High School, which is less than 3 miles away from the university. The office maintains a number of classrooms in the building that are used for workshops, seminars, and other meetings. Their classrooms are equipped with wifi internet, technology consoles for audio-visual presentations, SmartBoards, and modular tables and chairs. The building also has labs with Apple and PC desktop computers. As a central location with free parking, off-site courses, seminars, and meetings held in DPSCD will be convened at Northwestern High School.

For Dearborn PS, the Office of Curriculum and Professional Development is located in the district's Administrative Service Center. A former school building, the Center is 13 miles away from the university, and has a number of classrooms that are used for workshops, seminars, and other meetings. These classrooms are also equipped with wifi internet, technology consoles for audio-visual presentations, and modular tables and chairs. The building has labs with Apple and PC desktop computers. An accessible location with free parking, off-site courses, seminars, and meetings in Dearborn PS will be held at the Administrative Service Center.

The College of Education (COE) at Wayne State University is located in a modern four-story building on the main campus; faculty, staff and students enjoy sufficient classroom space and excellent resources conducive to delivering our degree programs. In the COE building, science and mathematics classrooms are fully fitted for laboratory-based activities and have internet wireless capabilities and SmartBoards. In addition, two equipment/prep rooms are part

of the science education classrooms. Equipment includes graphing calculators, calculator based laboratory probes, and high-quality microscopes. The mathematics education classrooms contain a vast collection of teaching tools, including manipulatives, software, models, and a textbook library. All faculty are assigned office spaces equipped with the most current computing equipment. Graduate and undergraduate student assistants are assigned work station spaces.

*Supplies and software:* COE has over 50 Apple and PC computers in three state-of-the-art computer laboratories. It has a room fitted for distance learning with video equipment that supports video making and editing. In addition, faculty have access to two iMac carts, each with 15 wireless laptops to be used in classrooms with wireless capabilities. COE has 15 video cameras, portable and stationary LCD projectors, and document cameras. A special technology grant has provided many faculty with iPads in addition to their existing computing equipment. COE has a full-time technical support staff to provide assistance to students, faculty, and staff.

*Other Resources*: Wayne State University maintains an excellent library system, with a dedicated librarian for COE faculty, staff, and students. The university's main David Adamany Library is a short walk from COE.

**B.ii. – The relevance and demonstrated commitment of each partner in the proposed project to the implementation and success of the project.**

The **College of Education** (COE) is the lead college for the Metro Detroit TRUE Project. The Principal Investigator and everyone else in the project team, with the exception of the Lead Evaluator and one evaluation assistant, are from COE (see Project Team description in section "C. Quality of Management Plan.")

*School District Partners:* COE has had long and extensive partnerships with the **Detroit Public Schools Community District** and **Dearborn Public Schools**. These partnerships range

from research, curriculum, and professional development collaborations, to placements for field practicums and student teaching as well as graduate cohorts for teachers and administrators. Many of these partnerships have been generously supported by federal, state, regional, corporate, and philanthropic grants and funding. For the TRUE Project, COE has received the full support and cooperation of DPSCD and Dearborn PS (see Appendix H - Letters of Support). Both districts agree to serve on the project's advisory board, become residency sites and provide mentor teachers, help recruit residents, and hire and support project completers as full-time teachers. They will also address curriculum alignment and integration, professional development and induction support for residents/completers.

Both school districts have identified at least one "high-need" school each that will serve as the primary residency site for the TRUE Project (see Appendices C and D on "high-need" requirement). DPSCD's Western International High School is a grade 9-12 school with 1,880 students, 80% of whom are considered economically disadvantaged. According to MI School Data for the 2017-18 school year, its graduation rate is 72%, compared to the state's 81%, and its dropout rate is 14%, compared to the state's 9%. Its percentage of qualified teaching staff, defined as teachers who have "current Michigan certification in the subject to which they are assigned," is approximately the same as the state rates for the past three school years (2015-18).

Dearborn PS will use Edsel Ford High School and Fordson High School as its primary residency sites. Edsel Ford is a grade 9-12 school with 1,505 students, 65.7% of whom are considered economically disadvantaged. During the 2017-18 school year, its graduation rate is above 95%, compared to the state's 81%, and its dropout rate is less than 5%, compared to the state's 9%. Its percentages of qualified teaching staff are consistently lower than the state rates for the past three school years (2015-18). Fordson High School is a grade 9-12 school with 2,756

students, 84.6% of whom are considered economically disadvantaged. Similar to Edsel Ford, its graduation rate is above 95%, compared to the state's 81%, and its dropout rate is less than 5%, compared to the state's 9%. Its percentages of qualified teaching staff are also lower than the state rates for the past three school years (2015-18).

*Internal University Partners* (see Appendix H - Letters of Support): The Metro Detroit TRUE Project has confirmed institutional support from the College of Education and the College of Liberal Arts and Science in the form of cost shared salaries and fringe benefits for all project staff with the exception of the project coordinator and student assistant. In addition, the Office of the **Provost** and the Office of the **Vice President of Research**, which has committed $600,000 over four years to our project (see matching funds table in Appendix H).

The **College of Liberal Arts and Sciences** (CLAS) will serve on the project's advisory board. Since the content areas of mathematics and sciences are in various CLAS departments, their partnership is crucial for course development and content support, especially for residents who may need additional or refresher coursework to pass the required certification tests. The CLAS Dean and department chairs of mathematics and sciences are part of the university-wide P-12 Educator Preparation Council, convened by the TRUE Project's principal investigator. Hence, a working relationship between the CLAS and the College of Education has been established, and is ready for additional collaboration.

The College of Engineering, which houses the Department of **Computer Science**, will be on the advisory board. We will work with the department to develop a new endorsement curriculum for Industrial and Technology Education that will enable certified teachers to teach computer science in schools and to meet the newly approved K-12 Computer Science Standards from the Michigan Department of Education.

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*External Partners* (see Appendix H - Letters of Support): The **Michigan Department of Education** will be part of the project's advisory board, and will assist with project marketing, recruitment initiatives, certification processing, and curriculum review and approval.

A powerful voice for businesses in Michigan, the **Detroit Regional Chamber** will be on the project's advisory board. Its support of the project is rooted in its commitment to build a better economic climate and stronger network for its members, including efforts focused on education, economic development, and workforce preparedness. The Chamber will support the project's recruitment efforts, especially to upskill displaced workers to become teachers.

With two of its largest school districts in the TRUE Project, **Wayne Regional Education Service Agency** will serve on the advisory board. It will help address outreach and mentoring, curriculum, professional development, and induction support in order to recruit, employ, and retain diverse and highly-qualified STEM teachers in urban schools.

The **Engineering Society of Detroit** promotes excellence, innovation, cooperation, and professional networking in engineering and allied professions. It will assist in recruiting potential applicants, especially displaced workers in automobile and technology industries who may be interested in becoming teachers.

## C. QUALITY OF THE MANAGEMENT PLAN

In this section, the project's logic model, work plan, and team will be discussed as crucial aspects of our management plan's successful development and implementation.

**Logic Model:** According to the US Department of Education's Institute of Education Sciences, a logic model is a "visual representation" utilized for "effective program planning, collaboration, and monitoring. It defines the four components of resources, activities, outputs, and outcomes, and explains how they connect. Using logic models can help practitioners and

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evaluators better understand a program's mechanics and structure and chart a course toward improved policy and practice." The Logic Model for the Metro Detroit TRUE Project (see Appendix F) is centered on the four goals of Teaching, Residency, Urban, and Excellence. These goals are underpinned by key assumptions related to the persistent shortage of highly qualified teachers, especially in STEM and computer science (CS) fields; Wayne State University as a leader in urban teacher preparation; and the upskilling of mid-career STEM and CS professionals to transition as school teachers. Two major external factors shape these goals: the uncertain work conditions in the automobile and technology industries in metro Detroit due to recent and pending plant closings and worker lay-offs; and the continuation of funding and partnerships to build upon and sustain the project's goals, programs, and processes.

With these TRUE goals, assumptions, and external factors in mind, the project's Logic Model delineates more fully the four components of inputs (or resources), activities, outputs, and outcomes. More specifically, the goals lead to identifying inputs needed to attain them, which are subsequently followed by activities that will carry out the goals through particular inputs. These activities aim to generate concrete and measurable outputs that will produce particular transformative outcomes related to the four TRUE goals. These outcomes will include: positive results in student learning and academic progress; a greater number of diverse and highly-qualified teachers with STEM and CS content expertise; a new urban teacher preparation model, especially for STEM/CS education, with school-based residency, culturally responsive and trauma-informed approaches; and a new induction model for greater retention of new teachers, especially in urban schools.

**Work Plan:** The project's Work Plan (see Table 5 on page 39) offers a visual and more detailed depiction of the Activities section of the Logic Model. In particular, it delineates the

Activities' five aspects of strategic planning, outreach and recruitment, coursework and residency, induction, and evaluation. Each aspect includes one to six specific plans of action with timelines over a five-year period. For instance, strategic planning and evaluation will take place throughout the duration of the project. Outreach and recruitment will be targeted during the first two years to attract applicants for the two cohorts of residents, whereas induction will take place during the last three years as residents complete their coursework and residency and begin their careers as full-time teachers. The coursework and residency aspect will involve: implementing the 18-month curriculum for a master's degree and teaching certification; developing a new endorsement curriculum for computer science teaching competency; incorporating strategies for trauma-informed, socio-emotional learning and culturally responsive teaching; collaborating with district partners, school mentor teachers, and university coaches on residency programming; and helping residents prepare for and pass teaching certification tests.

The Work Plan demonstrates how the five-year period of the Metro Detroit TRUE Project will unfold. Year 1 will be the main period for strategic planning with the project team, partners, and other stakeholders, and working with the evaluation team to delineate instruments and processes to continuously assess the project's process, impact, and effectiveness. During Year 1, curriculum matters, such as state standards, quality assurance system, socio-emotional learning and culturally responsive teaching, STEM integration, and the new endorsement curriculum for computer science teaching, will be addressed. The hiring and on-boarding of project personnel, such as course instructors, residency and induction coaches, and working with district partners to identify mentor teachers in selected residency schools will also take place at this time. For the first cohort of residents, recruitment will take place in Year 1, and their coursework and residency will be in Year 2. As they complete their master's projects, they will

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simultaneously start their career as full-time teachers in Year 3; hence, their two-year induction will take place in Years 3 and 4. For the second cohort of residents, recruitment will be in Year 2, and their coursework and residency will be in Year 3. As they complete their master's projects, their induction will take place simultaneously in Years 4 and 5. As a result, the project will graduate two cohorts, and will continue supporting them during the first two years of full-time teaching. During Years 4 and 5, three main activities will occur: promoting the project through feature stories of residents/completers and their impact on STEM teaching and student learning; evaluating the overall process and impact of the project; and planning for scaling up, replicating the project in other contexts and/or other teaching fields; and exploring additional financial support for project extension and sustainability.

*Outreach and Recruitment*: One specific aspect of the Work Plan (see Table 5 on page 39) that deserves additional attention is the outreach and recruitment of TRUE residents. Other sections and sub-sections of the grant proposal discuss other aspects of the Work Plan. For instance, for strategic planning, the project team is in the next sub-section and the project partners are in the previous section on "B. Adequacy of Resources." Details on coursework and residency and on induction are in the first section on "A. Quality of Project Design," while plans for evaluation are in the last section on "D. Quality of Project Evaluation." Since this project has a particular target for potential residents, a more concrete plan is necessary and important.

To be led by the project's Recruitment Specialist, we will strategically recruit diverse mid-career professionals in STEM fields, including computer science. We will leverage existing partnerships to gain new partners that can provide access to other pools of potential residents. To attract precariously employed workers in the automobile and technology industries, we will participate in open houses and other events geared toward displaced workers in these industries.

We will work with career counseling services that support displaced workers and with other contacts in companies and unions interested in facilitating career transitions of precarious workers to the teaching profession. An intensive outreach campaign will be launched, including social media (e.g., Facebook, Instagram, Twitter), print posters and materials for distribution, and press releases for print, broadcast, and online media. A website will be developed with information about the project and an easy sign-up for interested applicants' names and contact details. We will work with university partners, such as the College of Liberal Arts and Sciences and the College of Engineering, to reach out to their alumni, and with district partners to post project posters in their schools. Other partners, such as the Michigan Department of Education, Detroit Regional Chamber, and Engineering Society of Detroit, will assist in identifying outreach contacts. We will develop a database of potential applicants, outreach resources, and contacts, and will follow-up with them by email, by phone, and/or in person.

## Table 5. Work Plan – Metro Detroit TRUE Project

Note: Q1: July – September  Q2: October – December  Q3: January – March  Q4: April – June

| Category | Activities | Y1 Q1 | Y1 Q2 | Y1 Q3 | Y1 Q4 | Y2 Q1 | Y2 Q2 | Y2 Q3 | Y2 Q4 | Y3 Q1 | Y3 Q2 | Y3 Q3 | Y3 Q4 | Y4 Q1 | Y4 Q2 | Y4 Q3 | Y4 Q4 | Y5 Q1 | Y5 Q2 | Y5 Q3 | Y5 Q4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Strategic Planning | plan, execute, and assess with project team and partners (school districts, internal, external) | | plan | | cycle: implement, assess, revise (as needed) → | → | → | → | → | → | → | → | → | → | → | → | → | → | → | → | → |
| Strategic Planning | integrate state standards and national accreditation quality assurance system | | integrate standards | integrate standards | COHORT #1: quality assurance → | → | → | | | COHORT #2: quality assurance → | → | → | | | | | | | | | |
| Outreach & Recruitment | develop and execute outreach campaign | | COHORT #1: recruit | COHORT #1: recruit | | COHORT #2: recruit | COHORT #2: recruit | | | feature stories of residents, completers, and overall project → | → | → | → | → | → | → | → | → | → | → | → |
| Outreach & Recruitment | implement accelerated teacher certification + master's curriculum | | curriculum planning | curriculum planning | COHORT #1: coursework → | → | → | | | COHORT #2: coursework → | → | → | | | | | | | | | |
| Coursework & Residency | incorporate trauma-informed, socio-emotional learning (SEL) and culturally responsive STEM education | | SEL + STEM integration plan | SEL + STEM integration plan | COHORT #1: SEL + STEM integration → | → | → | | | COHORT #2: SEL + STEM integration → | → | → | | | | | | | | | |
| Coursework & Residency | develop and implement new curriculum for computer science | Computer Science: develop + approval → | → | → | → | | | | | Computer Science: implement → | → | → | → | | | | | | | | |
| Coursework & Residency | collaborate with school districts on residency programming | | residency planning | residency planning | COHORT #1: residency → | → | → | | | COHORT #2: residency → | → | → | | | | | | | | | |
| Coursework & Residency | create cohesive support with university-based coaches and school-based mentors | | support planning | support planning | collaboration between coaches and mentors → | → | → | → | → | → | → | → | | | | | | | | | |
| Coursework & Residency | help residents pass teaching certification test | | | | | test prep + pass | test prep + pass | | | test prep + pass | test prep + pass | | | | | | | | | | |
| Induction | create and implement induction program for new teachers | | | | | | induction planning | induction planning | | COHORT #1: induction → | → | → | → | COHORT #2: induction → | → | → | → | | | | |
| Evaluation | assess project's process, impact, and effectiveness | ongoing evaluation → | → | → | → | → | → | → | → | → | → | → | → | → | → | → | → | → | → | → | → |

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**Project Team***:* The team will be comprised of forward-thinking and committed faculty and staff at Wayne State University, with professional and research experiences in urban schools and communities.

*Principal Investigator and Project Director* **– Roland Sintos Coloma**, Ph.D., is Professor and Assistant Dean of Teacher Education in the College of Education. With a Ph.D. in Cultural Studies in Education and a Minor in African American Studies from The Ohio State University, he served as an urban high school teacher in the Los Angeles area, and as a faculty member and administrator in Ohio, Kentucky, and Toronto, Canada. He has garnered grants and fellowships from the Social Sciences and Humanities Research Council in Canada and from the AERA-Spencer and Mellon foundations in the United States. As Assistant Dean, Coloma is chief academic and financial officer of the Division of Teacher Education, in charge of 28 full–time faculty, over 50 part-time faculty, eight academic and administrative staff, and over 950 students in 22 undergraduate and graduate degree programs, certifications, and endorsements. To address the critical teacher shortages in Michigan, he has developed a new alternative teaching certification pathway, a new high school dual-enrollment pathway, and a new Minor in Urban and Equity Studies in Education. He is responsible for developing new and enhancing existing partnerships with school districts in the metro Detroit region and the state Department of Education, and helped lead the College of Education's successful CAEP accreditation in 2019.

In his role as the Metro Detroit TRUE Project Director, Coloma will be in charge of the project's overall curriculum, residency/induction, partnership, and financial planning, execution, and evaluation. He will convene regular meetings with project team on goal targets, processes, implementation, and attainment, and will oversee the hiring and evaluation of course instructors and residency/induction coaches. His other duties will include: collaborating with school district

partners; convening bi-annual meetings with project partners for planning, updates, and assessment; working with college budget personnel on project's financial management, living stipend disbursement to residents, payment of instructors and coaches, etc.; working with university personnel to facilitate residents' application, registration, financial support, and career transition to teaching; working with college accreditation and assessment personnel to ensure project's alignment with existing quality assurance system and continuous improvement process; seeking additional financial donations to support residents' tuition and fees; and writing and submitting annual reports.

*Project Coordinator* – **Sarah Schrag**, M.B.A., is Research Coordinator in the College of Education. She earned a master's degree in Business Administration from Wayne State University. Schrag has extensive administrative and financial management experience with grants that faculty have garnered from federal, state, regional, corporate, and philanthropic agencies, including the National Science Foundation, Kellogg and Skillman foundations, and Michigan Department of Education. In her role as Project Coordinator, Schrag will support the project's administrative, financial, curriculum, and partnership planning, implementation, and evaluation. She will provide administrative support to the project Director and team; work with the Office of Research on grant reports and budget management; collaborate on project data for evaluation and quality assurance system; schedule and take notes during meetings; and develop contact lists and databases for project team and partners; applicants, residents, and completers; course instructors, residency/induction coaches, and mentor teachers.

*Curriculum Coordinator* – **Elsie Babcock**, M.A., is Lecturer and Director of Undergraduate Studies and Teacher Certification in the Division of Teacher Education. She was a teacher and mathematics specialist in Detroit Public Schools Community District, and Director

of the Mathematics and Science Center at Wayne Regional Education Service Agency. With an extensive grant-funded background, she is the induction director of a W.K. Kellogg Foundation W. Wilson Teaching Fellowship program; coordinator of the Dream Keepers Urban Teacher Residency; and director of a Science grant project, supported by the Michigan Department of Education. As Curriculum Coordinator, Babcock will oversee the implementation of the 18-month Master's degree and teaching certification and the development of the endorsement curriculum for computer science teaching competency. She will handle course scheduling, locations, and modes of delivery; as well as faculty planning, teaching, and on-boarding. She will serve as the initial contact person for applicant inquiries and program information, and will work with university personnel for registration, financial aid, and certification test support.

*Residency and Induction Coordinator* – **Linda Hicks**, Ed.D., is Assistant Director of Educational Partnerships and Experiences in the Division of Teacher Education. She holds an Ed.D. in Education Leadership, Policy and Management from Seton Hall University in New Jersey. She was a teacher, principal, assistant superintendent, and eventually superintendent of two districts in Michigan – South Redford School District and Battle Creek Public Schools. As the project's Residency and Induction Coordinator, Hicks will work with partner districts to place residents with high-performing mentor teachers; coordinate, co-plan, and facilitate seminars for residents and completers, as well as professional development for mentor teachers and residency/induction coaches; provide oversight for residency/induction coaches; and assess effectiveness of seminars and professional development on a continual basis.

*Lead Advisor* – **Beverly Schneider**, M.A., is an Academic Advisor in Teacher Education. She provides guidance and counseling support to students seeking initial teaching certification at the post-bachelor and master's level. She was a teacher, staff member in the

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Office of Desegregation, and executive director of Human Resources in Detroit Public Schools Community District. For the TRUE Project, Schneider will serve as the lead advisor for all residents. She will collaborate with the project team to vet applicants, review admissions materials, and advise all residents on coursework and other matters, such as completing prerequisites, professional sequence and degree requirements, and transition to teaching.

*Recruitment Specialist* – **Truman Hudson**, Ed.D., is the Outreach and Marketing Specialist in the Division of Teacher Education. For the TRUE Project, he will take the lead in developing and implementing the project's outreach and marketing strategy. He will develop social media campaigns, website, press releases, feature stories, and print materials. He will identify contacts and events for outreach; work with partners to identify outreach contacts; and participate in open houses and other events geared toward STEM fields, including computer science. He will also work with career counseling services that support displaced workers in the automobile and technology industries, and identify key contacts in those industries who would be interested in supporting career transitions of their workers.

*Residency and Induction Coaches* – Residency Coaches (10, TBD) and Induction Coaches (4, TBD) will be responsible for co-planning lessons and observing residents co-teaching; providing feedback on residency- and course-related assignments; working with digital tools for pedagogical practice, grading, and course data; supporting residents in e-portfolios, professional dispositions, and teacher identity and transitions; and providing additional support for first two years of full-time teaching. Induction will be ongoing support and guidance, and coaches will meet regularly with completers and provide vital feedback on their performance and ways to improve. Coaches will be required to have a commitment to educational equity; passion

for preparing effective urban educators; an education degree, preferably in a STEM education area; experience teaching in urban K-12 contexts; and experience in instructional coaching.

*Course Instructors* (TBD) will have content expertise in the primary area of teaching responsibility. Instructors will provide course syllabi to residents and the project team, prepare and upload materials to the university's learning management system, maintain rigor and assign readings, provide and grade assignments, and utilize technology to enhance teaching and learning. Instructors will employ appropriate assessment techniques to measure resident performance, and will submit course assessment and quality assurance system data. Support will be provided to course instructors, so that culturally responsive teaching and trauma-informed, socio-emotional learning will be integrated in course readings, assignments, and discussions.

*Lead Evaluator* – **Stephanie Hartwell**, Ph.D., is Dean of the College of Liberal Arts and Sciences and Professor of Sociology at Wayne State University. She received her Ph.D. in Sociology from Yale University, and was a faculty member at the University of Connecticut and the University of Massachusetts Boston. She has published more than 45 peer-reviewed articles and chapters, and has received over $8 million in grants to fund her research. She has extensive experience as a lead evaluator on grants and projects, ranging from criminal justice and crime reduction to trauma, recovery, substance abuse, and mental health. As the project's Lead Evaluator, Hartwell will oversee and implement all aspects of the evaluation plan: including qualitative and quantitative methods; working with project team, partners, and graduate assistants; providing quarterly reports on progress toward project goals and recommendations to support continuous improvement; and submitting a final report with highlights on effective strategies and recommendations for sustaining, improving, and replicating practices.

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*Evaluation Assistants* – Two graduate students (TBD, one from the College of Liberal Arts and Sciences and another from the College of Education) will work with the Lead Evaluator, and will assist with evaluation data collection, management, analysis, and reporting. They will administer surveys and conduct individual and focus group interviews. They will interface with project team, partners, and residents/completers to determine and assess goals, objectives, and needs. They will help prepare policy/program briefs and research articles for presentations and publications.

## D. QUALITY OF THE PROJECT EVALUATION

**D.i. – The extent to which the methods of evaluation will provide valid and reliable performance data on relevant outcomes.**

The Logic Model for the Metro Detroit TRUE Project (see Appendix F) offers seven different outcomes that are ultimately connected to the project's four central goals of Teaching, Residency, Urban, and Excellence. Table 6 below on Evaluation Questions and Data Collection provides a more detailed articulation of the outcomes from the Logic Model as specific evaluation questions and how these questions will be answered through qualitative and quantitative methods.

For Goal 1 – Teaching, three evaluation questions will ask about: awareness and recruitment of mid-career STEM and CS professionals to teaching; improving their STEM and CS teaching knowledge, skills, and dispositions; and reduction of teacher shortage. For Goal 2 – Residency, an evaluation question will focus on the preparation of coaches and mentors to work effectively with residents during their residency and induction periods. For Goal 3 – Urban, a multi-part question will address the components of a high-quality urban teacher preparation that

will include culturally responsive and trauma informed approaches, residency-based integration

of theory and practice, and comprehensive mentoring and support. For Goal 4 – Excellence, a

question will delve into the impact of project residents/completers on student learning and

academic progress. Two additional evaluation questions will inquire into partnerships and into

scale and replication. The partnership question will investigate how internal and external partners

support the project's goals, process, and outcomes. The scale and replication question will pursue

the possibilities for enlarging participation in terms of number and teaching fields and for

reproducing the project model in other institutions and contexts.

**Table 6. Evaluation Questions and Data Collection**

| Evaluation Questions | Data Collection |
| --- | --- |
| Goal 1 – To what extent has the TRUE Project brought greater awareness and successfully recruit diverse mid-career professionals in STEM and CS fields to teaching? | interviews, focus groups |
| Goals 1 – To what extent does the TRUE Project residents successfully complete program activities and improve their: (1) knowledge, (2) skills, and (3) dispositions, related to STEM and CS teaching and learning? | surveys, interviews, focus groups, document analysis |
| Goals 1 – To what extent does the TRUE Project reduce the teacher shortage in high-need school districts? | document analysis |
| Goal 2 – To what extent does the TRUE Project successfully prepare coaches and mentors to work effectively with residents during their residency and during their first two years of induction as full-time teachers? | interviews, focus groups |
| Goal 3 – To what extent does the TRUE Project develop and implement a high quality, urban teacher preparation program for secondary STEM and CS teachers with the following components: (a) research-based, innovative coursework that is culturally responsive and trauma informed to students in high-need districts; (b) teacher preparation with residency experiences that integrate theory and practice; and (c) high-quality mentor and induction support? | surveys, interviews, focus groups, document analysis |
| Goal 4 – What is the impact on student learning and academic progress by TRUE Project residents and completers? | interviews, focus groups, document analysis |

| | |
|---|---|
| Partnership – How have internal and external partners supported the TRUE Project goals, processes, and outcomes? | interviews, document analysis |
| Scale and Replication – What progress has been made toward disseminating, sustaining, and "scaling up" activities and strategies, and to what extent does the TRUE Project serve as a model for other institutions or partnerships? | interviews, focus groups, document analysis |

Data collection for the evaluation questions will involve quantitative and qualitative approaches (Creswell & Creswell, 2018). For the quantitative approach, valid and reliable data can be obtained from the residents' performance during coursework and residency. From our recent national accreditation process, various measures for professional dispositions, lesson planning and implementation, integration of educational technology for teaching and learning, student case study, and digital self-study have undergone validation and inter-rater reliability. Additional data will be obtained from the Michigan Department of Education which will provide results from the required teaching certification tests as well as exit surveys of recent completers, surveys of graduates after one to five years, and principal satisfaction surveys. For the qualitative approach, validity of data will be obtained primarily through triangulation of sources/participants and methods. The sources/participants will include the residents/completers, residency/induction coaches, mentor teachers, and course instructors. The qualitative research methods will consist of individual interviews, focus group interviews, and document analysis.

Moreover, for the Project Objectives and Performance Measures Information included with this application, specific quantitative data will be used to measure target attainment. The project will have three objectives: the successful transition and employment of mid-career professionals in STEM and CS fields to school teaching; the residents' success in school-based residency; and the completers' effectiveness as full-time teachers during their induction period. Each objective has two to three quantifiable performance measures. For instance, for the first

objective, at least 80% of the residents will pass the state certification tests and become certified teachers in mathematics or science. For the second objective, at least 80% of the residents will receive satisfactory or effective rating on their lesson plan assignments. And for the third objective, at least 80% of employed completers/graduates will be rated effective at the end of their first year of full-time teaching employment.

**D.ii. – The extent to which the methods of evaluation are thorough, feasible, and appropriate to the goals, objectives, and outcomes of the proposed project.**

The Metro Detroit TRUE Project evaluation will have two components: (1) a *process* evaluation; and (2) and *impact* evaluation. Table 7 below provides details on the evaluation timeline and activities, and delineates if the activities will be tied to process or impact evaluation and if the data needed will derive from primary or secondary sources.

During **Year 1**, grant efforts will be documented including strategic planning processes and partners and outreach and recruitment activities. We will also assess the curriculum and identify enhancements for teachers working in urban areas. Methods of administering the stipends, matching mentor teachers and residency coaches, as well as setting up school-based residencies and job placements will be documented.

During **Year 2**, we will begin separate focus groups with project stakeholders at DPSCD and Dearborn PS, including the residents, mentor teachers, and school administrators. Each focus group will have 6 to 8 participants and participants will be given $10 gift cards for participation. While the process information will be collected as primary data, secondary data on number of project recruitments, number yielded, number matriculated, and target populations will also be assessed to provide formative feedback to the project team on the applicants/residents pipeline so adjustments can be made, where necessary.

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**Years 3-5** will assess project impact answering questions including: are these partnerships viable and sustainable? Are we recruiting and preparing the residents we had hoped to? Are residents completing the master's degree and teaching certification program in 18 months? Are the mentor teachers effective? Are residents succeeding in their school placements? Are residents passing the state certification exams? Are they being employed by partner school districts? Do these variables look the same or different in the Detroit and Dearborn schools? Measures of program impact include increased student performance as attained from de-identified student records. Additional measures include assessing instruments for teacher preparation effectiveness, such as lesson planning, professional dispositions, student case study, digital self-study, and exit surveys. During Years 3-5, process evaluation on project instrumentation as well as assessing project procedures and goal attainment will be undertaken.

The evaluation team will discern increased awareness of STEM, including computer science, teaching as an alternative profession by tracking program inquiries as well as recruitments. We will track number and demographics of baseline teachers in the schools from year 1 to 5 to learn if there is an increase in the number of teachers in general and minority teachers in particular. We will assess the training and residency impact on the percentage of program graduates who complete the required 3-year commitment to teach in Detroit or Dearborn public schools and successfully pass the certification exams. The evaluation team will randomly select 15 residents to interview for Baseline (program admission), Time 2 (T2 - month 12 of program when stipend will stop), and Time 3 (T3 - upon program completion). The interview cohort will receive gift cards at Baseline, T2 and T3 with increasing amounts up to $40 at T3 for their time.

The Evaluation Team will include an Evaluator and two graduate student assistants trained in program evaluation, data collection, and analysis, as well as focus groups and interviewing. The evaluation team will provide quarterly evaluation reports on both the process and impact arms of the evaluation, and will meet with the project team and advisory board annually.

**Table 7. Evaluation Timeline and Activities**

| Year | Evaluation Activity | Evaluation Component | Data Type |
|---|---|---|---|
| 1 | • Observe and document processes, activities, planning<br>• Document curriculum enhancements<br>• Methods – stipend distribution, residency placement | Process | Primary |
| 2 | • Focus group interviews with faculty, coaches/mentors, administrators | Process | Primary |
| | • Utilization data: #s recruited, yield, matriculated | | Secondary |
| | • Cohort #1 – Resident interviews baseline | Impact | Primary |
| 3 | • Cohort #1 – Resident interviews T2<br>• Cohort #2 – Resident interviews baseline | Impact | Primary |
| | • Demographics of residents<br>• Student achievement | | Secondary |
| 4 | • Assessment of project instrumentation | Process | Primary |
| | • Cohort #1 – Resident/completer interviews T3<br>• Cohort #2 – Resident interviews T2 | Impact | |
| | • Student achievement | | Secondary |
| 5 | • Certification exam pass rates<br>• Completion and retention rates<br>• Student achievement | Impact | Secondary |
| | • Cohort #2 – Resident/completer interviews T3 | | Primary |
| | • Observe and document processes, goals attainment | Process | Primary |