



THE WOODROW WILSON
National Fellowship Foundation

**The Woodrow Wilson Ohio Teaching Fellowship:
A Five-Year Statewide Investment to Improve
Teacher Preparation**

A report

by the Woodrow Wilson National Fellowship Foundation

February 2017

Introduction: Addressing the Shortage of STEM Teachers in Ohio

In March 2010, Arthur Levine, President of the Woodrow Wilson National Fellowship Foundation, and Eric Fingerhut, then-Chancellor of the Ohio Board of Regents announced the creation of the Woodrow Wilson Ohio Teaching Fellowship—the third in a series of state-based programs designed to improve teacher preparation, attract outstanding candidates to teaching, and reduce teacher attrition. In their words, “Ohio needs its young people to be far ahead of [the] curve. We need to give math and science teachers the kind of preparation that truly motivates and equips all our students to succeed. And that requires collaborations among the universities that prepare teachers, the schools where they teach, and the state-level leadership that supports their efforts.”

Both Ohio’s state leadership and its foundation community recognized that, to move forward in a global economy, Ohio would need a highly trained workforce that would attract high tech companies to the state. Though STEM shortages have been a pervasive problem for decades, with the election of a new Governor in 2008, there was call to action from state higher education executive officers to address the STEM shortage areas as well as the growing achievement gap.

In the years leading up to 2010, the state had significant teacher shortages in ten subject areas, with the greatest need in mathematics, sciences, and special education. These shortages, already severe, were projected to worsen as the state looked to adopt new rules for additional math and science courses required for graduation. There were also indicators that the state would adopt the common core standards, which required additional high level math and science preparation for all high school students taught by highly qualified and “effective” teachers. This program was seen by public and private entities as a way to address teacher shortages, increase the level of teacher performance in STEM subject areas, and help to close a widening achievement gap.

Supported by more than \$16 million in funding from the State of Ohio and private foundations, the program selected as partners seven Ohio universities: John Carroll University, Ohio State University, Ohio University, the University of Akron, the University of Cincinnati, the University of Dayton, and the University of Toledo. From 2011 to 2016, the WW Ohio Teaching Fellowship worked with these partner institutions to redesign their teacher education programs and recruit highly qualified candidates to careers in teaching.

In collaboration with these seven Ohio partner institutions, the Woodrow Wilson Teaching Fellowship (WWTF) has recruited and prepared four cohorts of highly qualified STEM teachers for the most challenging and hard-to-fill positions in Ohio’s high-need urban and rural school districts. The Woodrow Wilson National Fellowship Foundation has had significant influence in improving and supporting STEM teacher training in Ohio, and the WWTF model has been incorporated into the partner institutions’ permanent course and degree offerings.

The Woodrow Wilson Foundation’s History of Education Reform

Before coming to Ohio, the Foundation already had a history of addressing teacher shortages in Indiana as well as Michigan. In addition, the Foundation could draw on its experiences with recruiting teachers through two other successful national Fellowship programs with which it had honed its capacity to manage a program based within a state as large as Ohio, the seventh most populated state in the nation.

The Annenberg Fellowship, based at Stanford University and the Universities of Pennsylvania, Virginia and Washington, was the first of Woodrow Wilson’s model teaching fellowship programs and set the stage for the Teaching Fellowships initiative in several ways. First, a rigorous selection process was applied in order to identify exceptionally able candidates. Second, candidates were placed at top teacher education programs with the expectation that the curriculum would be reorganized to allow a minimum of three days of in-school clinical placement for the first semester, four days in the second semester. Third, Fellows committed to teach in a hard-to-staff school for three years, with close supervision and coaching support from a mentor, following the clinical year. Finally, it was intended that this program would go to scale, influencing teacher education programs at other top universities to adopt an intensive clinical model combined with mentoring. The transformative intent, ultimately, was to develop a stronger approach to teacher education and induction, one that would improve student outcomes as well as retention of new teachers, particularly in hard-to-staff schools.

The Rockefeller Brothers Fund Fellowships for Aspiring Teachers of Color (RBF) took this model and focused it on preparing teachers of color in all disciplines, responding to the significant national need for greater racial and ethnic diversity in the teaching force. A larger pool of partner universities was identified and their programs reviewed and approved by Woodrow Wilson staff in order to allow them to recruit Fellows. Both Annenberg and RBF relied on a nomination process that made recruitment of highly qualified candidates easy; participating universities identified their top choices, and WW selected and admitted what turned out to be extremely successful cohorts. Retention rates in the clinical year averaged just above 95 percent for Annenberg and 98 percent for RBF, with 100 percent placement of certified Fellows in teaching positions in underserved schools.

Next came the Woodrow Wilson Indiana Teaching Fellowships, which had as its two primary goals to recruit the best and brightest to careers in middle and high school teaching—specifically in science and math, the state’s areas of greatest need—and to improve the quality of teacher preparation in Indiana’s, and ultimately, America’s, colleges and universities. Diverging slightly from the Annenberg and RBF models, the Indiana program, funded by a grant from the Lilly Endowment, was the first to focus reform efforts on STEM teaching, to target a particular state, and to attempt to make rapid, tangible change by concentrating the placement of well-trained teachers within specific hard-to-staff districts. A conversation about sustainability also began as Indiana state officials and university partners contemplated the ways in which teacher preparation would change permanently as a result of the project. The process in Indiana and subsequently in Michigan offered templates and trial runs for the work that would follow.

In this context, the Woodrow Wilson Ohio Teaching Fellowship program was a crucial addition to the slate of existing Woodrow Wilson programs—the largest and most varied WW Teaching Fellowship to date. It constituted a major education commitment by Ohio state leadership and philanthropy to reform the state’s teacher preparation, dedicated to the objective that all Ohio children—especially the most vulnerable among them—would receive the excellent science and math education they needed in order to compete in the 21st-century global economy.

How the WW Teaching Fellowship Program Works

The Woodrow Wilson Teaching Fellowship was launched in Indiana in 2007, expanded to Michigan and Ohio in 2009 and 2010, and has since added New Jersey (2012) and Georgia (2013). The program seeks both to increase the quantity and quality of math and science

teachers for high-need urban and rural schools and to improve the quality of university-based teacher education by creating models of exemplary practice at participating universities.

The program works in states where there is a severe shortage of qualified teachers in math and science, where student achievement in these subjects needs to be strengthened and where the achievement gap is large. It seeks to build a better-prepared workforce, supporting each state's economic development by preparing the next generation to succeed in a global and technology-based economy.

The WW Teaching Fellowship concentrates its efforts in the state's troubled urban and rural districts, which have the greatest difficulty recruiting and retaining strong teachers in the STEM fields (science, technology, engineering, and math). Working through master's degree programs, the Fellowship recruits and prepares a critical mass of STEM teachers for high-need middle and high schools. Relatively small numbers of Fellows can have a large effect on these districts.

Addressing challenges in teacher retention in high-need schools, also a critical factor in the achievement gap, is a key focus of the Woodrow Wilson Teaching Fellowship. The Fellowship relies on a full school year of clinical experience in a high-need school as part of Fellows' preparation, followed by three years of mentoring once Fellows become teachers of record. By recruiting subject matter experts and focusing on preparing them extensively for the classroom environments in which they will teach, the Fellowship seeks to improve teacher retention.

Working with whole states, the program not only recruits and prepares STEM teachers, but also transforms the way universities prepare them, seeking to repair systemic problems in university-based teacher education. In the five states where the Woodrow Wilson Teaching Fellowship now operates, the Fellowship has partnered with 28 universities to create model teacher education programs. The goal is that the Fellowship approach—rigorous academic preparation, extended clinical experience, ongoing mentoring, and strong collaboration between schools of arts and sciences and schools of education as well as targeted partnerships with school districts—will transform teacher education in these states. At a number of participating institutions in the Fellowship states, innovations developed through the WW Teaching Fellowship have become the standard for all teacher preparation programs. Many of those innovations have been shaped by the Woodrow Wilson Foundation's experience in working with Ohio and other early partners.

Selecting the University Partners in Ohio

In Ohio, the process for selecting partner institutions began with an invitation from the Foundation to apply, which was sent to all 61 eligible in-state universities and colleges that prepared math and/or science teachers in Ohio. Of those 61 universities, 24 completed an application and were invited to the press event, a conference held at the offices of the Board of Regents; there, Arthur Levine and Chancellor Fingerhut jointly provided an overview of the program as well as the expectations for participation. The later selection of successful applications was a joint process that involved the Ohio Board of Regents. The Chancellor assigned staff to meet with Foundation representatives as they reviewed applications and made selections for site visits.

A Foundation visit or site review for a potential WWTF partner campus typically includes a series of conversations with the institution's president and provost; deans of the schools of arts and sciences, engineering, and education; faculty of these schools; and superintendents and district hiring managers in prospective partner districts. Once the university is selected as a partner, a

second meeting is held at which goals and priorities for the program are agreed upon and the beginnings of a memorandum of understanding—to be jointly signed by the Foundation and the university President—are outlined. At this meeting, the Foundation and the university decide how the collaboration will ultimately shape teacher education at the university; the provost as PI for the project then meets with key stakeholders, including deans of arts and science, engineering, and education, as well as senior administrators such as the heads of admissions, marketing, and student affairs. This process affirms that this is the direction the program will take and that there will be high-level accountability.

The process was much the same in Ohio: After a thorough review of the applications and the corresponding comprehensive site visits, which included a visit to the university's key school partners, the Foundation and the Chancellor selected institutions that they believed were best positioned to meet the goals of the Fellowship.

In Ohio there were two rounds of institutional selection. In the first round, four institutions were selected to partner with the Foundation in 2010. In the second round, an additional three institutions were funded, bringing the total number of partner institutions in Ohio to seven in 2012. The project was made possible thanks to the generosity and vision of both the Ohio Board of Regents and the Ohio Department of Education.

In addition to identifying institutions with strong leadership that were committed to making STEM education a priority, Woodrow Wilson wanted to be sure that the program would truly address the needs of the state. From

a geographic standpoint, the institutions that were selected served all six of the state's largest cities (Columbus, Cleveland, Cincinnati, Toledo, Akron, and Dayton) as well as some of the state's highest-need rural areas in southeastern Ohio. The map at right exhibits the geographic reach of the program and shows the year in which each university became a Woodrow Wilson partner.



As in other states, once institutional selection was completed, programs were required to form a planning committee that included faculty from the schools of arts and science, engineering, and education, as well as school district personnel. This team worked together to revise the existing curriculum and decide what the clinical fieldwork would look like. Each university and its partner district for the clinical fieldwork signed an MOU that outlined their agreement. It is the Foundation's practice to intervene to communicate the importance of the transformation if challenges occur during this phase. The revised curriculum was approved by the state agencies and later endorsed by the Foundation. The universities were then authorized to recruit and admit Fellows into the new program.

To affirm this partnership and raise the profile of the Fellowship, each year the partner universities were invited to a media event announcing that year's cohort of Fellows, held at the Statehouse in Columbus with the Chancellor, representative Fellows from each campus, and the media. These announcement events, broadcast statewide, not only signaled the importance of the transformative work to which the campuses had agreed, but also helped to dignify the profession and signal the importance of teacher by presenting impressive new teacher candidates to the public. (*See Appendix I for full list of Fellows named.*)

The following section presents summaries of the seven Ohio partner institutions' efforts, based on each individual campus's agreed-upon plan, including program design, curricular transformation, and certification and placement results. Table 1 on pages 6–7 provides an overview of high-level changes in the campuses' teacher preparation programs, with a narrative description of each beginning on page 8.

Table 1: Changes in Programs as a Result of the Woodrow Wilson Ohio Teaching Fellowship

	Then	Now												
One-year master's degree program in teaching for career-changing professionals and other post-baccalaureate students in math and science	✓	✓		✓		✓	✓	✓	✓	✓		✓	✓	✓
Curriculum built in joint partnership with the College of Arts and Sciences and the College or Department of Education		✓		✓		✓		✓		✓		✓		✓
A master's program with fewer than 36 credit hours and 15 months of full-time coursework	✓	✓		✓		✓		✓		✓		✓		✓
Graduate classes taught primarily in school district		✓		✓				✓		✓			✓	✓
A fully developed mentoring program that provides a seamless transition between mentoring during university coursework and throughout the additional three years of teaching		✓		✓		✓		✓		✓		✓		✓
New graduate certification areas added to programs to accommodate career-changing professionals in a variety of math and science fields		✓		✓		✓	✓	✓	✓	✓		✓		✓
A fully developed, clinically based program where field experiences are integrated with coursework and other experiences		✓	✓	✓		✓		✓	✓	✓		✓		✓

Innovation in Ohio: Progress at the Seven Woodrow Wilson Partner Universities

John Carroll University

Original Program Design

With its Jesuit mission and liberal arts tradition, John Carroll University instills in the student body a strong commitment to use their education in service to others and to the public good, inside and outside the classroom.

JCU's School-Based Master of Education program, which prepared students for initial teacher licensure in K–12, had been in existence for 30 years as a 39 credit hour program. This 11-month site-based program—offered annually from summer and through May—had a number of longstanding partnerships with local schools, including St. Ignatius High School and Hawken School. The coursework required a series of foundation courses, including Foundations of Education, Exceptional Learner, Research Methods, and Adolescent Development. The University provided a 30 percent tuition discount to students in the School-Based Master of Education program. The program attracted a significant number of career changers, and many students were recruited straight out of undergraduate programs, especially OSU students.

The two-semester clinical component required students to spend four days a week in the classroom during the fall. The spring semester required an all-day school immersion at the partner schools five days a week. Because the strong school partnerships gave the program a stable base, rather than a revolving door, signed agreements with local area schools allowed JCU to employ school teachers to teach methods courses and serve as co-evaluators for the formative assessment of teacher candidates. Each school site was staffed by a coordinator who was the main point of contact for students; the site coordinator was also responsible for co-planning professional development for mentors. These sessions for mentors involved three full days of training and an orientation program at the beginning of the program.

Curriculum Transformation

As a result of the WW program, JCU strengthened and expanded relationships with local schools, including Shaker Heights City Schools. Unfortunately, the program was not initially able to expand its partnership with the Cleveland Metropolitan School District due to challenges facing the district, including budget cuts, declining enrollment, and leadership transitions. These challenges also had a negative impact on job placement as the Cleveland Metropolitan School District was not hiring in the first two years of the program. In addition, the school district was looking for teachers with integrated science licensure, and JCU does not offer an integrated science program. Despite these challenges, the majority of Fellows in the program's first two years were placed in a variety of schools, including Hawken School and Shaker Heights City Schools. Subsequently, as local economic conditions improved, the partnership with the Cleveland schools also became more robust.

The WWTF project gave the University the freedom to look at the curriculum, in particular content and methods courses, in a different way. One fundamental change in the design of the program, unique among the WW Ohio partner institutions: all methods courses and field observation blocks are solely taught by arts and science faculty, who have autonomy and control

over both content and pedagogy instruction. The WW curriculum transformation allowed better alignment between coursework and the clinical component. The new program also promoted collaboration between arts and science faculty and the Department of Education and School Psychology. The transformed 12-month master's degree course of study is a 40-credit-hour program, with all students required to take and pass the Ohio educator exam before the second semester. As a summative assessment of all Fellows at the completion of their program, edTPA is a requirement of the new WW program. WW Fellows receive a 40 percent tuition discount.

As part of the formative assessment process, the curriculum also addressed several interdisciplinary areas. The School in Community component, the Diversity course and the clinical seminar examined inequality in education, racial disparities, and socioeconomic status of schools and communities. In addition, education technology was integrated with a number of courses, including methods, content and literacy course, general teaching, and adolescent development. Given this integration, methods courses became discipline specific.

The job placement of JCU's WW Teaching Fellows, though challenging in the first two years of the program, has been very good. Dedicated career services professionals provide a full range of resources—job search strategies, resume writing, and mock interviews—designed to support Fellows at all points of the job search. Fellows attend University-sponsored career events where they explore employment opportunities with local area schools.

Given extensive collaboration with school site-based coordinators, mentors are required to go through rigorous training and Fellows learn the value and importance of mentoring from the start of the program. Incorporating professional development days for Fellows was an intentional plan of JCU's mentoring program, and this approach is now written into the agreements with partner schools and school districts.

Summary

Although the early implementation phase of the project proved challenging, JCU drew on its experience in yearlong clinically based programs to build a strong and innovative STEM-based curriculum. Among the 28 participating universities in five states, JCU has the only WWTF program led by arts and science faculty and housed within the School of Arts and Science, and the WW initiative has had a significant impact on Arts and Science faculty. For example, math department faculty became highly engaged in K–12 education, particularly at the secondary education level. JCU's WWTF Program Director, Mark Waner, is recognized by educators statewide as an expert in edTPA—particularly significant given that he is a professor of chemistry with a strong interest in education policy.

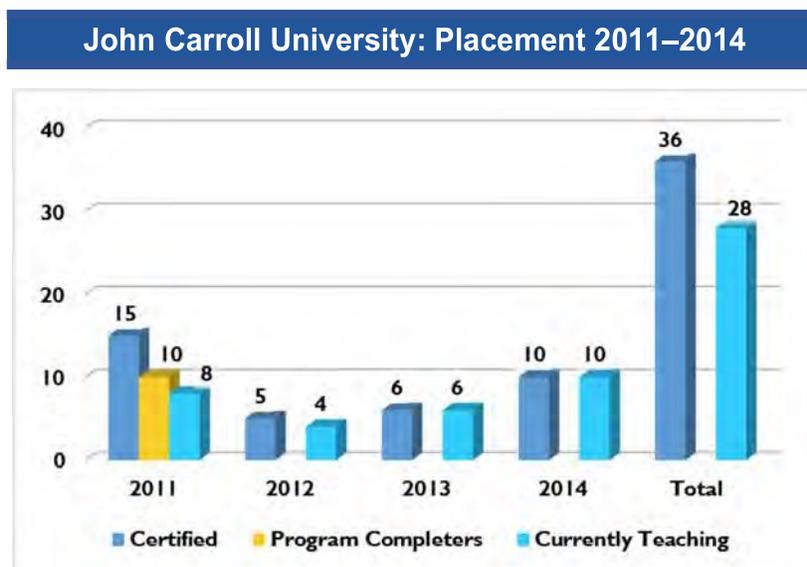
Today the JCU program features strong school-based clinical cohorts where Fellows are individually matched with cooperating teachers in the Cleveland Municipal School District and Cleveland Heights/University Heights District. As a result of WWTF, JCU continues to expand partnerships in community relations in the city of Cleveland.

As a result of the WWTF program, JCU will continue to offer a clinically based program where students spend 75 percent of program time in school at their clinical sites and the remainder of the time in the university classroom. Not only will the strengthened mentoring component and the extensive arts and science engagement remain central to the School-Based program, but the University also plans to expand it to other secondary education programs.

John Carroll University was able to secure a grant from the First Energy Foundation to continue to support its WW Ohio Teaching Fellowship program. The grant will be used to sustain the WWTF program goals in high-need schools and provide scholarship support to STEM students joining JCU's School-Based M.Ed. program.

Placement: 2011–2014

Since 2011, the WW Ohio Teaching Fellowship at JCU program has prepared 36 STEM teachers. Of those 36 who were certified, 30 Fellows (83.3 percent) were placed, and 28 (77.7 percent) remain employed in high-need schools throughout the state.



The Ohio State University

Original Program Design

The Ohio State University's Master of Education (M.Ed.) program is grounded in the mission and philosophy of OSU's Teacher Education framework—namely, *to assist pre-service teachers in developing the knowledge, skills, and disposition needed to become effective leaders and advocates for social justice in the field of education*. The program is fully accredited through the National Council for Accreditation of Teacher Education (NCATE).

OSU's original M.Ed. program, based on a quarter calendar system, required 45 quarter hours in three consecutive quarters, starting in the summer and concluding in the spring. The clinical component followed the calendar of the school district, not the University's academic calendar. Pre-service teacher candidates began the clinical experience on the first day of the school district calendar and were embedded in schools for a half-day in autumn and a full day in the winter and spring quarters. The typical time to completion was 12 months. Given the intensity of the program, teacher candidates were asked to do a lot with very little time, but most students completed the degree in a year, except for those who had to take a medical leave of absence. On average for the five years before WW and OSU began working together, OSU prepared 19 science teachers and 15 math teachers per year. The WW Teaching Fellowship helped to keep these enrollments steady during the ensuing statewide recession.

Curriculum Transformation

The Ohio State University switched to a semester calendar during the implementation of the WWTF project. The new program can be completed in three consecutive semesters or twelve months, starting in the summer and ending in the spring. Similar to the original program, Fellows follow the school district's calendar, not OSU's academic calendar. The program features a two-semester clinical component.

The WW project, under the guidance of Program Director Sandy Stroot, allowed OSU to establish exemplary interschool collaborations between the College of Education and Human Ecology, the College of Arts and Science, and the College of Engineering. As a result of the Woodrow Wilson Ohio Teaching Fellowship, the University redesigned a number of courses, especially math and science methods courses taught by math, science, and engineering faculty. OSU created an interschool curriculum committee comprising faculty and deans, charged with responsibility for course and curricular development through their respective colleges.

This WW curriculum innovation improved the quality of teaching and pedagogical content knowledge. For example, faculty from the Mathematics Department developed two new math courses for the program: Algebra for Teachers and Geometry for Teachers. These courses are now required for all master's degree candidates and undergraduates. In addition, the program created and implemented a co-planning/teaching model which is the pride of the program. This successful model of cooperation was then expanded to all STEM programs and later diffused to the Early Childhood, Middle Childhood, and Foreign/World Languages licensure programs. In addition to the innovative content and methods courses, the program incorporated interdisciplinary courses in diverse disciplines such as learning technology, culturally relevant pedagogy, and language acquisition (with an emphasis on how to engage English language learners). Fellows also work closely with the Educational Studies program, taking courses in educational psychology with an emphasis on brain science and learning.

Transforming the Teacher Workforce

The Woodrow Wilson program changed the demographics of the teacher education program at The Ohio State University. Historically, OSU's M.Ed. program did not attract career changers; before the WWTF partnership, 100 percent of students in the program came straight from undergraduate programs. In the first year that the program was redesigned, 76 percent of Fellows came straight from undergraduate programs and 24 percent were career changers.

The WW Ohio Teaching Fellowship program not only represented a growth opportunity for the M.Ed. program, but also enabled the College of Education and Human Ecology to diversify its M.Ed. student body, attracting a new population of students to OSU. The program director saw this as a mixed blessing: Most career changers were successful in the program, but they required a different level of support and attention, as the resources already in place for traditional students did not often meet their needs. Transitioning back to academia was a greater challenge than originally expected. Often, the challenges and opportunities career changers faced required a new set of skills that they did not develop in their undergraduate program, or during their time in private industry. Career changers had to excel in a demanding academic environment and better understand the realities of teaching in a high-need school setting. OSU was able to respond to these challenges and provided the requisite support services to handle the needs of career changers, including personalized academic counseling, certification requirements guidance, and career planning.

As a result of the collaboration with the Woodrow Wilson Foundation, OSU strengthened relationships with local districts, especially Columbus City Schools, which now employs a significant number of Fellows. Faculty and school district leadership are familiar with the WWTF program, they like the quality of WW Ohio Teaching Fellows, and they are actively looking for more WW Fellows to fill STEM teaching vacancies. This relationship has helped OSU better to engage and understand the needs of schools and school districts. For example, the conversation about school districts' hiring needs is very open, and districts keep the University abreast of their needs.

Joining forces with WW also allowed OSU to significantly improve the mentoring component of the program. The College of Arts and Sciences and College of Education and Human Ecology faculty work together with Fellows from the start of the program and follow them until their third year of teaching. Faculty and students meet five times a year. Saturday mentoring meetings provide good content about the quality of teaching practices. WW Teaching Fellows are also given leadership roles in this mentoring model; for example, Fellows from previous cohorts will become eligible to act as mentor teachers for new students. Fellows are expected to become teacher leaders and many are actively involved in state and regional math and science professional associations.

Summary

The following components of the WW Teaching Fellowship at OSU will be sustained: yearlong clinical experience; strong collaboration between the School of Arts and Sciences and the School of Education, as well as targeted partnerships with school districts; the co-planning/teaching model; and redesigned math and science methods and content courses. The Ohio State University also expects to sustain the mentoring component with a NSF Noyce grant, and the Provost's Office plans to provide matching funds for the program.

The program has been extremely successful in diffusing some important WWTF components to other programs and disciplines, including the undergraduate education major. Specifically, the WW summer program and the clinical experience are now required of all secondary education students. In addition, informed by the WW Teaching Fellowship program, the University reinstated the Bachelor of Science in Education program. As a result of the WWTF urban-oriented curriculum, OSU is considering creating either a minor or a certificate in Urban Studies, diffusing and formalizing the WW Urban Teaching seminar experience so that it can be reflected in depth university-wide. WW Teaching Fellows are also working with College of Engineering Professor Cathy Harper as part of the Ohio State STEM Outreach Summer Science Modeling Workshops for high school teachers. Professor Harper and WW Fellows engage science teachers in robotics and modeling training.

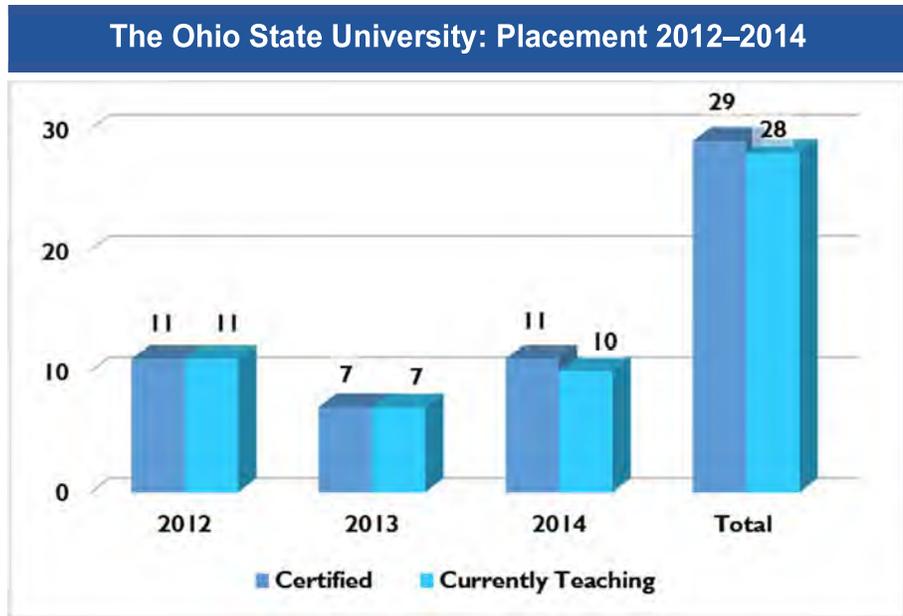
Increasing diversity of the student body has been an ongoing challenge not only for the College of Education but across the University. The WW Teaching Fellowship has greatly helped OSU diversify its teacher education program. For example, as a result of the WWTF project, OSU was able to develop relations with Ohio HBCUs, and the interim Department Chair and former WW Program Director has secured funds to bring students from diverse backgrounds to campus and expose them to the OSU community, particularly to careers in teaching.

The WW Ohio Teaching Fellowship provided OSU's College of Education with the context to work with arts and science faculty and, more importantly, to learn about the needs, perspectives and experiences of other departments and colleges at the University. The WW model set an

innovative example and was the motivation for increasing faculty cooperation. The WWTF improved interschool collaboration and bridged three colleges (Education & Human Ecology, Arts and Science, and Engineering); it also enhanced school district relations and improved mentoring and placement.

Placement: 2012-2014

Since 2012, the program has trained 29 STEM teachers. Of those 29 who were certified, 28 Fellows or 96.5 percent are employed in high-need schools throughout the state.



Ohio University

Original Program Design

The Woodrow Wilson Ohio Teaching Fellowship at Ohio University brought an important dimension to the program statewide; it was the only partner campus to work exclusively with rural schools in preparing STEM teacher candidates. The M.A.T. program at Ohio University that preceded collaboration with the Woodrow Wilson Foundation was a two-year program that required 50–54 credits to complete. Students took part in a one-semester clinical component, as well as less intensive field placements tied to their methods courses. The length of the program as well as the number of credits required made the program cost-prohibitive to recent graduates and career changers alike. Program directors at Ohio University estimate that one-third of their M.A.T. students in the five years prior to the Woodrow Wilson program were career changers. As at many institutions in Ohio and across the country, the number of program completers in the original program was very low and did not keep up with STEM teacher shortages in southeastern Ohio. Over a period of five years, the program prepared six math teachers, eight science teachers, and three middle school math and science teachers—on average, 3.4 STEM teachers each year.

The program benefited from having multiple entry points, offering part-time students easy access to courses and flexible course loads. However, the multiple entry points also posed challenges in that it was difficult to advise students, who were each at different stages of program progression. Some students were able to attain licensure without having achieved their master's degree. Moreover, no stipend or tuition scholarship existed, and finances were burdensome to students who needed to finish their capstone research in order to earn their master's degrees.

Another significant obstacle in the original program was the scheduling of content courses. Courses in the College of Arts and Sciences tended to meet during the day, multiple times a week. This created extra challenges for students who were simultaneously employed.

Curriculum Transformation

Ohio University was not an original grantee when the program in Ohio was originally announced. This served as motivation for the Dean of the College of Education to ramp up the University's approach to clinically based teacher preparation. Ohio University consciously decided to transition to a yearlong clinical model, regardless of whether or not the campus was selected to participate in the next round of the WWTF program. As a result, preparation for a program redesign was already under way when the University joined the Woodrow Wilson Ohio Teaching Fellowship in 2011.

Ohio University took fidelity of implementation very seriously. Faculty from the College of Education, the College of Engineering, and the College of Arts and Sciences engaged in frequent and substantive deliberations about program redesign, clinical placements, mentoring, and course sequencing. They engaged area school leaders and STEM faculty in these conversations to ensure that the new program would attend to their needs. The result of the planning meetings was a new 45-credit program—nine credits fewer than the program that preceded it—that incorporated a yearlong clinical experience in the high-need rural school districts in Greater Athens, Ohio. The program was designed to be completed in one year (15 months, to be precise: two summers and two semesters). The new program used a cohort model with fixed entry and exit points made possible by cooperative scheduling agreements with the colleges and departments involved. The Fellowships

helped recruit more career changers as well as students from a larger geographic area and from more diverse STEM fields. In terms of numbers, 28 Fellows in total were prepared at Ohio University over three years, roughly a third of whom were career changers. In other words, nine STEM teachers, on average, were prepared each year through the Woodrow Wilson Ohio Teaching Fellowship at Ohio University, nearly three times as many as were prepared in the old program.

The University and the Program Director took seriously the Foundation's emphasis on mentoring and co-teaching. As Program Director, Pam Beam worked closely with Fellows during their clinical year and leveraged her professional experiences and relationships in nearby school districts to forge collaborative partnerships.

The biggest challenge faculty and students in the new program reported was its intensity. The workload was extensive and required intensive preparation prior to the clinical year. Since Fellows were placed in the same classroom for the full academic year, opportunities for diverse clinical experiences were somewhat limited. However, the experience of working in the same placement from fall to spring ensured that Fellows were able to experience the realities of schools that resemble the ones in which they eventually secured teaching positions. Local administrators sought out Fellows to hire because of the richness of their clinical experience.

Most impressive about the transformation efforts at Ohio University is the fact that the clinical model has been diffused not only to other content areas at the master's level, but also to the undergraduate program. Every single teacher preparation program at Ohio University, with the sole exception of the undergraduate Adolescent Young Adult (AYA) program, now follows the yearlong clinical model. Faculty and administration at Ohio University are currently working to convert the AYA to the clinical model, but diffusion has been interrupted as the College of Education considers how to accommodate the model alongside state regulatory requirements for additional coursework in that licensure area. Administrators anticipated that, by 2017, that program too would be clinically based.

In 2015, the year after the final WW cohort graduated, numbers in Ohio University's STEM teacher preparation programs had reverted back to levels before the Woodrow Wilson Ohio Teaching Fellowship. To combat the decline in enrollment, the College is exploring ways to provide financial incentives (scholarships, tuition remission) to students who are seeking licensure in hard-to-fill, teacher shortage areas such as math and science. The cohort model which begins with a summer program has been sustained.

Summary

The Ohio University Department of Teacher Education will continue yearlong programming for a master's degree with licensure for career changers and has expanded it to include all majors in middle childhood and adolescent young adult programs. It is no longer a program for just STEM candidates. In addition, the Department has committed to maintaining a full-year clinical experience in the same classroom with the same mentor teacher for these programs. While the diffusion into the undergraduate programs will require some scheduling accommodations to insure that some required courses do not conflict with the clinical experience in the fall semester of a candidate's senior year, the Provost remains supportive of the model and is facilitating conversations between the associate deans in both Colleges to make sure this happens smoothly and swiftly. Although not as robust as in the WWTF model, mentoring informed by the Woodrow Wilson experience will remain a cornerstone of the institutionalized clinical

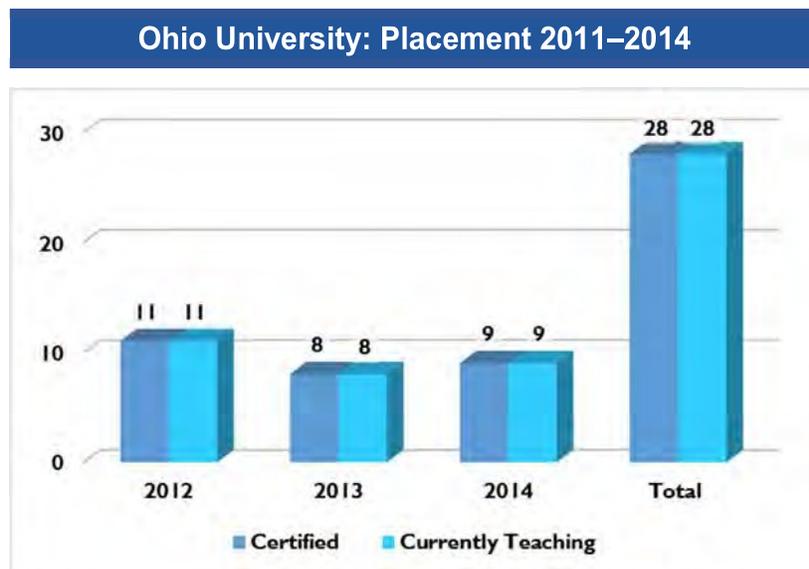
experiences at both the graduate and undergraduate level. The department has developed online professional development modules to support the mentor teachers in a myriad of ways for all clinical models.

The College of Education dean and faculty have completely embraced the clinical model of teacher preparation. In the College's current faculty search postings, it has been explicitly stated that new faculty are going to be required to spend one semester in the clinical field experience. They can supervise student teachers and they conduct research on students in the clinically based programs in order to gain more proof points of the program's efficacy.

Faculty indicated that it was extremely helpful to require university administration involvement, leadership and multi-college/multi-department participation in this project. The planning process helped to elevate expectations, provide clear focus, and spread understandings about the complexities and range of support required for preparing successful teachers. The connections between the Colleges of Education, Engineering, and Arts and Sciences at Ohio University were deepened through this work.

Placement: 2012–2014

Since 2012, the program has trained 28 STEM teachers. Every Fellow who obtained certification is teaching in a high-need Ohio school—a 100 percent placement.



The University of Akron

Original Program Design

The Woodrow Wilson Ohio Teaching Fellowship at the University of Akron was one of the largest WWTF programs in Ohio. Not only is the university recognized for its engineering programs and polymer sciences, it is also Ohio's polytechnic institution. This campus climate offers an opportunity for transformative innovation in STEM learning and teaching.

The University of Akron's graduate STEM teacher preparation program was completely redesigned for the Fellowship, incorporating co-teaching, advanced content preparation, lab seminars, laboratory schools, technology integration, distance learning, and coursework scaffolded over the course of a year of clinical experiences. The Program Director, Lynne Pachnowski, a recognized expert in STEM pedagogy, presents at conferences across the country. She took the lead in convening faculty and designing the new program, and held the program together in the face of enormous institutional changes.

Under UA's old program, candidates enrolled in traditional courses that could be taken out of sequence. For a STEM teaching major, candidates completed 47 credit hours that included one semester of clinical experiences plus 150 hours of fieldwork spread across the program. The program also included 9 hours of advanced content coursework that could be taken at any point in the program. Typically, candidates would complete the program within two years, but if they were out of sequence, the time could be longer—in some cases much longer.

The newly designed program is a fully integrated one-year master's with licensure program for STEM teaching candidates. Graduates leave UA prepared to teach using the latest technology and in the most challenging schools throughout Akron, Canton, and Cleveland. At 36 hours, the new program now has far fewer credits, and candidates are required to take courses in sequence as a cohort, thereby ensuring a one-year graduation date. The program also takes advantage of the public STEM charter on campus, where students take classes and meet with faculty. This makes the UA WW Ohio Teaching Fellowship the only WWTF program—across all five states in which Woodrow Wilson is working—to combine coursework and clinical aspects fully within the setting of a K–12 school. In year two of the program, education faculty offices were moved into the same high school as well, so that clinical faculty are completely immersed in the school culture where Fellows and future candidates are teaching.

Other hallmarks of the new program design include:

1. Emphasis on critical thinking and reflective practice
2. Strong content preparation woven throughout the program, especially co-teaching with the engineering faculty
3. Interdisciplinary preparation across all disciplines
4. Extensive technological preparation within the scientific and mathematical context
5. Strong preparation for teaching in a diverse setting (both Canton and Akron schools are predominantly high-need and racially mixed)
6. Emphasis on equity and social justice
7. Seminars and courses on brain-based learning

The old program design offered methods classes in the spring and was not aligned with the K–12 school calendar. This made it difficult for candidates to complete the program within a year. Moreover, since clinical experiences were offered by semester and candidates could choose either semester in which to enroll, there was no continuity of practice. Faculty had also cautioned that the old program had too much redundancy in content. Since courses were offered individually, there were no opportunities to map the curriculum and ensure that topics were not cross-covered.

The new UA program designed through the WWTF program is very tight; it places Fellows immediately into the school setting, using the school calendar, and they follow high school students from the beginning of the year to the end of June. Redundancy has been eliminated, and faculty co-teach and meet regularly about the content covered throughout the courses as well as the clinical experiences.

The University of Akron’s new curriculum design requires Fellows to be placed immediately into school settings during the first week of classes. This total school and university integration design, unique among the WW partner campuses in Ohio, remains a strong asset in the current program. This was due partly to the close relationship the University has always had with both of the major urban areas that surround the campus, and partly to a unique opportunity for Fellows to work with Project Upward Bound in a location close to campus. As result, the new program at UA has fully embraced early experience for teacher candidates and created a summer institute which is now a part not only of the STEM teacher preparation program, but of all UA graduate teaching programs. UA leadership sees this new design aspect as one of the best opportunities afforded through the partnership with the Woodrow Wilson Foundation.

In embracing the Foundation’s requirement of completely transforming its graduate education program, the University of Akron has created a fully integrated clinical model. The new program design offers rigorous content; clinically based instruction; full immersion in the K–12 setting; a yearlong, 36-credit curriculum; and a comprehensive summer institute that offers early field and clinical experiences prior to residency. The success of this model has been replicated throughout UA’s graduate teacher education programs in other disciplines, and parts of the model— especially the yearlong clinical practice requirement —are also being tested at the undergraduate level.

Curriculum Transformation

Faculty at the University of Akron enthusiastically embraced the new program design, and the University allowed the department to use funds early on to support co-teaching, early mentoring, and the added costs associated with the summer institute and other summer experiences.

From the beginning, this program was easy to recruit for and consistently had good enrollments and retention. While the Akron program’s proximity to major metropolitan areas made it attractive to applicants, WW Teaching Fellows were also interested in the unique experiences associated with its location in a public school, and in the Program Director’s expertise within the content area. Not only was the Program Director very active in that role, she also taught the majority of classes and was a great asset in recruiting Fellows.

Before implementing the new program, UA saw an average 82 percent completion rate over a four-year period—a number that did not reflect candidates who opted out prior to field and clinical experiences. With many candidates taking courses out of sequence over a long period of time, there was no formal cohort of students to report on and getting accurate completion rates was very

difficult. Under the new program, every candidate is tracked and retention is much higher at 95 percent, a far more accurate figure than previous estimates given the new program design.

Enrollment at UA during the WWTF initiative had been steady and was as expected, given that WW Ohio Teaching Fellowship began just as the state entered a recession. Five years prior to implementing the new program, the University graduated 21 math teachers and 21 science teachers. Since the implementation of the WWTF program, enrollments in math climbed to 27 and science held constant at 21. Given that enrollments in teacher preparation programs have fallen statewide since 2009, these steady enrollments were a positive sign.

Moreover, the program redesign has led to a demographic shift in enrollment. Most of the candidates in the older program were career changers—65 percent, with just 35 percent new graduates of STEM. Today the program attracts an equal number of new STEM graduates and career changers as well as newly graduated STEM candidates.

However, faculty at Akron now express concern about the future of the WW Teaching Fellowship there; enrollment has fallen considerably (for the whole University as well as for the WWTF program) since the conclusion of the Fellowship, down to just two STEM candidates in 2016. The University itself is facing financial constraints as well as transitions in leadership. There are very serious questions about whether this new approach can be sustained with so few candidates.

During the implementation of the WWTF program at UA, there have been numerous changes of leadership—including the president, provost, dean, and chair—creating considerable challenges for the Program Director in seeking faculty time and resources for the WW Teaching Fellowship program. Woodrow Wilson Foundation leadership made numerous trips to Akron for meetings at all levels to ensure the University's continued commitment to the program.

For these various reasons, the new curriculum that was to be institutionalized during the first year of implementation only received final approval in 2015. The turnover of deans and provosts led to long delays in curriculum approvals. As of January 2016, however, the University of Akron had a fully revised graduate teacher preparation program with all the hallmarks of the WW Teaching Fellowship program, as agreed to in 2010.

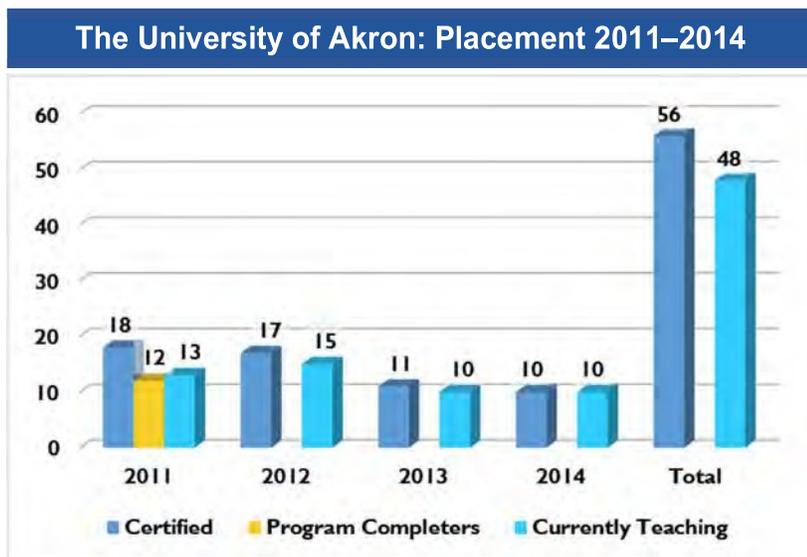
Summary

Though the University of Akron continues to struggle financially as it wrestles with budget cuts and drops in enrollment, the WW Teaching Fellowship was the impetus needed to create a cutting-edge STEM curriculum that became a model for all of UA's future graduate teacher education programs across the disciplines. While the future of the program, like that of many UA programs, remains uncertain, it is clear that the WWTF partnership with Akron produced one of Ohio's most comprehensive and innovative STEM teacher preparation programs. The WW Ohio Teaching Fellowship at UA can now boast increased retention, a yearlong residency, early summer experiences for candidates, content-rich curriculum, technology-infused courses with mentoring, and course sequencing within a cohort model. Most importantly, the program continues to

produce highly sought-after teachers who are poised to create new access to excellence in STEM learning in the very depressed areas of southern Cleveland, Akron, and Canton.

Placement: 2011–2014

Since 2011, the program has trained 56 STEM teachers. Of those 56 who were certified, 48 Fellows (85.7 percent) remain employed in high-need Ohio schools.



The University of Cincinnati

Original Program Design

The University of Cincinnati, a major player in teacher preparation in Ohio, serves over 2300 undergraduate and graduate teacher candidates. The College’s longstanding commitment to preparing educators and leaders for careers in urban schools—as well as its emphasis on developing 21st-century skills for all students, especially in the STEM fields—made UC a strong partner from the start of the program.

The STEM teacher education program that predated the Woodrow Wilson Ohio Teaching Fellowship at UC was a two-year program that included only one semester of student teaching. The program used to end in December, which made it difficult for program completers to obtain teaching positions in the middle of the school year. There was never a summer session in the former program, nor were there opportunities for summer clinical experiences. Moreover, the program was entirely administered in the College of Education with courses strictly taught by Education faculty. Linkages with the College of Arts and Sciences were few and far between. And, while the University had always had clinical partnerships with the Cincinnati Public Schools (CPS), there was room for improvement.

UC began its program revisions in June 2010, shortly after being named one of the original four WWTF partner universities in Ohio. The Provost’s Office named a Program Director, Helen

Meyer, and assembled an interdisciplinary team of faculty from the Colleges of Arts and Sciences, Education, and Engineering, as well as a team from CPS, to overhaul the curriculum.

Curriculum Transformation

The University of Cincinnati's Program Director noted that, while UC had always maintained partnerships with CPS, the Woodrow Wilson Teaching Fellowship took those relationships to the next level. By design, Woodrow Wilson Teaching Fellows were placed in four CPS high schools: Hughes High School, Withrow High School, Woodward High School, and Taft IT High School. Hughes High School had the benefit of being adjacent to campus as well as having strong clinical collaborations with UC.

UC developed a program with a specific focus on creating a pipeline of STEM talent for CPS and addressing the challenges of urban education in high-need areas. From the beginning, it was the intent that all Fellows' early field experiences and clinical practice would take place at Cincinnati schools. UC achieved Woodrow Wilson's goal of completely restructuring its master's-level teacher preparation program for mathematics and science teachers. Moreover, the collaboration between a large research university and a large urban school district, as well as public/private partnerships, established a model for teacher preparation that can serve as a guide to other institutions.

In order to achieve the Woodrow Wilson Ohio Teaching Fellowship's goals of improving STEM instruction and STEM learning, UC developed the following tenets, which undergird the program:

1. Teaching and learning are socially and culturally embedded; therefore, the program is based on an ecological model of learning in a community.
2. Knowledge is distributed and context-bound; therefore, the program draws on and values multifaceted knowledge bases.
3. Teaching must be learner-focused; therefore, the program incorporates multiple and extended opportunities for Fellows to interact with and learn from students.
4. Deep content knowledge is essential for the development of pedagogical content knowledge; therefore, the program makes explicit connections between content and the development of instruction for content.

Perhaps the most impressive feature of the UC program redesign efforts was the degree to which faculty from different disciplines collaborated extensively to develop a coherent program.

Physics, chemistry, mathematics, life science, and engineering faculty met regularly to discuss several fundamental questions:

- How does UC currently prepare mathematics and science teachers, and how can we better meet their needs?
- How do we connect mathematics and science content in authentic ways?
- What is the best content to use for these multiple goals?

Together, the faculty designed brand-new courses focused on rich content and new pedagogies, grounded in research, to teach that content. Meanwhile, School of Education faculty redesigned licensing courses to complement Fellows' clinical and coursework experiences. They developed new learning activities and assessments aligned to those activities and to the overall tenets of the program.

Following Woodrow Wilson design principles, the new UC program began with a summer session that included coursework and a field component in which UC Fellows worked with rising high school freshmen. Fellows then spent the academic year in their clinical placements, following CPS's schedule rather than UC's; they were in their clinical sites at the start of the school year, participated in professional development days, and took holidays when the school district did.

One complication for the new program of studies was that the planning committee started their efforts when the University was still employing the quarter system. Shortly after program launch, UC transitioned to a semester system. The Program Director reported that the transition to the semester system made it more possible for students to take courses in different colleges.

UC essentially created a new clinically based teacher preparation program embedded in the CPS. The new program, a 15-month program, replaced what had been a two-year, 48-credit program. The current program no longer has a December end date, assuring graduates a much easier time finding a teaching position at the start of the school year.

In reflecting on the revised program, the Program Director stated the following:

“An outsider might believe the greatest difficulties would be getting partners to agree on the vision and goals or syllabus content—the big conceptual ideas. These big ideas required discussion, exploration, clarification, and communication. But ideas are exciting, and the opportunities for sharing and learning helped to build our community and program culture. The trickiest difficulties arose when the structures and institutional resources among the partners were in conflict. Such matters as room and lab space, differences in calendars, courses that required crossing grading periods, transportation issues, and getting new courses onto schedules required a huge sum of collective creativity and willingness to compromise. But by doing so, we expanded our thinking about what a course means and how schedules be negotiated. The freeing of our thinking opened new levels of flexibility in scheduling, course organization and use of resources.”

The result is a program that incorporates the following key elements:

- a) Consistent school placement for the entire year in a partner school
- b) School-based teams of Fellows
- c) School-based support teams for the Fellows consisting of a mentor for each Fellow, a teacher coordinator at each school, a UC clinical liaison to support mentors and teacher coordinators, and a UC team supervisor
- d) An online mentor learning community and graduate course in teacher development
- e) Modular course work
- f) Alignment of the university calendar to the CPS academic calendar
- g) Courses taught by clinical faculty
- h) Courses taught at the clinical sites

With development of all coursework and syllabi grounded in the four tenets of the program listed earlier, courses were completely redesigned to focus on the desired learning outcomes and objectives, working backwards from those outcomes and objectives to course content. The grant made it possible for Arts and Science faculty not only to contribute to the planning of the new program but also to teach some of the courses in the new program. The Program Director noted

that, while it was not always easy for the A&S faculty to “suffer through training in pedagogy,” the resulting strong linkages between Education and A&S faculty have remained in place.

The program’s greatest strength is the yearlong clinical experience. Fellows become fully immersed in the school community and the length of the experience allows program faculty to target supports where they are most needed. According to the Program Director, “Sometimes it takes four months to learn entirely what a student needs. The yearlong experience allows students more time to practice teaching and gives us more time to meet their individual needs.” The fact that the UC clinical experience began in the summer provided program faculty with an even earlier baseline of Fellows’ immediate needs.

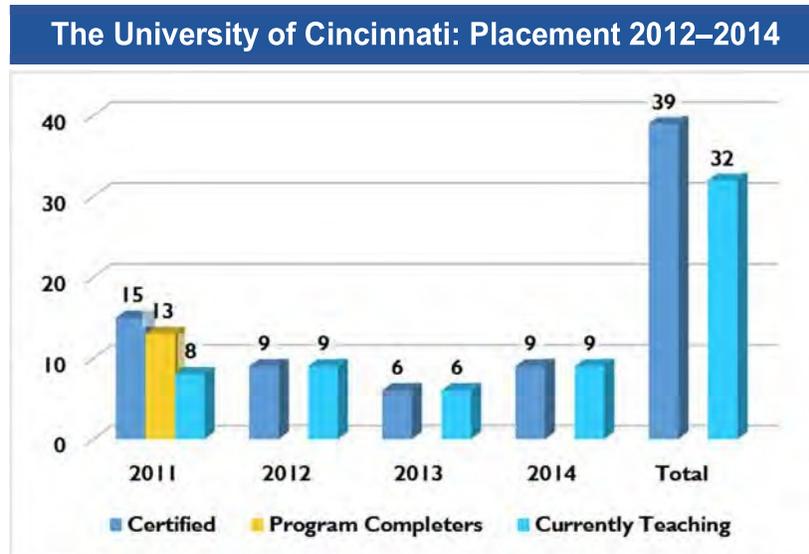
Summary

Since the beginning of the new program, 117 students have been prepared at UC to teach secondary mathematics and science, of whom 42 (36 percent) were funded through the Woodrow Wilson Ohio Teaching Fellowship. More than 50 percent of the UC Fellows are currently working in CPS, a testament to the program’s impact on the urban schools it was designed to serve. The program that was developed with support from the Woodrow Wilson Foundation will be sustained at the University of Cincinnati in important structural components. While the value and impact of the summer session is unquestioned, it is not clear how UC might sustain it. The Program Director stressed that the summer session was very labor-intensive for faculty, and the College has not yet identified resources to cover salary for the summer faculty and administrators. Though the A&S and Education faculty have enjoyed the experience of working in the yearlong program, the Program Director considers the structure “somewhat antithetical to the mission of a research university” because it gives faculty less time to focus on their research.

The mentoring component of the program produced mixed results; however, UC was successful in producing a number of “just in time” professional development videos for Fellows. Remaining in contact with UC Fellows when mentoring dollars expire will be a challenge for UC as it has been for other institutions. Despite tremendous turnover during the grant period, UC implemented the program with fidelity and the impact of the Foundation’s investment and UC’s hard work is being felt in the Cincinnati Public Schools by the thousands of students who are benefiting from high-quality STEM teaching and learning.

Placement: 2012–2014

Since 2012, the UC WWTF program has prepared and certified 39 STEM teachers. Of those 39, 37 Fellows (94.8 percent) were placed, and 32 (82 percent) remain employed in high-need Ohio schools.



The University of Dayton

Original Program Design

Two years before its collaboration with the Woodrow Wilson Foundation, the University of Dayton had received a grant to recruit more career changers into teaching by offering virtual courses that would work with their schedules. However, few if any career changers were in the M.A.T. math/science program; they tended to enter the M.A.T. program in language arts and social studies. The course requirements for the original math/science M.A.T. were rarely completed in one calendar year; most of the students who entered the program did not have extensive backgrounds in their content disciplines and were therefore required to take additional coursework in mathematics and science. As a result, most students ended up spending two full years in the program.

Due in part to the length of the program and in part to the lack of financial incentives to attract math and science majors to teaching careers, the M.A.T. in math/science was not intentionally recruiting candidates with graduate majors in the STEM fields. It suffered from the same low enrollment numbers that are commonplace across the country. According to Tom Lasley, UD’s Program Director, “The previous program prepared four times fewer the number of teachers in these hard to fill areas of math and science.” In a given year, the original program prepared 1–4 secondary math and science teachers.

While the original program had a considerable clinical component—with students in local public schools a few days a week during the fall semester, followed by a full semester in the field the following semester—there was less emphasis on placing student teachers in the highest-need and most demanding environments. Faculty wanted to be sure that the handful of students they were preparing would have the very best mentoring from their cooperating teachers, and there was

little confidence that teachers in the Dayton Public Schools could provide that. In essence, field experiences in the old program were connected to a particular course as opposed to being the bulk of the master's experience. The program graduates who took jobs in high-need schools experienced mixed success when they started to teach because their clinical placements were not long enough, and the schools that hired graduates often did not resemble the schools where they carried out their clinical placements.

Curriculum Transformation

UD faculty—both from Education and from Arts and Sciences—spent thoughtful time reengaging with the teacher preparation curriculum. As at all institutions, curriculum can be a very political issue; a professor becomes known for teaching *this* course, at *this* time, during *this* semester, and such rigidity prevents the type of innovation that the WWTF model required. When UD began its curriculum redesign efforts, faculty members were asked, “Do students need your course?”—a simple question, but one rarely posed. It sparked program transformation, with some courses eliminated and others combined. The grant also helped design new courses with new syllabi. For example, the program developed a new classroom management module, as well as a number of new one- and two-credit courses in areas such as “Understanding Adolescence” that would directly prepare Fellows for the realities of teaching STEM in high-need urban secondary schools. According to the Program Director, some of these changes were messy, requiring faculty who had long been teaching the same courses to reevaluate the course content, its relevance to the Fellowship experience, and the time and manner in which the courses would be delivered. As a result of these changes, the M.A.T. in math/science went from being a 45-credit program to a 30-credit program.

The WWTF also is directly responsible for the University's building bridges with the Dayton Public Schools. Despite being located in Dayton, the math and science education faculty never wanted to send their student teachers to the district for fear that they would not be supported. The Woodrow Wilson program required that partner universities work with the school districts that most needed high-quality STEM teachers, which essentially forced UD to rethink its clinical placement sites. By including principals and Dayton Public Schools faculty in the planning process, the program helped build trusting relationships where they previously had not existed. Realizing the three-year teaching commitment that would follow the master's year, with much more intentionality, University of Dayton put Fellows in schools that would resemble the schools where they eventually would be teaching. The partnership with the Dayton Public Schools has made a quantifiable impact with the district. Every Fellow who wanted to teach in Dayton was hired by the school district and, to date, more than half of the Fellows prepared at the University of Dayton are now employed in the district.

The Foundation's requirements of admitting candidates with very strong content backgrounds as well as the promise of a \$30,000 Fellowship had a real impact on the program. According to the Program Director, “We were able to attract people that we never, ever would have been able to get otherwise.” From 2012 to 2014, the program enrolled 38 Fellows. As previously noted, as few as one and as many as four students would have typically been enrolled in the M.A.T. programs for math and science before the WWTF project. The Program Director credits the Woodrow Wilson program with producing four times the number of STEM teachers in that timeframe.

Fellows at the University of Dayton benefited from an early clinical experience at the Dayton Early College Academy (DECA), a charter school housed on campus. During the first summer of

their program, Fellows worked with DECA students in small groups and began to demystify their assumptions about teaching, learning, high-need schools, and adolescence. The summer clinical program was designed explicitly for Fellows to build their confidence in preparation for their yearlong clinical experience. Efforts are under way to ensure that non-Fellows in clinically based programs can have a similar summer experience.

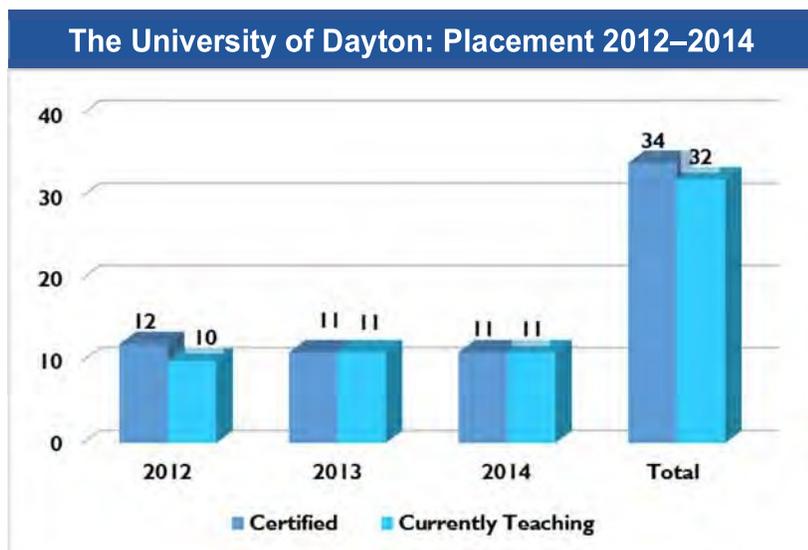
The transformation efforts remained largely confined to the math/science M.A.T. and licensure programs. As a result, as the programs are currently constituted, the University of Dayton's math and science teacher preparation programs are more clinically based than M.A.T. programs preparing English and social studies teachers.

Summary

The University of Dayton successfully improved its program from one that cared deeply about clinical experiences to one that now puts clinical experience at the center of its teacher preparation program. Through the WWTF, Dayton's M.A.T. program became more streamlined and attracted teacher candidates whom the Program Director believes UD would not have attracted on its own. Both the intra-university collaboration and the district-university collaboration that took place through the Woodrow Wilson program have resulted in rich partnerships and stronger clinical sites for future cohorts of program graduates. The University is excited about continuing to work with Woodrow Wilson Teaching Fellows in Dayton in hopes that they may soon serve as mentors for other STEM teachers who come through the UD program.

Placement: 2012-2014

Since 2012, the University of Dayton WWTF program has trained 34 STEM teachers. Of those 34 who were certified, 32 Fellows or 94 percent are employed in high-need Ohio schools.



The University of Toledo

Original Program Design

The University of Toledo program, the only Woodrow Wilson Ohio Teaching Fellowship that serves the northwest section of the state of Ohio, is the primary provider of STEM teachers for the Toledo City Schools. Because of its history and proximity to the city of Toledo, the program is urban-focused.

UT had already been considering a major redesign of its LAMP (Licensure with Master's Program). Program Director Virginia Keil (now the College of Education's Interim Dean) and her colleagues saw the WWTF model as a great opportunity to make program changes that faculty had wanted to make for years. While the program already had a one-year curriculum with extensive field and clinical experiences, the WWTF also had many other components that UT faculty were interested in incorporating, such as a yearlong clinical experience, cohort-based and site-based work, co-teaching, and an emphasis on the needs of urban classrooms. Committed to redesign of the current program from the beginning, the University provided an additional scholarship to each Fellow in the new WWTF/LAMP program.

The new program also offered an opportunity for UT to work formally with the leadership of the Toledo Public School system to create a new and solid cooperative agreement. Having Fellows teach primarily in the Toledo Public Schools provided a way for both entities, building on an already strong relationship, to work together on a single project in new and exciting ways. A program with a strong urban focus would also be attractive to out-of-state students, primarily in the Detroit area, who were looking for opportunities to come to Ohio and teach. Graduates of a well-known program at the University of Toledo would also be able to secure positions in many of Ohio's other large urban districts, including Cleveland, Columbus, and Cincinnati.

The newly designed WW Ohio Teaching Fellowship program at UT was 36 credit hours, like the original LAMP program; although it retained many of the original course titles, the pedagogical courses, seminars, and field experiences were redesigned. Many of the newly designed courses are now team-taught, while courses and/or experiences at the schools are now co-taught, with university-based and school-based faculty working side by side.

One major change to the program was the shift from a university-based calendar to the calendar used by the school districts. LAMP students had entered that program at different points and often could join only when courses were added or available. Moreover, candidates in the LAMP model could select when they enrolled in clinical courses. Under the new WWTF model, all candidates join a cohort in August and start their school placement, where they remain until the school closes for the summer the following June.

Adopting a yearlong clinically based program and using a cohort model increased completion rates significantly. Prior to the WWTF program, completion rates averaged 20–30 percent. Since the adoption of the new model, current completion rates now stand at 80–90 percent, with a four-year average of 88 percent. According to the Program Director, “the improved completion rate for our graduate STEM majors has been one of the biggest assets to being a WWTF partner.”

The new program design developed through UT's Woodrow Wilson initiative has been carried throughout other content areas in LAMP, and the WWTF model is now being used to prepare graduate level teachers in language arts and social sciences as well.

Curriculum Transformation

Before UT adopted the WWTF model, 90 percent of candidates in the LAMP program were career changers and adults. Only a small fraction of candidates came directly out of an undergraduate STEM program. As a result of recruiting for the newly designed program, however, many more undergraduate candidates applied—an increase that UT leadership ascribed to intentional recruitment across colleges, especially in UT’s College of Engineering. Today, 33 percent of these STEM teaching candidates come directly out of an undergraduate program and 66 percent from prior careers, a shift of almost 20 percentage points toward a younger population. Although it is not clear whether this shift indicates future trends, the Fellowship seems to have made younger candidates at UT more aware of graduate-level teaching programs as an option.

The university leadership believes that the greatest strengths of the new program are its cohort model, its yearlong residency, its co-teaching design, and the course sequencing that allows candidates to complete the degree over 4 cycles, increasing completion rates by 60 percent. The new program also provides a greater emphasis on interdisciplinary teaching and technological tools for teaching and learning. In 2016, several Fellows were accepted to present their paper at a national conference on the use of technology in their classrooms. The program redesign also provided more opportunities for Fellows, as well as current LAMP candidates, to work with clinical faculty in the schools and find creative and innovative ways to use technology to teach science and math. Their knowledge was also enhanced during seminars and pedagogical courses that focused on the use of new technologies in classroom teaching.

The University of Toledo saw some leadership turnover during the implementation of the Fellowship; the president and provost both moved on. Throughout these transitions, however, faculty and program director support has remained consistent. As Interim Dean of Education, the Program Director continues to support the Woodrow Wilson Teaching Fellows who are completing their mentoring experience. She also has been a major supporter of the continuation of the WWTF model and has been a key player in securing a formal agreement for placement of LAMP STEM teaching Fellows in the Toledo Public Schools. She also supports Fellows as they present at national and state conferences.

The university has been an excellent financial partner and was the only institution in Ohio to offer Fellows a substantial additional stipend of approximately \$5,000—a significant gift from the Dean of the Graduate School, offered in addition to the \$30,000 stipend provided by the Woodrow Wilson Foundation. This supplemental funding, available to all UT Fellows in all cohorts, was also a major tool for recruiting top STEM candidates into the program.

A further benefit of the new cohort model was not only the increase in retention, as discussed above, but also an increase in funding for the program, given a change in the state funding formula. In 2012, around the same time the first cohort entered the WWTF program at UT, the State of Ohio implemented state funding based on student completion. The increase in completion that the WWTF program made possible therefore came at the right time to generate additional support for the newly redesigned LAMP program.

Enrollments in STEM programs at The University of Toledo have remained the same or dropped slightly since the WWTF program was implemented. In years prior to implementation, the University graduated 10 math teachers and 14 science teachers; last year, the university graduated 7 math teachers and 17 science teachers. However, as noted elsewhere in this report, enrollments

at other institutions across the state have dropped considerably, so maintaining steady enrollments in these key fields remains significant in helping to address the STEM teacher shortage.

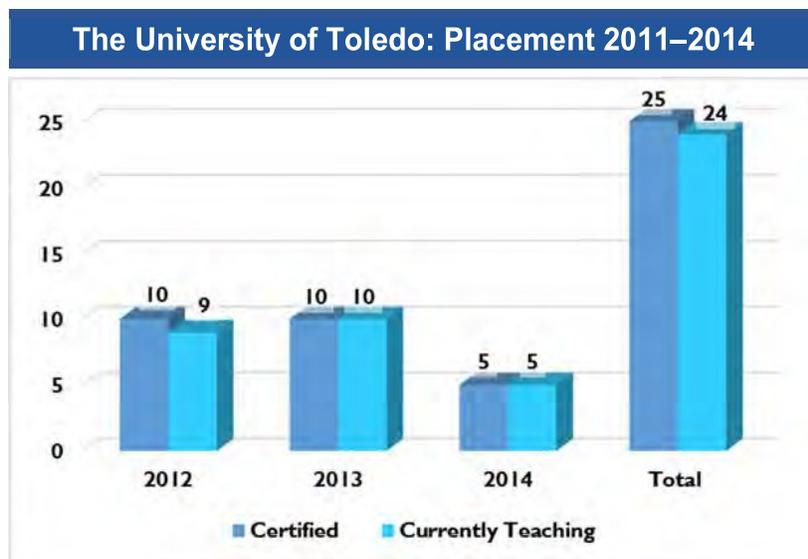
One of the major challenges during UT’s first two years of WWTF implementation was the retention of Fellows who had not scored well on content tests. Though this was an issue for all Fellows, it was particularly prevalent among career changers. As a result, the program at UT instituted a new policy requiring all incoming candidates to pass the content tests for licensure before they could begin summer coursework. If Fellows were enrolling as late as April, many had only a matter of weeks or months to study and pass the test in order to remain in the program. In the final year of the program, the requirement resulted in a significant drop in enrollment. This will continue to be a challenge, and UT recognizes that candidates should be screened nine months in advance to ensure that all testing and admissions requirements are completed prior to summer coursework.

Summary

As a result of the newly designed elements embedded within the LAMP program, UT leadership is confident that the program will continue to gain popularity and graduate more STEM teachers. As Interim Dean, Dr. Keil is receiving requests for more and more LAMP graduates to work in Toledo Public Schools, as well as districts that surround the city, and she believes the demand for teachers prepared through this model will only increase. Employment opportunities for new graduates continues to grow. The WWTF model has increased enrollment and retention, and has had lasting impact in the subject areas beyond STEM as well.

Placement: 2012–2014

Since 2012, the WWTF program at UT has trained 25 STEM teachers. Of those 25 who were certified, 24 Fellows (96 percent) are employed in high-need Ohio schools.



Sustainability of Transformations Through the Fellowship

For each state in which the Woodrow Wilson Teaching Fellowship works, the Woodrow Wilson Foundation seeks both to shape state policy on teacher preparation—in some cases to have the state adopt the Fellowship program after Woodrow Wilson funding ends—and to create lasting transformation at individual institutions, including both those that have been WWTF partners and those that compete with them.

Recruiting similar numbers of students into these programs without Fellowship dollars is seen as a challenge by the seven higher education partners across Ohio. Each campus saw its enrollment in master's programs in STEM education decline in the year following the Fellowship. The partners are therefore committed to restoring the structure of the Fellowship program, which they see as a support for enrollment in hard-to-fill programs. The institutions are currently working closely with the Ohio Department of Higher Education and Senator Peggy Lehner, Chair of the Senate Education Committee, to enact legislation that would result in a state appropriation for fellowship dollars. Institutions of higher education would use these dollars to attract candidates to programs that prepare teachers in state-identified shortage areas, such as the STEM fields. The University of Dayton has particularly taken a lead in these negotiations, which are ongoing.

The proposal currently under consideration would award dollars to those programs that have exhibited the following:

- a. Partnership between a university and one or more high-need school districts;
- b. Recruitment strategy to identify a diverse pool of high quality candidates with an interest in high-need content areas in urban/rural Ohio schools;
- c. A comprehensive full-year clinical component;
- d. Selection of experienced and skilled cooperating teachers;
- e. Collaboration between Arts & Science and Education faculty as well as experienced K–12 professionals in the design and delivery of the curriculum;
- f. Intense mentoring through the preparation and induction periods;
- g. Innovative, high-leverage pedagogical practices and appropriate technology-based learning experiences;
- h. Professional development focusing on innovative and effective teaching practices in high-need urban/rural settings.

All of the above reflect design principles that were non-negotiable elements in the Woodrow Wilson Teaching Fellowship program. If the legislation is adopted, the seven partner universities in Ohio are well positioned to sustain their programs through state funding and to serve as a model to other institutions across the state who wish to undergo similar program transformation efforts.

At the institutional level, the goal is for each university to sustain the program after funding ends, as well as to diffuse it in whole or in part to undergraduate STEM teacher programs and other graduate teacher preparation programs. A requirement to do so is a feature of the memorandum of understanding that each partner institution in Ohio signed at the outset of the program—and, indeed, that all Woodrow Wilson Teaching Fellowship partner institutions sign, in every state.

As noted in the summaries presented in this report, the seven WWTF Ohio partner institutions have already moved in these directions. Table II below (through page 34) provides an overview of their progress. This table makes it clear that a yearlong clinical placement, improved partnerships with area high-need schools, and a more streamlined master’s curriculum are the most common and sustainable improvements, and will continue to benefit the teachers prepared through these programs.

**Table 1I:
Program Transformation and Sustainability—Highlights (by Institution)**

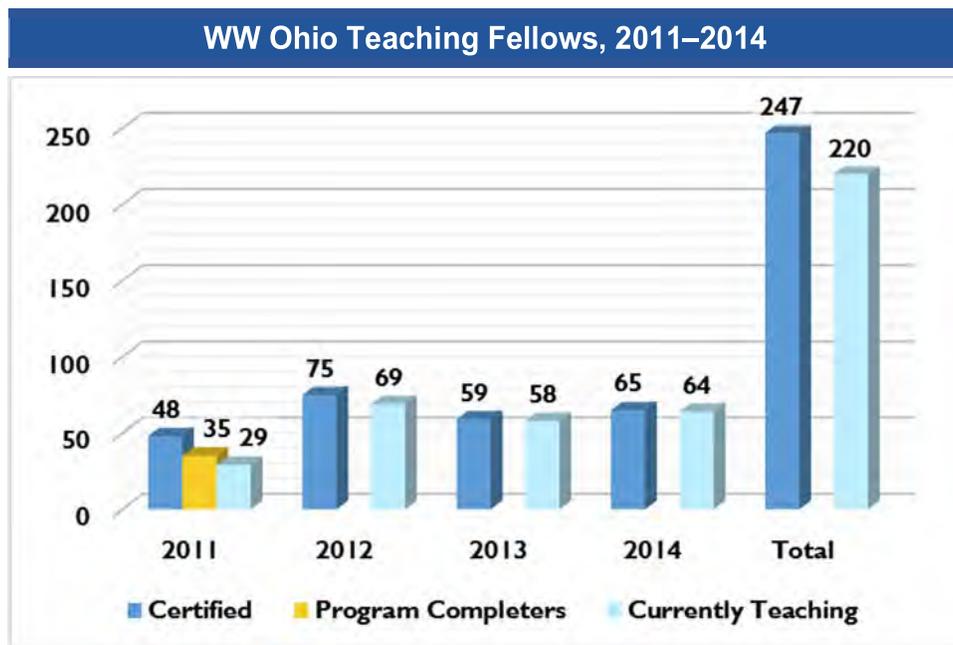
Partner University	Highlights of Program Transformation and Sustainability
John Carroll University	<ul style="list-style-type: none"> • The program represents the first and only partnership across the WW Teaching Fellowship network to be fully housed within the College of Arts and Sciences. • The mentoring program that was developed for this program established a site coordinator at each clinical placement site to reinforce collaboration between the university and the clinical experience. • The mentoring component, where students benefit from receiving both individual and cohort mentoring, remains a strong part of the School-based program, and the University plans to expand it to other secondary education programs. • JCU will continue to offer a clinically based program where students spend the majority of program time in school at their clinical sites.
Ohio State University	<ul style="list-style-type: none"> • The program helped develop a new co-planning/co-teaching model. • The Colleges of Education, Arts & Sciences, and Engineering were intricately involved in the planning and implementation of the model. Faculty from Arts & Sciences and Engineering continue to teach methods classes for all master’s level and undergraduate teacher education students. • The University developed new supports to ensure success for career changers/non-traditional students. • This WW model of cooperation was expanded to all STEM programs and diffused to other programs, including Early Childhood, Middle Childhood, and Foreign/World Languages licensure programs.
Ohio University	<ul style="list-style-type: none"> • The yearlong clinically based program has successfully been diffused to all content-area programs at the master’s level. • The undergraduate education program now employs a yearlong clinical model in nearly all of its certification areas. • The university has committed itself to continuing to provide scholarships to recruit STEM students to its master’s and certification programs. • By any measure, this program represents the most successful example of program diffusion and sustainability across the Woodrow Wilson Teaching Fellowship network.

Partner University	Highlights of Program Transformation and Sustainability
University of Akron	<ul style="list-style-type: none"> • The program is one of the more clinically rich programs anywhere, taking full advantage of being housed in the same building as a public STEM Academy on campus, where students take classes and meet with faculty. • The program provides with robust content preparation and high-quality integrated STEM pedagogical training. • The partnerships with Akron and Canton ensure program graduates receive excellent training in high-need, racially diverse schools.
University of Cincinnati	<ul style="list-style-type: none"> • The program successfully produced “Just in Time” mentoring videos that will continue to be used in support of UC students. • The yearlong clinical model marked a major shift in how UC prepared its teachers and, despite initial resistance from faculty, the results have been overwhelmingly positive. • The partnerships with the Cincinnati Public Schools dramatically improved as a result of the collaboration. Moreover, more than 50 percent of all Fellows prepared through the Woodrow Wilson program now teach in the Cincinnati Public Schools.
University of Dayton	<ul style="list-style-type: none"> • The program is housed in the same building as the Dayton Early College Academy, and students therefore benefit from early and extensive clinical training as well as a tight feedback loop between the clinical experience and the academic program. • The program built bridges with the Dayton Public Schools. The planning process included principals and Dayton Public Schools faculty, and that effort helped build trusting relationships where they previously had not existed. • The partnership with the Dayton Public Schools has made a quantifiable impact with the district. Every Fellow who wanted to teach in Dayton was hired by the school district and to date, more than half of the Fellows prepared at the University of Dayton are now employed in the district.
University of Toledo	<ul style="list-style-type: none"> • The cohort model that was introduced as part of the Woodrow Wilson program, resulted in a program completion rate that improved by 60 percent over pre-cohort levels. • The new program provides a greater emphasis on interdisciplinary teaching and technological tools for innovative teaching and learning. • The intentional recruitment across colleges, especially from the College of Engineering, resulted in an increase in the number of STEM graduates applying to and enrolling in the program at the University of Toledo.

WW Ohio Teaching Fellows Program Retention & Placement Rates: 2011–2014

Since 2011, the WW Ohio Teaching Fellowship program, across all seven partner campuses, has prepared 247 STEM teachers for Ohio’s high-need schools. Of those 247 who were certified, 226 Fellows (91.5 percent) were placed, and 220 (89 percent) remain employed in high-need schools throughout the state. Of the inaugural 2011 cohort who obtained certification, 35 Fellows have completed the three-year program. Twenty-nine of the 2011 Fellows (83 percent) are still

teaching, including three Fellows who are on an alternate schedule, and are scheduled to complete the three-year teaching commitment by June 2016.



The WW Model in Ohio: Top-Line Lessons, Overall Outcomes

The WW Ohio Teaching Fellowship has proven to be a successful and effective means of continuing to address the achievement gap, particularly in STEM subjects, in Ohio’s high-need school districts. Based on the experience of developing and implementing the program in Ohio and elsewhere—including both successes and missteps—WW has identified 15 strategies that are essential to improving the quality of teacher training programs:

- 1. Focus on entire states.** States offer the greatest leverage in meeting the Foundation’s goals because they are the locus of the nation’s educational policies and funding. They have common certification and teacher-education-program authorization requirements. They permit the most effective targeting of high-need districts and their teacher-subject-matter shortages. And, at the state level, relatively small numbers of new teachers can make a large impact and build critical mass in struggling districts.
- 2. Begin with the governor and build a statewide coalition.** This coalition should consist of the state’s top higher education official, its chief state school officer, legislators on both sides of the aisle, universities, high-need school districts, unions, and other stakeholders. This guarantees program continuity and brings all the key state players to the table.
- 3. Be selective.** Choose the best, but recognize that capacity to create excellent teacher education programs does not mirror *U.S. News & World Report* rankings. Invite participation only by those universities with the capacity to create excellent teacher education programs, stable school districts that can benefit from the initiative, and high-ability aspiring teachers with a commitment to teach in high-need schools. Vet potential participants carefully.

- 4. Invest in recruitment.** Attracting high-ability students in high-need subject areas, particularly STEM majors, and professionals who have many more-lucrative career possibilities, is expensive and time-intensive, but worth it.
- 5. Focus on yearlong master’s-degree teacher education programs.** They are cheaper than four-year undergraduate programs and far more attractive to career changers.
- 6. Be explicit.** Make clear to participants—universities, districts, and admitted students—what is expected of them in terms of program characteristics, assessment, how many years they must work in high-need schools, and what constitutes a high-need district. The Woodrow Wilson Teaching Fellowship provides participating universities with detailed program-design requirements, such as yearlong clinical experiences and three years of mentoring for graduates, and demands that fellows teach for three years in the state’s high-need schools.
- 7. Do the research.** Determine the number of teachers that participating districts can actually hire and the subject areas that are needed. There is a tendency on the part of superintendents to speak of how many teachers they need, rather than how many they can actually hire. Similarly, STEM vacancies tend to be thought of as fungible, when in fact biology is often adequately staffed and physical sciences are woefully understaffed.
- 8. Provide necessary resources for universities.** They need the funding to develop excellent, cutting-edge programs and to offer financial support to students. The Woodrow Wilson program provides universities up to \$500,000 to develop their programs and also awards students \$30,000 fellowships to attend them.
- 9. Require skin in the game.** Universities should be asked to match funds for program development to strengthen ownership and commitment.
- 10. Foster strong partnerships between universities and school districts.** Such partnerships enable districts to get the teachers they need, and foster collaborations between arts and sciences colleges and education schools to bring together subject-matter content and pedagogy.
- 11. Give universities the time to create excellent teacher education programs.** Generally, it takes 18 to 21 months for universities to create cutting-edge programs and three years to perfect them after implementation.
- 12. Demand accountability.** In the Woodrow Wilson program, university presidents and district superintendents are required to sign memoranda of understanding making clear what they will do by what dates. Universities must successfully achieve their stated objectives to qualify to receive fellowships. Future teachers who do not fulfill their minimum commitment of three years of teaching in high-need schools in the state where they earned their master’s degrees must repay their fellowships.
- 13. Work with universities and school districts to develop and implement excellent programs, and mentor students once they become teachers.** Imagining new programs is difficult, and, without support, many universities and schools tend to maintain the status quo. Mentoring students encourages retention. Data on the early cohorts of WW Teaching Fellows in Indiana, for example, shows that 80 percent of Woodrow Wilson Indiana Teaching Fellows stay in teaching. Preliminary results in Ohio, as reflected in this report, appear to be similar.

14. Require third-party evidence-based assessment. Anecdotes and reassurances no longer suffice as proof of success. The coin of the realm has become hard data on issues such as student achievement and teacher retention, supplied by disinterested and credible third parties. States must build in plans and resources for such assessment from the very beginning.

15. Require achievable sustainability plans. Every memorandum of understanding by presidents of universities participating in the Woodrow Wilson Teaching Fellowship includes a plan for institutionalizing the new teacher education program and for diffusing its practices to other teacher education programs in the university.

Study after study has shown that teachers are the single most important in-school factor in improving student achievement. Yet too many young people in the nation's urban and rural high-need schools still lack the opportunity to work with good teachers, across the curriculum. To change this situation requires a clear state-level commitment, like Ohio's, to invest in a stronger and more diverse corps of educators and excellent teacher-preparation programs, as well as an energetic local response to hire and support the best teachers.

The Woodrow Wilson experience shows that significant improvement is indeed possible. Committed universities can develop excellent teacher education programs. Highly able students will attend such programs and make careers teaching high-need subjects in high-need districts.

Conclusion

A conservative estimate, accounting for attrition, suggests that every day across the State of Ohio, the Woodrow Wilson Ohio Teaching Fellows are reaching as many as 22,000 students in STEM classrooms in the state's highest-need rural and urban schools. If Fellows remain in teaching for a total of five years, they will reach as many as 110,000 students statewide. The redesigned teaching preparation program from which the Fellows were prepared provided them with a year of clinical experience in schools resembling those that currently employ them, seeking to prepare them for the real challenges that confront them in high-need schools. The intent of this approach, along with the mentoring that complements it, is to keep these well-prepared STEM teachers in the classroom for many years to come.

What is more, as this report has demonstrated, the Woodrow Wilson Ohio Teaching Fellowship has sought, overall, to change the way that teachers in the Buckeye State are prepared. Given the success of the WWTF model in Ohio to date, as well as its diffusion to fields beyond STEM and to undergraduate as well as graduate programs, the Woodrow Wilson Foundation is confident that—with state support and ongoing commitment from all parties—this transformation will strengthen teacher preparation in Ohio for some years to come. The Foundation has been honored to partner with the State of Ohio and its seven partner institutions to achieve this transformation, and we applaud the work of the many state and district leaders, university officials, faculty, and teachers who have made it happen.

