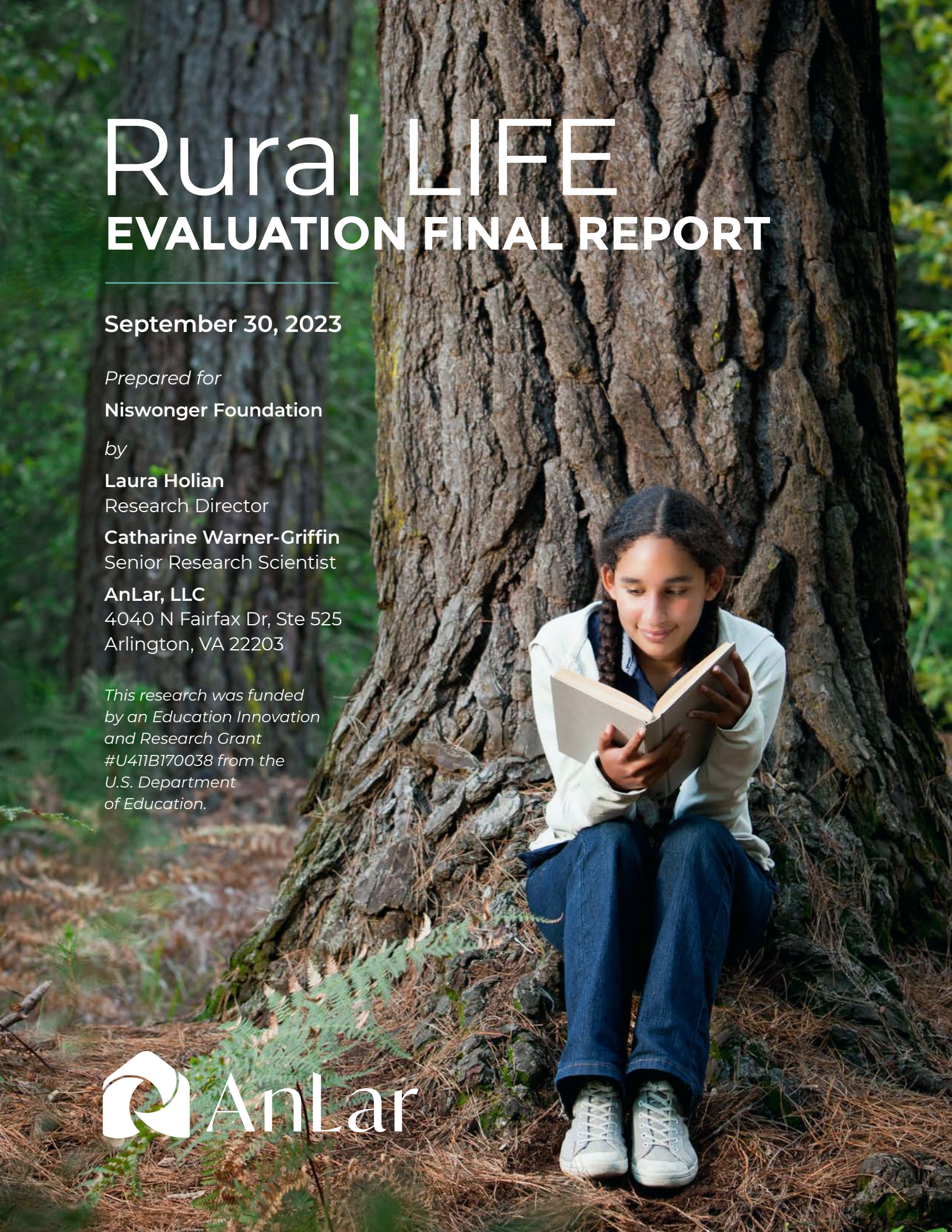

Rural LIFE
EVALUATION FINAL REPORT

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Prepared for

Niswonger Foundation

by

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Abstract

This study examines the impact of the Niswonger Foundation's Rural Literacy Intervention Focused on Effectiveness (Rural LIFE) program compared to business-as usual (BAU) professional learning and instruction on student achievement in middle school. The Rural LIFE program was designed as a two-year intervention involving personalized learning plans for schools, professional learning for principals and teachers, and coaching to support schools in implementing personalized learning plans. Due to school closures canceling testing in 2020 and the uncertainty of school openings in 2020-21, the two-year intervention could not be evaluated. The study instead included a randomized controlled trial (RCT) that looked at the impact of the program after one year in the 2018-19 school year, and a second quasi-experimental study of one year of the intervention in the 2021-22 school year. Key outcome indicators include student achievement on annual state reading and literacy tests as well as school-level value-added composite scores collected by the Tennessee Department of Education (TDOE).

Findings

- There was no significant impact of the Rural LIFE program on student English Language Arts (ELA) achievement or school-wide value-added outcomes after one year of implementation in the initial cohort using an RCT design.
- There was no significant impact of the Rural LIFE program on student ELA achievement after one year of implementation when the program was modified for a second cohort, using quasi-experimental design (QED).
  - There was a positive and significant impact on student ELA achievement among the economically disadvantaged subgroup.
- There was a significant impact of the Rural LIFE program on student math achievement after one year of implementation in the second cohort, using QED. This finding was robust across all subgroups.
- There was a significant impact of the Rural LIFE program on school-wide ELA proficiency three years after completion of initial implementation compared with BAU.

Discussion

The Rural LIFE program was designed to be implemented over two years. There was not an expectation of significant impact after one year of implementation, as it takes time for the benefits of teacher professional learning to lead to changes in classrooms and ultimately student outcomes. Similarly, it takes time for schools to create a plan and to purchase and receive resources. The disruption of COVID-19 and the closing of schools in March 2020 meant that impact had to be assessed in spring 2019 after schools had only received part of the program. After schools reopened in fall 2020, they were coping with repeated closings and the second cohort that was scheduled to begin implementing Rural LIFE chose to delay implementation until fall 2021. This meant that there was again only one year of implementation before assessing student and school outcomes. The sustainability analysis shows a school-wide positive impact on ELA proficiency in 2022 among schools participating in Rural LIFE in 2018-19 and 2019-20 compared with schools operating under BAU conditions. This suggests that more time is needed to detect an impact of broad-based school-wide interventions.

The impact on math but not ELA outcomes in Cohort 2 could be due to a focus on literacy across curricula. Several schools in Cohort 2 involved math and science teachers in developing and implementing the school plan. The initial conception of the Rural LIFE program was intended to build literacy skills and to allow personalized learning practices to spread throughout schools. The broad-reaching nature of the program was intended to have impacts beyond literacy. Another potential explanation for the positive outcome in math achievement is that the Rural LIFE program may have improved students' literacy and comprehension of standardized test items. The literacy focus of Rural LIFE might help with reading comprehension of assessment questions, which could lead to higher standardized test scores in multiple subject areas.

Both coaching and personalized learning strategies have potentially positive impacts on student achievement outcomes, measured either at the individual student level or as an average across schools. These components need more evaluation, but they could be used to support schools, students, and teachers in any context.

Background

Literacy is a foundational skill and is important for understanding and learning in all content areas. Adolescent literacy is crucial for student comprehension in diverse subjects such as social studies, science, math, and even ELA. While literacy is important in all geographic areas, students in rural areas have disproportionately greater challenges with literacy than their non-rural peers. Children in rural areas are less likely than non-rural children to be proficient in letter and sound recognition when they enter kindergarten (Grace, et al., 2011). As rural schools see their student populations shift, they are under increasing pressure to improve academic results for their high-need students and close the persistent achievement gap in academic performance, dropout rates, college completion rates, and other measures of success. Since 42 percent of U.S. school districts are in rural areas (Gutierrez & Terrones, 2023), it is becoming increasingly important nationwide to develop a rural strategy to close the achievement gap.

Recognizing the importance of adolescent literacy and the low rates of ELA achievement in the middle grades in Tennessee, the Niswonger Foundation developed the Rural LIFE program. In 2017, when the Niswonger Foundation was creating the Rural LIFE program, one-third (33.6 percent) of all students in grades six through eight in Tennessee were proficient in ELA as measured by the state test (TDOE, 2018). Fewer than one-fifth (18.2 percent) of economically disadvantaged students were proficient in ELA (TDOE, 2018). Notably, the majority of schools and districts in northeast Tennessee are rural.

After working with high schools to improve college and career readiness among students in northeast Tennessee, the Niswonger Foundation turned to middle schools. Research shows that the gaps between those with lower and higher reading ability widen in the middle grades (Firmender et al., 2013). This may be due in part to middle grades teachers not having the same background as early grades or elementary teachers in the fundamentals aspects of teaching literacy. Foundational skills such as word identification, fluency, and/or comprehension may be assumed for students coming out of elementary school. When middle grades students struggle, teachers may not have the background to help them build those foundational skills.

Because the needs of students vary, the Niswonger Foundation designed the Rural LIFE program to provide professional learning and instructional coaching around personalization. While a personalized approach to learning shows positive effects and increased options for improved equity (Bingham et al., 2016; DeMink-Carthew et al., 2017; Zhang et al., 2020), a clear definition and understanding of the particular components that define personalized learning remains elusive (Walkington and Bernacki 2020). At its core, personalized learning focuses on meeting students' individual needs and incorporating their interests and preferences into curriculum delivery. There is a diversity

> **"Personalized learning prioritizes a clear understanding of the needs and goals of each individual student and the tailoring of instruction to address those needs and goals. These needs and goals, and progress toward meeting them, are highly visible and easily accessible to teachers as well as students and their families, are frequently discussed among these parties, and are updated accordingly."**
>
> (Pane et al., 2017)

of personalized learning approaches across schools nationwide. Due to the range of personalized learning practices, there is not yet consensus on which practices may lead to improvements in achievement and which are necessary (Pane et al., 2017b). Nevertheless, there is enthusiasm around the promise of personalized learning to improve student engagement and performance.

Researchers suggest that personalized learning can positively impact student achievement by increasing student motivation (Walkington and Bernacki 2014). Increased motivation may lead to improved academic achievement. One study found that students in schools using personalized learning performed significantly better on math and reading assessments than comparable students, with particularly strong progress in elementary and middle grades (Pane, et al., 2017a). However, more research is needed on how personalized learning can be implemented in rural schools, particularly at the middle school level, to improve student outcomes.

Personalization aligns with the needs of students to allow for greater autonomy and increased engagement. Coaching is aligned with the needs of individual teachers and can lead to changes in teacher practices that affect student outcomes. Rather than being a one-size-fits-all professional learning, coaching allows more autonomy for teachers. Effective coaching practices include forming partnerships and deep relationships with teachers; modeling lessons or strategies; and helping teachers to plan effectively, develop leadership skills, remain focused on a goal, and maintain connections to students through teaching (Anderson and Wallin, 2018).

The Niswonger Foundation used their experience in the local education community combined with research on literacy instruction, personalized learning, and instructional coaching to develop the Rural LIFE program. The Rural LIFE program received funding in 2017 from the U.S. Department of Education's Education Innovation and Research (EIR) grant program (award number U411B170038). The Rural LIFE program relies on the expertise and contextual knowledge of school leaders and teachers to develop school-wide personalized learning plans. There is a broad variety of avenues to provide students with voices and choices, to help students make connections between what they learn and their own interests and passions and, eventually, to enable students to become responsible for their learning. Hence, a single one-size-fits-all approach does not exist. Instead, flexibility is a key component as researchers, policy-makers, and educators consider scalability for personalized learning. The focus of Rural LIFE is on adaptability and meeting students or schools where they are. The program provides financial resources to help schools implement their plans. Participating schools have chosen to invest in classroom libraries, subscriptions, technology (both hardware and software), furniture, and professional learning for teachers. Along with the facilitation of a school-wide plan for personalizing literacy instruction, teachers and leaders also receive professional learning and instructional coaches to help them implement plans and improve their practice.

Impact Study #1, RCT, 2018-19

Study Description

RESEARCH QUESTIONS FOR STUDY #1

1. What is the impact of attending a middle school supported by Rural LIFE for one year compared to a BAU middle school on students' ELA achievement in grades six through eight (as measured by the TN Ready ELA test)?
2. Among economically disadvantaged students in grades six, seven, and eight, what is the effect on ELA achievement of attending a middle school supported by Rural LIFE for one year, compared to a BAU middle school?
3. What is the effect of the Rural LIFE program after one year on the schools' overall composite scores fromTennessee's value-added model, compared to the BAU condition?

INTERVENTION CONDITION

The Rural LIFE project is designed to improve literacy across the curriculum in grades six to eight through technology-enabled, literacy-focused personalized learning strategies, a shared services network, standards-aligned instructional materials, formative assessment and data tools for teachers, and professional learning and coaching support for teachers.

The Rural LIFE program's shared services network pooled resources across participating schools. The first cohort of the Rural LIFE schools participated during the 2018-2019 and 2019-2020 school years. Participation in the Rural LIFE program included three key components for treatment schools:

1. a personalized learning plan for each school with funding for resources selected by the school,
2. professional learning opportunities, and
3. regionally-based literacy coaches.

First, school administrators and lead teachers met with the Niswonger Foundation to develop **personalized learning plans**. Particular personalized learning strategies, such as flexible learning environments, learner profiles, and personal learning paths, empower student learning and foster autonomy, confidence, and a greater sense of belonging in school. A learner profile helps teachers know more about each student and can include information about their interests, strengths, skills, aspirations, and passions. A personal learning path starts with identifying goals and subgoals and linking those with steps on how topics or content will be mastered to achieve the goals. Being able to pick a seat, choose reading material based on personal interests, and discuss academic progress with teachers can lead students to engage more in their education.

Niswonger Foundation staff helped school teams to incorporate different core principles of personalized learning into their plans, including personal learning paths, learner profiles, competency-based progression, and flexible learning environments. School leaders also identified the following primary and secondary focus areas as part of their plan development:

- strengthening literacy development across the content areas;
- implementing literacy interventions for struggling readers and writers;
- adapting school policies, structures, and culture to support literacy;
- building leadership capacity; and
- supporting teachers to improve instruction.

To help schools implement their plans, the Niswonger Foundation allocated funds for each school to use towards their personalized learning plan. Schools determined their purchases with approval from the Rural LIFE team. Examples included laptops or tablets for students, personalized learning software, student books, classroom libraries, alternative seating, and teacher training. The Rural LIFE team also helped secure competitive and bulk pricing on items across schools.

Second, the intervention provided access to **professional learning opportunities**. Rural LIFE professional learning was intentionally designed and delivered to build capacity specific to individual roles and to support the creation of a shared vision for change within and across schools in the region. These professional learning opportunities included an annual summer institute, regional multi-day trainings with a learning arc, and professional learning communities (PLCs) organized within each school and across schools by content area. Topics covered during the summer institutes and trainings included effective personalized learning strategies, selection and use of online products and applications, and the creation and use of high quality assessments and data. Professional learning sessions included both general topics and personalized topics aligned with the strategies focused on by schools.

Third, grant funding provided treatment schools with access to nine regionally-based **literacy instructional coaches**. Each coach was assigned to four treatment schools, and the coaches visited their schools throughout the week. Coaches worked with the lead teacher, principal, other teachers at the school, and district coaches to identify areas of need within the school and provide guidance on personalized learning. Support included co-teaching, co-planning, providing feedback on lessons, developing assessments or unit plans, and providing guidance on technology use. Coaches also facilitated PLCs within and across schools. Coaches were selected based on their expertise in literacy, technology, and social and emotional learning (SEL), and they committed to working with the Rural LIFE program for at least one year (although most coaches stayed for both years of the intervention).

Figure 1. Rural LIFE Logic Model, Cohort 1

RESOURCES	ACTIVITIES	OUTPUTS	OUTCOMES
Project team coordinates a shared services network across districts	School teams develop and implement personalized learning plans	Teachers increase use of personalized learning strategies: • use data to customize instruction • try new approaches to classroom management • flexible learning environments • personal learning paths • competency based progression	Student literacy increases
Standards aligned materials	School teams participate in professsional learning around literacy and personalized learning	Students are more engaged in own learning, show more agency, have greater connections to teachers, and articulate learning goals	Student performance in math and social studies improves
Instructional coaches	Instructional coaches help schools implement personalized learning plans to improve literacy	Teachers participate in personalized learning and PLCs and share strategies with each other	School-wide value-added scores increase
Personalized learning and middle grades literacy resources			
Computers and instructional software			

PROGRAM IMPLEMENTATION

The Rural LIFE program was designed to last for two school years, measuring impacts on student achievement after one year and two years of exposure. However, it was not possible to conduct confirmatory analyses on the second year of implementation due to the COVID-19 pandemic and the resulting mid-year disruption in student learning in 2019-20. Instead, impact analyses examine the effects of one year of Rural LIFE compared to BAU on student ELA achievement and on overall school achievement in middle school.

The cornerstone of the Rural LIFE program involved allowing schools to develop their own personalized learning plans focused on improving literacy. As such, schools varied in the intensity of implementation, with some schools focusing on a single subject area, grade, or personalized learning practice, while other schools implemented personalized learning across content areas and grade levels. At the start of each school year, a lead teacher was identified as the main point of contact for each school. Some larger schools identified two lead teachers. Lead teachers were responsible for partnering with Rural LIFE coaches to work with the principal and other teachers at the school to develop a school plan.

Figure 2. Example of Matrix Used by School Teams to Identify Focus Areas

	Literacy Focus Area				
Personalized Learning Strategy	**Strengthening Literacy Development Across the Content Areas**	**Literacy Interventions for Struggling Readers and Writers**	**School Policies, Structures, and Culture for Supporting Literacy**	**Building Leadership Capacity**	**Supporting Teachers to Improve Instruction**
Personal Learning Paths					
Learner Profiles					
Competency-Based Progression					
Flexible Learning Environments					

Each school could choose one or more literacy focus areas. The majority of schools chose two or more priority areas (on average, schools selected 2.2 focus areas). Supporting teachers to improve instruction was the most common focus area (26 of 36 schools), followed by strengthening literacy development across content areas (19 of 36 schools) and literacy interventions for struggling readers and writers (18 of 36 schools). Few schools (6 of 36) chose building leadership capacity as a focus area. In addition to the literacy focus area, schools also identified personalized learning strategies that they would attempt to implement. On average, schools selected three of the four personalized learning strategies. The strategy selected by the most schools was personal learning paths (32 of 36 schools), followed by learner profiles (27 of 36 schools), competency-based progression (26 of 36 schools), and flexible learning environments (26 of 36 schools).

As teams developed their plans, they had access to a variety of resources and examples from other schools (see **Appendix A**). Each team also met with their assigned Rural LIFE instructional coach for feedback on the plan. As part of the planning process, school teams identified focus areas. For each focus area, the school team provided data or evidence to support why pursuing an action in the identified focus area would improve literacy outcomes in their school. Then the school team wrote out action steps and a timeline, who was responsible for the actions, resources needed, and the budget or cost to implement the action step. The Rural LIFE leadership team reviewed the school plans and financial requests and approved or denied requests based on alignment with the goals of Rural LIFE. School teams were able to revise their plans during the school year and make additional requests for financial support. Each school was informed of the total financial amount available to them before they started writing their plan.

Fidelity of implementation in developing and instituting a school-wide personalized learning plan for each school was measured through review of the school plans and a survey of teachers about their use of different personalized learning strategies.

The second key component of the Rural LIFE program consisted of professional learning opportunities. The summer before the 2018-19 school year, teachers and principals participated in two two-day workshops introducing them to the Rural LIFE program and

concepts around personalized learning and improving literacy. Throughout the school year, lead teachers participated in three full-day professional learning sessions and principals participated in two half-day sessions. A team from the Friday Institute delivered professional learning sessions and Rural LIFE instructional coaches led breakout sessions. The lead teachers were encouraged to bring their learning back to their school teams.

Table 1. 2018-19 Lead Teacher and Principal Professional Learning Sessions

Date	Who and what	Objectives
June 2018	2-day workshop for lead teachers and principals	• Understand the Rural LIFE program • Understand the personalized learning core principles • Introduce the Six Elements of Effective Reading Instruction • Understand the current data on ELA performance at schools • Identify ways to cultivate a positive classroom culture • Build community among lead teachers & coaches
July 2018	2-day workshop for lead teachers and principals	• Examine the role of a coach and explore the coaching cycle • Discover new tools and strategies to share with other staff • Develop a coaching plan • Explore ways to support learner agency and SEL • Understand the Strategic Literacy Practices and strategies for implementation
October 2018	6-hour training for lead teachers	• Co-construct a vision for middle grades literacy • Explore SEL and its impact on classroom culture and management • Examine the concept of learner profiles and how they inform the practice of connecting students to their learning
October 2018	4-hour training for principals	• Understand what personalized learning is • Look at data to understand current conditions • Support teachers in carrying out school-wide plan • Work with Rural LIFE coaches
December 2018	6-hour training for lead teachers	• Deepen the understanding of SEL and learner agency necessary to support student success in a personalized learning environment
February 2019	4-hour training for principals	• Build an understanding of how to foster a school culture that supports literacy • Consider human capacity and how to leverage people to lead for change • Share how the school's Rural LIFE coach is making an impact • Understand the revision process for school plans in year 2
May 2019	6-hour training for lead teachers	• Deepen knowledge of effective strategies to build student literacy • Build teachers' capacity to design effective writing instruction • Increase teachers' knowledge and ability to personalize learning for all students
July 2019	Any teachers or school leaders in the Niswonger Foundation service area	At the annual Niswonger Foundation Summer Symposium, there were special sessions for Rural LIFE treatment schools focused on literacy and personalized learning. Sessions were led by Rural LIFE instructional coaches.

In addition to the structured professional learning days, school teams also had opportunities for learning within their schools. The Rural LIFE instructional coaches provided one-on-one learning and mentoring for teachers as well as help with leading PLCs.

Rural LIFE instructional coaches also received PD and training from the Friday Institute during full-day sessions in October 2018 and March 2019. During the October session, coaches were trained in developing a personal identity as a coach and exploring their leadership roles. They were also trained in how to coach school teams on implementing aspects of personalized learning and improving classroom culture and management. During the March session, professional learning was focused on coaching cycles, methods for collecting student-centered data, and strategies for practicing effective questioning.

In addition to in-person professional learning, teachers and leaders were also offered opportunities to take part in online modules. The content of the online modules was focused on literacy, personalized learning, and leadership development.

Fidelity of implementation for participation in personalized learning opportunities was measured through sign-in sheets at each event.

The third component of the Rural LIFE program was the provision of instructional coaches to help schools implement their plans. The core responsibilities of coaches were to visit with each school once a week for a full day, have a 30-minute check-in with the principal of each school at least once per month, provide PLC guides and advice on using them, model personalized learning strategies, participate in a weekly coaches meeting to share practices with other coaches, and provide school-wide professional learning aligned with the focus of each school's personalized learning plan. Rural LIFE instructional coaches were assigned to four schools each. Fidelity of implementation for instructional coaching was measured through weekly coaching logs completed by each coach.

SETTING

The study took place across 18 school districts in Tennessee, consisting of 11 county-based systems and seven city-based systems during the 2018-19 school year. The intervention continued during the 2019-20 school year, but it stopped in March 2020 when schools closed due to the COVID-19 pandemic. Participants and comparison schools were limited to schools with students in grades six through eight. The number of students in grades six through eight varied across schools, from a low of 30 to over 1,000, with an average of 273. Over half (61 percent) of these students were considered high-need based on their poverty level.

The program was school-based and, as such, assignments to the treatment and control groups were made at the school level. Treatment and control group characteristics were similar.

COMPARISON CONDITION

The control schools were from the same state and region as the treatment schools. Tennessee placed emphasis on personalized learning in its ESSA plan. Because of the national and state emphasis on personalized learning, schools in both conditions had exposure to the concept of personalized learning and resources to support personalized learning outside of the intervention. Schools in the control condition could have implemented strategies on their own if they chose.

Schools in the comparison condition did not receive any of the services included in the Rural LIFE program and continued with BAU professional learning and instruction. Schools in the comparison condition did not have access to any elements of the Rural LIFE shared services network, including personalized learning plan support, professional learning opportunities, or Rural LIFE coaches.

STUDY PARTICIPANTS

All sixth- through eighth-grade students attending treatment schools were included in the intervention. Students who did not have both spring 2018 and spring 2019 scores were not included in the analytic sample. Table 2 below provides the number of schools and students at randomization and in the analytic sample.

SAMPLE ALIGNMENT WITH THOSE SERVED BY THE PROGRAM

Prior to the evaluation, schools were offered the opportunity to participate in the study. Schools were informed that those volunteering to participate would be randomized to receive the treatment during the 2018-19 and 2019-20 school years or the 2020-21 and 2021-22 school years. The evaluation sample includes all of the schools that volunteered to participate. There were no other schools served by the program during the evaluation that did not participate in the evaluation.

Design and Measures

INDEPENDENCE OF THE IMPACT EVALUATION

AnLar independently conducted the impact evaluation. AnLar team members assisted with recruitment of schools, conducted the random assignment, collected outcome data through administrative sources, analyzed the data, and wrote the findings.

PRE-REGISTRATION OF THE STUDY DESIGN

The study was pre-registered with the Registry of Efficacy and Effectiveness Studies (**REES**), registry id 7180.

DESIGN

The study design was a cluster RCT across 18 Tennessee districts. Evaluators assigned participants to conditions at the school level. In April 2018, 72 schools within the districts that serve students in at least two of three middle grades (sixth, seventh or eighth grade) were randomized to the intervention or comparison group. All students in grades six, seven, and eight who were enrolled in the study schools on October 1, 2018 are included in the study sample[1]. Students who entered schools after October were excluded from the sample.

[1] Parents could not have known a school's assignment as a Rural LIFE or comparison school before the start of school in September. Parents were not notified about the Rural LIFE program earlier. Although school administrators and teachers were notified of schools' assigned conditions in April 2018, they could not have plausibly

AnLar conducted the randomization of the 72 schools that volunteered to participate in the Rural LIFE program. The randomization was broadcast live so that school administrators and program staff could watch and observe the process. After sorting the schools by EIR rural status, half of the schools were assigned to the treatment group and half to the control group. There were 44 rural schools and 28 non-rural schools. Half of schools in each block were assigned to treatment and half to control, resulting in a total of 36 treatment schools and 36 comparison schools.

AnLar examined several school characteristics to compare the treatment and control schools at baseline prior to the implementation of the Rural LIFE program. There were no statistically significant differences between the schools in the treatment and control groups.

Table 2. Comparison of Treatment and Control Schools on School Characteristics

School characteristic	Treatment	Control	Overall
Average number of students	451	451	451
Average number of teachers	30	30	30
Percent white	86	90	88
Percent Black/Hispanic/Native American	12	9	11
Percent economically disadvantaged	37	36	36
Percent rural	61	61	61
Percent PK/K-8 grade span	50	64	57
Percent 6/7-8 grade span	42	36	39
Percent 6/7-12 grade span	8	0	4

MEASURES

The Tennessee Education Research Alliance (TERA) and the TDOE provided the school and student data.

To address research questions 1 and 2, the student-level outcome is students' **2019 ELA achievement**. This is a standardized measure based on Tennessee's annual statewide testing, the TNReady. The TNReady is administered to students in grades three through eight each spring and has been used since 2017. Scores are standardized within each grade to enable different grade levels to be pooled together in the analytic sample.

To address research question 3, the school-level outcome measure is a school's **composite value-added score** (TVAAS), measured annually using composite scores from Tennessee's value-added model. This score measures student growth during the year compared to other students in the state that took the same assessment. The score does not measure whether the student is proficient on the state assessment. The composite scores use data from student performance during that year in ELA, math, science, and social studies. At the school level, this score ranges from 1 to 5, with 1 being low levels of growth and 5 being high levels of growth.

influenced students' placement into a particular study school.

Both of these measures were accessed through TERA.

Student data are used as covariates in the impact analyses. Student data include the following variables, provided by TERA:

- Baseline (2018) performance on the state ELA assessment
- Student economic disadvantage status
- English Learner status
- Race/ethnicity
- Gender identity

School-level covariates include the following data, downloaded through publicly available data from TDOE:

- Baseline (2018) value-added composite measure
- Rural/non-rural status
- Enrollment
- Percent of students with economic disadvantage
- Percent of students with a disability

SAMPLE SIZES AND ATTRITION

Overall, there were 72 schools in the study, with 36 assigned to the treatment group and 36 to the comparison group. There was no cluster attrition, as all schools remained in the intervention after one year. Individual attrition was low. For individual attrition, the overall rate was 8.8 percent, while the differential rate was 0.0 percent. There were no joiners after October 2018.[2]

Table 3. Sample Sizes at Randomization and in Analytic Sample

	Comparison Group				Treatment Group			
	Schools		Students		Schools		Students	
Outcome measure	# Randomized	# Analytic Sample	# Randomized	# Analytic Sample	# Randomized	# Analytic Sample	# Randomized	# Analytic Sample
ELA Achievement	36	36	8,484	7,737	36	36	11,822	10,781
Composite TVAAS	36	36	n/a	n/a	36	36	n/a	n/a

[2] Supplemental analyses explore whether limiting the analytic sample to students in the same schools as of May 2018 instead of October 2018 indicates the presence of sample bias through joiners. Results (available upon request) indicate similar treatment and covariate effects.

Data Analysis and Findings

BASELINE EQUIVALENCE

Table 4 shows the treatment and control groups were equivalent on student scores, student economic disadvantage status, and school proficiency before the start of the Rural LIFE intervention, in spring 2018. Students in treatment and comparison schools had comparable ELA achievement (ES = 0.05). Treatment and comparison schools were equivalent on baseline composite TVAAS scores (ES =0.00). The analytic sample size is 18,518 students, with 10,781 students in 36 treatment schools and 7,737 students in 36 comparison schools.

Table 4. Baseline Equivalence Assessment

	Treatment Group			Comparison Group				
Measure	Sample Size	Mean	Standard Deviation	Sample Size	Mean	Standard Deviation	Treatment-Control Difference	Standardized Difference
All students								
2018 ELA Achievement	10,871	326	29	7,737	324	28	1.6	0.054
2018 TVAAS Score	36	3	1.6	36	3	1.6	0.00	0.000
Gender	10,871	0.49	0.5	7,737	0.49	0.5	0.0015	0.003
Economic disadvantage	10,871	0.39	0.48	7,737	0.35	0.48	0.038	0.079
Students facing economic disadvantage								
2018 ELA Achievement	3,928	318	28	2,723	316	28	2	0.071

Note: In order to ensure that the comparison for baseline balance at the student level is made by comparing treatment and comparison units within strata and then averaging the treatment control differences across strata, the balance effect size is calculated using a regression-based approach.

PROGRAM EFFECTS

Approach to Estimating Student-Level Outcomes

We use a multilevel model to estimate the impact of the Rural LIFE program on general literacy achievement, adjusting for randomization blocks (rural/non-rural) and baseline covariates. The model is estimated using Stata's mixed command and accounts for the nesting of students within schools, with students at Level 1 and schools at Level 2 in the model. The impact of Rural LIFE was estimated at the school level, which is the level of assignment. The impact is measured after one year of treatment.

The impact of the program is estimated as the average treatment effect when comparing general literacy achievement in Rural LIFE schools to achievement in schools that were not assigned to the Rural LIFE program. The latter schools conducted BAU over the same school year. Additionally, covariates in the model ensure contrasts are being made with similar schools and students.

We use the following model to estimate effects on student-level ELA achievement:

Level-1: Student Level

$$Y_{ij} = \beta_{0j} + \beta_{1j}\left(Y^{*}_{ij}\right) + \sum_{m=1}^{M} \beta_{2.m} X_{mij} + \varepsilon_{ij}$$

Level-2: Cluster (School) Level

$$\beta_{0j} = \gamma_{00} + \gamma_{01}\left(T_j\right) + \sum_{q=1}^{Q} \gamma_{02.q} W_{qj} + \gamma_{03} Rural_j + \mu_{0j}$$

$$\beta_{1j} = \gamma_{10}$$

$$\beta_{2.mj} = \gamma_{2.m0}$$

Where,

Y_{ij} = the *outcome* for the i^{th} student in the j^{th} school

β_{oj} = the intercept for school j

β_{1j} = the effect of pretest in school j

Y^{*}_{ij} = a pretest measure for the i^{th} student in the j^{th} school

$\beta_{2.mj}$ = the effects of student covariates in school j

X_{mij} = the m^{th} of M additional covariates for student i in school j

ε_{ij} = a residual error term for student i in school j

γ_{00} = the mean intercept

γ_{01} = the treatment effect

T_j = 1 if school j is assigned to treatment, and = 0 if school j is assigned to comparison.

$\gamma_{02.q}$ = the effect of school-level covariates (e.g., percent of students facing economic disadvantage; total enrollment)

W_{qj} = the qth of Q covariates for school j

$Rural_j$ = 1 if the school j is located in a rural locale and 0 if school j is located in a non-rural locale

γ_{03} = the effect of rural status

μ_{0j} = random intercept term – deviation of school j's mean from the grand mean, conditional on covariates; assumed to be normally distributed with mean 0 and variance τ^2_{00}

γ_{10} = mean effect of pretest

$\gamma_{2.m0}$ = mean effect of student covariate m

The parameter estimate, Υ_{01}, provides a covariate-adjusted estimate of the impact of Rural LIFE. The hypothesis test for Υ_{01} indicates whether or not the intervention has a statistically significant impact on the given outcome. An impact with a *p*-value of .05 or lower, based on a two-tailed test, will be considered statistically significant.

A standardized effect size will be calculated by dividing the impact estimate (Υ_{01}) by the pooled standard deviation derived from the unadjusted sample standard deviations for the outcome in the intervention and comparison groups. This linear model yields unbiased estimates of the intervention impact.

The contribution of covariates for student characteristics and baseline performance was assessed for inclusion in the model. If the coefficient term for a covariate has a p-value less than $p = 0.20$, we considered the covariate to be contributing to the precision of the impact estimate. In this model, the percent of students with a disability at the school level did not contribute to explaining students' ELA achievement in 2019, and the variable was removed from the model. None of the covariates could be affected by the intervention. Finally, the model uses listwise deletion, removing any students who are missing data. All 72 schools have data in the final model.

Approach to Estimating School-Level Effectiveness

For estimating impacts on school effectiveness, we use an ordered logistic regression model, adjusting for blocking by rural status and controlling for baseline school growth performance. Because this model does not use student-level data, no additional adjustments for clustering are needed. School effectiveness is measured using the TVAAS, which ranks schools on an ordinal scale from 1 to 5, with higher scores indicating improved effectiveness year over year. A dummy-coded variable is used to block schools by rurality status. To ensure only similar schools are contrasted with each other, we use school-level covariates, measuring schools' effectiveness composite scores in 2018, the percentage of average daily attendance, the percentage of students facing economic disadvantage, and the percentage of students with disabilities. We use the following model to estimate the unbiased treatment effect of the Rural LIFE program on school effectiveness:

$$Y_j = \beta_0 + \beta_1\left(T_j\right) + \beta_2\left(Y_j^*\right) + \sum_{m=1}^{M} \beta_{3.m} W_{mj} + \beta_4 Rural_j + e_j$$

Where,

Y_j = the outcome for the j^{th} school

β_o = the intercept

β_1 = the treatment effect

T_j = 1 if school j is assigned to treatment, and = 0 if school j is assigned to comparison

β_2 = the effect of baseline school effectiveness (i.e., school composite value-added score)

Y_j^* = the baseline school composite value-added score for the j^{th} school

$\beta_{3.m}$ = the effect of school-level covariates (e.g., percent of students receiving free/reduced-price lunch; total enrollment

W_{mj} = the m^{th} of M covariates for school j

β_4 = the effect of block (i.e., rural status)

$Rural_j$ = 1 if the school j was assigned to the treatment or comparison condition within the rural block, and = 0 for non-rural schools

e_j = a residual error term for school j

The parameter estimate, β_1, provides a covariate-adjusted estimate of the impact of Rural LIFE on school effectiveness. The hypothesis test for β_1 will determine whether or not the intervention has a statistically significant impact on school effectiveness. An impact with a *p*-value of .05 or lower, based on a two-tailed test, will be considered statistically significant. A standardized effect size will be calculated as described above.

We use the same approach described above for deciding which school covariates will be included in the analysis model (i.e., those with a *p*-value less than .20). Again, the percentage of students with disabilities at the school was dropped from the model due a high *p*-value.

Findings

The results for the student-level outcome model are presented in Table 5. We have presented the results for the full model, which included the treatment effect, the blocking variable, and all predictor variables with a *p*-value greater than 0.2. Additional tables with full model estimates are presented in the appendix.

Table 5. Impact Analysis Results

	Comparison Group				Treatment Group						
	Sample Size				Sample Size						
Outcome Measure	# clusters	# students	Mean	S.D	# clusters	# students	Mean	S.D	T-C Difference	Standardized Difference	*p*-value
2019 ELA Achievement	36	7,737	327.4	28.44	36	10,781	326.4	30.25	-1.0	-0.03	0.174
School effectiveness (2019 TVAAS)	36	-	3.53	1.50	36	-	2.72	1.47	-0.61	-0.41	0.07

There was no significant treatment effect of the Rural LIFE program on students' ELA achievement after one year, holding constant student and school characteristics. Overall, student ELA test scores did not vary widely across schools. The intraclass correlation coefficient (ICC) of the null model is 0.06. This value indicates that 6.0 percent of the variation is accounted for by school contexts and factors, while a majority of the variation in test scores is at the individual level. Results for the subsample of students facing economic disadvantage in the randomized schools were similar to those of the full sample. There was no significant treatment effect of Rural LIFE among economically disadvantaged students.

The Rural LIFE program did not significantly affect schools' value-added composite scores. The estimated treatment effect was -0.61 (p=0.07), with controls for covariates. Although the program did not significantly decrease schools' effectiveness scores, the treatment schools received lower scores on average than the comparison schools. Overall, there was relatively little explanatory power for the model, suggesting that at the school level, the value-added evaluation approach is unlikely to be moved by school geography, previous value-added evaluation success, or participation in the intervention. None of the covariates were associated with 2019 TVAAS scores, including 2018 baselines (coefficient of 0.04, p=0.74). Similar to the ELA achievement model, schools' rurality and percentage of students facing economic disadvantage did not significantly predict school effectiveness.

DISCUSSION

Overall, there was no significant impact of attending a middle school supported by Rural LIFE on student ELA achievement after one year compared to attending a school operating under BAU conditions. There was no effect of attending a school supported by Rural LIFE on economically disadvantaged students' ELA achievement compared to economically disadvantaged students attending schools continuing with BAU. There was no significant impact on schools' value-added score after participating in Rural LIFE for one year compared to schools that did not.

The original intent to implement across two school years, and its interruption by the COVID-19 pandemic, may relate to some of the nonsignificant findings. Over two years, teachers would have had more time to incorporate new instructional methods, technologies, and data use plans. Instead, analyses indicate that student and school characteristics have a greater effect on student and school outcomes.

Fidelity of Implementation, Study #1

FIDELITY MEASUREMENT

Fidelity of implementation means that specific practices are conducted and executed as intended. A program or practice with demonstrated effectiveness in some schools can be ineffective elsewhere if the way it is being implemented takes it far away from its original (evidence-based) design. A measure of fidelity of implementation is the extent to which the activities are carried out as intended.

The Rural LIFE program had three major components:

- helping create school-wide personalized learning plans focused on literacy,
- providing professional learning opportunities, and
- providing coaching to implement personalized learning plans.

AnLar worked with the Rural LIFE team (staff from the Niswonger Foundation and the Friday Institute) to identify all of the major activities within each component.

We refer to each identified activity as an indicator. For example, the creation and submission of a plan by each school constituted one indicator for helping schools to create school-wide personalized learning plans focused on literacy. AnLar and the Niswonger Foundation identified seven indicators under the component "schools create school-wide

personalized learning plans focused on literacy," nine indicators under "professional learning opportunities," and six indicators under "coaching to implement personalized learning plans."

Table 6. Key Components of Rural LIFE and Associated Indicators

Component	Indicators
School-wide personalized learning plan focused on literacy	1. School develops a personalized learning plan with a literary focus. 2. School uses flexible learning environments. 3. School uses flexible learning environments.[3] 4. School uses competency-based progression. 5. School uses personal learning paths. 6. School / teacher creates learner profiles for students. 7. Schools use technology for personalization.
Professional learning opportunities	1. Niswonger Summer Symposium holds PD sessions for Rural LIFE treatment school faculty. 2. PLCs are offered to teachers in schools and supported by coaches. 3. Principals will receive a total of 2 days of PD over 2 years. 4. Lead teacher(s) are identified in each school and receive training. 5. Teachers work with coaches. 6. Teachers are offered two days of professional learning on a personalized learning or literacy-focused topic. 7. Teachers are offered online modules. 8. Teachers participate in online modules. 9. Coaches receive professional learning.
Coaching to implement personalized learning plans	1. Coaches work with schools weekly. 2. Coaches work with lead teachers to develop PLCs 3. Coaches hold monthly virtual sessions with their lead teachers. 4. Lead teachers participate in virtual sessions with the coach. 5. Coaches meet with school leadership to discuss their activities and the school's needs. 6. Coaches develop or provide group training for teachers at each school.

To measure the fidelity of the intervention, each indicator was defined and a threshold of what constitutes fidelity was set. Indicators can occur at the program-, school-, coach-, or teacher-level. The 22 indicators were monitored by AnLar through survey data, observations, and review of documents. Understanding variation in implementation of different activities (indicators) across schools helped the program staff to determine what was working for schools as well as areas where the supports needed to be changed or strengthened.

[3] Indicators #2 and #3 are the same, but they are measured differently. One indicator is measured using coach responses, and the other is measured using teacher responses.

Table 7. Scoring That Defines Adequate Implementation of Each Key Component of Rural LIFE

Indicator	Unit of Measurement	Indicator Threshold Scoring at Unit Level	Indicator Threshold	Indicator Actual Scoring
Key Component 1. School-wide personalized learning plan focused on literacy				
1. School develops a personalized learning plan with a literary focus	School	Low = did not submit a plan; Moderate = submitted plan but did not identify focus areas; High = submitted plan, identified focus area(s), and had plan approved	80 percent of schools are moderate or higher	100 percent of schools achieved the high threshold
2. School uses flexible learning environments	School	Low = no literacy teachers report any of the flexible structures; Moderate = any literacy teachers report at least one flexible structure; High = literacy teachers report existence of all 4 flexible structures	80 percent of schools are moderate or higher	97 percent of schools achieved the moderate or high threshold
3. School uses flexible learning environments	School	Low = no evidence of flexible learning environments in literacy classrooms; Moderate = some (half of literacy teachers) use flexible learning environments; High = approximately half (or more) of literacy teachers report use of flexible environments	80 percent of schools are moderate or higher	8 percent of schools achieved the low threshold; 50 percent of schools achieved the moderate threshold; 42 percent of schools achieved the high threshold
4. School uses competency-based progression	School	Low = scale score <2.73; Moderate = scale score >2.73 and <3.07; High = scale score >3.07	80 percent of schools are moderate or higher	14 percent of schools achieved the low threshold; 42 percent of schools achieved the moderate threshold; 44 percent of schools achieved the high threshold
5. Schools use personal learning paths	School	Low = scale score <2.61; Moderate = scale score >2.61 and < 2.63; High = scale score >2.63	80 percent of schools are moderate or higher	42 percent of schools achieved the low threshold; 6 percent of schools achieved the moderate threshold; 53 percent of schools achieved the high threshold **NOT MET**
6. Schools/ teachers create learner profiles for students	School	Low = scale score <2.74; Moderate = scale score >2.74 and < 2.76; High = scale score >2.76	50 percent of schools are moderate or higher	83 percent of schools achieved the low threshold; 14 percent of schools achieved the moderate threshold; 3 percent of schools achieved the high threshold **NOT MET**

Indicator	Unit of Measurement	Indicator Threshold Scoring at Unit Level	Indicator Threshold	Indicator Actual Scoring
7. Schools use technology for personalization	School	Low = scale score <2.56; Moderate= scale score >2.56 and <2.99; High= scale score >2.99	50 percent of schools are moderate or higher	50 percent of schools achieved the low threshold; 22 percent of schools achieved the moderate threshold; 28 percent of schools achieved the high threshold
Key Component 1 Total Score Threshold = Program is adequate on 5 of 7 indicators				5 of 7 adequate
Key Component 2. Professional learning opportunities				
1. Niswonger Summer Symposium holds PD sessions for Rural LIFE treatment school faculty	Program	Low = no sessions on PL, literacy, or lead teachers offered at the symposium; Moderate = 1-3 sessions offered; High = 4 or more sessions offered on personalized learning, literacy, or lead teachers	High	There were four sessions on literacy and personalized learning; Rating of High
2. PLCs are offered to teachers in schools and supported by coaches	Program	Low = PLCs offered in 8 schools or fewer per month; Moderate = PLCs offered on average in 9-11 schools per month; High = PLCs offered on average in 12 or more schools per month	Moderate	PLCs were offered on average in 8 schools per month; Rating of Low **NOT MET**
3. Principals will receive a total of 2 days of professional learning over 2 years	Program	Low = training offered and < half of principals attend or view recordings; Moderate = 50-75% of principals attend or view recordings; High = >75% of principals attend or view recordings	Moderate	22 principals attended the trainings offered in 2018-19; Rating of Moderate
4. Lead teacher(s) identified in each school and receive training	Program	Low = training offered and lead teachers from less than 18 schools attend or view recordings; Moderate = lead teachers from 18 to 27 schools attend or view recordings; High = lead teachers from at least 28 schools attend or view recordings	Moderate	41 lead teachers attended June 2018 training; 28 lead teachers attended training in December; lead teachers from all schools attended training in May; Rating of Moderate

Indicator	Unit of Measurement	Indicator Threshold Scoring at Unit Level	Indicator Threshold	Indicator Actual Scoring
5. Teachers work with coaches (one-on-one/ mentoring)	Program	Low = coaches average <1 hour per month per school in 1-1 mentoring; Moderate = coaches average 1-3 hours per month per school in 1:1 mentoring; High = coaches average >3 hours per month per school in 1:1 mentoring	Moderate	Coaches averaged 3.6 hours per month; Rating of High
6. Teachers are offered 2 days of professional learning on a personalized learning or literacy topic (Rural LIFE focused days)	Program	Low = no PD days offered; Moderate = 1 PD day offered during school year; High = 2 or more PD days offered during school year	High	PD days in December, March, May, and multiple half day sessions offered in June 2019; Rating of High
7. Teachers are offered online modules	Program	Low = no modules developed or available; Moderate = 1-4 modules developed and available; High = 5-6 modules developed and available	Moderate	2 Modules developed and available; Rating of Moderate
8. Teachers take online modules	Program	Low = no one completes any modules; Moderate = 1 to 20 teachers log in and complete at least 1 module each; High = more than 20 teachers log in and complete at least one module	Moderate	No teachers or principals began any module; Rating of Low **NOT MET**
9. Coaches receive PD	Program	Low = on average, coaches attend less than 50% of training (calculated as the average of the percent of coaches attending each training); Moderate = on average, coaches attend between 51-74% of trainings; High = on average, coaches attend at least 75% of trainings/meetings	Moderate	Coaches attended 75 percent of trainings; Rating of High
Key Component 2 Total Score Threshold = Program is adequate on 6 of 9 indicators				7 of 9 adequate
Key Component 3. Coaches work with schools				
1. Coaches work with schools weekly	School	Low = 0-2 visits per month; Moderate = 3 visits per month; High = more than 3 visits per month (August-April)	80 percent at high or moderate	3 percent achieved the low threshold; 11 percent at moderate; 86 percent at high

Indicator	Unit of Measurement	Indicator Threshold Scoring at Unit Level	Indicator Threshold	Indicator Actual Scoring
2. Coaches work with lead teachers to develop PLCs	School	Low = no PLCs facilitated by coach; Moderate = coaches spend time facilitating PLCs in 1 semester (fall or spring); High = coaches spend time facilitating PLCs in both fall and spring	50 percent of schools at high or moderate	8 percent at low; 8 percent at moderate; 83 percent at high
3. Coaches hold monthly virtual sessions with their lead teachers (*Note this is measured at the coach level)	Coach	Low = coaches do not hold meetings with lead teachers; Moderate = coaches hold meetings with lead teachers 1x per semester; High = coaches hold monthly meetings	Threshold: at least 75 percent of coaches achieve high	11 percent at low; 55 percent at moderate; 33 percent at high **NOT MET**
4. Lead teachers participate in virtual sessions with coach	School	Low = lead teacher does not attend any cross school meetings; Moderate = lead teacher attends less than half of cross school meetings; High = lead teacher attends more than half of cross school meetings	80 percent of schools moderate or high	19 percent at low; 17 percent at moderate; 64 percent at high
5. Coaches meet with school leadership to discuss their activities and the school's needs	School	Low = coach averages <1 check in with leadership per month; Moderate = coach averages 1-2 check-ins per month; High = coach averages 3 or more check-ins with leadership per month (August-April)	80 percent of schools moderate or high	11 percent at low; 75 percent at moderate; 14 percent at high
6. Coaches develop or provide group training for teachers at each school	School	Low = coach averages <1 group training per semester; Moderate = coach averages 1-2 group trainings per semester; High = coach averages 3 or more group trainings per semester	75 percent of schools moderate or high	42 percent at low; 33 percent at moderate; 25 percent at high **NOT MET**
Key Component 3 Total Score Threshold = Program is adequate on 4 of 6 indicators				4 of 6 adequate

FIDELITY FINDINGS

Overall, the Rural LIFE program was implemented with fidelity in 2018-19. The indicators of each component were measured at different levels (school, coach, or program). Fidelity was met on all three components and the majority of the indicators within each component. Even so, there were a few indicators within each component that were not implemented as intended. This is a normal part of implementing a new program and identifying measures for program indicators that are flexible and change based on the needs of the population being served. There were six indicators out of 22 that were not implemented with fidelity in 2018-19. This means that across all of the schools participating in the program, the threshold for the number of schools meeting fidelity was not met. Some of the schools implemented the indicators of the components with fidelity. The table below lists the three components along with total number of measurable indicators, units, threshold, and results.

Table 8. Fidelity of Implementation by Component

Key Components, Number of Indicators, Units, and Threshold				Results (2018-19 School Year)		
Key Component	Total # of Measurable Indicators	Unit of Implementation	Sample-Level Threshold for FOI	Number of Units in Which Component Was Implemented	Number of Units in Which Fidelity Component Was Measured	Achieved Fidelity Score and Whether Program Met Sample-Level Threshold
Schools develop and implement personalized learning plans	7	School	Program is adequate on 5 of 7 indicators	36	36	Yes
Principals, lead teachers, teachers, and coaches receive professional learning	9	Program	Program is adequate on 6 of 9 indicators	1	1	Yes
Coaches work with schools to implement personalized learning plans	6	School	Program is adequate on 4 of 6 indicators	36	36	Yes

Across the three key components, there were six indicators on which the program did not meet the levels of fidelity deemed adequate by the program.

Table 9. Indicators Where the Program Did Not Meet Fidelity of Implementation in 2018-19

Component	Indicators that the program did not meet with fidelity in 2018-19
Schools develop and implement personalized learning plans	1. School uses personal learning paths. 2. School / teacher creates learner profiles for students.
Principals, lead teachers, teachers, and coaches receive professional learning	1. PLCs are offered to teachers in schools and supported by coaches. 2. Teachers participate in online modules.
Coaches work with schools to implement personalized learning plans	1. Coaches hold monthly sessions with their lead teachers. 2. Coaches develop or provide group training for teachers at each school.

The program was designed to be flexible and allow schools to identify the areas of literacy and personalized learning on which they would like to focus. Similarly, the design encourages coaches to meet schools where they are and provide the support in which each school is willing to engage. That said, when the schools developed their personalized learning plans in August 2018, many of them were not familiar with the components of personalized learning. The flexibility of the program may be responsible for failure to meet the thresholds for fidelity on schools using personal learning paths, schools creating learner profiles for students, PLCs being offered in schools, and coaches providing group training.

Nevertheless, the Niswonger Foundation and the Friday Institute began making changes in response to feedback in spring 2019. Several changes were made to the indicators in the 2019-20 school year and beyond. First, the indicators of "teachers are offered online modules" and "teachers take online modules" were eliminated due to lack of participation in the online modules in 2018-19. Instead of online modules, the Friday Institute and the Niswonger Foundation decided to create face-to-face professional learning guides for four deep dives. This change was meant to allow for in-school small-group support facilitated by the Niswonger coach or a school staff member.

Additionally, the coaches were meant to facilitate cross-school collaboration. In 2018-19, the plan was to have coaches hold monthly meetings (in person or virtually) where lead teachers could share their practices and learn from one another. In 2018-19, there were reasons these meetings did not take place as intended. First, scheduling time across schools was difficult. Second, the schools served by the same coach were not always working on the same focus areas. Moving forward, coaches coordinated with each other to identify peer schools that were working on similar focus areas and could better learn from one another. Coaches still attempted to facilitate cross-school collaboration, but this feature was removed as an indicator within the core components.

Sustainability and Scaling

The 2018-19 cohort was the first group of schools to implement the Rural LIFE program. One objective of the Rural LIFE scale-up is to develop a project approach that can be successfully replicated. Prior to the 2018-19 implementation, the Niswonger Foundation identified several potential obstacles related to replicating the program:

- New users (schools, districts) may have difficulty replicating the program.
- There are insufficient professional learning resources around implementing personalized learning strategies in classrooms.
- The cost of adding coaches may be too great for schools or districts.

To address the barrier of replication difficulties, the Rural LIFE team created templates and documented their practices for schools and districts. To address the barrier of insufficient resources around implementing personalized learning strategies in classrooms, the Rural LIFE instructional coaches captured practices from the schools they were working with. These examples and cases were summarized and stored online for other schools to access and learn from. Lastly, to address the barrier of cost associated with adding instructional coaches, the project showed how costs could be shared across schools.

During the summer of 2020, after the Study #1 schools had completed two years of Rural LIFE, 17 schools submitted proposals to the Niswonger Foundation for sustainability funding. Fourteen of those proposals were approved. In 2021-22, five of the schools and one school district from Study #1 continued to work with the Rural LIFE program through sustainability grants. Other schools from the original 36 Study #1 treatment schools continued to have access to the resources purchased by the grant. Teachers were also able to implement practices they learned through the professional learning opportunities and to access shared resources through the Niswonger Foundation Rural LIFE website.

Based on feedback from schools about challenges related to instruction and school closures in 2020-21, the Rural LIFE program was not fully implemented in 2020-21. Rural LIFE coaches met with school teams to understand their needs and offered support, but the program as designed was not implemented until the 2021-22 school year. During the 2021-22 school year, 30 schools began implementing Rural LIFE. These schools became the treatment schools for Study #2.

Impact Study #2, QED, 2021-22

Study Description

Impact analyses examine the effects of one year of Rural LIFE compared to BAU as well as the sustainability of previous 2018-19 participating schools.

RESEARCH QUESTIONS FOR STUDY #2

The confirmatory research questions are:

1. What is the effect of attending a middle school supported by Rural LIFE on sixth-, seventh-, and eighth-grade students' achievement in ELA, compared to attending a middle school under BAU conditions?
2. What is the effect of the Rural LIFE program on the schools' percentage of students scoring "on-track" or "mastered" on state ELA tests (school-wide percent proficient), compared to BAU conditions?

Exploratory research questions include:

3. What is the effect of attending a middle school that was previously supported by Rural LIFE on sixth-, seventh-, and eighth-grade students' achievement in ELA, mathematics, and science, compared to attending a middle school under BAU conditions? (This tests if the impact of supports are sustained over time.)
4. What is the effect of sustaining the Rural LIFE program on the schools' percentage of students scoring "on-track" or "mastered" on the state ELA test (school-wide percent proficient), compared to BAU conditions?
5. What is the effect of attending a middle school receiving its first year of support from Rural LIFE on sixth-, seventh-, and eighth-grade students' achievement in ELA, mathematics, and science, compared to attending a middle school that was previously supported by the Rural LIFE program?[4]
6. What is the effect of attending a middle school supported by Rural LIFE on sixth-, seventh- and eighth-grade students' achievement in mathematics, compared to attending a middle school under BAU conditions?
7. What is the effect of attending a middle school supported by Rural LIFE on sixth-, seventh- and eighth-grade students' achievement in science, compared to attending a middle school under BAU conditions?
8. Does the impact of Rural LIFE compared to BAU conditions differ for rural and non-rural schools?
9. Does the impact of Rural LIFE compared to BAU conditions differ for students who face economic disadvantage?

[4] This question examines whether the schools that are sustaining the Rural LIFE program have outcomes similar to schools that are actively receiving Rural LIFE supports. Are sustained effects as large as current supports? If sustaining schools showed a positive impact compared to BAU in the previous research questions, a 'positive' result of the comparison of current support to previously supported would be no impact.

INTERVENTION CONDITION

Rural LIFE was designed to improve literacy across the curriculum in grades six through eight using technology-enabled, literacy-focused personalized learning strategies, a shared services network, standards-aligned instructional materials, formative assessment and data tools for teachers, and professional learning and coaching support for teachers. The Rural LIFE program was designed to last for two school years. However, due to the disruption in student learning in 2019-20, lack of state testing in 2020-21, and the need for teachers to focus on COVID-19 recovery in 2020-21, the program was implemented for only one year in 2021-22.

The key components of the program were the same for Study #2 as they were for Study #1:

- a personalized learning plan and funding for additional resources selected by each school,
- professional learning opportunities, and
- regionally-based literacy coaches.

The logic model remained the same for Study #2.

Figure 4. Rural LIFE Logic Model, Cohort 2, 2021-22

RESOURCES	ACTIVITIES	OUTPUTS	OUTCOMES
Project team coordinates a shared services network across districts	School teams develop and implement personalized learning plans	Teachers increase use of personalized learning strategies: • use data to customize instruction • try new approaches to classroom management • flexible learning environments • personal learning paths • competency based progression	Student literacy increases
Standards aligned materials	School teams participate in professsional learning around literacy and personalized learning	Students are more engaged in own learning, show more agency, have greater connections to teachers, and articulate learning goals	Student performance in math and social studies improves
Instructional coaches	Instructional coaches help schools implement personalized learning plans to improve literacy	Teachers participate in personalized learning and PLCs and share strategies with each other	School-wide value-added scores increase
Personalized learning and middle grades literacy resources			
Computers and instructional software			

PROGRAM IMPLEMENTATION

Similar to Study #1, the cornerstone of the Rural LIFE program involved allowing schools to develop their own personalized learning plans based on an analysis of their needs and an understanding of their teacher and student contexts. Changes that were made to the Rural LIFE program included adjusting school plans. In Study #2, school teams started the development of their school plans by reflecting on what they were already doing. Teams completed a Landscape Analysis worksheet (see **Appendix A**) where they provided evidence of how their schools were already engaging in each literacy focus area or how they were already implementing personalized learning strategies. The teams then decided if the literacy focus area or personalized learning strategy would be the central concern for their school plan.

The school plan document was also revised and put into a Google Sheet for teams and Rural LIFE staff to collaborate (see **Appendix A** for screenshots of template). Section One contained two parts. Part A had several questions for teams to reflect on and respond to:

1. Alignment: What are your school's overarching school improvement plan goals for literacy? Similarly, in what ways is your school/district using ESSER funds to support literacy?
2. Focus: Given your overall literacy improvement goals, what do you specifically want to improve or accomplish during this school year that will both connect to your school's goals and further develop literacy/personalized learning practices within your school? How will improving in this area impact literacy results in your school?
3. Need: What district, school, and/or classroom-level data shows this area as a need?
4. Coherence: In what specific ways has your school supported improvements in literacy in the last one to three years (e.g., professional learning, school-wide focus areas, PLC studies, etc.)? (Note: As schools have adopted new ELA curricular materials, we have included a space below [in blue] for you to consider how to tie your Rural LIFE work to this current work happening in your schools.)
5. Sustainability: As you think about what you want to accomplish with your team's literacy work, what hurdles might you have to navigate to be successful? What will you need to consider for your work this year to be sustained (e.g., funds, mindsets, staff considerations, scheduling, competing work, etc.)? *You might want to consider answering these questions last, after you have completed the rest of the Literacy Action Plan.

Part B specifically asked, “Given your school's literacy goals, where do you want to focus your team's Rural LIFE work and coaching support?” Each team then identified their plan for the year. For each part of their plan, they filled in:

1. The focus of the work
2. Personalized learning practices
3. Adult learning design

4. Collaboration considerations
5. 1-3 Progress indicators (including a timeline)
6. An assessment of resources (what resources do they already have, what do they need to make progress on their indicators and achieve their goal)

There were many embedded links to resources in the Part B document to help teams as they worked to complete their school plans.

Section Two was the financial plan where teams identified the resources they were requesting to purchase, how each resource would support their Rural LIFE work, a projected cost, and any notes on the request.

Another tab provided space for the Rural LIFE team to communicate questions, comments, and feedback on the plan. A final tab provided links to resources on personalized learning, adolescent literacy, rural education, and professional learning.

Across the 30 schools, 19 had plans to use data to help students set goals, 17 had plans to work on increasing student choice, 14 had plans to implement or increase flexible spaces, 13 had plans focused on improving teacher and student feedback, nine had plans to focus on dynamic grouping, and three had plans for personalized learning technology. Fidelity of implementation for creating and implementing a school plan was measured through reviewing each school's plan.

The second key component of Rural LIFE consisted of professional learning opportunities. Principals had originally been onboarded in March 2020, but with the delayed implementation, professional learning and onboarding officially took place in summer 2021.

During the 2021-22 school year, several professional learning opportunities were provided to school teams. The formal professional learning sessions were led by Leading Edge Learning (LEL) with support from Rural LIFE coaches and staff. Fidelity of implementation for elements of professional learning was measured through attendance sheets.

Table 10. 2021-22 Rural LIFE Professional Learning Sessions

Date	Who and what	Objectives
June 2021	1-day new learning and planning preparation for lead teachers, supporting teachers, principals	· Understand the Rural LIFE program · Understand the Personalized Learning Core Principles · Explore best practices around personalized learning · Build community among the lead teachers and coaches and between schools
July 2021	2-day new learning and planning for school teams (lead teacher, supporting teachers, principals, school leaders)	· Understand connections between their school's chosen high-quality instructional materials (HQIM), literacy instruction, and personalized learning · Understand the relationships of SEL · Understand how to create a school-wide culture of literacy · Explore data notebooks · Draft school plan and receive feedback from other schools and Rural LIFE staff
July 2021	Virtual Summer Institute. 14 one-hour-long sessions open to all K-12 teachers and leaders in the Niswonger Foundation service area	· Improve literacy through personalized learning · Support SEL · Utilize technology to meet instructional goals
October 2021	1-day progress check, new learning, and sustainability planning for school teams	· Understand what personalized learning is · Implement personalized literacy instruction · Implement data-driven instruction · Implement student choice and use formative assessments with students to set goals
January 2022	2-hour training for principals	· Manage change and clarify the vision · Develop formative success criteria for Rural LIFE · Share strategies across the network
February 2022	2-hour training for principals	· Explore high-leverage teaching practices based on learning science · Develop milestone goals for the school · Examine the current state of the school to determine next steps related to the school's Rural LIFE plan
February 2022	1-day progress check, new learning, and sustainability planning for school teams	· Identify what personalization and data use look like in your curriculum/setting · Understand how systems thinking can facilitate and impact change · Explore and outline local opportunities for sustaining change
March 2022	2-hour training for principals	· Identify the role that student agency plays in personalized learning · Develop supports towards progress indicators · Share strategies across the network

Rural LIFE coaches engaged in ongoing professional learning as well. LEL team members met monthly with the coaches as a group for targeted capacity building in key areas related to coaching schools in improving literacy and personalized learning. These sessions involved diving deeply into topics such as communication skills and coaching cycles, learner profiles and data notebooks, and SEL and learner agency. Coaches further explored these topics in the context of the schools they supported through one-on-one bi-weekly meetings with LEL partners.

The final core component of the Rural LIFE program entailed providing instructional coaching supports to school teams. The responsibilities of coaches were to work with the school team on how they wanted to use the coach, help the school team create and update their school plan, check in with the principal, provide PLC guides and advice on using them, model personalized learning strategies, and provide school-wide professional learning to assigned schools aligned with their school plans. Rural LIFE coaches also worked with school teams on using HQIM aligned with state standards. Fidelity of implementation for instructional coaching was measured through monthly coaching logs completed by each coach.

SETTING

The intervention took place in 30 schools in northeast Tennessee during the 2021-22 school year. Comparison schools were selected from across Tennessee among schools with students in grades six through eight. The number of students in grades six through eight varies across schools, from 21 to 551 with an average of 331. About 30 percent of these students are considered high-need based on their poverty level, and about 65 percent of students attended schools in rural locations.

The program was school-based and, as such, the assignments to treatment and control groups were made at the school level. Treatment and control group characteristics were similar, and comparison students were matched at both the school and then the student level.

COMPARISON CONDITION

Two comparison conditions were examined in Impact Study #2. First, Cohort 2 (2021-22) treatment schools were compared to control schools from the same state as the treatment schools and were identified using two-stage matching. Schools in the comparison condition did not receive any of the services included in the Rural LIFE program and continued with BAU professional learning and instruction. Schools in the comparison condition did not have access to any elements of the Rural LIFE shared services network including the personalized learning plan support, professional learning opportunities, or Rural LIFE coaches. Charter schools were excluded from the comparison condition to increase comparability.

Second, to understand the sustainability of the intervention, Cohort 1 (2018-19) treatment schools were compared to BAU schools based on 2022 outcomes using two-stage matching. The Cohort 1 treatment schools were then compared to Cohort 2 treatment schools to identify any differences between groups based on sustained versus new implementation efforts.

STUDY PARTICIPANTS

Impact Study #2 provides comparisons on four different groups of study participants: Cohort 2, Cohort 1 sustainability, and two BAU matched comparison groups.

- **Cohort 2** was a group of 30 schools receiving the intervention for the first time in 2021-22. The Cohort 2 schools had volunteered to participate in the research study in spring 2018. They were randomly assigned to serve as the BAU group in Impact Study #1. Due to 13 of the 36 originally randomized schools being closed or consolidated between spring 2018 and summer 2021, there were fewer schools in Study #2. The new schools that were formed based on consolidation of the BAU schools from Study #1 were assigned to be Cohort 2 schools. During 2021-22, there were approximately 7,500 students in grades six through eight in the 30 Cohort 2 schools.
- **Cohort 1 Sustainability** was a group of 31 schools that received the intervention in 2018-19 and 2019-20. These schools continued to have access to the resources that had been purchased for their school plans along with online personalized learning resources. Five of these schools continued to be supported by a Rural LIFE coach. The reason the number of schools is 31 rather than 36 is because five of the schools that were originally randomized to be part of the treatment group for Study #1 were closed by the time Study #2 began in 2021. In 2021-22, there were approximately 8,800 students in grades six through eight in the 31 Cohort 1 Sustainability schools.
- **Matched comparison BAU.** For each cohort separately, treatment schools were matched to a BAU comparison group based on two-stage matching. Charter schools and schools with more than 40 percent of students who reported a disability were excluded from the sample prior to matching.[5] Schools were matched using propensity scores based on total enrollment, percent of students at the school facing economic disadvantage, and percent of students at the school with a disability. Five matchblocks were established and used as controls in multivariate analyses and baseline equivalence testing. Next, students were matched within schools using a coarsened exact matching (CEM) approach. Students were matched based on pretest scores, English Learner status, whether they experienced economic disadvantage, race/ethnicity, and grade level. Based on the CEM analysis, CEM frequency weights were used in the final models as well as baseline equivalence calculations. This results in the following comparison groups:
    - Cohort 2 BAU: 424 schools and approximately 123,900 students
    - Cohort 1 BAU: 463 schools and approximately 152,000 students

For all comparisons, students with both spring 2021 and spring 2022 scores were included in the analytic sample. The analytic sample includes all students who were offered the intervention during the evaluation, as compared to a matched sample of students who did not receive the intervention. No schools were excluded from the treatment analytic sample.

The comparisons were:

- Cohort 2 versus Cohort 2 BAU,
- Cohort 2 versus Cohort 1, and
- Cohort 1 versus Cohort 1 BAU.

[5] In 2021-22, there were 57 charter schools in TN excluded and three schools with more than 40 percent of students who reported a disability. There were 575 eligible control schools with sixth- through eighth-grade students to match to the treatment cohorts.

Design and Measures

INDEPENDENCE OF THE IMPACT EVALUATION

AnLar independently conducted the impact evaluation. AnLar team members assisted with recruitment of schools, conducted the random assignment, collected outcome data through administrative sources, analyzed the data, and wrote the findings.

PRE-REGISTRATION OF THE STUDY DESIGN

The study was pre-registered with **REES**, registry id 7180.

DESIGN

The impact analysis used QED to examine two confirmatory research questions for Cohort 2. These questions consider the effects of the Rural LIFE program on student achievement in ELA and the percentage of students in a school who score in the "on-track" or "mastered" range for ELA on the TNReady assessment. As discussed above, the QED approach employed two-stage matching of schools and then students. Schools were matched using a propensity score approach (establishing matchblocks) and students were matched using a CEM approach (establishing CEM weights used in models).

The impact analysis examined an additional seven exploratory questions, some of which were based on sustainability comparisons between Cohort 1 and Cohort 2 treatment schools. These research questions are described above.

MEASURES

Similar to Study #1, the TERA and the TDOE provided the school and student data. Additional school-level data from the Common Core of Data (CCD) were merged into the TERA data files.

In addition to exploratory research questions, the impact analysis also examined outcome measures of student achievement in 2022: ELA, mathematics, and science. These are standardized measures based on Tennessee's annual statewide testing, the TNReady. The TNReady is administered to students in grades three through eight each spring, and has been used since 2017. Scores are standardized within each grade to enable different grade levels to be pooled together in the analytic sample.

In addition, school-level analyses include the percentage of sixth through eighth graders at the school who reached an achievement level of "on-track" or "mastered" on the TNReady ELA assessment. All four of these measures were accessed through TERA.

Student data were used as covariates in the impact analyses. Student data included the following variables, provided by TERA:

- Baseline (2021) performance on the state assessments
- Student economic disadvantage status
- Grade level
- English Learner status
- Disability status

- Race/ethnicity
- Gender identity

School-level covariates included the following data, downloaded from TERA and publicly available data from the 2021-22 CCD, available through the National Center for Education Statistics:

- Baseline percent "on-track" or "mastered"
- Rural/non-rural status
- Enrollment
- Percent of students facing economic disadvantage
- Percent of students with a disability

Data Analysis and Findings

BASELINE EQUIVALENCE

This report provides baseline equivalence for three comparisons:

1. 2021 pretest scores for Cohort 1,
2. Cohort 2 compared to BAU, and
3. Cohort 1 compared to Cohort 2.

Baseline equivalence is calculated using a model-based approach that adjusts for matched blocks of schools and CEM weights. The measurement of baseline balance for individual-level scores also accounts for the clustering of variance at the school level.

For Cohort 2, the samples indicate baseline equivalence, given that the baseline mean difference is less than 0.25 effect size for each of the pretest outcomes and the statistical analysis of impacts adjusts for these pretest measures. These results are shown for the students attending rural schools and students facing economic disadvantage subgroups as well. The appendix provides descriptive statistics for all variables in the analysis by treatment and comparison groups.

Table 11. Cohort 2: Baseline Equivalence Assessment, Cohort 2 and BAU, 2021

	Cohort 2			BAU				
Samples	Sample size	Mean	S.D.	Sample size	Mean	S.D.	T-C Difference	Standardized Difference
All students (n=454 schools)								
TN Ready ELA pretest	7,531	327	27	123,963	325	27	2.2	0.082
TN Ready Math pretest	7,303	319	37	117,609	319	39	-0.39	-0.01
TN Ready Science pretest	7,461	323	28	121,131	324	29	-0.86	-0.029
ELA School-level pretest	30	0.28	0.94	424	0.28	0.14	0.13	0
Students attending rural schools (n=259 schools)								
TN Ready ELA pretest	4,958 students 20 schools	327	27	55,596 students 239 schools	325	27	2.1	0.078
TN Ready Math pretest	4,793 students 20 schools	319	38	54,063 students 239 schools	319	38	-0.42	-0.011
TN Ready Science pretest	4,929 students 20 schools	323	28	55,445 students 239 schools	324	29	-1	-0.036
Students facing economic disadvantage (n=454 schools)								
TN Ready ELA pretest	2,167	317	27	31,072	313	26	4	0.15
TN Ready Math pretest	2,130	303	35	30,580	302	37	1.5	0.041
TN Ready Science pretest	2,136	312	26	30,484	311	28	1.2	0.045

For Cohort 1 (n=31 schools) compared to BAU (n=456 schools), treatment and comparison groups again show baseline equivalence, with effect sizes below 0.25.

Table 12. Cohort 1: Baseline Equivalence Assessment, Cohort 1 and BAU, 2021

	Cohort 1			BAU				
Samples	Sample size	Mean	S.D.	Sample size	Mean	S.D.	T-C Difference	Standardized Difference
All students								
TN Ready ELA pretest	9,031	322	29	152,398	321	29	0.68	0.024
TN Ready Math pretest	8,666	317	39	145,812	313	41	3.2	0.079
TN Ready Science pretest	8,889	322	31	149,367	320	31	1.5	0.050
ELA School-level pretest	31	0.25	0.097	463	0.25	0.13	0.00	0.000

Finally, when comparing Cohort 1 and Cohort 2, the two samples show baseline equivalence. These models do not include model-adjusted controls for matched school variables since schools were not matched based on established characteristics for this comparison. Instead, most of the Cohort 2 schools served as controls for the RCT conducted for Impact Study #1.

Table 13. Baseline Equivalence Assessment, Cohort 1 and Cohort 2, 2021

	Cohort 1			Cohort 2				
Samples	Sample size	Mean	S.D.	Sample size	Mean	S.D.	T-C Difference	Standardized Difference
All students								
TN Ready ELA pretest	9,081	320	29	7,541	321	27	-0.086	-0.03
TN Ready Math pretest	8,714	313	39	7,313	311	37	1.9	0.05
TN Ready Science pretest	8,938	320	31	7,471	318	28	1.8	0.06
ELA School-level pretest	31	0.24	0.96	30	0.24	0.094	0	0.00

REPRESENTATIVENESS OF INDIVIDUALS IN CLUSTERS

The percentage of sixth- through eighth-grade students in the school who reached an achievement level of "on-track" or "mastered" on the TNReady ELA assessment is measured for two different groups of students at baseline (2021) and outcome (2022). This approach is taken to provide evidence that the students who contribute to this measure at both time points are representative of students in the school. Specifically, we provide evidence that missing data rates were low for the population of sixth through eighth graders in the study schools at baseline and outcome time points. The baseline and post-intervention sample sizes by cluster are reported in table 14.

Table 14. Post-Intervention Cluster Sample Sizes and Enrollment, 2022

	Treatment			BAU		
Samples	Clusters in analysis	# Indiv contributing to posttest mean	# Matched 6-8th graders enrolled in clusters	Clusters in analysis	# Indiv contributing to posttest mean	# Matched 6-8th graders enrolled in clusters
Cohort 1						
ELA School-level posttest, 2022	31	9,077	9,281	461	153,260	156,998
ELA School-level pretest, 2021	31	9,231	9,281	461	156,060	156,998
Cohort 2						
ELA School-level posttest, 2022	30	7,551	7,679	424	123,963	126,717
ELA School-level pretest, 2021	30	7,655	7,679	424	126,339	126,717

PROGRAM EFFECTS

Approach to Estimating Student-Level Outcomes

We use a multilevel model to estimate the impact of the Rural LIFE program on literacy, mathematics, and science achievement, adjusting for matching blocks, CEM weights, and baseline covariates. The model is estimated using Stata's mixed command and accounts for the nesting of students within schools. The impact of Rural LIFE is estimated at the school level, which is the level of assignment. The impact is measured after one year of treatment.

For each outcome, the impact of the program is estimated as the average treatment effect by comparing Rural LIFE schools to a matched sample of BAU schools. Additionally, covariates in the model ensure contrasts are being made on similar schools and students. We use the following model to estimate effects on student-level achievement:

Level-1: Student Level

$$Y_{ij} = \beta_{0j} + \beta_{1j}\left(Y^{*}_{ij}\right) + \sum_{m=1}^{M} \beta_{2.m} X_{mij} + \varepsilon_{ij}$$

Level-2: Cluster (School) Level

$$\beta_{0j} = \gamma_{00} + \gamma_{01}\left(T_j\right) + \sum_{q=1}^{Q} \gamma_{02.q} W_{qj} + \gamma_{03} Match_j + \mu_{0j}$$

$$\beta_{1j} = \gamma_{10}$$

$$\beta_{2.mj} = \gamma_{2.m0}$$

Where,

Y_{ij} = the outcome for the i^{th} student in the j^{th} school

β_{0j} = the intercept for school j

β_{1j} = the effect of pretest in school j

Y^{*}_{ij} = a pre-test measure for the i^{th} student in the j^{th} school

$\beta_{2.mj}$ = the effects of student covariates in school j

X_{mij} = the m^{th} of M additional covariates in school j

ε_{ij} = a residual error term for student i in school j

Y_{00} = the mean intercept

Y_{01} = the treatment effect

T_j = 1 if school j is assigned to treatment, and = 0 if school j is assigned to comparison

$Y_{02.q}$ = the effect of school-level covariates (e.g., percent of students recieving free/ reduced-price lunch; total enrollment; rurality)

W_{qj} = the q^{th} of Q covariates for school j

$Match_j$ = indicator for the matching stratum identifying the school match (based on school characteristics and grade levels), or in the case of a treatment v. sustainability comparison this will be an indicator of rurality for the original RCT blocking approach

Y_{01} = the effect of matching or rurality indicator for the school

μ_{0j} = random intercept term - deviation of school j's mean from the grand mean, conditional on covariates; assumed to be normally distributed with mean 0 and variance τ^2_{00}

Y_{10} = mean effect of pretest

$Y_{2.m0}$ = mean effect of student covariate m

The parameter estimate, Y_{01}, provides a covariate-adjusted estimate of the impact of Rural LIFE. The hypothesis test for Y_{01} will determine whether or not the intervention has a statistically significant impact on the given outcome. An impact with a *p*-value of .05 or lower, based on a two-tailed test, will be considered statistically significant. The individual and school covariates included the models are as follows: pretest achievement score from 2021, gender, race/ethnicity[6], student disability status, English Learner status, grade level, school's rural location, percent of students at the school facing economic disadvantage, percent of students at the school with a disability, school match block, and coarsened exact match weight.

A standardized effect size is calculated by dividing the impact estimate (Y_{01}) by the pooled standard deviation derived from the unadjusted sample standard deviations for the outcome in the intervention and comparison groups. This linear model yields unbiased estimates of the intervention impact. The model uses listwise deletion, removing any students who are missing data.

Approach to Estimating School-Level Student Success Rate

We use a linear regression model to estimate impacts on school-wide percent proficient in ELA, adjusting for matching and controlling for baseline school characteristics. Exploratory findings consider the impact of treatment versus BAU on the school-level success rate for ELA. Contrasts will include the treatment (Cohort 2) v. BAU, Rural LIFE sustainability (Cohort 1) v. BAU, and treatment (Cohort 2) v. Rural LIFE sustainability (Cohort 1). Because this model does not use student-level data, no additional adjustments for clustering are needed. Additional covariates in the model include the following: school-wide pretest measure, school rural status, the percentage of students facing economic disadvantage, the percentage of students with disabilities, and the matching block based on the propensity score estimates. We use the following model to estimate the unbiased treatment effect of the Rural LIFE program on school effectiveness:

[6] We use four categories for race/ethnicity: African-American, Hispanic/Latino/a, other races and ethnicities including Asian, American Pacific Islander, Native American, and more than one racial/ethnic identity, and White.

$$Y_j = \beta_0 + \beta_1(T_j) + \beta_2(Y_j^*) + \sum_{m=1}^{M} \beta_{3.m} W_{mj} + \beta_4 Match_j + e_j$$

Where,

Y_j = the outcome for the j^{th} school

β_0 = the intercept

β_1 = the treatment effect

T_j = 1 if school j is assigned to treatment (i.e., Cohort 2 schools), and = 0 if school j is in the matched BAU comparison group (or the Cohort 1 schools comparison group)

β_2 = the effect of baseline school success rate

Y_j^* = the baseline school student success rate for the j^{th} school

$\beta_{3.m}$ = the effect of school-level covariates (e.g., percent of students receiving free/reduced-price lunch; total enrollment)

W_{mj} = the m^{th} of M covariates for school j

β_4 = the effect of the matching or rurality indicator

$Match_j$ = indicator for matching stratum based on school characteristics and grade levels or the rurality indicator for the original randomization blocking

e_j = a residual error term for school j

The parameter estimate, β_1, provides a covariate-adjusted estimate of the impact of Rural LIFE on school effectiveness. The hypothesis test for β_1 will determine whether or not the intervention has a statistically significant impact on school effectiveness. An impact with a *p*-value of .05 or lower, based on a two-tailed test, will be considered statistically significant. A standardized effect size will be calculated as described above.

Findings

This section provides three sets of findings, based on the comparisons under consideration. First, the impact analysis for Cohort 2 estimates the effect of treatment on student achievement in ELA, mathematics, and science compared to BAU. The findings for these comparisons are shown below.

Table 15. Impact Analysis Results, Cohort 2 Compared to BAU, 2022

	Comparison Group				Treatment Group						
	Sample size				Sample size						
Outcome	# clusters	# students	Mean	S.D.	# clusters	# students	Mean	S.D.	Treatment-Control Difference	Standardized Difference	*p*-value
Student level											
TN Ready ELA	424	123,963	330	36	30	7,531	331.36	34	0.94	0.03	0.252
TN Ready Math	424	117,609	321	41	30	7,303	325.40	41	3.99	0.10	0.003
TN Ready Science	424	121,131	324	29	30	7,461	325.87	27	1.41	0.05	0.077
Students attending rural schools											
TN Ready ELA	239	55,956	330	34	20	4,958	331.08	34	1.05	0.03	0.313
TN Ready Math	239	54,063	322	39	20	4,793	325.54	40	3.54	0.09	0.039
TN Ready Science	239	55,445	324	28	20	4,929	325.77	27	1.79	0.06	0.095
Students facing economic disadvantage											
TN Ready ELA pretest	423	31,072	314	34	30	2,167	316.27	33	2.18	0.07	0.024
TN Ready Math pretest	423	30,580	304	39	30	2,130	306.93	39	3.05	0.06	0.038
TN Ready Science pretest	423	30,484	311	26	30	2,136	312.64	25	1.22	0.05	0.176
School-level outcome											
TN Ready ELA	424	N/A	0.3	0.2	30	N/A	0.3	0.1	0.01	0.10	0.273

These findings show positive effects of the intervention across several outcomes. Students who attended Cohort 2 schools had small but significant increases in their TNReady Mathematics scores compared to students who attended comparison schools. This finding of increases in mathematics scores among treatment students was consistent for students who attended rural schools and students facing economic disadvantage. In addition, among students facing economic disadvantage, students who attended Cohort 2 schools demonstrated an increase in ELA scores relative to students who attended comparison schools.

The next set of findings highlights whether Cohort 1 schools differed from BAU schools three years after the intervention was implemented in 2018-19.

Table 16. Impact Analysis Results, Cohort 1 Compared to BAU, 2022

	BAU Comparison Group				Cohort 1						
	Sample size				Sample size						
Outcome	# clusters	# students	Mean	S.D.	# clusters	# students	Mean	S.D.	Treatment-Control Difference	Standardized Difference	*p*-value
Student level											
TN Ready ELA	463	152,398	326.1	36.5	31	9,031	327.65	36.16	1.56	0.04	0.052
TN Ready Math	463	145,812	316.1	41.9	31	8,666	317.94	41.58	1.88	0.04	0.145
TN Ready Science	463	149,367	320.8	30.3	31	8,889	323.57	30.49	2.82	0.09	0.001
School-level outcome											
TN Ready ELA	463	N/A	0.30	0.15	31	N/A	0.32	0.10	0.02	0.17	0.027

Findings demonstrate that students attending Cohort 1 schools in the 2021-22 school year showed increased science scores compared to students attending comparison schools. In addition, the percentage of students scoring proficiency or mastery in ELA was higher in Cohort 1 schools compared to BAU.

Finally, findings explore whether the intervention shows indication of sustainability. These findings compare Cohort 1 schools to Cohort 2 schools at the end of the 2021-22 school year.

Table 17. Impact Analysis Results, Cohort 1 Compared to Cohort 2, 2022

	Cohort 1				Cohort 2						
	Sample size				Sample size						
Outcome	# clusters	# students	Mean	S.D.	# clusters	# students	Mean	S.D.	Treatment-Control Difference	Standardized Difference	*p*-value
Student level											
TN Ready ELA	31	9,081	328.9	36.2	30	7,541	328.90	33.9	-0.01	0.00	0.991
TN Ready Math	31	8,714	318.8	41.5	30	7,313	321.09	40.2	2.3	0.06	0.256
TN Ready Science	31	8,938	325.4	30.5	30	7,471	323.98	26.8	-1.4	0.05	0.164
School-level outcome											
TN Ready ELA	31	N/A	0.32	0.10	30	N/A	0.336	0.0875	0.01	0.15	0.321

Results show that Cohort 1 and Cohort 2 schools performed similarly in 2021-22, with no significant differences between the two cohorts of schools in student academic achievement in ELA, mathematics, or science.

DISCUSSION

While the two confirmatory research questions indicated no significant differences between schools who received the intervention versus BAU schools, there were several differences noted across exploratory questions. Findings suggest that students facing economic disadvantage may see more benefits from personalized learning compared to all students in ELA performance. There was also some evidence of continued effects of implementation based on improved science scores and school-wide ELA performance three years after the initial investments and implementation in Cohort 1 schools. There was also evidence of sustainability of implementation, given no differences in performance between Cohort 1 and Cohort 2 in 2022.

These findings indicate promise for future implementation of personalized learning, with some adjustments to implementation approaches and analytic design. Future evaluations should be designed to allow enough time to detect effects, both through longitudinal analyses of individual students and continued monitoring of schools.

Another area for study is the relationship between implementation and outcomes. Specifically, there is potential for a descriptive study of how different school plan focus areas lead to different outcomes or how use of a coach affects student outcomes.

Table 18. Research Question Findings, Impact Study #2

Research Question	Results
Confirmatory	
1. Achievement in ELA, compared to the BAU condition?	Not significant
2. Schools' percentage of students scoring "on-track" or "mastered" on ELA tests, compared to the BAU condition?	Not significant
Exploratory	
3. Attending a middle school previously supported by Rural LIFE in ELA, mathematics, and science, compared to the BAU condition?	ELA: Not significant Math: Not significant Science: Positive
4. Attending a middle school supported by Rural LIFE in 2021-22 on students' achievement in ELA, mathematics, and science, compared to attending a middle school that was previously supported by the Rural LIFE program from 2018-2020?	ELA: Not significant Math: Not significant Science: Not significant
5. What is the effect of sustaining the Rural LIFE program on the schools' percentage of students scoring "on-track" or "mastered" on the state ELA test, compared to the BAU condition?	Positive
6. Attending a middle school supported by Rural LIFE on students' achievement in Mathematics, compared to the BAU condition?	Positive
7. Attending a school supported by Rural LIFE on students' achievement in Science, compared to the BAU condition?	Not significant
8. Does the impact of Rural LIFE compared to the BAU condition differ for rural and non-rural schools?	Positive for mathematics outcomes No difference for ELA and science
9. Does the impact of Rural LIFE compared to the BAU condition differ for students who face economic disadvantage?	Positive for ELA and mathematics outcomes No difference for science

Fidelity of Implementation, Study #2

FIDELITY MEASUREMENT

After the 2018-19 year, the Niswonger Foundation made a few changes to the indicators of the key components of the program (described above in the Fidelity of Implementation section for Study #1). During the 2021-22 year, the key components included:

- helping to create school-wide personalized learning plans focused on literacy,
- providing professional learning opportunities, and
- providing coaching to implement personalized learning plans.

Table 19. Key Components of Rural LIFE and Associated Indicators for Cohort 2 in 2021-22

Component	Indicators
Schools develop and implement personalized learning plans	1. Principals and lead teachers conduct a 'landscape analysis' 2. School develops a personalized learning plan with a literacy focus 3. School implements plan
Principals, lead teachers, teachers, and coaches participate in professional learning	1. School teams (principals and teachers) participate in onboarding 2. School teams participate in a learning collaborative 3. Coaches receive 1:1 mentoring where they set goals and reflect on and improve their coaching 4. Teachers and leaders have the opportunity to participate in a Strong Start Network to learn about effective literacy instruction and iterative use of data to inform instruction 5. Teachers and leaders learn about effective literacy and iterative use of data to inform instruction through participation in the Strong Start Network
Coaches work with schools to implement personalized learning plans	1. Coach develops a plan to work with each school 2. Coach supports implementation of personalized learning strategies 3. Coach develops and curates examples of personalized learning strategies 4. Coach adds developed/curated materials on personalized learning practices and strategies to shared site 5. Coach meets with school leadership 6. Coach helps teachers use data to personalize instruction 7. Coach connects teachers to others in the region

To measure the fidelity of the intervention, each indicator was defined and a threshold of what constitutes fidelity was set. Indicators can occur at the program-, school-, or coach-level. The 15 indicators were monitored by AnLar through survey data, observations, and review of documents. Similar to Study #1, understanding variation in implementation of different activities (indicators) across schools helped the program staff to recognize what was working for schools as well as areas where the supports needed to be changed or strengthened.

Table 20. Scoring That Defines Adequate Implementation of Each Key Component of Rural LIFE

Indicator	Unit of Measurement	Threshold Scores at Unit Level	Indicator Scoring at Unit Level	Indicator Scoring at Sample Level
Key Component 1. School-wide personalized learning plan focused on literacy				
Principals and lead teachers conduct a 'landscape analysis'	School	Low = did not submit analysis; Moderate = submitted analysis, but analysis was incomplete; High= submitted complete (or mostly complete) analysis	High = 28 Moderate = 1 Low = 1	Threshold: 75% of schools at high Actual: 98% of schools at high
School develops a personalized learning plan with a literacy focus	School	Low = did not submit a plan; Moderate = submitted plan, but did not identify focus areas; High = submitted plan, identified focus area(s), and had plan approved	High = 28 Moderate = 1 Low = 1	Threshold: 75% of schools at high Actual: 98% of schools at high
School implements plan		Low = School implemented less than half of their plan Moderate = School attempted to implement their plan but had some setbacks and only carried out between half and 3/4 of what they intended High = School remained true to most of the elements of their plan	High = 8 Moderate = 17 Low = 5	Threshold: 75% of schools at moderate or high Actual: 83% of schools at moderate or high
Key Component 1 Total Score Threshold = Program is adequate on 2 of 3 indicators				3 of 3
Key Component 2. Professional learning opportunities				
School teams (principals and lead teachers) participate in onboarding	Program	Low = onboarding training offered and < half of teams attend; Moderate = 50-75% of teams participate; High = >75% of school teams participate	High = Teams from 26 of 30 participating schools attended and participated in onboarding	Threshold = high Actual = High (87% of schools participated in onboarding)
School teams participate in a learning collaborative	School	Low = learning collaboratives are offered, but fewer than half of school team members attend each on average Moderate = learning collaboratives are offered, and between 50 and 70% of school team members attend each on average High = learning collaboratives are offered and more than 70% of school team members attend each on average	Learning collaboratives were offered in October 2021 and February 2022 In October: Low = 2 schools Moderate/high = 28 schools In February: Low = 6 schools Moderate/high = 24	Threshold = 60% of schools should be moderate or high Actual = High (more than 70% of school teams attended each learning collaborative)
Coaches receive 1:1 mentoring from LEL, set goals, and reflect on and improve their coaching	Coach	Low = Coach attends sessions but does not reflect or work on growth. Moderate = Coach attends sessions, reflects, and shows some growth in coaching self efficacy High = Coach attends sessions, reflects, and shows major growth on areas where he/she set goals	High= All 8 coaches met with LEL, attended reflection sessions, and showed growth in goals	Threshold = 75% of coaches score high Actual = 100% of coaches received mentoring, reflected, and showed major growth in their coaching self-efficacy

Indicator	Unit of Measurement	Threshold Scores at Unit Level	Indicator Scoring at Unit Level	Indicator Scoring at Sample Level
Teachers and leaders have the opportunity to participate in a Strong Start Network to learn about effective literacy instruction and iterative use of data to inform instruction	Program	Low = 0-1 sessions are offered each school year Moderate = 2-3 sessions are offered each school year High = 4 or more sessions are offered each school year	High = 4 sessions offered	Threshold = high (4 sessions offered) Actual = high (4 sessions offered)
Teachers and leaders learn about effective literacy instruction and iterative use of data to inform instruction through participation in the Strong Start Network	Program	Low = 0-25% of districts participate in the Strong Start Network Moderate = 26-49% of districts participate in the Strong Start Network High = 50% or more of districts participate in the Strong Start Network	Moderate = 5 of 15 districts participated in SSN	Threshold = high (50% or more of districts participate in the SSN) Actual = moderate (33% of districts had some participation in SSN) **NOT MET**
Key Component 2 Total Score Threshold = Program is adequate on 4 of 5 indicators				4 of 5
Key Component 3. Coaches work with schools				
Coach develops a plan to work with each school	School	Low = Coach does not create a plan for working with the school High = Coach creates a plan for working with the school	Low = 0 High = 30	Threshold: 80% of schools score high Actual: 100% of schools score high
Coach supports implementation of personalized learning strategies	School	Low = Coach helps the school implement personalized learning strategies 0-1 months over the course of the year Moderate = Coach helps the school implement personalized learning strategies 2-5 months over the course of the year High = Coach helps the school implement personalized learning strategies 6+ months over the course of the year	Low = 0 Moderate = 4 High = 26 On average, coaches helped schools implement personalized learning strategies 7.4 months per year	Threshold: 65% of schools score high Actual: 87% of schools score high
Coach develops and curates examples of PL practices and resources	School	Low = 0-1 months, resources are developed/shared Moderate = 2-5 months, resources are developed/shared High = 6 months+, resources are developed/shared	Low = 2 Moderate = 10 High = 18 On average, coaches created and curated resources 5.5 months per school	Threshold: 65% of schools score high Actual: 60% of schools score high **NOT MET**
Coaches develop resources and upload them to the Rural LIFE Google site	Program	Low = no new resources are added to the Google site Moderate= new resources are added, but not for all personalized learning strategies/strands High = new resources are added for each personalized learning strategies/strands	High= new resources were added for each strategy	Threshold: High Actual: High (resources were added for each strategy)

Indicator	Unit of Measurement	Threshold Scores at Unit Level	Indicator Scoring at Unit Level	Indicator Scoring at Sample Level
Coaches meet with school leadership monthly to discuss their activities and the school's needs	School	Low = coach meets (virtually or in person) with school leader 0-1 months per year Moderate = coach meets (virtually or in person) with school leader 2-5 months per year High = coach meets (virtually or in person) with school leader 6+ months per year	Low = 1 Moderate = 3 High = 26 On average, coaches met with school leaders 8.7 months per school	Threshold: 65% of schools score high Actual: 87% of schools score high
Coaches help teachers use assessment data, observational data, or formative feedback data	School	Low = Coach works with school on using data 0-1 months per year Moderate = Coach works with school on using data 2-5 months per year High = Coach works with school on using data 6+ months per year	Low = 3 Moderate = 8 High = 19 On average, coaches helped teachers use data 5.5 months per school	Threshold: 50% of schools score high Actual: 63% of schools score high
Coaches work together to help connect teachers to others in the region working on similar issues or who have expertise/ experience in issues of interest	School	Low = Coach does not connect teachers between schools Moderate = Coach connects teachers between schools once per year High = Coaches connects teachers between schools more than once per year	Low = 3 Moderate = 6 High = 21 On average, coaches made connections between teachers 3.6 months per school	Threshold: 50% of schools score high Actual: 70% of schools score high
Key Component 3 Total Score **Threshold = Program is adequate on 5 of 7 indicators**				6 of 7

FIDELITY FINDINGS

The table below lists the three components along with the number of measurable indicators, units, threshold, and results.

Table 21. Fidelity of Implementation by Component

Key Components, Number of Indicators, Units, and Threshold				Results (2021-22 School Year)		
Key Component	Total # of Measurable Indicators	Unit of Imple-ment-ation	Sample-Level Threshold for FOI	Number of Units in Which Component Was Implemented	Number of Units in Which Fidelity Component Was Measured	Achieved Fidelity Score and Whether Program Met Sample-Level Threshold
Schools develop and implement personalized learning plans	3	School	Program is adequate on 5 of 7 indicators	30	30	Yes
Principals, lead teachers, teachers, and coaches receive professional learning	5	Program	Program is adequate on 6 of 9 indicators	1	1	Yes
Coaches work with schools to implement personalized learning plans	7	School	Program is adequate on 4 of 6 indicators	30	30	Yes

Across the three key components, there were two indicators on which the program did not meet the levels of fidelity deemed adequate by the program.

Table 22. Indicators Where the Program Did Not Meet Fidelity of Implementation in 2021-22

Component	Indicators that the program did not meet with fidelity in 2021-22
Schools develop and implement personalized learning plans	· N/A. All indicators met.
Principals, lead teachers, teachers, and coaches participate in professional learning	· Teachers and leaders learn about effective literacy instruction and iterative use of data to inform instruction through participation in the Strong Start Network.
Coaches work with schools to implement personalized learning plans	· Coach develops and curates examples of personalized learning practices and resources.

Scale-up Evaluation, Study #2

STRATEGY TO SCALE

The 2021-22 cohort was the second group of schools to implement the Rural LIFE program. It was the first test of intervention scale-up. During the implementation of Rural LIFE with the 2018-19 cohort, several challenges were identified. In response to the identification of challenges, the program was updated. Changes included the elimination of online modules for teachers and the inclusion of full school teams in professional learning activities rather than holding separate professional learning for teachers and principals.

The first scale-up goal for the 2021-22 implementation was to develop standardized materials, guides, and frameworks for schools and teachers implementing the Rural LIFE program. A challenge in this scale-up goal was that the flexibility of the program made the creation of standardized materials difficult. Materials need to be standardized enough to provide a framework but flexible enough that schools and teachers can personalize them for specific contexts and goals. Another challenge was the need to continuously review and update the materials. To address these challenges, the Niswonger Foundation planned to create an online repository for project-specific resources, collecting and reviewing materials from coaches and schools, tagging materials with the personalized learning strategy or project management process those materials would support, and providing numerous examples of each strategy.

The second scale-up goal was to increase the number of sites implementing the program while also sustaining the initial sites. The challenge, particularly after the COVID-19 pandemic, was that schools had a lot of competing priorities along with resources for implementing a variety of programs aimed at supporting students and mitigating learning loss. To address this challenge, the program provided flexibility in school plans and encouraged school leaders and teachers to develop strategies in conjunction with other programs and priorities at their schools.

Table 23. Elements of the Scale-up Approach of the Rural LIFE Project

Scale-up Goal	Challenge to Meeting Goal	Strategy to Address Challenge
Develop and adapt descriptive materials about the program that establish procedures for implementation, state the cost of the program, and identify for whom it is effective	There is wide variation in the program and the needs of schools. It is difficult to create standardized materials that describe the program components and affiliated costs. Materials need to be reviewed and revised on a consistent basis.	Create an online repository for project-specific resources. Develop and add resources to the repository to help with start-up process and implementation. Collect and review materials from coaches and schools and tag with related personalized learning strategies. Provide many examples of each strategy.
Increase the number of sites implementing the program, while sustaining initial sites	Schools are doing a lot of different things and have many opportunities. Principals and leaders must choose which programs to implement. Without flexibility for how to implement, schools will not integrate the program into their existing strategies and other programs.	In Cohort 2, allow greater flexibility in the school plan with revised materials. Encourage schools to work the program into their existing strategies and combine it with other programs. Share examples of how schools are implementing the program so others see the flexibility.

Details on the definitions of the full implementation strategy, thresholds for implementation, and data collection and reporting are described in table 24.

Table 24. Measurement of Scaling Strategies of the Rural LIFE Project

Scale-up Goal	Scaling Strategy	Threshold for Level of Implementation	Data Collection and Reporting Plan for Measuring Implementation Strategy
Develop and adapt materials	Create an online repository for project-specific resources Develop and add resources	An online repository is accessible to school teams. **MET** At least 24 resources are created and shared. **MET**	Online repository is shared with the evaluation team. Evaluation team reviews and counts the resources that are added.
Increase number of sites	Implement revised version of Rural LIFE in a second cohort of schools. Encourage schools to work the program into their existing strategies and combine it with other programs. Continue actively supporting schools from Cohort 1 Give presentations about the program to schools and districts outside of the Rural LIFE service area.	At least 28 of 36 schools participate in Cohort 2. **MET** At least 28 of 36 schools actively engage as sustainability schools. **NOT MET** At least 2 presentations are given to schools or districts outside of the northeast Tennessee service area. **MET**	Cohort 2 schools participate in program, attend onboarding, and create personalized learning plans. These are sent to the evaluation team. Cohort 1 schools apply for sustainability grants and sustainability plans are sent to the evaluation team. Copies of presentations are sent to the evaluation team.

Overall, full implementation of the scale-up strategies was met on four of the five indicators.

- An internal website was created for the Cohort 2 schools to access resources. After the end of the program, a **legacy website** was created for any school to access resources and see examples of the strategies used by schools as they implemented personalized learning strategies.
- Within the online repository, more than 24 examples and templates were shared. Examples include materials on creating learner profiles, using HQIM, and having coaching conversations.
- Among the 36 schools that served as BAU in 2018-19 and 2019-20, 30 participated in the Rural LIFE program in 2021-22.
- Only 6 of the 36 schools that served as Rural LIFE schools in 2018-19 and 2019-20 applied for and received sustainability grant funding in 2021-22. A reason this strategy did not meet the threshold might be that during and after the COVID-19 pandemic, schools faced many challenges. There was a great deal of turnover in the schools and it was not a priority for schools to maintain the practices started during the grant. Even though schools might not have submitted applications for sustainability grants, the changes in resources and infrastructure that took place in the schools as a result of the Rural LIFE program remained in the schools. Examples include classroom libraries, flexible furniture, software access, school book clubs, creation of skinny periods (shorter periods during modified block schedules), and new developments in teacher practices.

Members of the Rural LIFE team gave multiple presentations about their work to schools and districts as well as at conferences such as at the Association for Middle Level Education, Learning Forward, and the National Rural Education Association.

Cost Effectiveness Study

In addition to knowing if the Rural LIFE program is effective at improving student and school outcomes, it is also important to understand the cost per student of implementation as well as the cost effectiveness. This section of the report provides information about the number of students served, the average cost of the program, and the effect size of the program on student outcomes.

Although the program did not begin implementation until the summer of 2018, the number of students in treatment schools during the prior school year is included. The majority of the cost in 2017-18 included recruiting schools, hiring staff, onboarding staff, and purchasing equipment and supplies for the program. The 2018-19 school year was the first year of full implementation. The 2019-20 school year was the second year of full implementation, but the impact study could not be conducted because student outcome measures were not collected in spring 2020. The 2020-21 school year was planned to be the first year of full implementation for Cohort 2, while Cohort 1 schools sustained their personalized learning practices. However, the COVID-19 pandemic led the Niswonger Foundation to support schools in other ways. Because the Niswonger Foundation was supporting schools in 2020-21, the cost and the total number of students in both Cohort 1 and Cohort 2 schools are included. The 2021-22 school year became the first year of implementation among Cohort 2 schools, while Cohort 2 schools continued to sustain personalized learning practices.

Table 25. Per-Student Cost Per Year

Year	Students Served	Cost	Cost per Student in Dollars	Notes on What is Included in Cost
Year 1: 2017-18	11,187	$476,664.47	$42.61	Project staff (coaches, project director, implementation coordinator, technology specialist, financial manager), equipment, supplies, professional learning provider contractual costs, and travel to develop partnerships and get the program started. Evaluation costs not included.
Year 2: 2018-19	11,422	$1,955,066	$158.43	All costs for project staff, school plan allocations, teacher/principal stipends, equipment, travel, and PD provider costs. Evaluation costs not included.
Year 3: 2019-20	20,206	$1,440,448	$71.29	All costs for project staff, school plan allocations, teacher/principal stipends, equipment, travel, and professional learning provider. Evaluation costs not included.
Year 4: 2020-21	19,967	$1,648,262	$82.55	All costs for project staff, school plan allocations, teacher/principal stipends, equipment, travel, and professional learning provider. Evaluation costs not included.
Year 5: 2021-22	12,178	$2,484,385.19	$204.01	All costs for project staff, school plan allocations, teacher/principal stipends, equipment, travel, and professional learning provider. Evaluation costs not included.
Total/Average	**74,960**	**$8,004,825.66**	**$106.79**	

Because the Rural LIFE program is school-based, the cost per student is relatively low. All students in a school being served by the program are counted because they all may benefit from the resources the school purchases, the leadership training that administrators go through, and the change in culture from teachers working together on a school plan. The diffuse nature of the program that allowed for low cost per student also meant that the relative effect of the program was small when looking at changes in student test scores.

Table 26. Student Impacts and Cost per Student

Student Outcome Measure	Impact Estimate (Standardized Effect Size)	Cost per Student
2019 Student ELA	-0.03	$158.43
2022 Student ELA	0.03	$204.01
2022 Student Math	0.10	$204.01
2022 Student Science	0.05	$204.01

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Appendix

A. Rural LIFE Program Implementation Resources

CORE PRINCIPLES & LITERACY PLANNING

> "Personalized learning prioritizes a clear understanding of the needs and goals of each individual student and the tailoring of instruction to address those needs and goals.
>
> These needs and goals, and progress toward meeting them, are highly visible and easily accessible to teachers as well as students and their families, are frequently discussed among these parties, and are updated accordingly."
>
> (**Rand, July 2017**)

Rural LIFE Key area	Example Ideas to Support
Teachers customize instructions for each student that is adaptive to the student's needs, progress, and objectives	**Personalized Learning at Work: "What I Need" Sessions** (Henry County, GA) **Personalized Learning Journey** (Luella Middle School)
Teachers collect and use detailed information to adjust instruction	**Every Child, Every Day** **Why Student Data Should Be Students' Data**
Students cover material and reach core competencies at individualized pace	**The Techy Teacher / Rethinking Grading** **Competency Education and Personalized Learning**
Schools reconfigure daily schedule and space to complement personalized learning strategies	**Flexible Classrooms: Making Space for Personalized Learning** **How 45-minute Class Periods Stall Learning**

5 Essential Components of an Effective Literacy Action Plan

*Based on this article

Effective Literacy Plan Component	Resources to Support
Strengthening Literacy Development Across the Content Areas	**How Important is Teaching Literacy in All Content Areas?** (Article, Edutopia) **Teaching Content-Area Literacy and Disciplinary Literacy** (Article, SEDL/AIR) **What Content-Area Teachers Should Know About Adolescent Literacy** (Report, National Institute for Literacy) **Literacy Instruction in the Content Areas: Getting to the Core of Middle and High School Improvement** (Report, Alliance for Excellent Education) **Tell Me About … / How You Teach Content-Area Literacy** (Article, ASCD) **Low-Stakes Writing: Writing to Learn, Not Learning to Write: Teachers Use Low Stakes Writing in Every Discipline to Build Student Engagement and Understanding** (Video, Edutopia)
Literacy Interventions for Struggling Readers and Writers	**Executive Skills and the Struggling Reader** (Article, Edutopia) **Figment Provides Space for Students to Share Writing** (Article, National Writing Project) **Best Practices: High School Reading Strategies** (Video, Fairfax County Public Schools) **Building Stamina for Struggling Readers and Writers** (Article, Education Leadership, ASCD) **Kids Can't Wait: Strategies to Support Struggling Readers** (Article, Yale Center for Dyslexia and Creativity) **Help for struggling writers** (Video, Reading Rockets)
School Policies, Structures, and Culture for Supporting Literacy	**Kashmere High School Reading Strategies - I Read Every Day** (Video, Houston ISD) **Literacy Coaching for Change: Choices Matter** (Literacy Leadership Brief, International Literacy Association) **Reading Buddies** (Video, Fairfax County Public Schools) **How to Build a Culture of Literacy in Schools** (Blog, Alliance for Excellent Education/WestED) **Self-Study Guide for Implementing Literacy Interventions in Grades 3- 8** (Article, Regional Educational Lab Southeast)
Building Leadership Capacity	**Leading The Way In Literacy** (Article, Learning Forward) **Principals should be literacy leaders in their schools** (Article, Education Dive) **The View from the Principal's Office: An Observation Protocol Boosts Literacy Leadership** (Article, Learning Forward Journal of Staff Development) **Committing to Literacy Leadership** (Book Chapter, ASCD) **BullsEye: Literacy Leaders** (Video, Durham Public Schools)
Supporting Teachers to Improve Instruction	**Literacy Unleashed: Making the Case for the Literacy Classroom Visit Model** (ASCD book chapter) **Teaching Your Students to Read Like Pros** (Article, Edutopia) **Common goal unites district: Leaders and teachers build literacy and a collective responsibility for student learning** (Article, Journal of Staff Development, Learning Forward) **5-Minute Writing Conferences** (Article, Edutopia) **Scaffolding Literacy Instruction for English Language Learners** (Video, EL Education) **Putting an End to Fake Reading** (Article, Edutopia)

PERSONALIZING THE PATHS TO PERSONALIZED LEARNING: PRE-ASSESSMENT CHECKLIST

This checklist will help you determine your strengths, as well as your growth areas, in your implementation of Personalized Learning. For each question mark either "In Place" or "Growth Area."

- Mark "In Place" if you are comfortable with your knowledge and skills in this area and exhibit appropriate and consistent behavior. If the practice is "In Place," describe what evidence(s) support your thinking.
- Mark "Growth Area" if you feel you need to strengthen your knowledge and skills around the action data and assessment. If the practice is a "Growth Area," reflect on how you would like to see this practice changed to strengthen your craft.

How do you rate yourself on...	In Place	Growth Area	Evidence(s) or Reflection
I use **learner profiles** to help personalize learning for all students.			
I create **flexible learning environments** that promote personalized learning and allow students to develop learner agency within the classroom.			
I create **personal learning pathways** for students to individualize instruction to meet the needs of each student.			
I use **technology for personalization**.			

NEXT STEP: Review your pre-assessment to help determine your session choices.
The questions are color-coded to help guide you on your pathway.

RURAL LIFE COHORT 2 LANDSCAPE ANALYSIS

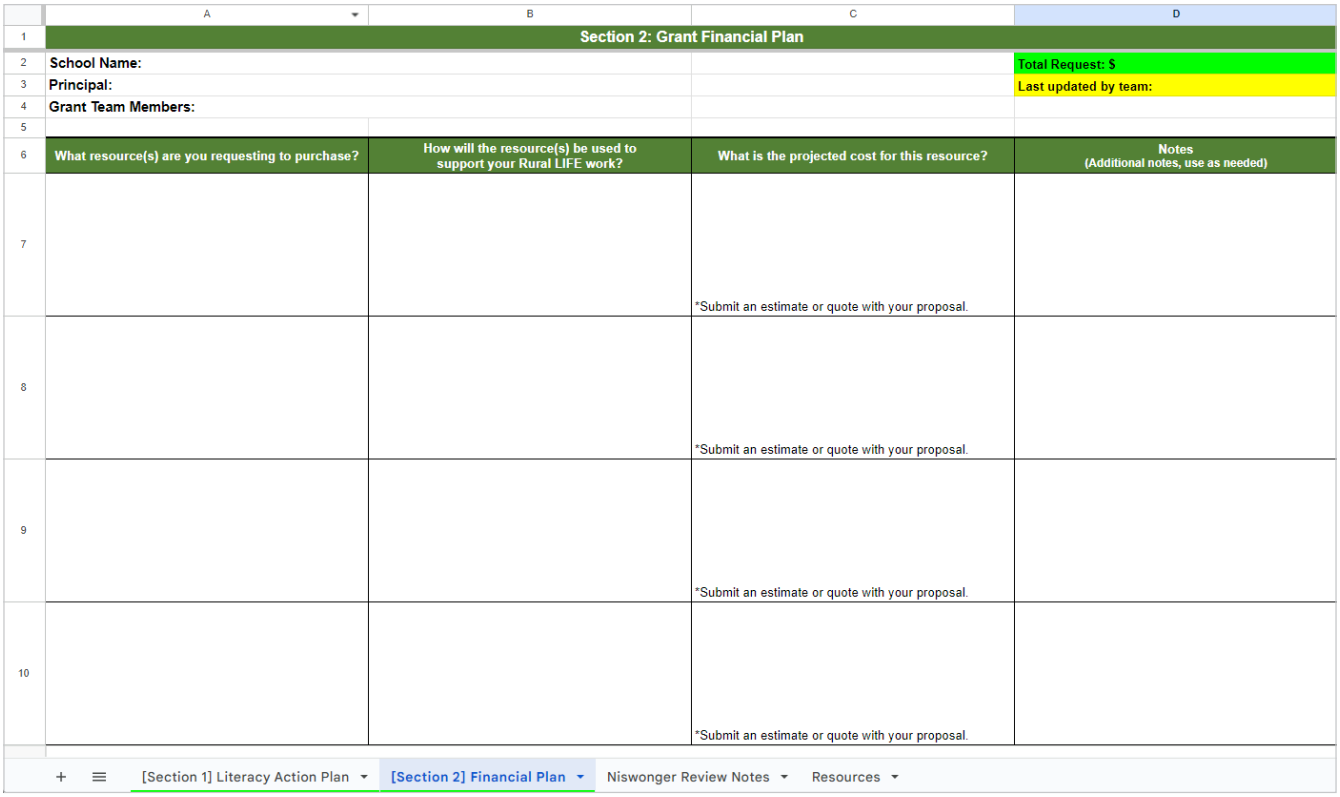
Literacy			
	Criteria Standards For Performance	**Evidence** Share what you are doing	**Focus Area?** (Y / N)
Strengthening Literacy Development Across the Content Areas	The school has identified specific action steps to support all content-area teachers in utilizing literacy strategies.		
	There is professional development provided for all content-area teachers to assist them in implementing classroom instruction that is motivating, engaging, and strategy based.		
School Policies, Structures, and Culture for Supporting Literacy	The school promotes a culture of literacy through programs and expectations.		
	Teachers and school leaders use data to identify student strengths and weaknesses		
	There are structures in place to support teachers in coordinating their efforts to design and implement curriculum and instruction across subject areas.		
Building Leadership Capacity	There are distributed roles and responsibilities for literacy improvement across the school.		
	Literacy instructors work with other content area instructors to include literacy in their day-to day activities.		
Supporting Teachers to Improve Instruction	There is ongoing and targeted professional development for content area literacy instruction.		
	Teachers work with peer teachers, mentors, or coaches to improve literacy instruction.		

Personalized Learning			
	Criteria Standards For Performance	**Evidence** Share what you are doing	**Focus Area?** (Y / N)
Personal Learning Paths	Teachers customize instruction for each student that is adaptive to student's needs, progress, and objectives.		
	Students have consistent opportunities to use digital tools to select personalized learning paths based on their learning differences.		
Learner Profiles	Teachers collect and use detailed information to better understand students' needs and adjust instruction.		
	Student learner profiles exist and include historical student performance data, real-time formative assessment data, information on student learning differences and other contextual out of school factors.		
	Teachers and students use learner profiles to personalize learning at the student level.		
Flexible Use of Time & Space	Schools reconfigure daily schedule and space to complement personalized learning strategies.		
	Schools reconfigure space to complement personalized learning strategies.		
Competency-Based Progression	Students cover material and reach core competencies at individualized pace.		
	Teachers engage in personalized data-driven re-teaching to individual students who are struggling.		

RURAL LIFE COHORT 2 SCHOOL PLAN TEMPLATE

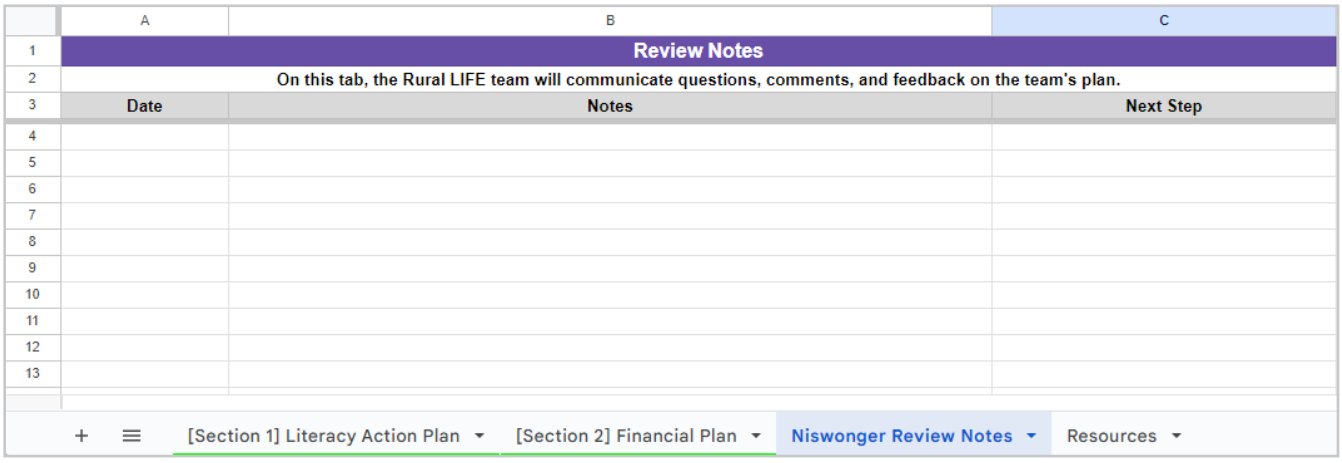
	A	B	C	D	E	F
1	**Section 1: Literacy Action Plan**					
2	**School Name:**					**Last updated by team:**
3	**Principal:**					
4	**Grant Team Members:**					
5						
6	**PART A: As you are developing your literacy action plan with your Rural LIFE coach, consider the following...**			**Your Team's Response/Proposal**		
7	**Alignment**	What are your school's over-arching *school improvement plan* goals for literacy? (Similarly, in what ways is your school/district using ESSER funds to support literacy?)				
8	**Focus**	Given your overall literacy improvement goals, what do you specifically want to improve or accomplish *during this school year* that will both connect to your school's goals and further develop literacy/personalized learning practices within your school? How will improving in this area impact literacy results in your school?				
9	**Need**	What district, school, and/or classroom-level data shows this area as a need?				
10	**Coherence**	In what specific ways has your school supported improvements in literacy in the last 1-3 years (e.g.: professional learning, school-wide focus areas, PLC studies, etc.)? (**Note:** As schools have adopted new ELA curricular materials, we have included a space below **(in blue)** for you to consider how to tie your Rural LIFE work to this current work happening in your schools.)				
11	**Sustainability**	As you think about what you want to accomplish with your team's literacy work, what hurdles might you have to navigate to be successful? What will you need to consider for your work this year to be sustained (e.g.: funds, mindsets, staff considerations, scheduling, competing work, etc.)? **You might want to consider answering these questions last, after you have completed the rest of the Literacy Action Plan.*				
13	**PART B: Given your school's literacy goals, where do you want to focus your team's Rural LIFE work and coaching support? Planning resources are linked below as well as included on the "Resource" tab of this spreadsheet).**					
14	Focus of your RL work (Should connect to the "Focus" notes you outlined above)	Personalized Learning Practices (What PL elements do you want to further develop as connected to your RL work?)	Adult Learning Design (Learn more here! Paragraph 4) What professional learning will your school need this year?	Collaboration Considerations (Learn more here!)	Progress Indicators (outline 1-3 progress indicators, including a proposed timeline)	Assessment of Resources (What resources do you currently have to support this work, and what do you need?)
15						
16						
17						

[Section 1] Literacy Action Plan | [Section 2] Financial Plan | Niswonger Review Notes | Resources



	A	B	C	D
1	Section 2: Grant Financial Plan			
2	School Name:			Total Request: $
3	Principal:			Last updated by team:
4	Grant Team Members:			
5				
6	What resource(s) are you requesting to purchase?	How will the resource(s) be used to support your Rural LIFE work?	What is the projected cost for this resource?	Notes (Additional notes, use as needed)
7			*Submit an estimate or quote with your proposal.	
8			*Submit an estimate or quote with your proposal.	
9			*Submit an estimate or quote with your proposal.	
10			*Submit an estimate or quote with your proposal.	

[Section 1] Literacy Action Plan | [Section 2] Financial Plan | Niswonger Review Notes | Resources



	A	B	C
1	Review Notes		
2	On this tab, the Rural LIFE team will communicate questions, comments, and feedback on the team's plan.		
3	Date	Notes	Next Step
4			
5			
6			
7			
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13			

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	A	B	C
1	This tab is provided as a place to keep useful Rural LIFE/school plan resources! Use in whatever way is most useful to you!		
2	**Grant Focus**	**Resources**	**School Team Notes**
3	School-Based Learning	School-Based Learning Planning Map	
4			
5	Personalized Learning Practices "In Action"	Personalized Learning Practices (surfaced from RAND studies listed below)	
6		Personalized Learning Core Look-Fors (from Ed Elements)	
7		Personalized Learning Practices Continuum (from Ed Elements)	
8			
9	Personalized Learning Research	Continued Progress: Promising Evidence on Personalized Learning (RAND, 2015)	
10		Informing Progress: Insights on Personalized Learning Implementation and Effects (RAND, 2017)	
11			
12	Adolescent Literacy	Taking Action on Adolescent Literacy (Chapter 5. Develop and Implement a Schoolwide Literacy Action Plan, ASCD)	
13		Time to Act: An Agenda for Advancing Adolescent Literacy for College and Career Success	
14			
15	Coaching	Instructional Coaching in K–12 — A Literature Review and Discussion Questions	
16		Coaching Partnerships (series of resources in one text)	
17			
18	Rural Education	Transforming the Rural South: A Roadmap to Improving Rural Education	
19			
20	Professional Learning	Learning Forward: Learning Designs (that support effective professional learning)	

+ ≡ [Section 1] Literacy Action Plan ▾ [Section 2] Financial Plan ▾ Niswonger Review Notes ▾ Resources ▾

B. Impact Study Supplemental Analysis Tables

Table B-1. Study 1- Confirmatory Analysis. Multilevel regression estimating treatment effects on students' average ELA achievement, 2019

	Null Model			Full Model		
	Est.	SE	*p*-value	Est.	SE	*p*-value
Level 1						
ELA Score 2018	-----	-----	-----	0.75	0.01	p<.001
English Learner				-2.41	1.05	p<.02
Female	-----	-----	-----	3.92	0.28	p<.001
Economic Disadvantage	-----	-----	-----	-3.49	0.30	p<.001
Race/Ethnicity						
Hispanic	-----	-----	-----	.23	0.62	0.37
Black	-----	-----	-----	-1.56	0.68	0.021
Other	-----	-----	-----	3.41	1.02	0.001
Level 2						
Treatment	-----	-----	-----	-1.00	0.74	0.174
Rural	-1.69	1.76	0.34	-0.99	0.78	0.203
Economic Disadvantage (centered)	-----	-----	-----	-0.11	0.04	0.003
Average Daily Attendance (centered)	-----	-----	-----	-0.003	0.002	0.083
Intercept	328.60	1.35	p<.001	83.86	1.79	p<.001
Variance (constant)	48.08	8.99	-----	7.26	1.54	-----
Variance (residual)	824.63	8.59	-----	341.46	3.56	-----
ICC	0.055			0.021		

Note: Other races include students that identified as American Indian, Pacific Islander, or Asian.
Sample size is 18,518 students, with 10,781 students in 36 treatment schools and 7,737 students in 36 control schools.

Table B-2. Study #1- Exploratory Analysis. Multilevel regression estimating treatment effects on the ELA achievement of students facing economic disadvantage, 2019

	Full Model		
	Est.	SE	*p*-value
Level 1			
ELA Score 2018	0.72	0.01	p<.001
English Learner	-4.56	1.82	0.01
Female	3.96	0.47	p<.001
Race/Ethnicity			
Hispanic	2.75	0.96	p<.001
Black	-0.75	0.95	0.43
Other	2.00	2.20	0.36
Level 2			
Treatment	-1.59	0.89	0.07
Rural	-0.07	0.94	0.94
Economic Disadvantage (centered)	-0.13	0.04	p<.001
Average Daily Attendance (centered)	-0.01	0.00	0.01
Intercept	91.48	2.82	p<.001
Variance (constant)	8.12	2.20	
Variance (residual)	356.9	6.22	
ICC	0.023		

Notes: N=6,651

Table B-3. Study 1- Confirmatory Analysis. Ordered logistic regression of treatment effects regressed on schools' value-added composite score, 2019

	Odds Ratio Est.	Log Odds Est.	Log Odds SE	*p*-value	Log Odds Confidence Interval	
Variable						
Treatment	0.45	-0.81	0.44	0.07	-1.67	0.05
Value-added composite score, 2018	1.05	0.05	0.13	0.73	-0.22	0.31
Rural location	0.48	-0.73	0.45	0.11	-1.60	0.15
Percent of students facing economic disadvantage	0.97	-0.03	0.02	0.19	-0.07	0.01
Cut Scores						
Cut 1		-3.19	1.08		-5.30	-1.09
Cut 2		-2.67	1.07		-4.76	-0.58
Cut 3		-1.58	1.04		-3.62	0.46
Cut 4		-0.83	1.02		-2.83	1.16
-2 Log Likelihood	-107.69					

Table B-4. Study #2- Cohort 1 Descriptive Statistics

	Treatment Cohort 1			Comparison Cohort 1		
Variables	**N**	**Mean**	**S.D.**	**N**	**Mean**	**S.D.**
Student-level variables						
2021 English	9,231	323.49	28.76	156,060	321.17	28.68
2021 Math	9,170	318.56	40.07	155,351	314.78	41.64
2021 Science	9,163	322.80	31.01	155,013	320.08	31.36
2022 English	9,077	328.76	36.16	153,260	326.01	36.55
2022 Math	8,711	318.65	41.58	146,885	315.91	41.98
2022 Science	8,993	325.25	30.49	151,170	320.62	30.28
Female students	9,281	0.48	0.50	156,998	0.49	0.50
Students facing economic disadvantage	9,281	0.32	0.47	156,998	0.31	0.46
Other races/ethnicities	9,281	0.02	0.14	156,998	0.03	0.17
African American	9,281	0.07	0.25	156,998	0.23	0.42
Hispanic	9,281	0.09	0.28	156,998	0.12	0.33
White	9,281	0.82	0.38	156,998	0.62	0.49
Students with a disability	9,281	0.14	0.34	156,998	0.11	0.31
English Learners	9,281	0.02	0.13	156,998	0.03	0.16
6th grader	9,281	0.28	0.45	156,998	0.31	0.46
7th grader	9,281	0.34	0.48	156,998	0.34	0.47
8th grader	9,281	0.38	0.49	156,998	0.35	0.48
School-level variables						
School ELA 2021	31	0.3	0.10	463	0.2	0.13
School ELA 2022	31	0.3	0.10	463	0.3	0.15
Total enrollment	31	467.8	255.69	463	531.0	313.13
Rural school	31	0.5	0.51	463	0.5	0.50
Percent of students at school facing economic disadvantage	31	0.4	0.13	463	0.4	0.18
Percent of students at school with a disability	31	0.2	0.05	463	0.1	0.04

Table B-5. Study #2- Cohort 2 Descriptive Statistics

	Treatment Cohort 2			Comparison Cohort 2		
Variables	**N**	**Mean**	**S.D.**	**N**	**Mean**	**S.D.**
Student-level variables						
2021 English	7,531	321.01	27.27	123,963	325.02	27.03
2021 Math	7,512	312.60	37.53	122,957	321.28	40.00
2021 Science	7,469	318.09	28.00	122,820	324.58	30.07
2022 English	7,531	325.72	33.79	123,963	330.42	35.51
2022 Math	7,287	316.23	40.17	117,310	321.53	40.68
2022 Science	7,476	320.00	26.71	121,228	324.49	29.39
Female students	7,531	0.48	0.50	123,963	0.49	0.50
Students facing economic disadvantage	7,531	0.29	0.45	123,963	0.25	0.43
Other races/ethnicities	7,531	0.02	0.12	123,963	0.03	0.18
African American	7,531	0.03	0.16	123,963	0.15	0.35
Hispanic	7,531	0.08	0.27	123,963	0.09	0.29
White	7,531	0.88	0.33	123,963	0.73	0.45
Students with a disability	7,531	0.13	0.34	123,963	0.11	0.31
English Learners	7,531	0.02	0.13	123,963	0.01	0.11
6th grader	7,531	0.28	0.45	123,963	0.31	0.46
7th grader	7,531	0.35	0.48	123,963	0.34	0.47
8th grader	7,531	0.37	0.48	123,963	0.35	0.48
School-level variables						
School ELA 2021	30	0.2	0.09	424	0.3	0.14
School ELA 2022	30	0.3	0.09	424	0.3	0.15
Total enrollment	30	447.3	202.46	424	485.2	273.74
Rural school	30	0.7	0.48	424	0.6	0.50
Percent of students at school facing economic disadvantage	30	0.3	0.11	424	0.3	0.15
Percent of students at school with a disability	30	0.1	0.04	424	0.1	0.05

Table B-6. Study #2- Cohort 2 Descriptive Statistics, Rural Schools Only

	Treatment Cohort 2			Comparison Cohort 2		
Variables	**N**	**Mean**	**S.D.**	**N**	**Mean**	**S.D.**
Student-level variables						
2021 English	4,958	321.12	27.37	55,956	324.54	26.52
2021 Math	4,948	313.33	37.99	55,594	320.82	38.43
2021 Science	4,927	318.17	28.41	55,470	324.01	28.60
2022 English	4,958	325.74	33.74	55,956	330.03	34.12
2022 Math	4,780	316.63	40.16	53,908	322.14	39.32
2022 Science	4,927	320.36	26.92	55,525	324.12	28.02
Female students	4,958	0.48	0.50	55,956	0.49	0.50
Students facing economic disadvantage	4,958	0.28	0.45	55,956	0.27	0.44
Other races/ethnicities	4,958	0.02	0.13	55,956	0.02	0.15
African American	4,958	0.03	0.16	55,956	0.11	0.31
Hispanic	4,958	0.07	0.26	55,956	0.07	0.26
White	4,958	0.88	0.32	55,956	0.80	0.40
Students with a disability	4,958	0.13	0.34	55,956	0.11	0.31
English Learners	4,958	0.01	0.12	55,956	0.01	0.07
6th grader	4,958	0.27	0.44	55,956	0.31	0.46
7th grader	4,958	0.35	0.48	55,956	0.34	0.47
8th grader	4,958	0.38	0.48	55,956	0.35	0.48
School-level variables						
School ELA 2021	20	0.2	0.09	239	0.3	0.10
School ELA 2022	20	0.3	0.08	239	0.3	0.12
Total enrollment	20	406.8	212.97	239	441.9	243.82
Rural school	20	1.0	0.00	239	1.0	0.00
Percent of students at school facing economic disadvantage	20	0.3	0.11	239	0.3	0.13
Percent of students at school with a disability	20	0.1	0.04	239	0.1	0.04

Table B-7. Study #2- Cohort 2 Descriptive Statistics, Students Facing Economic Disadvantage Only

	Treatment Cohort 2			Comparison Cohort 2		
Variables	N	Mean	S.D.	N	Mean	S.D.
Student-level variables						
2021 English	2,167	313.79	26.63	31,072	312.79	26.25
2021 Math	2,159	301.13	35.16	30,847	302.19	36.78
2021 Science	2,138	310.56	26.28	30,605	310.88	27.75
2022 English	2,167	316.68	32.84	31,072	314.09	33.51
2022 Math	2,121	304.29	38.82	30,459	304.02	38.78
2022 Science	2,142	312.71	25.21	30,579	311.48	26.18
Female students	2,167	0.49	0.50	31,072	0.50	0.50
Students facing economic disadvantage	2,167	1.00	0.00	31,072	1.00	0.00
Other races/ethnicities	2,167	0.01	0.09	31,072	0.01	0.11
African American	2,167	0.04	0.19	31,072	0.26	0.44
Hispanic	2,167	0.09	0.28	31,072	0.10	0.31
White	2,167	0.87	0.34	31,072	0.62	0.48
Students with a disability	2,167	0.19	0.39	31,072	0.17	0.37
English Learners	2,167	0.02	0.13	31,072	0.02	0.12
6th grader	2,167	0.29	0.46	31,072	0.31	0.46
7th grader	2,167	0.36	0.48	31,072	0.34	0.47
8th grader	2,167	0.35	0.48	31,072	0.35	0.48
School-level variables						
School ELA 2021	30	0.2	0.09	424	0.3	0.14
School ELA 2022	30	0.3	0.09	424	0.3	0.15
Total enrollment	30	447	202	424	485	274
Rural school	30	0.7	0.48	424	0.6	0.50
Percent of students at school facing economic disadvantage	30	0.3	0.11	424	0.3	0.15
Percent of students at school with a disability	30	0.1	0.04	424	0.1	0.05

Table B-8. RQ1. Confirmatory Analysis. Multilevel regression estimating treatment effects on students' average ELA achievement, 2022

Variables	Est.	SE	*p*-value
Treatment (Cohort 2)	0.94	0.82	0.252
Pretest 2021	0.87	0.00	p<.001 ***
Female	4.21	0.12	p<.001 ***
Students facing economic disadvantage	-3.71	0.14	p<.001 ***
Other races/ethnicities	3.21	0.49	p<.001 ***
African American	-4.25	0.27	p<.001 ***
Hispanic	-2.09	0.30	p<.001 ***
Students with a disability	-12.80	0.18	p<.001 ***
English Learners	-8.17	0.53	p<.001 ***
6th grader	17.41	0.15	p<.001 ***
7th grader	8.85	0.14	p<.001 ***
Rural school	-0.33	0.91	0.719
Percent of students at school facing economic disadvantage	-14.35	2.68	p<.001 ***
Percent of students at the school with a disability	-17.21	9.89	0.082
Matchblock_1	-1.49	1.59	0.348
Matchblock_2	-0.49	1.17	0.674
Matchblock_3	-0.81	0.89	0.363
Matchblock_4	0.21	0.90	0.815
Intercept	47.45	2.08	p<.001 ***
Variance (constant)	15.61	1.30	---
Variance (residual)	434.99	1.70	---

Note: Other races include students that identified as American Indian, Pacific Islander, or Asian. Sample size is 131,522 students.

Table B-9. RQ2. Confirmatory Analysis. OLS regression estimating treatment effects on percentage of students at the school achieving proficiency or mastery in ELA achievement, 2022

Variables	Est.	SE	*p*-value
Treatment (Cohort 2)	0.01	0.01	0.273
School percent "on-track"/"mastered" 2021	0.88	0.03	p<.001 ***
Enrollment	0.00	0.00	0.476
Rural school	-0.01	0.02	0.439
Percent students facing economic disadvantage	-0.06	0.07	0.37
Percent students with a disability	-0.29	0.20	0.138
Matchblock_1	-0.03	0.03	0.41
Matchblock_2	-0.01	0.02	0.702
Matchblock_3	0.00	0.01	0.912
Matchblock_4		(Omitted)	
Matchblock_5	0.01	0.02	0.511
Intercept	0.15	0.03	0

Note: Sample size is 454 schools.

Table B-10. RQ3. Exploratory Analysis. Multilevel regression estimating treatment effects on students who attended previously supported Rural LIFE middle school compared to BAU in ELA, mathematics, and science, 2022

	ELA			Mathematics			Science		
Variables	**Est.**	**SE**	***p*-value**	**Est.**	**SE**	***p*-value**	**Est.**	**SE**	***p*-value**
Treatment (Cohort 2)	1.56	0.80	0.052	1.88	1.29	0.145	2.82	0.84	0.001 **
Pretest 2021	0.88	0.00	p<.001 ***	0.69	0.00	p<.001 ***	0.61	0.00	p<.001 ***
Female	4.26	0.11	p<.001 ***	0.97	0.13	p<.001 ***	-0.50	0.10	p<.001 ***
Students facing economic disadvantage	-3.94	0.13	p<.001 ***	-4.07	0.16	p<.001 ***	-3.26	0.12	p<.001 ***
Other races/ ethnicities	5.02	0.44	p<.001 ***	7.15	0.58	p<.001 ***	4.40	0.42	p<.001 ***
African American	-4.14	0.21	p<.001 ***	-2.11	0.26	p<.001 ***	-3.03	0.20	p<.001 ***
Hispanic	-1.71	0.25	p<.001 ***	0.52	0.32	0.098	-1.15	0.24	p<.001 ***
Students with a disability	-12.89	0.18	p<.001 ***	-11.15	0.21	p<.001 ***	-7.61	0.16	p<.001 ***
English Learners	-7.17	0.48	p<.001 ***	-9.47	0.59	p<.001 ***	-5.46	0.45	p<.001 ***
6th grader	17.60	0.14	p<.001 ***	7.00	0.17	p<.001 ***	3.69	0.13	p<.001 ***
7th grader	9.20	0.12	p<.001 ***	1.81	0.16	p<.001 ***	3.17	0.12	p<.001 ***
Rural school	-0.05	0.39	0.899	2.06	0.63	0.001 **	-0.59	0.41	0.146
Percent of students at school facing economic disadvantage	-9.14	1.20	p<.001 ***	-12.47	1.87	p<.001 ***	-11.10	1.25	p<.001 ***
Percent of students at the school with a disability	-30.24	13.88	0.029 *	----	----	----	-21.15	14.52	0.145
Matchblock_1	-2.41	1.85	0.195	0.96	1.20	0.422	-2.68	1.94	0.168
Matchblock_2	-3.21	1.52	0.035 *	0.69	1.26	0.585	-1.48	1.59	0.352
Matchblock_3	-2.78	1.25	0.026 *	0.78	1.24	0.529	-1.75	1.31	0.182
Matchblock_4	-2.06	1.09	0.057	0.20	1.42	0.888	-1.80	1.14	0.114
Intercept	44.57	3.11	p<.001 ***	100.25	1.59	p<.001 ***	133.12	3.22	p<.001 ***
Variance (constant)	14.48	1.14	----	40.82	2.99	----	16.46	1.25	----
Variance (residual)	451.53	1.59	----	681.94	2.46	----	394.35	1.41	----
	N=161,591			N=153,773			N=157,673		

Note: Other races include students who identified as American Indian, Pacific Islander, or Asian.

Table B-11. RQ4. Exploratory Analysis. Multilevel regression estimating treatment effects on students who attended previously supported Rural LIFE middle school compared to BAU in ELA, mathematics, and science, 2022

	ELA			Mathematics			Science		
Variables	**Est.**	**SE**	***p*-value**	**Est.**	**SE**	***p*-value**	**Est.**	**SE**	***p*-value**
Treatment (Cohort 2)	-0.01	0.91	0.99	2.32	2.04	0.26	-1.39	1.00	0.16
Pretest 2021	0.88	0.01	p<.001 ***	0.72	0.01	p<.001 ***	0.63	0.01	p<.001 ***
Female	4.13	0.33	p<.001 ***	0.37	0.42	0.38	-0.82	0.31	0.01 *
Students facing economic disadvantage	-4.04	0.37	p<.001 ***	-4.80	0.47	p<.001 ***	-3.72	0.35	p<.001 ***
Other races/ ethnicities	3.26	1.22	0.01 **	1.38	1.61	0.39	2.74	1.15	0.02 **
African American	-1.81	0.78	0.02 *	-1.44	0.99	0.15	-2.81	0.74	p<.001 ***
Hispanic	-2.36	0.67	p<.001 ***	-1.19	0.84	0.16	-1.77	0.63	0.01 *
Students with a disability	-13.59	0.52	p<.001 ***	-11.63	0.65	p<.001 ***	-8.22	0.48	p<.001 ***
English Learners	-11.35	1.38	p<.001 ***	-8.88	1.72	p<.001 ***	-4.57	1.29	p<.001 ***
6th grader	17.85	0.43	p<.001 ***	7.33	0.54	p<.001 ***	2.48	0.40	p<.001 ***
7th grader	8.42	0.38	p<.001 ***	1.58	0.50	p<.001 ***	0.84	0.36	0.02 *
Rural school	-0.54	0.89	0.55	1.04	2.01	0.61	-0.32	0.98	0.74
Percent of students at school facing economic disadvantage	-2.92	4.49	0.52	-10.73	9.76	0.27	-1.44	4.89	0.77
Percent of students at the school with a disability	-6.92	12.16	0.57	27.73	25.82	0.28	-12.10	13.13	0.36
Intercept	39.01	2.92	p<.001 ***	91.81	4.41	p<.001 ***	124.52	2.74	p<.001 ***
Variance (constant)	8.43	1.99	---	52.67	10.77	---	11.05	2.42	---
Variance (residual)	441.03	4.85	---	692.27	7.75	---	390.58	4.32	---
	N=16,622			N=16,027			N=16,409		

Note: Other races include students who identified as American Indian, Pacific Islander, or Asian.

Table B-12. RQ5. Exploratory Analysis. Linear regression estimating effects on students who attended previously supported Rural LIFE middle school compared to BAU in schools' percentage of students scoring "on-track" or "mastered" compared to BAU, 2022

Variables	Est.	SE	*p*-value
Treatment (Cohort 1)	0.02	0.01	0.027 *
School percent "on-track"/"mastered" 2021	0.91	0.03	p<.001 ***
Enrollment	0.00	0.00	0.42
Rural school	0.01	0.01	0.274
Percent students facing economic disadvantage	-0.09	0.02	p<.001 **
Percent students with a disability	-0.19	0.20	0.335
Matchblock_1	0.00	0.02	0.953
Matchblock_2	-0.01	0.01	0.616
Matchblock_3	0.00	0.01	0.857
Matchblock_4		(Reference)	
Matchblock_5	-0.01	0.02	0.729
Intercept	0.13	0.04	0.001 **

Note: Sample size is 454 schools.

Table B-13. RQ6. Exploratory Analysis. Multilevel regression estimating treatment effects on students' average mathematics achievement, 2022

Variables	Est.	SE	*p*-value
Treatment (Cohort 2)	3.99	1.32	0.003 **
Pretest 2021	0.68	0.00	p<.001 ***
Female	1.23	0.15	p<.001 ***
Students facing economic disadvantage	-3.81	0.18	p<.001 ***
Other races/ethnicities	6.34	0.65	p<.001 ***
African American	-2.56	0.34	p<.001 ***
Hispanic	-0.48	0.37	0.203
Students with a disability	-10.98	0.23	p<.001 ***
English Learners	-7.21	0.66	p<.001 ***
6th grader	6.13	0.19	p<.001 ***
7th grader	1.47	0.17	p<.001 ***
Rural school	2.56	1.01	0.011 *
Percent of students at school facing economic disadvantage	-20.92	2.49	p<.001 ***
Percent of students at the school with a disability		(Omitted)	
Matchblock_1	-0.66	1.48	0.655
Matchblock_2	0.82	1.20	0.491
Matchblock_3	-1.63	1.16	0.159
Matchblock_4	0.39	1.41	0.783
Intercept	105.49	1.55	p<.001 ***
Variance (constant)	43.43	3.34	---
Variance (residual)	661.88	2.64	---

Note: Other races include students who identified as American Indian, Pacific Islander, or Asian. Sample size is 126,548 students.

Table B-14. RQ7. Exploratory Analysis. Multilevel regression estimating treatment effects on students' average science achievement, 2022

Variables	Est.	SE	*p*-value
Treatment (Cohort 2)	1.41	0.80	0.077
Pretest 2021	0.60	0.00	p<.001 ***
Female	-0.55	0.11	p<.001 ***
Students facing economic disadvantage	-2.83	0.13	p<.001 ***
Other races/ethnicities	3.63	0.46	p<.001 ***
African American	-2.49	0.25	p<.001 ***
Hispanic	-0.58	0.27	0.035 **
Students with a disability	-7.32	0.16	p<.001 ***
English Learners	-6.17	0.49	p<.001 ***
6th grader	2.56	0.14	p<.001 ***
7th grader	2.01	0.13	p<.001 ***
Rural school	-0.10	0.89	0.908
Percent of students at school facing economic disadvantage	-15.13	2.60	p<.001 ***
Percent of students at the school with a disability	-10.99	9.59	0.252
Matchblock_1	-0.56	1.54	0.717
Matchblock_2	-0.39	1.13	0.733
Matchblock_3	-0.71	0.87	0.416
Matchblock_4	0.11	0.88	0.899
Intercept	135.24	1.96	p<.001 ***
Variance (constant)	15.01	1.20	---
Variance (residual)	365.62	1.44	---

Note: Other races include students who identified as American Indian, Pacific Islander, or Asian. Sample size is 129,526 students.

Table B-15. RQ8. Exploratory Analysis. Multilevel regression estimating treatment effects on students who attended current Rural LIFE middle schools designated as rural schools compared to BAU in ELA, mathematics, and science, 2022

	ELA			Mathematics			Science		
Variables	**Est.**	**SE**	***p*-value**	**Est.**	**SE**	***p*-value**	**Est.**	**SE**	***p*-value**
Treatment (Cohort 2)	1.05	1.04	0.31	3.54	1.71	0.04	1.79	1.07	0.10
Pretest 2021	0.86	0.00	p<.001 ***	0.69	0.00	p<.001 ***	0.60	0.00	p<.001 ***
Female	4.15	0.14	p<.001 ***	1.30	0.17	p<.001 ***	-0.63	0.12	p<.001 ***
Students facing economic disadvantage	-3.63	0.16	p<.001 ***	-3.71	0.20	p<.001 ***	-2.60	0.15	p<.001 ***
Other races/ ethnicities	2.64	0.59	p<.001 ***	5.76	0.77	p<.001 ***	3.12	0.54	p<.001 ***
African American	-3.75	0.35	p<.001 ***	-2.72	0.43	p<.001 ***	-2.52	0.32	p<.001 ***
Hispanic	-1.88	0.35	p<.001 ***	-0.60	0.44	0.17	-0.19	0.32	0.55
Students with a disability	-13.02	0.21	p<.001 ***	-10.90	0.27	p<.001 ***	-7.50	0.19	p<.001 ***
English Learners	-7.96	0.69	p<.001 ***	-5.14	0.86	p<.001 ***	-7.12	0.63	p<.001 ***
6th grader	17.10	0.18	p<.001 ***	5.75	0.22	p<.001 ***	2.44	0.16	p<.001 ***
7th grader	8.63	0.16	p<.001 ***	0.85	0.20	p<.001 ***	1.45	0.15	p<.001 ***
Rural school	(Omitted)			(Omitted)			(Omitted)		
Percent of students at school facing economic disadvantage	-12.81	3.71	0.00 **	-12.74	3.75	0.00	-13.90	3.81	p<.001 ***
Percent of students at the school with a disability	-5.89	13.75	0.67	(Omitted)			-4.05	14.11	0.77
Matchblock_1	-0.75	2.67	0.78	-6.67	2.99	0.03	-1.06	2.73	0.70
Matchblock_2	0.39	1.45	0.79	0.21	1.36	0.88	0.13	1.49	0.93
Matchblock_3	-0.61	1.05	0.56	-2.28	1.23	0.06	-0.40	1.08	0.71
Matchblock_4	0.61	0.98	0.53	0.63	1.51	0.68	0.80	1.01	0.43
Intercept	47.79	1.95	p<.001 ***	105.16	1.66	p<.001 ***	134.29	1.91	p<.001 ***
Variance (constant)	16.08	1.68	---	47.11	4.60	---	17.72	1.79	----
Variance (residual)	426.17	1.97	---	649.31	3.05	---	351.51	1.63	----
	N=93,702			N=90,797			N=92,804		

Note: Other races include students who identified as American Indian, Pacific Islander, or Asian. The percentage of students with a disability are excluded from the mathematics model due to a p value over 0.20.

Table B-16. RQ9. Exploratory Analysis. Multilevel regression estimating treatment effects on students who experience economic disadvantage and attended current Rural LIFE middle schools compared to students who experience economic disadvantage at BAU schools in ELA, mathematics, and science, 2022

	ELA			Mathematics			Science		
Variables	**Est.**	**SE**	***p*-value**	**Est.**	**SE**	***p*-value**	**Est.**	**SE**	***p*-value**
Treatment (Cohort 2)	2.18	0.97	0.02 *	3.05	1.47	0.04 *	1.22	0.90	0.18
Pretest 2021	0.83	0.01	p<.001 ***	0.60	0.00	p<.001 ***	0.50	0.00	p<.001 ***
Female	4.34	0.24	p<.001 ***	1.86	0.31	p<.001 ***	-0.12	0.22	0.59
Students facing economic disadvantage	(Omitted)			(Omitted)			(Omitted)		
Other races/ ethnicities	4.17	1.51	0.01 **	6.45	2.00	0.00 **	6.46	1.42	p<.001 ***
African American	-3.08	0.45	p<.001 ***	-2.46	0.60	p<.001 ***	-1.67	0.42	p<.001 ***
Hispanic	-0.74	0.59	0.21	1.40	0.77	0.07	1.04	0.54	0.05
Students with a disability	-12.37	0.32	p<.001 ***	-12.52	0.41	p<.001 ***	-7.07	0.28	p<.001 ***
English Learners	-9.02	1.05	p<.001 ***	-11.64	1.38	p<.001 ***	-10.13	0.98	p<.001 ***
6th grader	19.48	0.31	p<.001 ***	10.90	0.39	p<.001 ***	0.98	0.27	p<.001 ***
7th grader	10.61	0.28	p<.001 ***	1.14	0.37	0.00	1.22	0.26	p<.001 ***
Rural school	-0.12	1.17	0.92	2.83	1.17	0.02	-0.47	1.09	0.67
Percent of students at school facing economic disadvantage	-7.17	3.43	0.04 *	-20.61	3.00	p<.001 ***	-6.79	3.20	0.03
Percent of students at the school with a disability	-31.08	12.77	0.02 *	(Omitted)			-36.45	11.91	0.00 **
Matchblock_1	-3.67	2.05	0.07	-1.47	1.73	0.40	-3.98	1.91	0.04 *
Matchblock_2	-2.48	1.47	0.09	-0.19	1.38	0.89	-3.04	1.37	0.03 *
Matchblock_3	-2.02	1.11	0.07	-1.93	1.31	0.14	-2.22	1.03	0.03 *
Matchblock_4	-0.98	1.07	0.36	0.15	1.55	0.92	-0.30	0.99	0.76
Intercept	55.97	3.02	p<.001 ***	126.07	2.22	p<.001 ***	165.01	2.69	p<.001 ***
Variance (constant)	16.94	1.78	---	43.75	4.01	---	14.83	1.49	---
Variance (residual)	448.18	3.51	---	762.49	5.99	---	371.49	2.93	---
	N=33,085			N=32,771			N=32,590		

Note: Other races include students who identified as American Indian, Pacific Islander, or Asian. The percentage of students with a disability are excluded from the mathematics model due to a p value over 0.20.

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