Annual Report
UT^3 Noyce Plus

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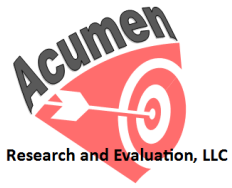

Recruiting: Recruiting participants proved to be difficult. Of the 40 Noyce scholars who participated in UT^3 Noyce, only 13 agreed to participate from October 2013 – September 2014. The group, however, provided a mix of 8 who graduated under the alternative licensure program and five from the residency program. Table 1 shows the basic demographics of the study sample. Of those who earned the Ohio Alternative Educators License (OAEL), six are teaching and of those, five are in high needs districts. Of those who followed the Licensed Alternative Masters Program (LAMP)—the one-year residency program culminating in full licensure—four are teaching and of those only one is in a high needs district. Those who followed the LAMP program are the more recent graduates—2011 and 2012. It was discovered that after the first few years of the program, teaching positions in high needs districts were not as prevalent as predicted. This was due to the downturn in the economy which influenced many teachers to delay retirement thereby limiting the number of positions available. Compounding that were the Ohio mentoring requirements of districts that sponsored teachers with the OAEL. Some districts gave preference to fully licensed teacher applicants to avoid the extra effort sponsoring one with the OAEL entailed.

Table 1: UT^3 Noyce Plus Participant Demographics

Year Graduated	Program	Gender	Content	Teaching?	High Needs?
2008	OAEL	F	science	x	x
2010	OAEL	M	math	x	
2010	OAEL	F	math	x	x
2010	OAEL	M	science	x	x
2010	OAEL	M	math	x	x
2010	OAEL	F	science		
2010	OAEL	M	science		
2010	OAEL	F	science	x	x
2011	LAMP	F	science	x	
2011	LAMP	F	science	x	
2011	LAMP	M	science	x	
2011	LAMP	F	science	x	x
2011	LAMP	F	science		
2012	LAMP	F	science	x	
Totals	8 OAEL 4 LAMP	8 Female 5 Male	10 science 3 math	11 teaching	6 high needs

Methodology: The first year of data collection consisted of a mixed methods of qualitative and quantitative data. First, all participants were interviewed (see Appendix for copies of protocols) to gather details about their teaching or pursuit of a teaching position over the past few years. Next all participants completed a battery of surveys including the STEBI, MTEBI, STIPS, and the Haberman Star Teacher Screener. The Science Teacher Efficacy Beliefs Instrument (STEBI; Enochs and Riggs, 1990) and the Math Teacher Efficacy Beliefs Instrument (MTEBI; Enochs, Smith, & Huinker, 2002) have long been used as a measure of teacher development and effectiveness as it reflects the teacher's belief (confidence) in his or her ability to effectively teach. There are two subscales on the instruments. The first is outcome expectation or the belief that high quality teaching will result in student learning. Coupled with outcome expectation is the confidence that the person can perform the action successfully. This is the self-efficacy

expectation or personal beliefs. High scores on each scale suggest a high level of self-efficacy in science teaching.

To examine science teaching preferences, the Science Teacher Ideological Preference Scale (STIPS)—an instrument designed to measure science teachers' instructional practice preferences—was employed (Jones and Harty, 1978; Gado, 2005). For this study, the survey was altered to add mathematics teaching. It has two subscales: inquiry-based instructional strategies and non-inquiry-based strategies. Respondents indicate their level of agreement with or preference for a series of inquiry and non-inquiry teaching strategies. Results of the STIPS can provide insight as to teacher willingness to use inquiry-based instructional strategies as opposed to more traditional, non-inquiry techniques. Additionally, the responses can reveal the types of teaching strategies the teachers favor or resist.

One way to measure whether the UT^3 Noyce scholars are prepared for teaching in urban schools is through the Haberman Star Teacher Screener. This tool, developed by Martin Haberman, PhD (University of Wisconsin-Milwaukee), is the culmination of 30 years of research and development in urban teacher education and is used by many school districts to predict success in teaching in at-risk schools and multicultural schools. There are ten constructs the assessment measures providing a score of high, average, and low. Once the test has been scored, the respondent gets an overall score as well as a quartile ranking (the higher the quartile, the more prepared the teacher). The constructs measured are as follows:

1. Persistence predicts the propensity to work with children who present learning and behavioral problems on a daily basis without giving up on them for the full 180 day work year.
2. Organization and Planning refers to how and why star teachers plan as well as their ability to manage complex classroom organizations.
3. Values Student Learning predicts the degree to which the responses reflect a willingness to make student learning the teacher's highest priority.
4. Theory to Practice predicts the respondent's ability to see the practical implications of generalizations as well as the concepts reflected by specific practices.
5. At-Risk Students predicts the likelihood that the respondent will be able to connect with and teach students of all backgrounds and levels.
6. Approach to Students predicts the way the respondent will attempt to relate to students and the likelihood this approach will be effective.
7. Survive in Bureaucracy predicts the likelihood that the respondent will be able to function as a teacher in large, depersonalized organization.
8. Explains Teacher Success deals with the criteria the respondent uses to determine teaching success and whether these are relevant to teachers in poverty schools.
9. Explains Student Success deals with the criteria the respondent uses to determine students' success and whether these are relevant to students in poverty schools.
10. Fallibility refers to how the teacher plans to deal with mistakes in the classroom.

Finally, all of the scholars currently teacher were observed teaching an inquiry-based math or science lesson. The observations were scored using the Horizon Inside the Classroom Observation Tool (www.horizon-research.com/inside-the-classroom-observation-and-analytic-

protocol) to determine the extent to which inquiry-based instruction was present as well as to provide a detailed account of teaching.

The quantitative measures were not analyzed using statistical measures due to the small sample size. Instead, scores on the instruments were used to expand upon interview and observations findings. Overall scholar scores were compared through examination of placement with regards to the group's median score because the scales are ordinal.

Findings: Following is a brief description of each of the members of the sample based upon the measures described in the Methodology section. Those whose identification codes begin with A are part of the alternative licensure program and those with codes that begin with an L are part of the LAMP or residency program. Interview questions concerning how well Noyce UT^3 prepared them for teaching will be presented in a separate section.

A1: This participant is not currently teaching but holds an alternative license in secondary school science education and was a lab manager in neuroscience prior to participating in the program. A1 came to the program with a PhD in biomedical science and took one additional course towards full licensure and spent some time as a long term substitute. A1 scored in the 2nd quartile on the Star Screener (below average) with low scores in the areas of organization and planning, working with at-risk students, working in a bureaucracy, understands elements of successful teaching, and fallibility. A1 scored higher than the sample on both the personal beliefs and outcome expectancy scales and the ratio of preference for inquiry practices versus the more traditional teaching practices was 0.88:1 indicating a slight preference for non-inquiry practices. The interview with A1 was inaudible. Questions from the Year 1 interview that are not repeated during Year 2 will be asked of this participant so missing data can be recuperated.

A2: A2 has a BS in mathematics and worked in a pre-engineering program prior to enrolling in the UT^3 Noyce Scholars. A2 is currently teaching mathematics at the high school level in a parochial school (not high needs) and holds the OAEL. A2 took the two extra graduate level courses required for full licensure and is now in the second of three years of teaching required to obtain full licensure. Scoring in the 2nd quartile on the Star Screener, A2 earned low rankings in the following areas: organization and planning, values student learning, at-risk students, approach to students, and fallibility. Of the total possible 44 points on the MTEBI personal beliefs scale, A2 scored a 37 and on the outcome expectancy scale, A2 scored a 29 out of a possible 40. If a participant responded positively to all items, the minimum score would be 33 for the personal beliefs and 30 for the outcome expectancy. A2 scored within an acceptable range on the personal beliefs but below the expected range on the outcome expectancy.

A2 was observed teaching a pre-calculus, trigonometry class to juniors and seniors. There were 19 students in the class—13 males and 6 females. The lesson began with the review of a quiz the students took the day before. A2 explained how to use the calculator to arrive at the correct answers and noted common mistakes the students made. Previously learned concepts were integrated and A2 then discussed how what they have learned so far will be applied in the next unit. A2 was well prepared. Once presented with new material, the students were given a small task to begin their understanding of the new concept. Meanwhile, A2 walked through the classroom helping students individually. A2 appeared to know the students and was able to gage the level of student understanding by some of their questions. While A2 was knowledgeable

about and quite comfortable with topic, it appeared at times the pace was a bit too fast. In fact, several students stayed after class to ask additional questions. A2 gave positive feedback even when student answers were wrong. A2 acknowledged the reasoning behind the incorrect response then explained why it was incorrect. Students were encouraged to rethink and answer again. One drawback to the lesson was that all the students had iPads and many were distracted by them. A2 did ask frequently for the iPads to be put away. Additionally, some students were not engaged; they got up and walked around during the lesson, had their heads laid down or were on their iPads. A2 did not reprimand any student for the disruptions aside from the requests to put the iPads away. The culture in the classroom seemed sometimes too relaxed; however each student was able to at least start the assignment.

During the interview, A2 was asked about the process of obtaining a teaching position. Graduating from Noyce in 2010, A2 applied for a position at a high needs school in Elyria, OH but the Human Resources Department at the district level was reluctant to hire someone with the OAEL. A2 waited a whole other year before another opportunity arose. A2 noted that again there was some resistance to hiring someone with the OAEL but the engineering background was instrumental in being hired. In the long run, the engineering experience outweighed the perceived drawbacks of the OAEL. The school/district does not provide much in the way of professional development but does provide quite a bit of technology for the classrooms. For example, new computers in the engineering labs are embedded in the desk and can be lowered to use the desk as a desk or raised to use the computer.

When asked about the challenges faced so far, A2 noted that there is an expectation that the teachers use the iPads for teaching but no district training was provided (and not covered in the University methods course either). A2 also struggled during the first year due to a lack of connection with fellow teachers: *"So this year is actually a different year where we all have the same planning period and I can't believe the difference from one year to the next year. I didn't realize my first year how little teacher collaboration I had until this year and I realized that my job is so much better when I can just throw ideas off of each other and talk with each other about how we can better serve these students."* Interestingly, A2 acknowledged that one challenge at first was slowing the pace of the lessons to match the comprehension level of the students. A2 shared that the school mentor frequently suggested slowing down. Additionally, during the first year A2 did not know what to expect with regards to student ability and prerequisite knowledge.

A3: A3 was in the first cohort, earned the OAEL, and took the two extra courses needed for full licensure. A3 teaches at a high needs high school in the partner district. The school offers courses online but students come to class to get assistance from teachers. Student enrolled at this school are often students with disciplinary problems. A3 has an undergraduate degree in biology and teaches secondary school science. A3 has completed the teaching obligation for the Noyce Scholarship. A3 scored right at the median on the Star Screener with a score that fell in the 2nd quartile. Areas of weakness included student learning, at-risk students, explains teacher success, and fallibility. A3 scored at the median on the personal beliefs scale of the STEBI and below the median on the outcome expectancy. This trend is common among teachers with experience. A3's preference for inquiry teaching strategies over non-inquiry is 1.8:1 indicating that inquiry strategies are favored almost twice as often as non-inquiry.

A3 did not agree to an observation due to the highly at-risk status of the students. During the interview, A3 seemed confused as to the status of licensure:

> I'm on a four-year residence. What happened is after the first year of the alternative license, there were layoffs and I was laid-off and I had to basically sub for myself. So I was a long-term sub but in the same position I had been in. But because they were trying to get me back at that school, so, and they would not mentor me, and then they changed the two-year license, they took that two-year trial license away, instead they have that four-year educator…or whatever. I'm not entirely sure what it's called. (So are you still working on that then or have you now gotten the licensure after that?) I had to start all over. They didn't give me any credit. (So what year are you in then?) Well, I don't know. I think I'm in my fourth year. I did the re-cert last year and I'm just waiting to hear back from that.

It is true that Ohio eventually rescinded the OAEL but not before A3 had the opportunity to obtain full licensure through teaching and supplemental coursework (2 courses). A3 was hired as a long term substitute upon graduation from the project (January) and was hired full time the following academic year. When asked about challenges faced, A3 focused on the lack of resources and the fact that with low seniority there is a possibility of being laid off whenever the district has to make budget cuts. Also, because the school teaches online, student attendance is sketchy—students have the option to come to school when they want or even to complete work outside the classroom. Because of this, it is difficult to create a classroom culture. Teaching at this school has made A3 more flexible in the delivery of coursework to augment what is taught online because of the unpredictability of student attendance.

A4: A4 has a B.S. in biology and was a loss prevention manager at a local department store prior to joining Noyce. A4 has been unable to obtain a teaching position but scored in the 3rd quartile on the Star Screener. A4 scored slightly below the median on the STEBI personal beliefs and right at the median on the outcome expectancy and preferred non-inquiry teaching strategies with an inquiry to non-inquiry ratio of 0.88:1. The interview with A4 was garbled and is being conducted again. Results will be provided in the next annual report.

A5: A5 also teaches 7th and 8th grade mathematics in an online school. Enrollment is 55.5% free/reduced lunch so the school qualifies as high needs. A5 graduated with a BS in Industrial Engineering and spent some time as a school advisor and as a manager for a small engineering firm. A5 has taught for three years and has completed the service requirement as well as the extra coursework required for full licensure. Similar to others in Cohort 1, A5 scored in the 2nd quartile on the Star Screener with a high score in persistence, an average score in fallibility, and low scores in all other categories. A5 scored within expected ranges on the MTEBI with a 36 on the personal beliefs (minimum acceptable score is 33) and 32 on the outcome expectancy (minimum 30).

To observe A5 teaching, an evaluator logged into the session and watched the online interaction between the teacher and students. Interaction consisted of actual audio conversations and written comments for those students who did not have microphones. The topic of the lesson was proportions. A5 began the lesson with a simple math question, to get the students participating. The lesson was well prepared and included a PowerPoint with examples of how to perform the calculations and problems for students to attempt during the lesson. A5 was confident in the students' abilities and consistently assured them that they could succeed. A5 provided adequate time for all students to work out the problems during the lesson. The class

was well-balanced with students taking turns attempting to solve problems during the blackboard presentation. The lesson topic was presented to the students as relevant to their lives and included real world examples. Methods that students had previously used were applied to new content and they used what they already knew to try and figure out the next steps. The relationship between teacher and student was difficult to gauge because of the learning platform; however, A5's voice was engaging and interactive. Students were engaged as several exceeded the instructions by rounding their answers. A5 praised students on their skills and efforts. The lesson platform included an interesting feature—a chat box for students to interact with one another. It was observed that students sometimes worked with other students they could perceive were struggling. The fact that students willingly and without encouragement helped other students was a testament to the cooperative culture A5 established within the class.

The quality of A5's interview recording was compromised. A5 will be re-interviewed and results will be shared in the next annual report.

A6: A6 obtained a BS in biology and managed a family business prior to teaching. A6 has taught high school biology and science at a charter school in an urban setting for the past two years but by the time we scheduled an observation A6 had left that position. At the time of the interview, A6 was looking for another position. Prior to teaching at the charter school, A6 was a long term substitute in a rural school district. A6 has taken one of the two required extra courses for full licensure and scored in the 3rd quartile on the Star Screener. Areas in which A6 earned a high score included dealing with bureaucracy, understanding teacher success, and understanding practical applications of theory. Areas with low rankings included organization and planning, understanding students, and fallibility. [test scores are missing and interview was inaudible]

A7: With a BA in mathematics, A7 was a production analyst prior to joining the Noyce program. A7 taught high school math at a high needs urban school for one year. After the first year, the district did not renew A7's OAEL and now A7 is working in the automotive industry. A7 scored in the 1st quartile on the Star Screener with low rankings in all categories except an average ranking in understanding what promotes student success. A7 scored above acceptable minimum scores on the MTEBI—39 on personal beliefs (highest of the three math teachers) and 31 on the outcome expectancy scale.

A7 used some employment websites to search for teaching positions but actually learned about the job at the high school through UT^3 Noyce. Prior to the full time position, A7 worked for the district as a substitute teacher. In the summer of 2013, A7 spent three months searching for a new teaching position but the search was unproductive. The position with the automotive company was offered and since this is what A7 did prior to Noyce, A7 returned to the position and has not pursued teaching since.

A7 learned about the program through an ad in the local newspaper. Because A7 had done some substitute teaching prior to joining Noyce and realizing that there was much A7 did not know about teaching, A7 was attracted to Noyce because of the opportunity to gain knowledge in pedagogy. A7 did not feel the program provided adequate preparation for working with students, motivating students, improving content knowledge, assessing student learning, recognizing individual differences, working with technology, creating a learning environment or working with parents. A7 felt that working with parents, something often overlooked in teacher preparation programs, would have been helpful.

A8: A8 has a BS in biology and is licensed in middle school science. Prior to joining Noyce A8 was an advisor and is currently employed at a charter middle school in an urban setting (high needs). A8 scored in the 3rd quartile on the Star Screener. A8 graduated from the program in 2011. Because A8 had been working as a substitute at a charter school, upon graduation A8 was hired full time. A8 had a 47 on the personal beliefs scale of the STEBI and a 36 on the outcome expectancy. A8 had the highest preference for inquiry vs. non-inquiry instructional strategies of the sample (1.89:1). A8 was hired, after completion of the program, at the school his/her daughter attended. One day when visiting the school, a teacher indicated the school was looking for a science teacher so A8 applied and was hired.

Comment [GM1]: observation

L1: L1 had a BA in biology prior to entering the LAMP version of UT[3] Noyce and subbed for a year after program completion because a permanent position could not be found. L1 had interviewed for a teaching position at a new charter school just prior to graduation but was not hired. A year later, the administration at the school changed and the new leaders contacted her about joining the school. The school was reorganized to focus on STEM. The students at the school are all low income, high risk. The school uses technology and students can be dual enrolled in high school and at a nearby college. L1 scored in the first quartile on the Star Screener (indicating a low probability of success teaching in an at-risk school). L1 scored low on most measures but scored above average on persistence, application of theory to practice, and ability to relate to children. L1 had the second highest score on the personal beliefs scale of the STEBI (48) as well as on the outcome expectancy scale (39). L1 favored inquiry-based instructional strategies over traditional lecture by 1.60:1.

L1 taught an anatomy lesson for observations. The students were 9th and 10th graders. Students were enrolled in this course because they expressed an interest in pursuing a career in the health professions. There were 9 students in the class: 2 males and 7 females. Students were working on a capstone project—part of which was a "showcase report" for an event similar to a science fair. The lesson focused on discussion of these reports. While little investigation was included, students shared where they were with regards to their projects and asked questions or offered suggestions. Because of the nature of the projects, much of the discussion focused on the health fields. All students were engaged and worked together to find solutions. L1 allowed students to share personal stories that were in line with the topics. The students all worked well together as well as with the teacher. The students were encouraged to think about more ideas to make their projects complete and thorough. Students seemed eager to learn.

As with all LAMP program completers, L1 has full Ohio Licensure. L1's school is small with only seven teachers and one administrator. The administrator serves as principal and mentor to the teachers. Six of the seven teachers were in their first year at the time of the interview. L1 found this first year of teaching to be challenging because of limited resources, being new to teaching, and building curriculum. Over the past year, however, L1 believes his/her teaching ability to have improved and feels comfortable working with staff and students. L1 felt that actual teaching met expectations—there were no surprises.

L1 entered the Noyce program upon undergraduate graduation (biochemistry). What was appealing about Noyce was the long term field experience and the ability to work with high needs students. L1 felt Noyce provided adequate preparation in all areas of teaching including

working with and motivating students, understanding content, planning instruction, assessing students, and using technology in teaching.

L2: L2 has an interesting background with a BA in English. L2 received licensing in middle school English and science and currently teaches science and English at a junior high school in a suburban location. L2 scored in the 3rd quartile on the Star Screener. [stebie/stips are pending].

Unfortunately during the past year L2 only taught English. An observation of L2's teaching was conducted in one of the English lessons (for 2014-15 L2 will be teaching science). There was some evidence of inquiry-based instruction during this lesson as the students were working independently on a reading assignment. Students were instructed to generate questions and ideas as they read. After a while, L2 asked the students to meet in groups and discuss their notes. At first students were engaged but after a while they became distracted. To address this, L2 assigned the students a literature question based on their reading. They were charged with writing a review of 5 to 9 sentences about what they had read and were given 10 minutes to do so. The students who were being disruptive were given a 4 minute deadline.

L2's interview was inaudible and will be repeated within the next month. It will be reported in the next annual report.