

**U.S. Department of Education - EDCAPS  
G5-Technical Review Form (New)**

Status: Submitted

Last Updated: 08/15/2023 02:24 PM

## Technical Review Coversheet

Applicant: N.C. Department of Public Instruction (S411B230035)

Reader #1: \*\*\*\*\*

	Points Possible	Points Scored
<b>Questions</b>		
<b>Selection Criteria</b>		
<b>Significance</b>		
1. Significance	15	0
<b>Strategy to Scale</b>		
1. Strategy to Scale	40	0
<b>Quality of Project Design</b>		
1. Project Design	15	0
<b>Quality of the Project Evaluation</b>		
1. Project Evaluation	30	24
<b>Sub Total</b>	100	24
<b>Priority Questions</b>		
<b>Competitive Preference Priority</b>		
<b>Competitive Preference Priority 1</b>		
1. Promoting Equity	5	0
<b>Sub Total</b>	5	0
<b>Total</b>	105	24

# Technical Review Form

Panel #4 - EIR Mid-phase - 4: 84.411B

Reader #1: \*\*\*\*\*

Applicant: N.C. Department of Public Instruction (S411B230035)

## Questions

### Selection Criteria - Significance

1. The Secretary considers the significance of the proposed project. In determining the significance of the proposed project, the Secretary considers the following factors:

Reader's Score: 0

#### Sub

1. The extent to which the proposed project involves the development or demonstration of promising new strategies that build on, or are alternatives to, existing strategies.

**Strengths:**

n/a

**Weaknesses:**

n/a

Reader's Score: 0

### Selection Criteria - Strategy to Scale

1. The Secretary considers the strategy to scale the proposed project. In determining the quality of the design of the proposed project, the Secretary considers the following factors:

Reader's Score: 0

#### Sub

1. (1) The extent to which the applicant identifies a specific strategy or strategies that address a particular barrier or barriers that prevented the applicant, in the past, from reaching the level of scale that is proposed in the application.

**Strengths:**

n/a

**Weaknesses:**

n/a

**Sub**

**Reader's Score: 0**

2. (2) The adequacy of the management plan to achieve the objectives of the proposed project on time and within budget, including clearly defined responsibilities, timelines, and milestones for accomplishing project tasks.

**Strengths:**

n/a

**Weaknesses:**

n/a

**Reader's Score: 0**

3. (3) The applicant's capacity (e.g., in terms of qualified personnel, financial resources, or management capacity) to bring the proposed project to scale on a national or regional level (as defined in 34 CFR 77.1(c)) working directly, or through partners, during the grant period.

**Strengths:**

n/a

**Weaknesses:**

n/a

**Reader's Score: 0**

4. (4) The mechanisms the applicant will use to broadly disseminate information on its project so as to support further development or replication.

**Strengths:**

n/a

**Weaknesses:**

n/a

**Reader's Score: 0**

5. (5) The likely utility of the products (such as information, materials processes, or techniques) that will result from the proposed project, including the potential for their being used effectively in a variety of other settings.

**Strengths:**

n/a

**Weaknesses:**

n/a

**Reader's Score: 0**

**Selection Criteria - Quality of Project Design**

1. The Secretary considers the quality of the design of the proposed project. In determining the quality of the design of the proposed project, the Secretary considers the following factors:

Reader's Score: 0

Sub

1. (1) The extent to which there is a conceptual framework underlying the proposed research or demonstration activities and the quality of that framework.

Strengths:

n/a

Weaknesses:

n/a

Reader's Score: 0

2. (2) The extent to which the goals, objectives, and outcomes to be achieved by the proposed project are clearly specified and measurable.

Strengths:

n/a

Weaknesses:

n/a

Reader's Score: 0

3. (3) The extent to which the design of the proposed project is appropriate to, and will successfully address, the needs of the target population or other identified needs.

Strengths:

n/a

Weaknesses:

n/a

Reader's Score: 0

#### Selection Criteria - Quality of the Project Evaluation

1. The Secretary considers the quality of the evaluation to be conducted of the proposed project. In determining the quality of the evaluation, the Secretary considers the following factors:

Sub

1. (1) **The extent to which the methods of evaluation will, if well implemented, produce evidence about the project's effectiveness that would meet the What Works Clearinghouse standards without reservations as described in the What Works Clearinghouse Handbook (as defined in 34 CFR 77.1(c)).**

**Strengths:**

The research questions are clear and effectively distinguish between impact, implementation, mediation and moderation, and exploratory analyses. (e37-e38). These questions are especially worth noting here because the impact research questions appropriately respond to the applicant's proposed priorities (e.g., math student achievement, teacher math content knowledge, etc.) while providing primary data sources that should meet WWC standards without reservations. Further, the evaluation design (e38) proposes to randomly split 100 elementary schools into treatment and control groups using a block design conditioning on demographics and prior achievement levels. (e40) Randomization at the school level is a sensible decision given the program design to increase content knowledge for all grade teachers at treatment schools. In that vein, the decision to prioritize the confirmatory analysis as intent-to-treat is a valid one. (e41, e65) If implemented well, the design can meet WWC standards without reservations.

Evaluation outcomes (and mediators) are clearly aligned to the applicant's conceptual framework found in Appendix G. (e117) For example, educators are to change practices to reflect learning (short-term outcome) to support student understanding of math (medium-term outcome) to increase student math achievement (long-term outcome). (e112)

The power analysis is based on reasonable assumptions, (e.g., 3 teachers per school, 25 students per classroom [e63]), and includes differing minimum detectable effect sizes (MDES) for student achievement outcomes (0.11 to 0.12) and teacher instructional activities (0.28 to 0.32). These differences are reasonable given the differences in N sizes and other factors. They also recognize the nested nature of the study and account for students in classrooms in schools. (e63) They also astutely consider different levels of possible missing data to ensure they will have sufficient power. (e64)

The evaluators will use various measures of impact (39-e40) that seem responsive to program design and proposed project objectives (e28). The impact measures (student test scores, teacher self-efficacy, etc.) have face validity and are shown to have strong psychometric properties (e.g., teacher self-efficacy subscales have an Alpha greater than 0.87). (e39)

The evaluators appropriately distinguish between analytic models based on impact outcomes (e65-e66). Teacher impact measures will be analyzed with a two-level linear model that accounts for teachers nested within schools. Student impact outcomes will be analyzed with a three-level model that accounts for students nested within classrooms nested within schools. Control variables seem appropriate. The decision to use prior math achievement in student impact models should increase analytic precision. (e66) In addition, decisions to use the Benjamini-Hochberg method to address multiple comparisons and GPA as a continuous variable (tested with sensitivity analyses) seem appropriate.

The evaluators indicate the study school-wide random assignment reduces the likelihood of contamination, especially in comparison to teacher-level assignment. They also reference a previous RCT featuring NCDPI's support and indicate that they believe attrition will be minimal. NCDPI's presence should help with participant continuity. (e41) However, they continue to demonstrate their understanding of overall and differential attrition while continuing to maintain that based on their experience high levels of attrition are unlikely. (e41) Still, the evaluators justify and describe their response to missing data, indicating that they will conduct listwise deletion if levels of missing data do not exceed the WWC attrition threshold. If the missing data do exceed the WWC attrition threshold, the evaluators appropriately explain how they will conduct a multiple imputation strategy in response. (e68) Further, the evaluators state that joiners will not be included in the study. (e41) Taken together, these approaches will likely allow the proposed study to meet WWC standards without reservations and are strengths of the proposal.

**Sub**

**Weaknesses:**

The applicant has put forward a plan to provide Patterns to Grade 4 teachers. They have detailed this plan. They have argued that Grade 4 is pivotal for students to have the foundational mathematics knowledge going forward. They further state the importance of the intervention's "impact on student math achievement during the crucial 4th grade year." (e22-e23) Yet the evaluator has identified Grade 5 for the impact study. It is unclear if this is a point of confusion or disagreement, or if there is a reason that we should expect the impact to be delayed. However, on e38 the evaluators state that they will use the 4th Grade End-of-Grade Assessment, so perhaps the references to Grade 5 are just an oversight.

There is no discussion of establishing baseline equivalence. Although randomization should result in equivalence, testing for it for confirmation (and potential response if there is not equivalence) is important to establishing legitimacy to the evaluation and its ability to meet WWC standards without reservations.

**Reader's Score: 12**

**2. (2) The extent to which the evaluation will provide guidance about effective strategies suitable for replication or testing in other settings.**

**Strengths:**

The dissemination plan (e31) identifies a number of important groups of stakeholders to inform, including practitioners, policymakers, researchers, and funders. The project team has also thoughtfully considered various outlets, including journal articles and reports, conference presentations, webinars, and websites, as well as leveraging their own networks as well as those of their corporate sponsors. Further, all three organizations have substantial reach and various platforms that each anticipates leveraging. (e32) Evaluators have also developed a timeline to share research results through conferences and journal articles. (e61-e62)

The evaluators provide clear research questions on implementation, moderation, mediation, and exploration (e37-e38), which set the stage for analyses that can inform the project staff and the field about inhibitors and facilitators of program success, as well as impact other differences by subgroups. The applicant provides reasonable rationale about how moderator analysis will inform generalizability and appropriately note how this evaluation can be especially informative to surrounding states with similar student demographics. (e42) The potential moderators listed at the student (e.g., race/ethnicity), teacher (e.g., years teaching experience), and school (e.g., Title I status) levels are logical, as is the evaluators' choice to use the same analytic models noted above with the inclusion of interaction between moderators and impact outcomes. (e66). They further recognize the need to leverage the evaluation to identify deficiencies to make "corresponding improvements." (e43)

The evaluators underscore the importance of a cost analysis (e42) and appropriately provide citations to substantiate their understanding of models and methods (e.g., ingredient method) to conduct these analyses. Moreover, they underscore not only the importance of determining per-student costs but also the need to make up-to-date recommendations about and based on cost analysis. (e43) Usability and feasibility research (e44) can be leveraged to not only inform program development and administration but the field, as well, about appropriate and reasonable strategies to improve replication and testing in other settings.

**Weaknesses:**

There are no weaknesses noted.

**Reader's Score: 5**

**3. (3) The extent to which the evaluation plan clearly articulates the key project components, mediators, and outcomes, as well as a measurable threshold for acceptable implementation.**

## Sub

### Strengths:

As noted above, the research questions (e38) clearly distinguish between moderation, mediation, and implementation. In particular, the questions on implementation scaffold appropriately to account for the measurement of baseline levels of acceptable implementation as well as barriers and inhibitors for this project and subsequent efforts to scale.

The outcomes for the impact analysis are aligned with the proposed goals and employ valid and reliable measures (e43). The evaluators clearly understand mediators and have a number in place to test. They understandably will analyze for multiple mediating pathways and interrelationships among them with student outcomes, leveraging various model fit indices to do so. (e67) Further, the evaluators recognize the importance of implementation fidelity, highlighting various data sources (e.g., observations, interviews, logs, etc.) and indicating that thresholds will be established from the formative evaluation stages of their overall evaluation design. (e44)

### Weaknesses:

Despite the evaluators' recognition that implementation fidelity is critically important and their intention to develop implementation thresholds, not having implementation thresholds for a mid-phase proposal submission is concerning. Presumably, the intervention has been built on previous research literature and has, perhaps, already been developed and implemented in other contexts. The program staff and evaluator should likely already have a basic framework for what implementation fidelity thresholds could be with the possibility of adapting them based on prior research, instead of relying solely upon the formative research of this project. This seems especially notable when in the section on formative evaluation (e44, in particular), the evaluators indicate that the formative components are for new aspects of the program. Thus, many existing programmatic components should already have implementation fidelity thresholds (that could potentially be adjusted).

**Reader's Score: 3**

#### 4. (4) The extent to which the methods of evaluation will provide performance feedback and permit periodic assessment of progress toward achieving intended outcomes.

### Strengths:

The evaluators have committed 1.5 years of the proposed evaluation to a formative study that includes usability and feasibility components, along with implementation fidelity. (e44-e46) These components allow for scaffolding based on intensive and intentional research and response cadences, specifically for "new program components, features, and content." (e44) The research questions driving the usability and feasibility studies (e74-e75) are appropriate and answering them should result in improved programming. Further, the evaluators specifically intend to conduct these formative components while balancing participants on various factors, enabling the evaluators to better understand different perspectives. They also emphasize providing "actionable recommendations" (e45) to the programmer. They extend the feasibility component by noting that they will be able to make actionable recommendations throughout the year.

The evaluators indicate that they will provide "consistent, periodic feedback" (e46), as well as participate in bi-monthly calls about upcoming project goals and reviewing progress to date. The evaluators are collecting a considerable amount of varied data (e.g., interview, observation, document, and more) to be able to provide relevant feedback. The timeline to collect data is comprehensive (e57-e62), demonstrating their plan to conduct the evaluation clearly. They can take advantage of the considerable amount of implementation data collected to inform NCDPI and Carnegie about potential modifications and actions to take to improve the intervention and its delivery.

### Weaknesses:

The evaluators are collecting a considerable amount of survey and interview data to inform programmer design and practice. Yet, there is insufficient detail about the data analysis procedures to be confident that the learning will be systematic and that the findings will be practically meaningful for the program staff and other stakeholders. This is especially the case for qualitative data. Deductive and/or inductive coding of interview data could be leveraged to



**Sub**

make sense of findings. Details such as these, however, are missing from the proposal.

**Reader's Score: 4**

**Priority Questions**

**Competitive Preference Priority - Competitive Preference Priority 1**

**1. Competitive Preference Priority 1:**

**Promoting Equity in Student Access to Educational Resources and Opportunities: Implementers and Partners (up to 5 points)**

**Under this priority, an applicant must demonstrate how the project will be implemented by or in partnership with one or more of the following entities:**

- (a) Community colleges (as defined in the NIA)**
- (b) Historically Black colleges and universities (as defined in the NIA)**
- (c) Tribal Colleges and Universities (as defined in the NIA)**
- (d) Minority-serving institutions (as defined in the NIA)**

**Strengths:**

n/a

**Weaknesses:**

n/a

**Reader's Score: 0**

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**Status:** Submitted

**Last Updated:** 08/15/2023 02:24 PM

Status: Submitted

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## Technical Review Coversheet

Applicant: N.C. Department of Public Instruction (S411B230035)

Reader #2: \*\*\*\*\*

	Points Possible	Points Scored
<b>Questions</b>		
<b>Selection Criteria</b>		
<b>Significance</b>		
1. Significance	15	15
<b>Strategy to Scale</b>		
1. Strategy to Scale	40	30
<b>Quality of Project Design</b>		
1. Project Design	15	12
<b>Quality of the Project Evaluation</b>		
1. Project Evaluation	30	0
<b>Sub Total</b>	100	57
<b>Priority Questions</b>		
<b>Competitive Preference Priority</b>		
<b>Competitive Preference Priority 1</b>		
1. Promoting Equity	5	1
<b>Sub Total</b>	5	1
<b>Total</b>	105	58

# Technical Review Form

Panel #4 - EIR Mid-phase - 4: 84.411B

Reader #2: \*\*\*\*\*

Applicant: N.C. Department of Public Instruction (S411B230035)

## Questions

### Selection Criteria - Significance

1. The Secretary considers the significance of the proposed project. In determining the significance of the proposed project, the Secretary considers the following factors:

Reader's Score: 15

#### Sub

1. The extent to which the proposed project involves the development or demonstration of promising new strategies that build on, or are alternatives to, existing strategies.

#### Strengths:

The proposed project has an excellent promise for building on prior work on the use of their approach to professional learning called "Patterns" (e26). They have conducted three prior studies showing the intervention leads to increased teacher subject matter knowledge in mathematics (e25-26). In the present work they plan to extend the development of the approach by delivering it virtually to rural high need student populations and establish its efficacy in a randomized control trial (RCT) study (e17, 26).

#### Weaknesses:

No weaknesses noted.

Reader's Score: 15

### Selection Criteria - Strategy to Scale

1. The Secretary considers the strategy to scale the proposed project. In determining the quality of the design of the proposed project, the Secretary considers the following factors:

Reader's Score: 30

#### Sub

1. (1) The extent to which the applicant identifies a specific strategy or strategies that address a particular barrier or barriers that prevented the applicant, in the past, from reaching the level of scale that is proposed in the application.

#### Strengths:

The applicant does a very good job connecting strategies to particular barriers which have prevented them previously from reaching scale (e26-27). For example, they note that teachers have time constraints, especially in

**Sub**

rural schools (e26). To address this, they have proposed the present professional learning approach which will make use of both synchronous and asynchronous sessions for maximum flexibility (e26-27). They also suggest that cost has been a significant factor in delivering face-to-face professional development due to travel and venue costs, and that geographical distance limits the number of teachers available at each session (e27). They address this by suggesting the virtual delivery format (e27).

**Weaknesses:**

It is unclear from the context provided on e26-27 whether the cited barriers are actual observations from prior implementation of the project or from rural contexts in general and how these barriers limited the scale in the prior implementations.

**Reader's Score: 8**

**2. (2) The adequacy of the management plan to achieve the objectives of the proposed project on time and within budget, including clearly defined responsibilities, timelines, and milestones for accomplishing project tasks.**

**Strengths:**

The management plan is excellent and should help the project team to accomplish its objectives on time and within budget. The plan includes two sufficiently detailed tables showing in the first table the three project objectives, 11 milestones, five-year timeline, responsible entities (e28) and in the second table 27 performance measures, 47 activities, start dates and end dates, and specific staff responsible (e57-62). Another table shows the key personnel and their specific responsibilities (e30-31).

**Weaknesses:**

No weaknesses noted.

**Reader's Score: 5**

**3. (3) The applicant's capacity (e.g., in terms of qualified personnel, financial resources, or management capacity) to bring the proposed project to scale on a national or regional level (as defined in 34 CFR 77.1(c)) working directly, or through partners, during the grant period.**

**Strengths:**

The applicant and its partners have a very good capacity for bringing the project to scale at a regional level. Most of the personnel and all of the project managers are very qualified and have appropriate experience in similar relevant projects. For example, the lead for NCDPI staff and partner relationships is a former teacher, faculty member in a teacher preparation program, and assistant dean in the college of education, with experience in research and evaluation, assessment, and strategic planning and program development (e30). The research lead is a Senior Director of STEM Research and Entrepreneurship and brings decades of experience managing large-scale research projects and grants (e30).

The budget justification shows a number of appropriate allocations of resources and sufficient levels of effort, like 1.00 FTE for the Program Manager (e180) and most of the research team over 15% committed. The contractor has already delivered prior instantiations of the intervention to over 5,000 teachers in 19 states.

**Weaknesses:**

The proposal would have been strengthened by more inclusion of teachers as co-creators or advisors in the development of the professional learning. Having teachers more involved would lend credibility and help the project to scale more effectively on a regional or national level. Similarly, with teachers involved in the development,

**Sub**

feedback about design considerations could be more easily solicited and potential speed bumps or new barriers would be minimized.

For the staff to be hired (e.g., e180, 185) it is unclear what qualifications will be required to help fulfill the objectives of the project

It is unclear what the role of Bennett College is in the proposed work (e17,175).

**Reader's Score: 8**

**4. (4) The mechanisms the applicant will use to broadly disseminate information on its project so as to support further development or replication.**

**Strengths:**

The applicant proposes a number of good dissemination mechanisms to inform various audiences about their results. For example, the applicant proposes to present their research findings at professional research conferences and publish their findings (e31,61-62). This includes professional societies for math teachers, chief state school officers, and superintendents (e31-32). The three partners plan on using all of their existing communication networks such as listservs and social media accounts to describe the project and its findings (e31-32). The professional learning contractor plans on continuing to refine and deliver this intervention, using what is learned here for continued replication (e32). All of these dissemination avenues and target populations are appropriate to the purposes of the project and could foster further development and replication.

**Weaknesses:**

There is little discussion in the narrative about how they anticipate others could replicate the grant. The dissemination makes no mention of providing the materials to others-- via a website or other means. What this means is that the intervention is limited in its further development or replication unless others contract or partner with the specific professional learning contractor involved in this project.

**Reader's Score: 7**

**5. (5) The likely utility of the products (such as information, materials processes, or techniques) that will result from the proposed project, including the potential for their being used effectively in a variety of other settings.**

**Strengths:**

If the intervention has success in its virtual delivery approach, this has potential to provide best practices and lessons learned for others wishing to do similar approaches (e33).

**Weaknesses:**

The proposal would have been strengthened by strategies which allow for open-source and wide use of the curriculum and materials. This is a major flaw in the utility of the products resulting from this project. Anyone wanting to conduct a similar intervention would be able to mimic the features but would have to develop their own sets of materials.

The proposal would have been strengthened by more fully describing how information about the programs, project design, and lessons learned would be provided to those wanting to use the products (such as a best practice guide).

Sub

Reader's Score: 2

### Selection Criteria - Quality of Project Design

1. The Secretary considers the quality of the design of the proposed project. In determining the quality of the design of the proposed project, the Secretary considers the following factors:

Reader's Score: 12

Sub

1. (1) The extent to which there is a conceptual framework underlying the proposed research or demonstration activities and the quality of that framework.

#### Strengths:

The conceptual framework is good. For example, the applicant has outlined the framework by providing a logic model which includes the inputs, primary components, and short-, medium-, and long-term outcomes. They include two studies that showed that well-designed professional development led to changes in instructional strategies and improvements on standardized math assessments-- which are two of the desired outcomes in the logic model (e206-207). They provide a table on page e34 outlining numerous studies used in developing some of the program's underlying features such as use of mathematical discourse, one-on-one coaching, and use of asynchronous learning.

#### Weaknesses:

The proposal lists the various components of the professional learning approach but provides few citations and little basis for the choice of some components such as "problem solving in a learner-centered environment," "exposure to a wide variety of instructional strategies," and "memorable 'aha' moments" (e24-25). Other research such as Joyce and Showers (2002) is outdated and may not be relevant to today's classrooms, especially post-pandemic.

The applicant states that the intervention will increase teachers' self-efficacy (e17,33), preparedness (e33), and empathy (e112) yet there is little research rationale behind these assumptions.

Reader's Score: 3

2. (2) The extent to which the goals, objectives, and outcomes to be achieved by the proposed project are clearly specified and measurable.

#### Strengths:

The goals, objectives, and outcomes are excellent. The aims as described on e35 and the three objectives as shown on e28 are clearly specified and are sufficiently measurable, as shown by the 27 performance measures (e57-62). Specific paper-based measures for many objectives are also given in the evaluation plan (e37-38, 39-40, 69-75).

#### Weaknesses:

No weaknesses noted.

Reader's Score: 5

3. (3) The extent to which the design of the proposed project is appropriate to, and will

**Sub**

**successfully address, the needs of the target population or other identified needs.**

**Strengths:**

The program design for meeting the needs of its targeted population is very good. The proposal sufficiently details many student and teacher needs. For students, they identify the need among economically disadvantaged minorities to gain stronger mathematical foundations (e18), as evidenced by black and Hispanic students in the state scoring very low on NAEP math assessments (e19).

They suggest addressing the student needs by providing enhanced teacher professional learning (e36-37). But to do so, they state that the teachers themselves have several needs such as enhanced access to professional learning and lower costs for scalability (e36). This project will address these teacher needs with virtual professional learning sessions, synchronous and asynchronous sessions, and one-on-one coaching.

Taken together, the design outlined here is appropriate to sufficiently address many of the identified target needs.

**Weaknesses:**

The applicant claims that their state has high turnover and large numbers of open teaching positions and underqualified teachers, and that elementary teachers have very little mathematics teaching background, but the narrative does not fully provide relevant statistics or citations to back up these assertions (e20-21).

The applicant asserts that teachers need greater self-efficacy in math subject matter (e21,22) as well as empathy toward students (e112) but does not fully describe the rationale behind these assertions. As such it is difficult to determine if the project design will meet these needs.

**Reader's Score: 4**

**Selection Criteria - Quality of the Project Evaluation**

- 1. The Secretary considers the quality of the evaluation to be conducted of the proposed project. In determining the quality of the evaluation, the Secretary considers the following factors:**

**Reader's Score: 0**

**Sub**

- 1. (1) The extent to which the methods of evaluation will, if well implemented, produce evidence about the project's effectiveness that would meet the What Works Clearinghouse standards without reservations as described in the What Works Clearinghouse Handbook (as defined in 34 CFR 77.1(c)).**

**Strengths:**

**Weaknesses:**

**Reader's Score:**

Sub

2. (2) The extent to which the evaluation will provide guidance about effective strategies suitable for replication or testing in other settings.

Strengths:

Weaknesses:

Reader's Score:

3. (3) The extent to which the evaluation plan clearly articulates the key project components, mediators, and outcomes, as well as a measurable threshold for acceptable implementation.

Strengths:

Weaknesses:

Reader's Score:

4. (4) The extent to which the methods of evaluation will provide performance feedback and permit periodic assessment of progress toward achieving intended outcomes.

Strengths:

Weaknesses:

Reader's Score:

### Priority Questions

#### Competitive Preference Priority - Competitive Preference Priority 1

##### 1. Competitive Preference Priority 1:

**Promoting Equity in Student Access to Educational Resources and Opportunities: Implementers and Partners (up to 5 points)**

Under this priority, an applicant must demonstrate how the project will be implemented by or in partnership with one or more of the following entities:

- (a) Community colleges (as defined in the NIA)
- (b) Historically Black colleges and universities (as defined in the NIA)
- (c) Tribal Colleges and Universities (as defined in the NIA)
- (d) Minority-serving institutions (as defined in the NIA)



**Strengths:**

(Option B) The applicant mentions 3 years of internships from Bennett College, which is an HBCU (e17). They state that these internships will allow students to get valuable experience with education and research companies, which could lead to important connections and interest in related fields for their career (e17).

**Weaknesses:**

The partnership is not listed in the project abstract or anywhere in the narrative. The only mention of Bennett College is on the first page (e17) and in the letters of commitment (e175). The role of Bennett College is not clarified otherwise.

**Reader's Score:** 1

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**Status:** Submitted  
**Last Updated:** 08/15/2023 11:53 AM

Status: Submitted

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## Technical Review Coversheet

Applicant: N.C. Department of Public Instruction (S411B230035)

Reader #3: \*\*\*\*\*

	Points Possible	Points Scored
<b>Questions</b>		
<b>Selection Criteria</b>		
<b>Significance</b>		
1. Significance	15	0
<b>Strategy to Scale</b>		
1. Strategy to Scale	40	0
<b>Quality of Project Design</b>		
1. Project Design	15	0
<b>Quality of the Project Evaluation</b>		
1. Project Evaluation	30	22
<b>Sub Total</b>	100	22
<b>Priority Questions</b>		
<b>Competitive Preference Priority</b>		
<b>Competitive Preference Priority 1</b>		
1. Promoting Equity	5	0
<b>Sub Total</b>	5	0
<b>Total</b>	105	22

# Technical Review Form

Panel #4 - EIR Mid-phase - 4: 84.411B

Reader #3: \*\*\*\*\*

Applicant: N.C. Department of Public Instruction (S411B230035)

## Questions

### Selection Criteria - Significance

1. The Secretary considers the significance of the proposed project. In determining the significance of the proposed project, the Secretary considers the following factors:

Reader's Score: 0

#### Sub

1. The extent to which the proposed project involves the development or demonstration of promising new strategies that build on, or are alternatives to, existing strategies.

**Strengths:**

N/A

**Weaknesses:**

N/A

Reader's Score: 0

### Selection Criteria - Strategy to Scale

1. The Secretary considers the strategy to scale the proposed project. In determining the quality of the design of the proposed project, the Secretary considers the following factors:

Reader's Score: 0

#### Sub

1. (1) The extent to which the applicant identifies a specific strategy or strategies that address a particular barrier or barriers that prevented the applicant, in the past, from reaching the level of scale that is proposed in the application.

**Strengths:**

N/A

**Weaknesses:**

N/A

**Sub**

**Reader's Score: 0**

2. (2) The adequacy of the management plan to achieve the objectives of the proposed project on time and within budget, including clearly defined responsibilities, timelines, and milestones for accomplishing project tasks.

**Strengths:**

N/A

**Weaknesses:**

N/A

**Reader's Score: 0**

3. (3) The applicant's capacity (e.g., in terms of qualified personnel, financial resources, or management capacity) to bring the proposed project to scale on a national or regional level (as defined in 34 CFR 77.1(c)) working directly, or through partners, during the grant period.

**Strengths:**

N/A

**Weaknesses:**

N/A

**Reader's Score: 0**

4. (4) The mechanisms the applicant will use to broadly disseminate information on its project so as to support further development or replication.

**Strengths:**

N/A

**Weaknesses:**

N/A

**Reader's Score: 0**

5. (5) The likely utility of the products (such as information, materials processes, or techniques) that will result from the proposed project, including the potential for their being used effectively in a variety of other settings.

**Strengths:**

N/A

**Weaknesses:**

N/A

**Reader's Score: 0**

**Selection Criteria - Quality of Project Design**

1. The Secretary considers the quality of the design of the proposed project. In determining the quality of the design of the proposed project, the Secretary considers the following factors:

Reader's Score: 0

Sub

1. (1) The extent to which there is a conceptual framework underlying the proposed research or demonstration activities and the quality of that framework.

Strengths:

N/A

Weaknesses:

N/A

Reader's Score: 0

2. (2) The extent to which the goals, objectives, and outcomes to be achieved by the proposed project are clearly specified and measurable.

Strengths:

N/A

Weaknesses:

N/A

Reader's Score: 0

3. (3) The extent to which the design of the proposed project is appropriate to, and will successfully address, the needs of the target population or other identified needs.

Strengths:

N/A

Weaknesses:

N/A

Reader's Score: 0

#### Selection Criteria - Quality of the Project Evaluation

1. The Secretary considers the quality of the evaluation to be conducted of the proposed project. In determining the quality of the evaluation, the Secretary considers the following factors:

## Sub

1. (1) The extent to which the methods of evaluation will, if well implemented, produce evidence about the project's effectiveness that would meet the What Works Clearinghouse standards without reservations as described in the What Works Clearinghouse Handbook (as defined in 34 CFR 77.1(c)).

**Strengths:**

The overall evaluation design is very good approach to study the effectiveness of the project on teacher and student outcomes. The applicant proposes to use a randomized controlled trial that compares outcomes between a treatment and control group, and this design is eligible for the What Works Clearinghouse (WWC) standards without reservations if implemented well. The design includes the use of placing schools into "blocks" of similar schools based on school-level demographic characteristics and achievement outcomes before randomization (e40), and this method is an acceptable strategy for increasing the likelihood of a successful randomization that can demonstrate baseline equivalence (e40). In addition to using the blocking method, the application will still include student characteristics and prior student achievement as covariates in the statistical models to account for any remaining baseline differences (e65). The applicant takes care to explain the business-as-usual comparison condition to distinguish it from the treatment condition (e41). Schools in the business-as-usual comparison condition will be offered the treatment in the second year of the impact study, and during the first year they are expected to only participate in professional learning and instruction typically offered that does not include the Patterns treatment. The applicant discusses the use of an intent to treat analysis to maintain the assignment to condition and will be able to track student enrollment within each participating school with the collection of the school rosters and will also have access to statewide student data due to the applicant's access to statewide testing and student demographic data. The applicant explains that students who join the schools after randomization will not be included in the impact analyses, which is a strong strategy for eliminating the risk of bias from joiners. The student outcome meets the WWC requirements for a valid and reliable measure since it is a state standardized assessment in mathematics (the North Carolina 4th Grade End-of-Grade Assessment) (e38). The outcome measures that will be used to test for effects on teacher mathematics content knowledge and teacher self-efficacy also meet the WWC requirements for valid and reliable measures since they are measures of the intended construct and have reliabilities of at least 0.72 and 0.87, respectively, and have been validated in prior studies (e39). The sample size is expected to be sufficiently large enough to yield a minimum detectable effect size of 0.11 to 0.12 for student outcomes and 0.28 to 0.32 for teacher outcomes as justified by a detailed power analysis (e38, e63). Within the 100 schools, the applicant assumes at least 300 teachers will participate along with their 7,500 students. The statistical models use hierarchical modeling to appropriately account for clustering effects (e65). Missing data procedures are consistent with WWC expectations (e67-e68). An independent evaluator will conduct the impact evaluation, and this allows for impartiality of the findings (e37). Taken together, these approaches will likely allow the proposed study to meet WWC standards without reservations and are strengths of the proposal.

**Weaknesses:**

Discrepancies are made throughout the proposal regarding the grade level of the students served and the assessment being used as the outcome. In some places, the grade level is identified as grade 4 (e35) and in others grade 5 (e37). In the appendix (e66), an Algebra assessment outcome is discussed which is not aligned to this project. The applicant proposes to use several subscales from an existing survey of teachers' sense of preparedness but does not provide reliability information to demonstrate that the reliability standard is met, and further information is needed to demonstrate that this pre-service survey is valid for in-service teachers (e39). It is suggested that items will be drawn from existing surveys for teacher outcomes, but no reliabilities are given for these new groupings of items and whether the subscales are reliable enough to serve as outcomes. Additional details on the procedures that will be used to conduct the blocking prior to randomization would allow for a determination of whether these procedures are sound (for example, how many blocks will be used and how blocks will be accounted for in the statistical models). Attrition is expected to be low by the applicant but there are reasons to expect otherwise when the outcome is collected through participation and not administrative data. Teacher participation in surveys, interviews, and observations is voluntary (e10), and no stipends are included in the budget. Therefore, it may be that school-level attrition is likely to be much higher because principals may not have the

**Sub**

support of teachers to conduct this extra work without stipends. This may result in differential school attrition that could lead to the study not being eligible to meet the WWC standards without reservations.

**Reader's Score:** 11

**2. (2) The extent to which the evaluation will provide guidance about effective strategies suitable for replication or testing in other settings.**

**Strengths:**

The applicant proposes an evaluation that will provide excellent guidance about effective strategies suitable for replication in schools with diverse student populations from both rural and non-rural settings. A set of 11 clearly worded research questions provide a solid framework for communicating the purpose of the evaluation and its findings (e37-e38). Impact analyses include student achievement outcome measures and teacher content knowledge measures, both of which are rigorous and relevant to a national audience focused on improving mathematics teaching and learning (e37). Other research questions seek to find answers regarding mediating and moderating effects and whether the effects of the intervention continue in the year after treatment (e38), and these are also important questions that will inform decisions related to replicating or testing in other settings. For example, moderation analyses will test whether the effects of the treatment are moderated by student, teacher, or school characteristics (e42) and mediation analyses will test whether implementation and instructional practices mediate student achievement in mathematics. At least 50 percent of the schools will be from rural settings, and schools will be selected to maximize generalizability (e9). The focus is on selecting schools with higher-than-average poverty rates and teacher turnover and this will inform other school leaders with similar challenges (e20). Data that will be used to share implementation context will be collected from teacher participation in training, observations, interviews, and teacher logs (e44) which allows for multiple data sources that can be triangulated. Detailed information is provided on the methods that will be used to conduct a cost analysis (e42). The applicant provides evidence to demonstrate that disseminating the findings of this project and the impact study will be a priority. Proposed dissemination strategies include presenting findings at national research and practitioner conferences (such as the American Educational Research Association and the National Council of Teachers of Mathematics), publishing the results in peer-reviewed journals (for example, Education Researcher), engaging the public using social media, and working through the Council of Chief State School Officers to share promising strategies with other state policymakers who are seeking successful strategies for improving mathematics (e32).

**Weaknesses:**

No weaknesses noted.

**Reader's Score:** 5

**3. (3) The extent to which the evaluation plan clearly articulates the key project components, mediators, and outcomes, as well as a measurable threshold for acceptable implementation.**

**Strengths:**

The applicant provides a good description of the key project components, potential mediators, and expected outcomes in the logic model (e112) and the proposal narrative. The evaluation plan is designed to measure the impact of the key components on both teacher and student outcomes—teacher content knowledge, teacher self-efficacy, teacher preparedness, effective instructional strategies, and student math achievement (e22). The applicant identifies plans to test the mediating effect of the intermediate outcomes identified in the logic model (such as new instructional strategies, student engagement, and teacher knowledge) on student achievement using structural equation modeling (e67), which will allow for an understanding of whether specific interrelationships exist among the key components and their targeted outcomes.

**Sub**

**Weaknesses:**

The applicant does not provide measurable thresholds for acceptable implementation for the key project components. They will be developed during the formative evaluation phase of the project (e44). Therefore, the threshold(s) for acceptable implementation could not be evaluated. There are some details related to the measurement of the mediators that are not clear. For example, it is not clear how student engagement will be operationalized and measured because it is not discussed, nor how a fidelity threshold will be used as a mediator since it is yet to be defined.

**Reader's Score:** 3

**4. (4) The extent to which the methods of evaluation will provide performance feedback and permit periodic assessment of progress toward achieving intended outcomes.**

**Strengths:**

The applicant proposes a good plan for the development of the intervention with usability, feasibility, and implementation studies. These studies allow for many of the implementation issues to be resolved prior to the start of the impact study. The usability study will test the new online program components, and the findings from this study will allow the project team to improve the content iteratively based on teacher feedback (e45). The feasibility study will inform the project team on whether teachers are able to translate what they learn into practice after data from teacher interviews and observations are analyzed. Finally, the implementation study will examine and report on a mini trial of the treatment prior to the full impact study to resolve any final issues that may impede the impact study. Throughout these activities, the evaluation and project team will hold bimonthly calls to discuss the project status (e46), and this seems reasonable assuming the interpretation is twice a month.

**Weaknesses:**

The applicant does not provide sufficient detail on how the qualitative and quantitative data will be analyzed to provide "actionable recommendations" (e45-e46). It is not clear what performance feedback will be provided during the impact evaluation because it is not explained. There are many activities that must be monitored and reported on during an impact study related to recruiting and maintaining the randomized sample and measuring fidelity of implementation, and these are not discussed with much detail in the proposal.

**Reader's Score:** 3

**Priority Questions**

**Competitive Preference Priority - Competitive Preference Priority 1**

**1. Competitive Preference Priority 1:**

**Promoting Equity in Student Access to Educational Resources and Opportunities: Implementers and Partners (up to 5 points)**

**Under this priority, an applicant must demonstrate how the project will be implemented by or in partnership with one or more of the following entities:**

- (a) Community colleges (as defined in the NIA)**
- (b) Historically Black colleges and universities (as defined in the NIA)**
- (c) Tribal Colleges and Universities (as defined in the NIA)**
- (d) Minority-serving institutions (as defined in the NIA)**

**Strengths:**

N/A



**Weaknesses:**

N/A

**Reader's Score:**     **0**

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**Status:**           Submitted

**Last Updated:**   08/15/2023 11:54 AM

Status: Submitted

Last Updated: 08/15/2023 03:37 PM

## Technical Review Coversheet

Applicant: N.C. Department of Public Instruction (S411B230035)

Reader #4: \*\*\*\*\*

	Points Possible	Points Scored
<b>Questions</b>		
<b>Selection Criteria</b>		
<b>Significance</b>		
1. Significance	15	15
<b>Strategy to Scale</b>		
1. Strategy to Scale	40	36
<b>Quality of Project Design</b>		
1. Project Design	15	14
<b>Quality of the Project Evaluation</b>		
1. Project Evaluation	30	0
<b>Sub Total</b>	100	65
<b>Priority Questions</b>		
<b>Competitive Preference Priority</b>		
<b>Competitive Preference Priority 1</b>		
1. Promoting Equity	5	3
<b>Sub Total</b>	5	3
<b>Total</b>	105	68

# Technical Review Form

Panel #4 - EIR Mid-phase - 4: 84.411B

Reader #4: \*\*\*\*\*

Applicant: N.C. Department of Public Instruction (S411B230035)

## Questions

### Selection Criteria - Significance

1. The Secretary considers the significance of the proposed project. In determining the significance of the proposed project, the Secretary considers the following factors:

Reader's Score: 15

#### Sub

1. The extent to which the proposed project involves the development or demonstration of promising new strategies that build on, or are alternatives to, existing strategies.

#### Strengths:

The applicant clearly demonstrates the use of promising new strategies related to immersive professional learning for elementary mathematics teachers utilizing the Patterns professional learning structure. These new strategies are based on and build on existing strategies. The new strategies include transitioning Patterns resources to a digital medium in order to provide virtual professional learning, establishing learning cohorts, and on-demand teacher coaching.

#### Weaknesses:

None noted.

Reader's Score: 15

### Selection Criteria - Strategy to Scale

1. The Secretary considers the strategy to scale the proposed project. In determining the quality of the design of the proposed project, the Secretary considers the following factors:

Reader's Score: 36

#### Sub

1. (1) The extent to which the applicant identifies a specific strategy or strategies that address a particular barrier or barriers that prevented the applicant, in the past, from reaching the level of scale that is proposed in the application.

#### Strengths:

The applicant identified limited time for in-person professional development as a barrier, which will be addressed by a combination of synchronous and asynchronous engagement for teachers across broader geographic areas along

**Sub**

with access to on-demand 1:1 coaching. (e26) Additionally, costs associated with delivering face-to-face professional development at scale is an identified barrier that will be addressed with this proposed blended learning model. (e27)

**Weaknesses:**

The applicant identified educators resorting to implementing new strategies in isolation as a barrier. However, it is not clear how this barrier has prevented the applicant, in the past, from reaching the scale proposed in the application.

**Reader's Score: 9**

**2. (2) The adequacy of the management plan to achieve the objectives of the proposed project on time and within budget, including clearly defined responsibilities, timelines, and milestones for accomplishing project tasks.**

**Strengths:**

The applicant provides both a quarterly and annual timeline for identified objectives with multiple corresponding milestones and a responsible organization. (e28). Responsibilities of key personnel, along with their relevant training or experience, are detailed. (e30-31). Additionally, a detailed project timeline and management plan that includes performance measures, activities, responsible staff, and start/end dates are provided in appendix J.3, (e57-e62) Thus the applicant has developed a management plan that, implemented with fidelity, would likely accomplish project tasks on time and within budget.

**Weaknesses:**

None noted.

**Reader's Score: 5**

**3. (3) The applicant's capacity (e.g., in terms of qualified personnel, financial resources, or management capacity) to bring the proposed project to scale on a national or regional level (as defined in 34 CFR 77.1(c)) working directly, or through partners, during the grant period.**

**Strengths:**

The project involves highly qualified personnel from WestEd and Carnegie Learning (e29-e31). The teams have previously worked on state-level projects that are equivalent in scale to the proposed project and/or have significant educational leadership experience. For example, Carnegie's Chief Services Officer brings 10 years of educational leadership experiences focused on professional learning (e88) and the NCDPI Section Chief brings more than 20 years of education leadership experience. (e83-84) The support of these key personnel indicates that the applicant likely has the capacity to bring the project to scale (i.e., 100 total schools, 60 rural schools, e117).

**Weaknesses:**

The applicant does not detail the qualifications of the staff to be hired.

**Reader's Score: 9**

**4. (4) The mechanisms the applicant will use to broadly disseminate information on its project so as to support further development or replication.**

**Strengths:**

Plans to disseminate findings appropriately target a range of audiences including research, policy, and practitioner audiences. The mechanisms include presentations at national research and education conferences and publishing

**Sub**

in peer-reviewed journals. The communication networks of partners (i.e., WestEd, Carnegie Learning) will be leveraged to distribute findings via blog, bulletins, articles, and partner websites. (e31-32) Additionally, the applicant lists dissemination of findings as an objective and will leverage tools, including social media and newsletters, to support further development and replication.

**Weaknesses:**

The proposal could be strengthened by discussing in more detail mechanisms for disseminating findings to academic math journals.

**Reader's Score:** 9

5. (5) **The likely utility of the products (such as information, materials processes, or techniques) that will result from the proposed project, including the potential for their being used effectively in a variety of other settings.**

**Strengths:**

The applicant will publish research articles, blogs, bulletins, and newsletters regarding the proposed project that are likely to be useful to the target audience. (e31-32).

**Weaknesses:**

The proposal could be strengthened by discussing the professional development materials developed from the project and their likely utility in a variety of other settings.

**Reader's Score:** 4

**Selection Criteria - Quality of Project Design**

1. **The Secretary considers the quality of the design of the proposed project. In determining the quality of the design of the proposed project, the Secretary considers the following factors:**

**Reader's Score:** 14

**Sub**

1. (1) **The extent to which there is a conceptual framework underlying the proposed research or demonstration activities and the quality of that framework.**

**Strengths:**

The applicant provides a comprehensive conceptual framework for all components that will comprise the Pattern professional learning approach (e34). Mathematical discourse and connection sessions, on-demand 1:1 coaching, information tracking, and asynchronous coursework are supported by empirical evidence. The components support increasing teachers' self-efficacy with mathematics subject matter, sense of preparedness, and math knowledge for teaching in order to increase student learning and mastery of mathematics content as presented in the theory of action. (e112)

**Weaknesses:**

None noted.

**Reader's Score:** 5

Sub

2. (2) The extent to which the goals, objectives, and outcomes to be achieved by the proposed project are clearly specified and measurable.

**Strengths:**

The objectives, and outcomes are clearly specified and measurable (e28, e112). For example, in objective 1, the applicant intends to create and test strategies to enhance adoption and use of Patterns. This is directly aligned to milestones (i.e., to integrate materials into a digital environment) and short-term outcomes (i.e., increased access to coursework and coaching resources). (e30)

**Weaknesses:**

The applicant provides curricular goals (e20), but goals for achieving the objectives and outcomes of the project are not provided.

Reader's Score: 4

3. (3) The extent to which the design of the proposed project is appropriate to, and will successfully address, the needs of the target population or other identified needs.

**Strengths:**

The proposed project successfully addresses the needs of the target population. The professional learning will address the content and pedagogical needs of elementary mathematics educators whose access to professional learning is constrained by time, cost and/or location, leading ultimately to improved teaching and learning outcomes for the high needs students that they serve. (e36)

**Weaknesses:**

None noted.

Reader's Score: 5

**Selection Criteria - Quality of the Project Evaluation**

1. The Secretary considers the quality of the evaluation to be conducted of the proposed project. In determining the quality of the evaluation, the Secretary considers the following factors:

Reader's Score: 0

Sub

1. (1) The extent to which the methods of evaluation will, if well implemented, produce evidence about the project's effectiveness that would meet the What Works Clearinghouse standards without reservations as described in the What Works Clearinghouse Handbook (as defined in 34 CFR 77.1(c)).

**Strengths:**

**Weaknesses:**

Sub

Reader's Score:

2. (2) The extent to which the evaluation will provide guidance about effective strategies suitable for replication or testing in other settings.

Strengths:

Weaknesses:

Reader's Score:

3. (3) The extent to which the evaluation plan clearly articulates the key project components, mediators, and outcomes, as well as a measurable threshold for acceptable implementation.

Strengths:

Weaknesses:

Reader's Score:

4. (4) The extent to which the methods of evaluation will provide performance feedback and permit periodic assessment of progress toward achieving intended outcomes.

Strengths:

Weaknesses:

Reader's Score:

## Priority Questions

### Competitive Preference Priority - Competitive Preference Priority 1

#### 1. Competitive Preference Priority 1:

**Promoting Equity in Student Access to Educational Resources and Opportunities: Implementers and Partners (up to 5 points)**

Under this priority, an applicant must demonstrate how the project will be implemented by or in partnership with one or more of the following entities:

- (a) Community colleges (as defined in the NIA)
- (b) Historically Black colleges and universities (as defined in the NIA)
- (c) Tribal Colleges and Universities (as defined in the NIA)
- (d) Minority-serving institutions (as defined in the NIA)

**Strengths:**

The applicant meets this competitive preference priority through partnership with Bennett College (option (b) in the CPP) in order to establish education and research internships with Carnegie Learning and WestEd in support of the proposed project.

**Weaknesses:**

The proposal lacks specificity on the responsibilities of Bennett College. A thorough discussion of the internships and how they support the goals and objectives of the project would strengthen the proposal.

**Reader's Score:**     **3**

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**Status:**           Submitted

**Last Updated:**   08/15/2023 03:37 PM



Status: Submitted

Last Updated: 08/15/2023 05:33 PM

## Technical Review Coversheet

**Applicant:** N.C. Department of Public Instruction (S411B230035)

**Reader #6:** \*\*\*\*\*

	Points Possible	Points Scored
<b>Questions</b>		
<b>Selection Criteria</b>		
<b>Significance</b>		
1. Significance	15	12
<b>Strategy to Scale</b>		
1. Strategy to Scale	40	31
<b>Quality of Project Design</b>		
1. Project Design	15	12
<b>Quality of the Project Evaluation</b>		
1. Project Evaluation	30	0
<b>Sub Total</b>	100	55
<b>Priority Questions</b>		
<b>Competitive Preference Priority</b>		
<b>Competitive Preference Priority 1</b>		
1. Promoting Equity	5	1
<b>Sub Total</b>	5	1
<b>Total</b>	105	56

# Technical Review Form

Panel #4 - EIR Mid-phase - 4: 84.411B

Reader #6: \*\*\*\*\*

Applicant: N.C. Department of Public Instruction (S411B230035)

## Questions

### Selection Criteria - Significance

1. The Secretary considers the significance of the proposed project. In determining the significance of the proposed project, the Secretary considers the following factors:

Reader's Score: 12

#### Sub

1. The extent to which the proposed project involves the development or demonstration of promising new strategies that build on, or are alternatives to, existing strategies.

#### Strengths:

The project focuses on one specific grade (4th) in math which is a strength as student variations and specific emphases in each grade level can vary significantly, particularly at this grade level, with the start of important accelerating conceptual content in math. This program has promise to build a strong platform to build teacher knowledge and efficacy in math with a targeted program that has promise to yield focused and thus reliable and useful results (e14). A project strength is the development of a strong and robust professional development program targeting math by building upon existing components of the ongoing program at Carnegie (e17). Forty teachers will be engaged initially, then expanding later to 300 teachers, 7,500 students in 100 elementary schools in the RCT phase, building out a promising strategy for professional development in the area of math (e17). A notable overall strength is the focus on professional development in a teacher-focused environment in a continuous cycle that affords teachers flexibility and accessibility via a virtual environment.

#### Weaknesses:

Mixing asynchronous and synchronous (face to face) learning can be effective but it was not clear to what extent this would be innovative since a lot of learning in college and in other professional development communities has become virtual. Other proposed strategies such as coaching and collaboration have also been used extensively and could be considered more of a standard part of professional development.

Reader's Score: 12

### Selection Criteria - Strategy to Scale

1. The Secretary considers the strategy to scale the proposed project. In determining the quality of the design of the proposed project, the Secretary considers the following factors:

Reader's Score: 31

Sub

1. **(1) The extent to which the applicant identifies a specific strategy or strategies that address a particular barrier or barriers that prevented the applicant, in the past, from reaching the level of scale that is proposed in the application.**

**Strengths:**

In the last two years, the project cites the pronounced and declining levels in standardized math scores, particularly for minority and low-income students; this targeted professional development program will address this barrier directly by supporting teachers with the latest and most current methods and techniques in math pedagogy (e18). Another larger and more general noted barrier is finding and retaining qualified teachers particularly in math (e21), which is a nationwide problem, and thus there is an immediate and continuous need for better math professional development. They cite research showing that similar professional learning experiences support teachers in math efficacy and foster student achievement (e22). In addition, the program provides evidence about barriers affecting the professional development methods proposed, including the problem that teachers have limited time for face-to-face professional development, that effective professional learning requires ongoing coaching and collaboration, and that the cost of professional development is high (e26, 27); these are all important and significant barriers that have prevented the applicant from achieving scale in the past.

**Weaknesses:**

A minor weakness is that the project does not provide sufficient details about how it has built or developed the professional learning program in math from previous programs. In other words, the proposal lacks a bit of detail on a specific program that they implemented in the past that was similar but smaller in scale, which had specific barriers which were mitigated; for example, did the teachers require more networking or more time to engage with concepts, etc. (e24). Other details of the program have insufficient rationale, like the 3-week cycle and why that is effective (e24).

Reader's Score: 8

2. **(2) The adequacy of the management plan to achieve the objectives of the proposed project on time and within budget, including clearly defined responsibilities, timelines, and milestones for accomplishing project tasks.**

**Strengths:**

The Detailed Project Timeline on page e57 has numerous helpful details with a sufficient and strong amount of management information, including performance measures, start and end dates and responsible staff (e57). Additionally, they provide a high-level project timeline by objective, which allows for a more over-arching sense of the entire program and is a strength (e28).

**Weaknesses:**

Project evaluation costs as listed in the budget (e183) seem high and close to \$4 M or half of total project costs, which was higher than any single other component of the program. More justification is needed for the overall expense categories of the program given this emphasis on evaluation.

Reader's Score: 4

3. **(3) The applicant's capacity (e.g., in terms of qualified personnel, financial resources, or management capacity) to bring the proposed project to scale on a national or regional level (as defined in 34 CFR 77.1(c)) working directly, or through partners, during the grant period.**

**Sub**

**Strengths:**

A full-time project manager will be hired to guide and coordinate the identification and participation of schools and teachers and other tasks, which is an important key person who can help tie project components together (e29). The partner for evaluation has a long history of successful educational research showing good capacity for conducting this project; as they state, WestEd has carried out almost 2,500 projects and holds somewhere between 450 and 700 active contracts and grants (e29). In addition, Carnegie Learning has provided K-12 ed technology, curriculum, and professional learning for over 25 years, and has previously supported Patterns at scale, reaching over 5,000 teachers in 19 states (e30). This history augments and ensures the project staff's likely capacity to bring the proposed project to scale.

**Weaknesses:**

Teachers seem to be under-represented in the overall makeup of the program. Insufficient details were provided on how the applicant will collaborate with teachers to develop these programs and teachers were not overly present in the leadership of the program.

**Reader's Score: 8**

**4. (4) The mechanisms the applicant will use to broadly disseminate information on its project so as to support further development or replication.**

**Strengths:**

The timeline on page e62 shows good detail on the applicant's dissemination plan with specific dates listed for national presentations, preparing manuscripts and documentation, and includes the responsible staff, which is a noted strength. The project also intends to liaison with state level and district superintendents to coordinate and collaborate on math coverage and pedagogical strategies (e29). Some level of detail is provided, including which specific educational conferences (e.g., American Educational Research Association, etc.) and journals (e.g., Journal of Research on Educational Effectiveness) will be targeted. NCDPI will promote findings about Patterns broadly across the U.S. through its collaboration with the Council of Chief State School Officers and other partners (e32).

**Weaknesses:**

A few more details about specific math-targeted journals were needed. Similarly, journals devoted to teacher methods or professional development seemed similarly overlooked (e31) in order to reach a broader audience of practitioners.).

**Reader's Score: 8**

**5. (5) The likely utility of the products (such as information, materials processes, or techniques) that will result from the proposed project, including the potential for their being used effectively in a variety of other settings.**

**Strengths:**

The main project product will be a virtual Patterns training that will bring professional development to a much broader audience and will be designed to accommodate a wide variety of teachers, including rural teachers (e33).

**Weaknesses:**

It is not clear what would be included within the Patterns product as described on e33. For example, one might assume that some of this this instruction would be about doing professional development, but it could also be more math teacher guides, or lesson plans, so a bit more clarity would be necessary to judge what types of additional materials might be disseminated and for whom those would have the most utility. Few details are provided about the specifics of the Patterns program; thus, it is not clear how it could be used effectively in a variety of settings,

**Sub**

what that would look like as a product, or how easily available it will be to other potential users (e33).

**Reader's Score: 3**

**Selection Criteria - Quality of Project Design**

- 1. The Secretary considers the quality of the design of the proposed project. In determining the quality of the design of the proposed project, the Secretary considers the following factors:**

**Reader's Score: 12**

**Sub**

- 1. (1) The extent to which there is a conceptual framework underlying the proposed research or demonstration activities and the quality of that framework.**

**Strengths:**

One of the conceptual foundations for this project is the notion that teacher expertise plays a significant role in influencing students' mathematical achievement, which is a strength and is supported by a wide range of research (e20). The applicant also promotes a "learning by doing" and a "learner-centered" approach focusing on the science of learning, which is a noted strength underlying the program, with citations supporting these approaches (e24, 25). The logic model also provides additional support for the theoretical foundations of this project, including standard useful logic model categories (inputs, outputs, outcomes as well as short, medium, and long-term outcomes), which is a strength and shows key assumptions underlying the project's conceptual foundation (e112).

**Weaknesses:**

The relationship between students and teachers is complex and multi-faceted with many additional factors impinging on that environment, including student family engagement, socioeconomic factors, and the overall school environment. A weakness of the proposal is that more details could be provided about how relationships in general affect the student-teacher relationship despite this complex multifaceted social environment. For example, additional conceptual foundations are needed for describing why the teacher-student relationship is so important and what relationship building can provide in terms of enhancing teacher efficacy.

**Reader's Score: 4**

- 2. (2) The extent to which the goals, objectives, and outcomes to be achieved by the proposed project are clearly specified and measurable.**

**Strengths:**

The goals and objectives to be achieved are clearly listed on e28. In addition, the project timeline provides more detail about the specific measurable goals and dates of when these will be accomplished (e57).

**Weaknesses:**

A weakness of the proposal is that the first goal to "Create and test strategies to enhance adoption, use and sustainability of Patterns" will be moot if a cost-effective sustainable product is not attainable within the project scope. In other words, a little more assurance on the possible cost effectiveness goals would have helped to clarify the intensive cost analysis section as listed on e57.

**Reader's Score: 4**

**Sub**

- 3. (3) The extent to which the design of the proposed project is appropriate to, and will successfully address, the needs of the target population or other identified needs.**

**Strengths:**

The project targets 100 elementary schools which are over 50% rural, which is a strength as additional research is needed in rural school populations, particularly for STEM achievement (e14). Additionally, the program design is appropriate for historically marginalized groups, students in the lowest quartile, and students from low in-come backgrounds as it provides intensive support on teacher scaffolding, a foundational key for reaching students (e17).

**Weaknesses:**

More details about the teacher targets for professional development would have been helpful as this is the population for which the program is designed. For example, the project might address more specific needs depending on whether these teachers are coming from rural or urban environments, whether they are mostly new teachers or a wide range. Other points that might change based on the needs of a specific teacher population is what their conceptual background or training in math might be (e35). Also, more details on the success of these virtual professional learning experiences and their acceptance among teachers would have further supported this proposal.

**Reader's Score: 4**

**Selection Criteria - Quality of the Project Evaluation**

- 1. The Secretary considers the quality of the evaluation to be conducted of the proposed project. In determining the quality of the evaluation, the Secretary considers the following factors:**

**Reader's Score: 0**

**Sub**

- 1. (1) The extent to which the methods of evaluation will, if well implemented, produce evidence about the project's effectiveness that would meet the What Works Clearinghouse standards without reservations as described in the What Works Clearinghouse Handbook (as defined in 34 CFR 77.1(c)).**

**Strengths:**

**Weaknesses:**

**Reader's Score:**

- 2. (2) The extent to which the evaluation will provide guidance about effective strategies suitable for replication or testing in other settings.**

**Strengths:**

Sub

**Weaknesses:**

**Reader's Score:**

3. (3) The extent to which the evaluation plan clearly articulates the key project components, mediators, and outcomes, as well as a measurable threshold for acceptable implementation.

**Strengths:**

**Weaknesses:**

**Reader's Score:**

4. (4) The extent to which the methods of evaluation will provide performance feedback and permit periodic assessment of progress toward achieving intended outcomes.

**Strengths:**

**Weaknesses:**

**Reader's Score:**

## Priority Questions

### Competitive Preference Priority - Competitive Preference Priority 1

#### 1. Competitive Preference Priority 1:

**Promoting Equity in Student Access to Educational Resources and Opportunities: Implementers and Partners (up to 5 points)**

Under this priority, an applicant must demonstrate how the project will be implemented by or in partnership with one or more of the following entities:

- (a) Community colleges (as defined in the NIA)
- (b) Historically Black colleges and universities (as defined in the NIA)
- (c) Tribal Colleges and Universities (as defined in the NIA)
- (d) Minority-serving institutions (as defined in the NIA)

**Strengths:**

The project will work with a regional HBCU partner (option b) to support 3 years of internships to provide students with additional valuable experience with education and research companies and additional career opportunities (e17).

**Weaknesses:**

Few and insufficient details were provided regarding this partnership with an HBCU beyond a fairly generic support letter (e175). For example, internships seem like a promising idea, but there were no details about the nature of these

internships, and how they could support teachers or future teachers or underrepresented populations.

**Reader's Score:** 1

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**Status:** Submitted

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