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Rural Education Achievement through AI Coaching and High-fidelity Supports (REACH – ND)

The North Dakota Department of Public Instruction (NDDPI), in partnership with Amira Learning and external evaluator WestEd, proposes Rural Education Achievement through AI Coaching and High-fidelity supports (REACH-ND), an EIR Mid-Phase project to develop and test the use of high-fidelity supports to scale Amira, an artificial intelligence-powered tutoring program across our primarily rural state. Amira is a PreK - 8th reading solution that drives measurable reading growth using the powerful synergy of neuroscience with AI (See **Appendix J.1, J.12**). Through ambitious policy, the NDDPI currently enables all districts throughout North Dakota to use Amira; however, like many statewide initiatives, there has been significant variability with the uptake and scaling of Amira across the state. ***Project REACH-ND aims to scale Amira with high fidelity across North Dakota by (a) creating a consortium of regional and local educational agencies to champion Amira's usage and integration into the existing tools teachers use for their core curriculum instruction, (b) improving teacher reporting and training to strengthen Amira's role as an enabler of instructional coherence and curriculum alignment, (c) enhancing student engagement by optimizing the student experience to minimize teacher friction, and (d) conducting a statewide randomized controlled trial (RCT) with K-5 students.***

Absolute and Competitive Preference Priorities

This proposed project meets **Absolute Priority 1—Moderate Evidence in Literacy**. Rigorous research has demonstrated that Amira meets What Works Clearinghouse (WWC) standards for moderate evidence (see **Evidence Form**). Because this project is initiated and led by the NDDPI and builds on the state's prior work with Amira, it also addresses **Competitive**

Preference Priority 1—Returning Education to the States. The NDDPI has been able to collect 26 letters from regional and local educational agencies within just a few weeks (see **Appendix C**). With this strong interest in REACH-ND, the NDDPI is well positioned to lead this statewide project. Additionally, through our partnership with Amira, this project will address **Competitive Preference Priority 2—High Impact Tutoring**. As students read aloud, Amira's AI Tutor delivers Science of Reading (SoR) practice that walks in the direct wake of the districts' reading curriculum. Amira listens and responds like a highly-trained human tutor, delivering real-time "micro-interventions" to keep reading growth on track. During every tutor session, Amira continuously monitors progress, tracks growth, and estimates mastery weekly, aligned with classroom instruction.

Through REACH-ND, we will help rural elementary schools throughout the state implement Amira's effective tutoring platform with fidelity through a two-prong approach that develops needed changes in the human systems and the AI platform itself. Our team brings immense expertise, experience, and excitement to ensure REACH-ND exceeds all expectations.

A. Significance

A.1 Unmet Demand for Effective Literacy Instruction Across a Rural State

North Dakota faces a literacy emergency–most of our students are struggling to read. Only 29% of 4th graders in the state scored at or above proficient on the 2024 Nation's Report Card—a level far below the national average (NCES, 2024). Internal state data confirm this troubling trend: on the 2023 North Dakota State Assessment (NDSA) in English Language Arts (ELA), just 44% of students met proficiency, down from 48% in 2019 (NDDPI, 2023). Reading performance has not yet rebounded from pandemic-era learning loss, and progress has plateaued since 2020–2021. In response, the NDDPI has established an ambitious goal: double the

percentage of students proficient in reading. Achieving this outcome will require a systemic shift in how foundational literacy is taught, monitored, and supported across our state's rural classrooms.

National research confirms the urgency of this work. The National Reading Panel, the National Center on Intensive Intervention, and the MTSS Technical Assistance Center all stress the need for explicit instruction, frequent progress monitoring, and targeted intervention. This is especially true for struggling readers in rural districts, where staffing shortages and long travel distances limit access to traditional interventions. HIT has emerged as one of the most effective evidence-based strategies to close early literacy gaps (Cortes, et al., 2025; Nickow, et al., 2023). However, HIT programs are often prohibitively expensive to implement at scale—particularly in rural communities. Staffing constraints, time demands, and administrative complexities have further hindered sustained adoption of traditional, human-delivered tutoring models. With more than 95% of North Dakota school districts classified as rural (based on locale codes 32, 33, 41, 42, and 43), REACH–ND is not just a pilot—it is a national demonstration of how AI tutoring can be deployed, adapted, and sustained in the most challenging educational contexts.

A.2 The Promise of AI Tutoring to Improve Statewide Literacy Outcomes

Amira offers a compelling alternative to human tutoring. By delivering one-on-one, high-frequency tutoring sessions at scale, Amira provides a cost-effective, AI-driven tutoring model that yields student outcomes similar to human-delivered tutoring models (Mostow et al., 2002). Amira is the only platform that delivers personalized oral reading practice with real-time coaching, offering thousands of SoR-aligned micro-lessons and monitoring growth through weekly mastery projections. It meets ESSA evidence tiers for Moderate or Strong evidence, and operationalizes the WWC recommendations for explicit decoding instruction, purposeful fluency

practice, and scaffolded comprehension (Foorman et al., 2016; Vaughn et al., 2022). Amira delivers individualized feedback to ***every*** student dynamically assessing decoding, fluency, and comprehension in live sessions—without overburdening teachers. Independent studies, including randomized controlled trials and quasi-experimental designs, have shown Amira to produce large, statistically significant literacy gains. For instance, in a student-randomized trial led by Carnegie Mellon researchers (Mostow et al., 2013), students in Grades 1–4 using Amira's predecessor (the Project LISTEN Reading Tutor) demonstrated an effect size of +0.64 on the Woodcock Reading Mastery Composite. In a matched comparison study in a large Texas district ($n > 15{,}000$ K–1 students) found that Amira use yielded effect sizes of +0.26 in Kindergarten and +0.06 in Grade 1 on DIBELS composite scores, when controlling for pretest performance.

In North Dakota, the DPI partnered with the North Dakota University System to analyze Amira usage across 27 school districts during the 2023-24 school year. Students who used Amira for the recommended 30–60 minutes per week ***grew nearly twice as fast*** as peers who used it less frequently. Higher-dosage Amira students in Grades 3–5 scored up to 13 points higher on the NDSA ELA assessment compared to their peers (North Dakota Legislative Assembly, 2025). These studies affirm that when implemented with fidelity, Amira functions as a high-impact tutor—delivering personalized feedback, driving reading growth, and enhancing instructional quality. However, they also reveal an unmet demand in scaling the intervention sustainably in rural environments where instructional coherence and professional development are fragmented across the state. In fact, without support for sustained implementation and platform changes in the dimensions of student engagement and teacher reporting, as described in this proposal, the number of districts using Amira in North Dakota declined between the 2023-24 school year and the current school year.

A.3 Our Innovative Approach to Enhance Fidelity

To meet this challenge, REACH–ND proposes to implement and evaluate an ***enhanced***, high-fidelity model of Amira that addresses barriers to scaling across North Dakota. By pairing product improvements with a sustainable professional support model rooted in local context, our strategy acknowledges the important interplay between humans and technology. Our comprehensive and innovative approach will include (1) organizing a statewide consortium of regional and local education agencies to champion Amira's high-fidelity support model and integration into teachers' existing workflows, (2) enhancing student engagement through new development work on the Amira platform, (3) improving teacher reporting to strengthen Amira's role as an enabler of instructional coherence and curriculum alignment, and (4) conducting a statewide randomized controlled trial (RCT) to rigorously evaluate impact and refine implementation strategies. Working together, the Consortium, Amira and the advisors will iterate teacher reporting, implementation process and PD to reflect the modified student experience. This iterative improvement cycle will repeat as rapidly as possible.

For the human system, DPI leaders, including the state's EduTech team, and Amira Learning, will work with implementation "champions" to support teachers' uptake, where their "give" is minimized and their "get" is maximized. State leaders will guide this consortium of regional and local educational agencies to embed Amira's high-fidelity supports and insights deeply into teachers' existing ELA instruction. The Amira product work will focus on improving curriculum coherence for teachers and student engagement to substantially increase the percentage of students reaching fidelity of use. Based on internal data and user feedback, Amira developers will focus on the following two levers:

A.3.1 Teacher Reporting to Enable Instructional Coherence: Amira will design and implement a refined teacher reporting system that more explicitly connects Amira platform data with classroom instruction. The enhanced reporting will translate Amira's AI-driven insights—such as fluency growth, error patterns, and comprehension trends—into clear, actionable insights teachers can use to inform whole-class, small-group, and individual instruction. Reports will align directly with district curriculum maps and pacing guides, highlighting where students are excelling or need reinforcement within the core ELA framework. By integrating these insights into teachers' daily planning tools, Amira's reporting will serve as a bridge between tutoring and instruction—driving coherence, reducing redundancy, and empowering teachers to make data-informed decisions that strengthen literacy growth across the classroom.

A.3.2 Student Engagement Sensitivity Layer: Amira will embed an engagement modeling module that uses speech tone analysis and pause timing to detect student frustration or fatigue. In response, the system will automatically modulate its response—offering more encouragement, switching to an easier passage, or initiating a break cue. These adaptations will be visible to teachers in real-time via alerts in their Amira dashboards. Through these system enhancements, Amira will enable a new set of mechanisms for transcending barriers to use.

Each enhancement will be co-developed with regional and local educators from the consortium, ensuring alignment with local expectations and curriculum pacing. Early prototypes of both teacher reporting and student engagement enhancements will be piloted, tested and refined in the 2026-2027 school year, with a broader rollout targeted for fall 2027.

B. Strategy to Scale

B.1 Addressing the Unmet Demand for Broader Statewide Implementation

When Amira is implemented with high-fidelity, students in North Dakota benefit substantially (North Dakota Legislative Assembly, 2025). However, even with ambitious policy support from the state, the number of districts using Amira dropped from 110 in 2024-25 to 72 (out of 168 possible) in 2025-26. To align with North Dakota's policies and goals for reading achievement, REACH–ND will overcome three key barriers to scaling and sustaining Amira implementation across our primarily rural districts: (1) impediments to leadership buy-in; (2) teacher uncertainty on how to integrate Amira into core ELA instruction; and (3) student disengagement, especially among struggling readers. These barriers require solutions that address both human systems and technology design. The project will deploy a coordinated, statewide infrastructure and make substantial upgrades to the Amira platform to increase fidelity and persistence of use across districts.

Innovative Solution #1. ***Establish a consortium of regional and local Amira champions led by DPI.*** To align with policy and address the state's goal of doubling the number of students reading at or above proficient, the DPI will establish a cross-tiered implementation consortium of regional and local champions to increase leadership buy-in for Amira. Usage data shows that schools with active Amira champions achieve 20% higher usage at recommended fidelity levels. However, the extent to which districts or schools are willing and able to identify and support a local champion varies dramatically. DPI leaders will identify and support local champions to develop the infrastructure to scale and sustain Amira through a continuous improvement process. Champions will be supported through DPI-led institutes and use consortium-created resources, including lesson-planning templates, fidelity dashboards, and

model implementation schedules. These champions will help to implement Amira's high-fidelity support model (see **Appendix J.2**) and facilitate continuous improvement in local deployment. The consortium will use data from Amira's dashboard as well as iterative feedback from WestEd during the development phase of the project to understand challenges in the field and improve practice. Based on these iterative data, the consortium will develop and share guidance documents, tip sheets, and infographics to support district and school wide usage.

Innovative Solution #2. ***Help teachers integrate Amira into their current ELA instruction*****.** Despite Amira's minimal instructional burden—requiring just 30 to 60 minutes per student per week—teachers need concrete, contextualized support to embed Amira into the fabric of their core ELA instruction. Many educators in North Dakota are juggling multiple initiatives, and without practical guidance, even evidence-based tools can remain underutilized. To address this challenge, Amira will develop enhanced teacher reporting features to enable coherence. To ensure that Amira acts as a true instructional ally, REACH–ND will support development of an enhanced teacher reporting experience that translates AI-driven insights into actionable, classroom-relevant information. The project will focus on elevating the usability, specificity, and immediacy of Amira's teacher-facing reports to align with teachers' workflows and the state's literacy framework. These improvements will emphasize dynamic mastery reporting at the standard and skill level, powered by Amira's proprietary Mastery of Academic Standards and Targets (MAST) metric. MAST continuously estimates student mastery by integrating data from assessments, tutoring, and instruction—ensuring that teachers see not just what a student knows, but which standards require instructional energy next.

REACH–ND will also extend Amira's real-time reporting with newly designed "Guidance Signals" that highlight mismatches between time spent on a skill and the estimated

time to growth, allowing teachers to optimize assignments and adjust grouping in real time. This enhanced teacher experience will incorporate lesson-level diagnostics, curated microlesson recommendations, and prebuilt IRIPs that reflect each district's curriculum, pacing, and scope. Just as the engagement layer minimizes student friction, these upgrades reduce instructional friction for teachers—turning data into decisions. In collaboration with North Dakota educators, Amira will co-design reporting enhancements to ensure they reflect real-world instructional rhythms and support timely, equitable, and data-informed literacy instruction at scale.

Additionally, as part of Amira's high-fidelity support model, consortium-supported champions will deliver co-planning sessions, classroom demonstrations, and grade-level PLCs focused on instructional integration. They will use a suite of consortium-developed resources, including: (a) sample classroom schedules that show how to align Amira with whole-group, small-group, and independent reading time; (b) "dashboard-to-instruction" guides that help teachers translate student tutoring data into whole-class mini-lessons or targeted groupings; and (c) teacher-enabled student motivation strategies that leverage Amira's progress badges and embedded choice architecture. Importantly, champions will not only support usage—they will cultivate ownership by adapting the materials to reflect local pacing guides, curriculum maps, and instructional norms. This approach ensures Amira is not an add-on, but a coherent part of the instructional day that strengthens the impact of teachers' existing efforts.

Innovative Solution #3. ***Develop student engagement sensitivity features within Amira to personalize tutoring dynamics.*** Amira's new engagement sensitivity layer will make the tutoring experience more empathetic and adaptive by analyzing student frustration signals in real time. Using paralinguistic cues such as vocal tone, pause patterns, and error bursts, Amira will infer when a student is confused, fatigued, or disengaged. In these moments, the system will

dynamically adjust—modifying its voice to be more encouraging, offering the student a short break, simplifying the task, or switching to a confidence-building activity. These empathetic adjustments are designed to prevent "shut down" moments that disproportionately impact struggling readers. Teachers will see real-time alerts in their dashboard and post-session indicators showing where students exhibited signs of struggle or resilience, allowing them to provide timely encouragement or follow-up support. This layer will increase student persistence while humanizing the AI-tutoring experience.

Together, these human and platform innovations will build a statewide infrastructure for Amira adoption and usage. Teachers will have the support, tools, and platform enhancements needed to sustain usage over time. The North Dakota model will offer a blueprint for other states on how to align AI tutoring with local systems to achieve high-impact, scalable literacy improvement.

B.2 Feasibility of the Management Plan

REACH-ND's management plan is designed so that project objectives are achieved on schedule, within budget, and with the high level of coordination required for a statewide randomized controlled trial (RCT). The plan draws on NDDPI's position of leadership with statewide initiatives, along with the implementation and evaluation capacity of its partners. **Appendix J.3** presents a detailed management table specifying each partner's personnel, responsibilities, and feedback and continuous improvement mechanisms across the project.

Leadership and partner responsibilities. The project will be overseen by [redacted], NDDPI's [redacted] (Project Director), who will provide strategic oversight for project goals, timelines, and deliverables. [redacted], [redacted], will manage day-to-day operations, coordinate consortium activities, and

supervise direct implementation. Amira Learning will lead platform refinements, product integration, and educator support systems. Its team will deliver professional learning, maintain data security, and ensure technical reliability throughout. WestEd will serve as the external evaluator partner, overseeing randomization, data collection, analyses, progress reporting, and the final evaluation report. WestEd will also facilitate continuous-improvement cycles through joint review of fidelity and outcome data with NDDPI and Amira.

Project coordination, communication and timeline. Project Directors from each partner organization will convene bi-weekly leadership meetings to review timelines, budgets, and performance indicators. Each team will also meet internally each week to address their project-specific operational issues and track deliverables. A shared online dashboard will monitor school recruitment, training completion, dosage metrics, and expenditure tracking to ensure transparency and adherence to milestones. The goals of REACH-ND will be achieved through iterative refinement, improvement, and evaluation processes that follow the timeline outlined in **Appendix J.4**. In Year 1, we will refine Amira's platform, establish the DPI-led consortium, conduct pilot testing, and prepare for the RCT. In Years 2–4, we will implement the enhanced version of Amira and consortium-developed resources, monitor fidelity, and collect data. In Year, we will conduct analyses, disseminate findings, and plan for sustainability. Annual milestones include completion of platform enhancements and consortium resources (Y1), district onboarding and baseline data collection (Y2), mid-phase fidelity and outcome reporting (Y3–4), and final analysis and replication toolkit (Y5).

B.3 Relevance and Commitment of Partners

Each REACH-ND partner has demonstrated the capacity to collaborate successfully to bring this project to scale and exceed all project objectives. **North Dakota Department of**

Public Instruction (NDDPI) will provide the leadership and infrastructure required for statewide implementation and scale. NDDPI will serve as the project lead and fiscal agent, overseeing all management, compliance, reporting, and consortium activities. **Amira Learning** has committed to co-investing in platform enhancements, contributing in-kind engineering, product-testing resources, and license support valued at approximately $1,186,800 (see **Appendix H**). **WestEd** will serve as the independent evaluator. A nationally recognized, non-partisan research organization, WestEd has extensive experience conducting RCT studies funded by the U.S. Department of Education. WestEd's commitment includes dedicated senior personnel for evaluation oversight, data security, and reporting, ensuring the rigor and transparency of findings in accordance with SEER and WWC standards. See **Table 1** and **Appendix B** for our qualifications and roles.

Table B.1. Key Personnel: Roles, Responsibilities, and Qualifications

Person, Role	**Responsibilities and Qualifications**
[redacted], NDDPI, Project Director	[redacted] will work closely with project staff and regional and local champions via the consortium on the successful development and implementation of REACH-ND. As the [redacted], she will manage grant funds and oversee the entire grant implementation. This role will serve as the primary point of contact for grant oversight and collaboration between partners.
[redacted], NDDPI, Project Staff	[redacted] and [redacted] will have direct oversight of the implementation plan and ensure timely progress on grant activities, district supports, and grant communications. This includes day-to-day project implementation, work planning, participant technical assistance and programmatic support, as well as monitoring and reporting.
[redacted], NDDPI, Project Staff	
[redacted], Amira, Intervention Project Lead	[redacted] and [redacted] are senior leaders of Amira Learning and have overseen numerous large-scale grant-funded projects. [redacted] will provide executive oversight and [redacted] will provide day-to-day management across Amira's technology and customer success teams to ensure REACH–ND delivers measurable
[redacted], Amira, Intervention Project	

Director	outcomes, strategic alignment, and statewide sustainability.
[redacted], WestEd, Evaluation Lead	[redacted] and [redacted] are [redacted] at WestEd and lead teams of highly qualified quantitative and qualitative researchers. They and their team will conduct all evaluation activities. [redacted] and [redacted] have conducted numerous RCTs, including EIR MidPhase and EIR Expansion projects.
[redacted], WestEd Evaluation Co-Lead	

B.4. Quality of the Plan to Deliver Project Services Efficiently at Scale

REACH-ND's innovative approach is designed to deliver high-quality, individualized literacy tutoring through a scalable, technology-enabled system that reduces implementation burden while maintaining effectiveness. By doing so, the project will provide a new means to support systems change to scale AI tutoring across rural settings. The plan leverages the human enterprise of NDDPI's existing infrastructure with the efficiency of innovative technology.

Enhancing human support for fidelity and feasibility. Technology, no matter how innovative and efficient, cannot replace human capital and expertise. North Dakota is a cautionary tale of the importance of building human capacity to effectively integrate innovative technology at scale. The DPI-led consortium will establish support at all levels of the human system–state, regional, local–to establish leadership buy-in and a robust infrastructure across the state. Although the consortium will be led by the DPI, the work will be conducted directly with local champions who best understand their context and needs. These local champions play a critical role in implementing and sustaining Amira's high-fidelity support model. The consortium and respective champions will coordinate implementation, monitor usage data, and support teachers in integrating Amira within the state's ELA framework. This structure ensures that implementation remains consistent and responsive even as the program scales.

Efficiency through technology and integration. Amira Tutor automates core elements of high-impact tutoring, particularly assessment, feedback, progress monitoring, and adaptive

lesson sequencing, allowing each student to receive individualized instruction without requiring a one-to-one human tutor. Improvements to the teacher component will emphasize dynamic mastery reporting at the standard and skill level, ensuring that teachers see not just what a student knows, but which standards require instruction next. Enhancements to the student experience will include the development of an intelligent and engaging tutoring interaction that can detect and respond to student frustration, which will help to reduce disengagement and resistance. Together, these innovations ensure that Amira delivers a more sustainable, high-return investment for rural schools. These developments, completed within the first 18 months of REACH–ND, will position Amira as a core instructional asset in every North Dakota elementary school, not just a supplemental tool.

Continuous improvement, sustainability and replication. Throughout the project, Amira, NDDPI, and WestEd will maintain an implementation dashboard that tracks participation, dosage, and fidelity metrics in real time. These data will guide the consortium's quarterly continuous improvement cycles to refine delivery supports and ensure that efficiency gains do not compromise instructional quality. Early indicators from pilot studies will inform adaptive refinements, allowing the project to optimize cost and impact concurrently. By embedding Amira within NDDPI infrastructure, REACH-ND creates a self-sustaining model that districts can continue after the grant period with minimal additional cost. Following the EIR Mid-Phase evaluation, NDDPI will disseminate a Replication and Implementation Guide that details fidelity tools, dosage thresholds, and training protocols to support adoption in other states.

Together, these design features ensure that REACH-ND will deliver evidence-based literacy tutoring efficiently with fidelity and at scale across rural settings—demonstrating that technological innovation and instructional quality can reinforce and support one another.

B.5 Quality of the Dissemination and Replication Plan

NDDPI, Amira, and WestEd will co-lead dissemination activities. We will assign one staff member from each agency to a dissemination team who will meet monthly and plan dissemination efforts. Activities will include (a) monthly social media posts on partner pages (LinkedIn, Facebook); (b) quarterly submissions to digital outlets such as practitioner websites (e.g., Edutopia), webinars, and podcasts (e.g., Teach by Design); (c) webpages on existing REACH-ND team websites; (d) annual presentations at national and regional conferences (e.g., AERA); (e) annual submission of scholarly research articles to peer-reviewed journals; (f) downloadable infographics and publications for champions and practitioners hosted on the Amira platform; and (g) monthly newsletters as part of Amira's high-fidelity support model to REACH-ND sites. We will share accessible Amira implementation information needed for exploration, adoption and scaling, technical support, study findings, implementation testimonials, and lessons learned. We will also disseminate the costs and cost-benefits of REACH-ND to inform future efforts. See **Dissemination and Replication Matrix** in **Appendix J.5**.

Replication and Implementation Guide. In the final project year, DPI, WestEd, and Amira Learning will jointly produce a Replication and Implementation Guide that includes all the resources necessary to implement Amira's high-fidelity support model in rural settings to a diverse range of audiences, including researchers, policymakers, and practitioners. The guide will include fidelity and dosage thresholds, sample implementation schedules, consortium resources, professional learning materials, cost parameters, and adaptation guidance aligned with the project's logic model. Designed as a practical toolkit, it will enable other states or districts, particularly those in rural settings, to replicate the model with fidelity while adapting to local contexts. The guide will be available on NDDPI and WestEd's websites.

C. Quality of Project Design

C.1 Logic Model

Our logic model provides a roadmap of how REACH-ND is hypothesized to improve school and student outcomes (see **Appendix G**). The **key components** of our model include the supports for sustained implementation of Amira with high-fidelity including (a) the DPI-led Consortium and Institute for local Amira champions, (b) Amira's high-fidelity support model, (c) Amira PL for educators, (d) access to the Amira platform, (e) Amira customer support manager and a local champion, and (f) implementation dashboards. The direct components are the core features of Amira (e.g., AI-guided oral reading practice, micro-interventions) and the **new enhancements** to the teacher dashboard and student engagement features.

Mediators and implementation dynamics. The effectiveness of these components is likely mediated by teachers' existing ELA instructional practices and the extent to which they "buy-in" to the value and utility of Amira. Additional mediators may include students' acceptance of technology as an educational tool and the school's overall technology infrastructure. The REACH-ND model assumes that as teachers become more comfortable with Amira's high-fidelity support model and the new features of their teacher dashboard, they will begin to integrate Amira into their core ELA instruction. Likewise, as students experience greater engagement through the new sensitivity feature, their motivation, persistence, and self-efficacy will rise, amplifying learning gains.

Short-term outcomes. Following one-year of implementation, we anticipate teachers will implement Amira with high-fidelity and integrate it into their ELA instruction. Students are expected to demonstrate improved reading fluency, strengthened vocabulary and comprehension strategies, and greater engagement and motivation to read.

Intermediate outcomes. The student gains translate into improved reading comprehension, higher achievement on state ELA assessments, and greater student reading self-efficacy. Teachers and champions sustain implementation, and schools integrate Amira tutoring seamlessly within their core ELA instructional model.

Long-term outcomes. We anticipate being able to meet our goal of doubling the percentage of students reading at or above proficient on the NDSA. After the end of the project, we believe that there will be sustained statewide implementation of Amira with high-fidelity and that it will be an integral component of the ND's ELA instruction. This will contribute to ongoing measurable increases in ELA proficiency rates statewide, reduced need for intensive interventions, and sustained improvements in academic performance across subjects. Longer-term benefits include higher enrollment in advanced ELA courses, increased high school graduation rates, and postsecondary readiness.

The REACH-ND logic model reflects a complete and testable theory of action: when educators are supported to integrate an AI-powered tutoring program into their core ELA instruction, students strengthen foundational and strategic reading skills, enabling sustained literacy growth and academic success. This model not only links clear inputs to validated outcomes but also provides a scalable framework for replication across other rural settings.

C.2 Project Goals, Objectives, and Outcomes

The goals and objectives of REACH-ND are clearly specified, measurable, and aligned with the EIR Mid-Phase purpose, to refine and implement Amira statewide with fidelity. Each goal links directly to the project's logic model, evaluation plan, and short- and long-term outcomes. Targets are ambitious yet achievable within the five-year project period.

Table C.1. REACH-ND Goals, Objectives, Performance Targets, and Data Sources

Goal	Objective	Performance Targets	Data Sources
1. Strengthen statewide capacity to deliver AI-based reading instruction with fidelity	**1.1** Train and support ≥ 960 teachers and 100 *Amira Champions* in SoR-aligned AI tutoring and data use. **1.2** Achieve ≥ 90 % district-level implementation fidelity by Year 3.	• ≥ 960 educators complete PD (≥ 95 % satisfaction) • ≥ 90 % of districts meet fidelity ≥ 0.80 threshold on implementation rubric	• Consortium Institute and teacher training attendance logs (DPI & Amira) • Fidelity checklists & usage analytics (Amira Dashboard) • Teacher survey (WestEd)
2. Improve foundational reading skills for students in grades K-5 performing below proficiency.	**2.1** Provide Amira tutoring to ≥ 23,040 students across 80 schools. **2.2** Increase decoding accuracy and oral-reading fluency by ≥ 0.35 SD vs. control. **2.3** Increase comprehension by ≥ 0.25 SD.	• ≥ 23,040 students complete ≥ 80 sessions per year • Average fluency gain ≥ 12 WCPM • Comprehension gain ≥ 5 %ile rank	• RCT outcome data (WestEd) • NDSA and ND A+Interim • Amira mastery metrics
3. Demonstrate sustained reading growth and academic achievement.	**3.1** Increase % of participating students meeting NDSA ELA and ND A+Interim proficiency by ≥ 10 points. **3.2** Improve motivation/self-efficacy scores by ≥ 15 %.	• ≥ 50 % of participants reach or exceed NDSA proficiency • ≥ 15 % mean increase on motivation/self-efficacy	• NDSA ELA scores (DPI and district data) • Student surveys (WestEd) • Amira engagement telemetry
4. Build a replicable model for statewide implementation of Amira with high fidelity.	**4.1** Produce *Replication & Implementation Guide* with validated cost and fidelity thresholds. **4.2** Disseminate findings statewide and nationally through ≥ 6 venues.	• Guide completed and publicly posted by Q3 Y5 • ≥ 6 presentations/briefs (AERA, SREE, REL, WWC)	• Final deliverables (DPI & WestEd) • Cost analysis dataset (WestEd) • Dissemination logs

D. Quality of the Project Evaluation

WestEd will conduct an independent evaluation of Project REACH-ND. The evaluation will examine the effectiveness of Amira to improve foundational reading skills through adaptive oral reading practice, micro-interventions, and real-time feedback. The study will focus on students in grades K–5**,** a pivotal developmental window in which mastery of decoding, fluency, and comprehension establishes the foundation for later academic success. The impact study will be a cluster randomized controlled trial (RCT) across approximately 80 rural elementary schools statewide. The study will meet What Works Clearinghouse (WWC) 5.0 Standards Without Reservations, yielding rigorous and policy-relevant evidence of effectiveness. Primary confirmatory outcomes will center on students' foundational reading skills and reading achievement, measured by both (a) the North Dakota Academic Progression of Learning and Understanding of Students **(**ND A+) summative (grade 3-5) and (b) the ND A+ Interim (grades K-5). These measures provide complementary information, including summative, statewide evidence of reading achievement and sensitive, formative indicators of growth in early reading skills. To complement the impact study, the evaluation will include a comprehensive implementation and fidelity study to document how Amira is integrated within existing ELA instructional practices and to identify facilitators and barriers to scaling the high fidelity support model in rural contexts. Fidelity data will capture dosage, adherence, and quality of implementation, supported by system-embedded analytics from Amira's teacher and student dashboards, supplemented by teacher and coach surveys, interviews, and usage logs. The evaluation will also collect data on teacher knowledge, self-efficacy, engagement, and sustainability to assess professional learning impacts and to inform state-level scaling strategies. The fidelity and implementation tools will be developed and validated during an initial pilot

phase (2026–2027), which will identify data-collection challenges and inform refinements prior to full-scale RCT launch in 2027–2028.

Consistent with Standards for Excellence in Education Research (SEER)**,** the REACH-ND evaluation will emphasize (a) rigorous causal inference, (b) meaningful and generalizable outcomes, (c) measurement of implementation and context, and (d) transparent dissemination to both research and practitioner audiences. This dual-focus design ensures that findings are both scientifically credible and actionable for state and local leaders seeking to sustain and expand evidence-based literacy practices across North Dakota (see **Table J.7** in **Appendix**). The Impact Study (2027–2029) is guided by the following research questions:

Table D.1. Evaluation Research Questions and Data Sources

Research Question	Primary Data Source(s)
Impact Analyses	
What is the impact of REACH-ND on foundational reading skills and reading achievement students for students in grade K-5?	ND A+ Summative ND A+ Interim
Implementation Analyses	
To what extent do schools in the treatment condition implement Amira with fidelity relative to the business-as-usual (BAU) condition?	Amira usage analytics, fidelity rubrics, teacher logs, and surveys
What are teacher, staff, administrator, and regional/local Amira Champion perceptions of REACH-ND (social validity, feasibility, and usability)?	Surveys, focus groups, and interviews
Exploratory Analyses	
To what extent is the impact of Amira tutoring on students' foundational reading skills and reading achievement moderated by student and school characteristics (e.g., grade, disability status)?	Student records, assessment data, school-level demographics

To what extent are student impacts of REACH-ND mediated by fidelity of implementation and student engagement?	Amira analytics (usage, adherence, quality), fidelity rubrics, teacher surveys, and student engagement metrics
Cost and Cost-Benefit Analyses	
What are the costs and cost-effectiveness of implementing REACH-ND relative to business-as-usual literacy supports?	Cost tracking logs, personnel time records, NDDPI fiscal reports, and Amira licensing data

D.1.1. Evaluation Design (SEER: Pre-Registration, Replication, and Rigor). The NDDPI, in collaboration with the evaluation team at WestEd and Amira Learning, will recruit 80 elementary schools across multiple North Dakota districts, representing approximately 950 instructional staff and 23,040 students in grades K–5. To maximize rigor and ensure strong internal validity, schools will be randomly assigned in two sequential cohorts (C1: 2027–28; C2: 2028–29). Within each 40-school cohort, 20 schools will be randomly assigned to the REACH-ND treatment condition, receiving Amira plus enhanced professional learning, regional champion supports, and implementation dashboards, while 20 schools will continue with business-as-usual (BAU) literacy instruction and typical statewide Amira access without added fidelity supports. To ensure equivalence between treatment and BAU groups, the study will employ a blocked randomization design. Blocking variables will include district, prior-year school-level reading proficiency, and Title I status as an indicator of socioeconomic disadvantage. This design will allow us to maintain balance across key contextual variables while maximizing statistical power and generalizability across North Dakota's rural schools.

Attrition will be carefully monitored at the school, teacher, and student levels throughout the study. Following WWC 5.0 guidelines, the evaluation will calculate and report overall and differential attrition, both by treatment condition and by cohort. To minimize school-level

attrition, the evaluation team will implement proactive retention supports: (a) participation incentives will be provided to schools and staff, including funds for substitutes, stipends for professional learning, or other locally identified needs; (b) a live retention dashboard will continuously monitor participation indicators (e.g., professional learning attendance, survey completion, Amira log-in rates). When two or more indicators signal risk, the evaluation team will trigger an "escalation playbook", a rapid support sprint that includes a targeted virtual or onsite visit, rescheduling assistance, and additional coaching or technical support to remove immediate barriers. Principals will complete a quarterly recommitment check-in confirming timelines, testing windows, and staffing to surface potential attrition risks early.

At the student level, we anticipate some degree of missing data due to mobility, absenteeism, or incomplete assessment records. Consistent with WWC standards, all analyses will follow an intent-to-treat (ITT) approach, retaining all randomized schools in the analytic sample regardless of implementation status. Analyses will document reasons for missing data and monitor differential attrition across conditions and employ multiple imputation under the missing-at-random (MAR) assumption and full information maximum likelihood (FIML) estimation in multilevel models. Exclude joiners (students who enroll after random assignment) to maintain baseline equivalence and protect internal validity.

All attrition procedures, analytic decision rules, and data-handling protocols will be pre-registered in the Registry of Efficacy and Effectiveness Studies (REES) prior to analysis to avoid post hoc analytic flexibility. In addition, detailed attrition reports, data-processing code, and supporting documentation will be shared through the Open Science Framework (OSF) to ensure replicability and transparency, consistent with SEER.

D.1.2. Statistical Power (SEER: Informative Nulls). The evaluation team estimated minimum detectable effect sizes (MDES) for the planned two-level cluster randomized controlled trial (RCT) using the *PowerUpR* package. The analysis assumes 80 elementary schools (40 treatment, 40 control), an average of ~12 teachers and ~20 students per teacher, balanced assignment, and a two-tailed significance level of $\alpha = .05$ with 80% power ($1 - \beta = .80$). Because participating schools vary in size and locale, we examined plausible ranges of the intraclass correlation coefficients (ICCs) at both the teacher and school levels (ρ_2, $\rho_3 = .05–.15$**)** based on prior literacy intervention RCTs. We also modeled conservative and optimistic levels of covariate adjustment, assuming that baseline measures (e.g., prior-year NDSA–ELA proficiency, demographics, and baseline reading scores) explain between 25% and 75% of student-level variance and 10–25% of school-level variance in outcomes. Across this plausible range of ICC and covariate adjustment values, the study is expected to achieve MDES estimates between 0.13 and 0.18 standard deviations for student ND A+ Interim assessment data.

D.1.3 Outcome Measures (SEER: Meaningful and Generalizable Outcomes). Primary confirmatory outcomes will measure reading fluency, vocabulary, comprehension, and reading achievement, supported by secondary measures of engagement and self-efficacy. All measures have strong reliability and validity evidence and are appropriate for students in grades K–5. **Table D.2**. provides a crosswalk for each measure and how it connects to the research questions and logic model. We present reliability in **Appendix J.8** and complete reliability and validity information in **Appendix J.9**. The primary outcome measures are the ND A+ summative (grades 3-5) and interim (grades K-5). Most schools in ND also use the Amira Assessment for literacy screening and progress monitoring. We will collect this data and conduct exploratory analyses and acknowledge that the measure may be overaligned and not meet the WWC

standards. We will combine items from two student surveys of reading motivation and persistence, the Motivations for Reading Questionnaire (MRQ; Wigfield & Guthrie, 1997) and the Elementary Reading Attitude Survey (ERAS; McKenna & Kear, 1990). The survey will be brief and appropriate for students in grades 2-5. We will collect pilot data and evaluate psychometrics during the pilot study in the 2026-2027 school year.

Table D.2. Measures Crosswalk: Outcome Domains, Measures, Research Questions, Logic Model Links, and Reliability

Outcome Domain	Measure / Instrument	Linked RQ(s)	Logic Model Construct	Reliability / Source
Student Outcomes				
Reading achievement	North Dakota State Assessment (NDSA – ELA)	RQ 1	Improved reading comprehension and overall ELA achievement	$\alpha \approx .90–.94$
Foundational reading and fluency	Amira Assessment Analytics (fluency, accuracy, prosody, comprehension)	RQ 1–2	Increased reading fluency, vocabulary, and comprehension	ICC $\geq .95$; convergent $r \approx .85–.91$ with DIBELS
Reading skills progress	ND A+ Interim Assessment (ELA)	RQ 2	Continuous progress in foundational skills	$\alpha \approx .86–.93$ (A+)
Reading motivation & self-efficacy	Student Reading Motivation and Self-Efficacy Survey (adapted MRQ + ERAS)	RQ 3; RQ 6 (mediator)	Greater student engagement, motivation, and persistence	$\alpha \approx .80–.90$
Teacher Outcomes				
Implementation fidelity (dosage, adherence, quality)	Teacher Electronic Log (AI usage analytics + survey entries)	RQ 4; RQ 6 (mediator)	High-fidelity implementation of Amira	$\alpha \geq .85$ (pilot target)

Instructional practice and data integration	Teacher Electronic Log (ELA practice integration index)	RQ 4 (subquestion)	Integration of Amira data into ELA instruction	New index (α target ≥ .80)
Teacher / Champion buy-in and social validity	REACH-ND Social Validity Survey (single scale for teachers and champions)	RQ 5	Perceived feasibility, usability, and value of Amira	α ≥ .80 (Cook & Cook, 2013 framework)
System / Contextual Outcomes				
School technology infrastructure	Technology Infrastructure Index (5-item site survey on access, bandwidth, device availability)	Moderator in RQ 6	School technology capacity to support AI tools	New measure (α target ≥ .80)
Implementation capacity and sustainability	Champion Implementation Logs + Training Participation Records	RQ 4 (exploratory)	Sustained regional support and leadership capacity	Administrative data / logs

D.1.4 Data Analytic Approach (SEER: Rigorous Methods and Replicable Results).

All analytic specifications will be preregistered in the REES, and replication materials, including cleaned analytic datasets and code, will be shared through the Open Science Framework (OSF) to ensure transparency and reproducibility. Because random assignment occurs at the school (cluster) level, impacts will be estimated using three-level hierarchical linear models (HLM) that account for students nested within teachers, and teachers nested within schools. The analytic framework follows an ITT approach: all randomized schools remain in their assigned condition regardless of implementation fidelity. Covariates include baseline reading achievement, student demographics, and school-level blocking variables used in randomization (district, baseline proficiency quartile, Title I status). Analyses will use maximum likelihood estimation with robust standard errors in *R (lme4)*. Results will be reported as Hedges *g* standardized mean differences and corresponding Improvement Indices, following WWC reporting conventions.

Implementation and contextual variation will be modeled jointly with impact analyses. Teacher electronic logs will capture dosage, adherence, and quality of Amira implementation, along with instructional integration indicators; these will be summarized into fidelity composites. Moderator analyses will test whether impacts vary by grade level, ELL status, or disability and tested using interaction terms. Mediation analyses will examine whether gains in student reading are explained by improvements in instructional fidelity or student engagement, testing the hypothesized pathways in the REACH-ND logic model. Mediation analyses will be estimated using multilevel structural equation modeling. Missing data will be handled using multiple imputation and full-information maximum likelihood (FIML); robustness checks will compare complete-case and imputed results. See **Appendix J.10** for full analytic descriptions.

D.1.5. Cost Analysis (SEER: Practical Value). We will conduct an ingredients-based cost analysis to document the full economic cost of implementing REACH-ND and to estimate cost-effectiveness alongside the impact study. The plan follows IES's Cost Analysis: A Starter Kit (Institute of Education Sciences, 2020; three-phase approach: identify ingredients → assign prices & make adjustments → calculate costs & sensitivity tests) and the SEER principle to report costs transparently and policy-relevantly. We will report both total and incremental costs relative to BAU, distinguishing start-up (e.g., initial training, platform set-up) from steady-state implementation (e.g., annual licenses, coaching). See **Appendix J.11** for full cost analysis plan.

D.2 Replication and Scaling (SEER: Generalization and Practical Value)

The REACH-ND evaluation is explicitly designed to generate generalizable, actionable guidance for state and district leaders seeking to scale literacy innovations in rural contexts. Consistent with the SEER standards on replication, generalization, and practical value, the study will document what works, for whom, under what conditions, and at what cost. The randomized

trial spans approximately 80 elementary schools across multiple North Dakota districts, representing diverse locales (rural, town, small city), grade configurations, and technology readiness levels. Random assignment by school ensures strong internal validity while embedding the intervention within authentic implementation contexts. The inclusion of two sequential cohorts (2027–28 and 2028–29) allows the evaluation to replicate findings across distinct samples and implementation years, producing cumulative evidence of generalizability across sites and time.

WestEd will use an implementation core and adaptation framework to identify which elements of REACH-ND are essential for impact and which can be adapted to local contexts. All professional learning materials, coaching protocols, and Amira platform configurations will be coded by function (core vs. adaptable) and linked to fidelity and impact outcomes. A structured adaptation log will document modifications by districts and schools (e.g., scheduling, platform use, instructional integration), alongside perceived benefits or challenges. This will allow future adopters to distinguish "non-negotiable" elements that drive impact from context-flexible features that can be tailored for fit.

We will estimate overall impacts and test the mechanisms and contextual factors that explain variation in effects. Through multilevel mediation analyses, we will examine whether improvements in student literacy outcomes operate through increases in teacher fidelity or student engagement. Qualitative data from focus groups and survey open responses will contextualize these findings, providing a rich understanding of the conditions under which AI-supported literacy interventions succeed in rural schools.

In partnership with NDDPI and Amira Learning, WestEd will develop a suite of replication resources, including: (a) An implementation guide specifying dosage, training, and

fidelity thresholds required to achieve impact; (b) A scaling cost model that distinguishes one-time versus recurring costs to inform state budgeting; (c) A technology readiness rubric to assess district infrastructure before adopting AI-enabled tutoring; and (d) A barrier-to-strategy map linking common implementation challenges to effective mitigation strategies. **Table J.6** in Appendix describes how the evaluation design supports replication and scaling.

D.3. Fidelity (SEER: Implementation and Mechanisms)

The REACH-ND evaluation includes a comprehensive plan to measure, monitor, and interpret fidelity of implementation at multiple levels (teacher, school, and system) to ensure that impact estimates are understood in the context of implementation quality. Fidelity will be measured both quantitatively and qualitatively, following SEER guidance to (1) define core components, (2) establish operational indicators, (3) set a priori thresholds for acceptable implementation, and (4) examine how fidelity mediates or moderates student outcomes. Fidelity is defined across three primary dimensions, dosage, adherence, and quality, supplemented by measures of contextual support (leadership engagement, technology readiness) and participant responsiveness (teacher buy-in). See **Table D.3**.

Table D.3. Fidelity Constructs, Data Sources, and Thresholds

Fidelity Construct	Operational Definition / Indicator	Data Source(s)	Acceptable Implementation Threshold	Analytic Use
Dosage	Frequency and duration of Amira sessions per student/class	Amira platform analytics; teacher logs	≥ 80% assigned sessions; ≥ 30 min/week/student	Predictor and descriptive fidelity indicator
Adherence	Completion of required Amira cycles and progress checks	Amira analytics; teacher logs	≥ 75% completion of core tasks	Fidelity composite and mediation variable

Quality of Instruction Integration	Incorporation of Amira data into ELA lessons (integration index 1–5)	Teacher electronic logs	≥ 3.5 on 5-point scale	Mediator of student outcomes
Contextual Support	Champion coaching frequency; tech reliability and leadership support	Champion logs; Tech Infrastructure Index	≥ 4 on 5-point scale	Moderator of fidelity–outcome relation
Participant Responsiveness / Social Validity	Teachers' perceived feasibility, usability, and value	Social Validity Survey	Mean ≥ 4 on 5-point scale	Mediator / predictor of sustained use

Analyses will link fidelity to student outcomes through multilevel mediation and moderation models. At the teacher and school levels, fidelity composites will be standardized (z-scores) and entered as predictors or mediators of student reading outcomes (NDSA, ND A+, Amira metrics). This will quantify the relationship between implementation quality and program effectiveness, identifying thresholds associated with meaningful student gains. The combination of continuous analytics, teacher logs, and social validity surveys ensures that fidelity is not only *measured* but *understood*, revealing the implementation conditions under which AI-enabled reading support systems like Amira achieve maximum impact.

D.4 Information to Guide Replication and Evidence of Effectiveness

The REACH-ND evaluation is designed to produce valid, replicable, and policy-relevant evidence on how to scale AI-supported literacy interventions in rural education systems. The statewide RCT will yield rigorous evidence on student literacy outcomes while integrating implementation, fidelity, and contextual data to identify why, for whom, and under what conditions the intervention is most effective. Fidelity will be captured through Amira platform analytics, teacher electronic logs, and social-validity surveys measuring dosage, adherence, and

instructional integration. These data will establish quantitative thresholds for high-fidelity implementation and identify contextual moderators, such as technology readiness and leadership support, that enable successful scaling. A parallel ingredients-based cost analysis will estimate start-up and steady-state costs and produce cost-effectiveness ratios (dollars per 0.10 SD gain in reading achievement). Together, the fidelity, cost, and outcome data will provide clear, actionable guidance on the resources, training, and infrastructure required for replication and sustainability. To ensure full transparency, WestEd will preregister all models in REES and archive all instruments, code, and documentation in the OSF. The evaluation will culminate in a Replication Playbook for Scaling AI Literacy Supports, a comprehensive, state-facing resource that includes: (a) A Fidelity & Implementation Guide with dosage thresholds and integration practices linked to outcomes; (b) A Cost Workbook and planning calculator for state and district budgeting; (c) A Technology Readiness Rubric to assess local infrastructure capacity; and (d) Adaptation logs and case exemplars illustrating how schools maintained fidelity while tailoring implementation.

Through this integrated and transparent design, REACH-ND will yield evidence that is scientifically rigorous, practically meaningful, and ready for replication: a complete, field-tested roadmap for implementing and evaluating AI-enabled literacy interventions across rural educational settings.

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