

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

Status: Submitted

Last Updated: 08/31/2022 06:33 PM

Technical Review Coversheet

Applicant: WestEd (S411C220011)

Reader #1: *****

	Points Possible	Points Scored
Questions		
Selection Criteria		
Significance		
1. Significance	20	18
Quality of Project Design		
1. Project Design	30	26
Quality of Project Personnel		
1. Project Personnel	10	6
Quality of the Management Plan		
1. Management Plan	10	9
Quality of the Project Evaluation		
1. Project Evaluation	30	0
Sub Total	100	59
Priority Questions		
Competitive Preference Priority		
Competitive Preference Priority 1		
1. Promoting Equity	3	3
Competitive Preference Priority 2		
1. COVID-19	3	1
Sub Total	6	4
Total	106	63

Technical Review Form

Panel #11 - EIR Early Phase - 11: 84.411C

Reader #1: *****

Applicant: WestEd (S411C220011)

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:

Reader's Score: 18

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. (20 points)

Strengths:

The significance of the proposed project is excellent. The applicant proposes to enhance, extend, and experimentally test an intervention to improve access and interest in computer science (CS) among high-need rural students. The program is based on Science, Technology, Engineering, Arts, and Math (STEAM) and called Furthering Rural Adoption of Computers and Technology through Artistic Lessons (FRACTAL) (e21).

One initiative with promise builds on the work of an earlier program of CS camps where students build computers, learn how they work, develop coding and computational thinking skills, and get to keep the computers they build. A second promising initiative involves teachers co-designing middle school art and CS curriculum extensions called "Expeditions" that integrate computational thinking, universal design for learning and culturally responsive pedagogy to build middle school students' positive attitudes towards CS, CS knowledge and skills, and interest in STEM and STEAM. These initiatives utilize innovative design approaches such as UDL (Universal Design for Learning) and CRP (Culturally Responsive Pedagogy) (e27-28).

The applicant makes a strong case for the promising effects of these interventions to help remove barriers for middle school students in pursuing careers in computer fields (e22-26). They note that the programs will help students identify with CS and will improve access and achievement in CS among high need students. The project also includes dissemination and scaling of FRACTAL for use in other rural communities (e35).

Weaknesses:

It is unclear in what ways the earlier "successful implementation" (e21) STEAM CS camps were successful and what features led to their success. So, this makes it unclear how the present work will build on and improve these camps.

The applicant should have focused more specifically on the precise nature of their innovations and what makes them innovative. From the narrative, the precise innovations must be inferred (e22-26).

Sub

Reader's Score: 18

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: 26

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. (10 points)

Strengths:

The quality of the conceptual framework is excellent. For example, the design features for the initiatives are backed up with numerous studies (e26-e34). The studies are recent and relevant, applying to STEM/ STEAM topic areas and underrepresented middle school students. The logic model shows the various project inputs, activities, outputs, outcomes, and impacts (App. G, e106) and provides an overview for the conceptual framework. It is centered around four main design elements: 1) addressing the unique barriers that rural students face; 2) making the experiences and materials culturally relevant; incorporating hands-on experiences; and 4) encouraging computational thinking skills. The co-design of the curriculum and educational experiences are to be based on UDL (e27).

Two other design features will aide the professional development activities considerably: The project will use the Stanford D. School Design Thinking Process (Appendix J.4) to guide the teacher co-design process (e30-31). The development and iterative testing of materials will make use of the PDSA (Plan, Design, Study, Act) cycles model (e32).

The applicant included the results of pre-post surveys from their earlier CS camps, showing promise for the present work in developing computer efficacy (e29).

Weaknesses:

The proposal includes numerous mentions of the use of CRP to inform the present work, however, there are three "essential dimensions" of CRP included that are not defined and no examples are given. Because of this, it is difficult to determine where and how these three essential elements are being incorporated into the present work. The "essential dimensions" are 1) maintaining high academic expectations with appropriate scaffolding; 2) reshaping curriculum around cultural competence, building on the "funds of knowledge of students," and 3) cultivating relationships with students and families; and developing the critical consciousness of power relations and societal inequalities] (e28). For example, the dimension of "high academic expectations" is not mentioned anywhere else in the project narrative.

Adding to the confusion, page e115 shows three additional dimensions to CRP, also without further definition or examples or mention anywhere else in the project narrative.

Reader's Score: 9

2. (2) The extent to which the goals, objectives, and outcomes to be achieved by the proposed project are clearly specified and measurable. (5 points)

Sub

Strengths:

This design of the goals, objectives, and outcomes is excellent. Pages e35-36 include five specific, achievable goals, and eight specific measurable objectives. Each of the objectives has correspondence with specified activities, measures, and outcomes. The measures have been identified in advance, have been operationalized, and are clearly measurable. The outcomes are project outcomes and provide a clear idea of the expected deliverables the project will accomplish.

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 successfully address, the needs of the target population or other identified needs. (15 points)

Strengths:

This project shows great promise for being able to successfully address the needs of the target population. The proposal identifies specific and numerous needs and some of the factors which have led to these needs. For example, they state that there is a need for more workers in computer and STEM occupations (e22-23), and that there are inequities and inequalities in underrepresented students having access to computers and computer-related curriculum that helps them to identify with and show success in STEM+CS courses (e23-24).

One way the project addresses the specific population is by citing research which shows that STEAM attracts and meets the needs of diverse students (e25). For example, page e25 describes the ways in which incorporating art into STEM helps to motivate students by helping them become designers of technology solutions. The expeditions will make use of students conducting design projects and will use three "foundational tenets": computational thinking, design thinking, digital expression (e31).

The applicant also connects the dots between student needs and most of the project's pedagogical approaches, such as the use of the UDL framework (e27-29).

Weaknesses:

Since the student instruction will take place in elective classes, it is unclear whether these classes represent the same demographics and needs as the rest of the school. For example, perhaps these schools have a preponderance of young Caucasian boys who elect to take computer science or art. It is difficult to determine if this is a threat to the project design since the applicant does not discuss this issue.

It is difficult to determine the involvement of district leaders and school principles who can help liaise aspects of the programs to the specific needs of their particular teachers and students in their schools.

Reader's Score: 12

Selection Criteria - Quality of Project Personnel

1. The Secretary considers the quality of the personnel who will carry out the proposed project. In determining the quality of project personnel, the Secretary considers:

Reader's Score: 6

Sub

1. **The extent to which the applicant encourages applications for employment from persons who are members of groups that have traditionally been underrepresented based on race, color, national origin, gender, age, or disability. In addition, the Secretary considers the qualifications, including relevant training and experience, of key project personnel. (10 points)**

Strengths:

The qualifications, training, and experience of most of the project teams are excellent and should enable a high likelihood of project success. The proposal breaks down the key personnel into four groups: the leadership team, co-design team, professional development team, and research/evaluation team (e37), which is an appropriate and helpful breakdown for efficiencies' sake. Most of these personnel are highly qualified, with direct, relevant training and prior experience (see resumes).

Weaknesses:

The proposal does not make mention of hiring practices. It is difficult to determine the extent to which the applicant encourages employment of persons who are members of groups that have traditionally been underrepresented based on race, color, national origin, gender, age, or disability.

There is one aspect of the descriptions of the project personnel which could have been improved: In the budget justification (starting on e27), two personnel are listed at nearly 50% for each of three years (Contreras, Wilson) for which no resumes were included or other description of their qualifications or experience. Given that their role in the project is important, their resumes should have been included.

Other than the team lead at Empirical (Jaciw) (e37), there is little to no information about other personnel that will assist in the evaluation duties, so it is difficult to determine the relevant qualifications or experience of the other team members.

Given that the budget for Katabasis comprises nearly 25% of the budget, more information would have been helpful. Without knowing the level of effort for the various staff members, it is difficult to determine the degree to which these personnel will be involved in the project.

Reader's Score: 6

Selection Criteria - Quality of the Management Plan

1. **The Secretary considers the quality of the management plan for the proposed project. In determining the quality of the management plan, the Secretary considers:**

Reader's Score: 9

Sub

1. **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**

Sub

milestones for accomplishing project tasks. (10 points)

Strengths:

The management plan is excellent. One of the applicant's strategies to ensure efficiency is to assign the various groups based upon their primary activities: the leadership team, co-design team, professional development team, and research/evaluation team (e37). The responsibilities for each group are well-described. The proposal also provides a wealth of detail breaking down the activities/ objectives across the five years and by the teams which are responsible.

There is a well-detailed timeline of activities and milestones included on page e38. The activities are broken down by project objective. Page e38 breaks the activities down year-by-year. For even more detail, the Gantt chart breaks the activities down by quarter (e118).

Milestones are clear and in line with project activities and purposes (e38).

Weaknesses:

Activities associated with performance feedback and periodic assessment of progress toward achieving the desired outcomes are not included in the timeline or milestones and it is unclear which key personnel will be involved in these activities (e38).

Reader's Score: 9

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 with or without reservations as described in the What Works Clearinghouse Handbook (as defined in this notice). (20 points)**

Strengths:

N/A

Weaknesses:

N/A

Reader's Score: 0

- 2. (2) The extent to which the methods of evaluation will provide performance feedback and permit periodic assessment of progress toward achieving intended outcomes. (5 points)**

Sub

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. (5 points)

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 (up to 3 points).

Projects designed to promote educational equity and adequacy in resources and opportunity for underserved students in middle school or high school that examine the sources of inequity and inadequacy and implement responses, including rigorous, engaging, and well-rounded (e.g., that include music and the arts) approaches to learning that are inclusive with regard to race, ethnicity, culture, language, and disability status and prepare students for college, career, and civic life, including one or more of the following:

(a) Student-centered learning models that may leverage technology to address learner variability (e.g., universal design for learning (as defined in this notice), K–12 competency-based education (as defined in this notice), project-based learning, or hybrid/blended learning) and provide high-quality learning content, applications, or tools.

(b) Middle school courses or projects that prepare students to participate in advanced coursework in high school.

(c) Advanced courses and programs, including dual enrollment and early college programs.

(d) Project-based and experiential learning, including service and work-based learning.

(e) High-quality career and technical education courses, pathways, and industry-recognized credentials that are integrated into the curriculum.

Strengths:

The applicant has done an excellent job describing how the project will promote equity in student access to educational resources and opportunities, especially for underserved students in middle school. The project plans to implement responsive approaches to learning that are inclusive with regard to race, ethnicity, culture, language, and disability status and prepare students for STEM success in college, and STEM careers (e8). The project for middle schoolers leverages technology, prepares them for advanced coursework in high school, and utilizes project-based and experiential learning.

Weaknesses:

No weaknesses noted.

Reader's Score: 3

Competitive Preference Priority - Competitive Preference Priority 2

1. Competitive Preference Priority 2:

Addressing the Impact of COVID-19 on Students, Educators, and Faculty (up to 3 points).

Projects that are designed to address the impacts of the COVID–19 pandemic, including impacts that extend beyond the duration of the pandemic itself, on the students most impacted by the pandemic, with a focus on underserved students and the educators who serve them through:

(a) conducting community asset-mapping and needs assessments that may include an assessment of the extent to which students, including subgroups of students, have become disengaged from learning, including students not participating in in-person or remote instruction, and specific strategies for reengaging and supporting students and their families; and

(b) using evidence-based instructional approaches and supports, such as professional development, coaching, ongoing support for educators, high quality tutoring, expanded access to rigorous coursework and content across K–12, and expanded learning time to accelerate learning for students in ways that ensure all students have the opportunity to successfully meet challenging academic content standards without contributing to tracking or remedial courses.

Strengths:

One strength is that the PI on the project has expertise on the use of UDL as a strategy to combat the impact of COVID-19 (e67).

Weaknesses:

Unfortunately, COVID-19 needs are not specifically identified in the proposal. These needs may vary from school to school and region to region.

Even though the applicant has identified four aspects of their proposed work that are stated to address the needs of those most impacted by COVID-19 (e112-113), the explanation is lacking in detail. It is not clear how those four aspects will address the needs. For example, one aspect is listed as “engaging in mutually respectful collaboration with students and educators” but the narrative does not explain how this aspect addresses any specific COVID-19 needs.

There is no discussion of asset mapping or other kind of needs assessment.

Reader's Score: 1

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Last Updated: 09/01/2022 10:45 AM

Technical Review Coversheet

Applicant: WestEd (S411C220011)

Reader #2: *****

	Points Possible	Points Scored
Questions		
Selection Criteria		
Significance		
1. Significance	20	19
Quality of Project Design		
1. Project Design	30	27
Quality of Project Personnel		
1. Project Personnel	10	6
Quality of the Management Plan		
1. Management Plan	10	8
Quality of the Project Evaluation		
1. Project Evaluation	30	0
Sub Total	100	60
Priority Questions		
Competitive Preference Priority		
Competitive Preference Priority 1		
1. Promoting Equity	3	3
Competitive Preference Priority 2		
1. COVID-19	3	1
Sub Total	6	4
Total	106	64

Technical Review Form

Panel #11 - EIR Early Phase - 11: 84.411C

Reader #2: *****

Applicant: WestEd (S411C220011)

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:

Reader's Score: 19

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. (20 points)

Strengths:

1. The proposal proposes to build upon existing strategies of a STEAM+CS Summer Camp program model that provided successful opportunities where "students build computers, learn how they work, develop coding and computational thinking skills." The FRACTAL program will "integrate computational thinking, universal design for learning and culturally responsive pedagogy" and extend the previous program curriculum from a summer program to eight new weeks of school curriculum content. The project's choice to focus on art and CS, and not just STEM, adds to the innovative significance of the project. The inclusion of art and focus on STEAM across eight school classrooms has the potential to attract and empower a greater number of students. (Page e18, e21, e33).
2. Existing strategies are strengthened by the inclusion of involving teachers in the co-design of the new project curriculum. The co-design structure intends to ensure the program is "culturally relevant, feasible for school implementation, and aligned with the needs of students." (Page e30)
3. The proposal identifies a variety of interested in audiences that establishes an existing community for future scalability. In order to drive interest and recruit future opportunities the proposal includes a vision for sharing findings, replicating successes, and scaling the project at the completion of the project, and supports this vision with strategies such as exemplars and how to videos. This comprehensive plan from ideation to expansion strengthens the proposal. (Page e26)

Weaknesses:

1. The applicant provides a significant amount of national data to draw awareness to the disparity in Computer Science jobs, graduates, and "inequities exacerbated by the COVID-19 pandemic," but fails to provide local data for the region that will be implementing the FRACTAL content. (Page e23)
2. The application fails to identify specific innovations of the project. Specifically, the applicant mentions the previous success of the summer camp model and "building interest," but fails to provide specific successes and expand on program curriculum details. The lack of specifics as to how those success will be built on weakens the significance of the proposal. (Page e22)

Sub

Reader's Score: 19

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: 27

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. (10 points)**

Strengths:

1. The proposal identifies two frameworks (Universal Design for Learning and Culturally Responsive Pedagogy) to support project goals, students, and teachers. The application's narrative clearly provides research based evidence that establishes a rationale for each framework and clearly correlates the two frameworks to the proposed project design. The comprehensive and evidence based support provided strengthen the quality of the project framework. (Page e27-29, J-3-4)

Weaknesses:

1. No weaknesses related to the selection criteria.

Reader's Score: 10

2. **(2) The extent to which the goals, objectives, and outcomes to be achieved by the proposed project are clearly specified and measurable. (5 points)**

Strengths:

1. The project design incorporates a comprehensive approach to designing, executing, and continuously supporting a culturally responsive and hands-on computer science curriculum within middle school art and technology courses. The thorough design of the project through expanded details documenting the project across all phases of planning and execution strengthen the success of the program. (Page e35-36)
2. Goals, objectives, and outcomes are detailed in narratives format, as well as clearly aligned in Table 2. The proposal is further strengthened by the detailed breakdown of each of the five goals into sub goals necessary for the project success. (Page e35-36)

Weaknesses:

1. No weaknesses related to the selection criteria.

Reader's Score: 5

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. (15 points)**

Sub

Strengths:

1. Targeted populations are defined and supported by data confirming their identification as high-needs rural students. The applicant states that these groups have been "historically marginalized in computing" and supports these claims with national research. (Page e18)
2. The proposed FRACTAL uses a fictitious story about a young girl name Zoey to document student experience and appropriateness of the project to the targeted population. (Page 34)

Weaknesses:

1. While the applicant identifies their target population, there is no guarantee that the population tested will be comprised of the targeted group. The applicant states, "research participants include any student in middle school registered for either an art or technology elective course," and that they "anticipate that participating students will be like the school population." The applicant fails to clarify if these are required electives or chosen electives. This lack of clarity weakens the proposal because the demographics of the classes might unintentionally reflect the disparity mentioned in the research if the classes are student selected electives versus reflecting the school population if they are required electives. (Page e13)

Reader's Score: 12

Selection Criteria - Quality of Project Personnel

- 1. The Secretary considers the quality of the personnel who will carry out the proposed project. In determining the quality of project personnel, the Secretary considers:**

Reader's Score: 6

Sub

- 1. The extent to which the applicant encourages applications for employment from persons who are members of groups that have traditionally been underrepresented based on race, color, national origin, gender, age, or disability. In addition, the Secretary considers the qualifications, including relevant training and experience, of key project personnel. (10 points)**

Strengths:

1. The applicant has the commitment of key players of the project such as school districts, community partners, as well as curriculum providers. These existing supporters imply the existence of future support beyond project completion. (Page e95-101)
2. The proposal identifies key personnel that are appropriately credentialed and experienced in order to successfully implement their responsibilities. They key personnel are also equipped to manage grant projects as documented with prior experience. An informed and proficient management team ensures the proposal is monitored and implemented successfully. (Page e37)

Weaknesses:

1. The proposal does not provide a GEPA statement or clarification on hiring practices for selection of project personnel . Additionally, there is no evidence of a system or practice for how the proposal encourages or advertises to candidates to submit an application for employment.
2. The budget identifies three personnel individuals to service as part project manager, project budget

Sub

analyst, and project operations coordinator, but does not provide evidence of experience or a resume for these individuals. These personnel salaries account for a significant portion of the requested salary budget and the absence of supporting documents weaken the support that these are qualified personnel for the roles. (Page e127-130)

Reader's Score: 6

Selection Criteria - Quality of the Management Plan

- 1. The Secretary considers the quality of the management plan for the proposed project. In determining the quality of the management plan, the Secretary considers:**

Reader's Score: 8

Sub

- 1. 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. (10 points)**

Strengths:

1. The management plan is detailed and aligns with goals and objectives outlined in the project design. The included personnel have the experience and skills necessary to implement the proposed project. A timeline is included that aligns proposal tasks over the five years of grant funding. (Page e38)
2. The management plan identifies a diverse Co-Design Team that supports the partnership with local teachers in the iterative development process of curriculum materials. The involvement of local teachers in the Co-Design process strengthens the sustainability of the program at the local level. (Page e37)

Weaknesses:

1. The proposal aims to "provide a biweekly coaching Professional Learning Community (PCL) during the implementation of the FRACTAL expeditions," and identifies the teacher PCL on the timeline of activities and milestones for years 2-5 of the program, however it does not assign this task to any personnel. This lack of personnel support to intentionally guide and reflect with the teachers weakens the management plan of the proposal. (Page e38)

Reader's Score: 8

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

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 with or without reservations as described in the What Works Clearinghouse Handbook (as defined in this notice). (20 points)

Strengths:

Weaknesses:

Reader's Score:

2. (2) The extent to which the methods of evaluation will provide performance feedback and permit periodic assessment of progress toward achieving intended outcomes. (5 points)

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. (5 points)

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 (up to 3 points).

Projects designed to promote educational equity and adequacy in resources and opportunity for underserved students in middle school or high school that examine the sources of inequity and inadequacy and implement responses, including rigorous, engaging, and well-rounded (e.g., that include music and the arts) approaches to learning that are inclusive with regard to race, ethnicity, culture, language, and disability status and prepare students for college, career, and civic life, including one or more of the following:

(a) Student-centered learning models that may leverage technology to address learner variability (e.g., universal design for learning (as defined in this notice), K–12 competency-based education (as defined in this notice), project-based learning, or hybrid/blended learning)

and provide high-quality learning content, applications, or tools.

(b) Middle school courses or projects that prepare students to participate in advanced coursework in high school.

(c) Advanced courses and programs, including dual enrollment and early college programs.

(d) Project-based and experiential learning, including service and work-based learning.

(e) High-quality career and technical education courses, pathways, and industry-recognized credentials that are integrated into the curriculum.

Strengths:

1. The proposal is providing eight weeks of new STEAM curriculum content to middle school students within art or technology courses. The new curriculum includes opportunities for students to build a computer and engage in algorithmic art creation.

Weaknesses:

1. No weaknesses related to the selection criteria.

Reader's Score: 3

Competitive Preference Priority - Competitive Preference Priority 2

1. Competitive Preference Priority 2:

Addressing the Impact of COVID-19 on Students, Educators, and Faculty (up to 3 points).

Projects that are designed to address the impacts of the COVID–19 pandemic, including impacts that extend beyond the duration of the pandemic itself, on the students most impacted by the pandemic, with a focus on underserved students and the educators who serve them through:

(a) conducting community asset-mapping and needs assessments that may include an assessment of the extent to which students, including subgroups of students, have become disengaged from learning, including students not participating in in-person or remote instruction, and specific strategies for reengaging and supporting students and their families; and

(b) using evidence-based instructional approaches and supports, such as professional development, coaching, ongoing support for educators, high quality tutoring, expanded access to rigorous coursework and content across K–12, and expanded learning time to accelerate learning for students in ways that ensure all students have the opportunity to successfully meet challenging academic content standards without contributing to tracking or remedial courses.

Strengths:

1. The applicant provides for a teacher PCL and continuous feedback mechanisms within the PCL group that contribute to the tracking and success of the proposal.

Weaknesses:

1. The proposal makes no mention of asset mapping or needs assessment local data. While the project identifies a plan of action to "address the needs of underserved students most impacted by COVID-19," it does not identify the needs of the communities. The failure to acknowledge the specific needs of the underserved students not only weakens the validity of the solutions, it fails to establish the proposal as a project meeting the requirements of this competitive preference. (Page e112-113).

Reader's Score: 1

Status: Submitted

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Status: Submitted

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Technical Review Coversheet

Applicant: WestEd (S411C220011)

Reader #3: *****

	Points Possible	Points Scored
Questions		
Selection Criteria		
Significance		
1. Significance	20	19
Quality of Project Design		
1. Project Design	30	27
Quality of Project Personnel		
1. Project Personnel	10	6
Quality of the Management Plan		
1. Management Plan	10	7
Quality of the Project Evaluation		
1. Project Evaluation	30	0
Sub Total	100	59
Priority Questions		
Competitive Preference Priority		
Competitive Preference Priority 1		
1. Promoting Equity	3	3
Competitive Preference Priority 2		
1. COVID-19	3	1
Sub Total	6	4
Total	106	63

Technical Review Form

Panel #11 - EIR Early Phase - 11: 84.411C

Reader #3: *****

Applicant: WestEd (S411C220011)

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:

Reader's Score: 19

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. (20 points)

Strengths:

1. This study has potential to increase computation thinking, computing self-efficacy, STEM achievement, and participation in STEM and computer science (CS) coursework, supporting career progression for traditionally underrepresented groups (p. 4, e15).
2. The proposal builds upon a proposal partner's successful CS camp approach. In this camp, students built computers, learned about their workings, developed coding and computational thinking skills, and were able to keep the computers after building them (e18).
3. A STEAM focus will be used to help students identify with and develop a sense of agency in regard to CS as they participate in the project which integrates computational thinking, universal design for learning, and culturally responsive pedagogy (e18).
4. This proposal supports an imperative need for training staff and students, equipping them with skills in computer science as we face a current shortage of skilled workers in this area amidst an atmosphere of rapidly growing openings in computer-related occupations (p. 2, e22).
5. The proposal will help build CS and STEM identity through inclusive, rigorous, culturally relevant, hands-on experiences. While CS courses and learning opportunities may currently be available in some rural areas, the manner in which curricula is conveyed to students can serve as a barrier to student engagement (heavily text-based, formal practice-based, exercise-based, culturally irrelevant and not aligned with the UDL framework). The applicant proposes a product-oriented STEAM approach which will benefit learners through hands-on, socially and culturally relevant learning experiences in which they will transition from consumers to designers of technologies (p. 4-5, e24-25).
6. The "gamify it," "make it social," and "storify it" approach holds great promise in motivating students to persevere to conquer challenging coding problems (p. 5, e25).
7. The ability for students to participate in camps in which they learn about hardware, programming, the internet, software, and games while building their own computers which they will be able to keep is a great motivator for student participants in developing CS skills and STEM+CS identity(p. 6, e26).
8. The applicant has a well thought out plan for sharing its findings so that they may be replicated elsewhere. A website and several social media channels will include project descriptions, lesson plans, examples of student work, student postings, how-to videos, materials, and research findings. Locally, student work will be showcased in community centers and libraries. The project will be shared in presentations at state and national conferences as well as in practitioner and research journals relevant to the project activities (p.6, e26).

Sub

9. The proposal's computer building activities hold great promise to empower and motivate students.

Weaknesses:

1. The proposal would be strengthened by the addition of data related to the camp programming upon which components of this proposal are built. The applicant indicates that the camp was successful but does not share specific details regarding outcomes and lessons learned.

Reader's Score: 19

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: 27

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. (10 points)**

Strengths:

1. The proposal involves collaboration between three nonprofit organizations and four rural educational agencies to serve rural students. Proposed activities will include 65 teachers and 3,520 students (p. 2, e22).
2. A logic model provides a clear overview of the inputs, activities, outputs, outcomes, and impacts of the project (G-1, e106).
3. The applicant provides a good conceptual framework diagram for the proposal highlighting the interaction of research teams and teachers in a co-design process focused on supporting student outcomes (computational thinking skills, CS self-efficacy, STEM knowledge, and STEM interest) (J-6, e117).
4. The applicant includes helpful diagrams to describe in detail the approaches to be used, including UDL, Culturally Responsive Pedagogy (CRP), and the Stanford D. School Design Thinking Process (J-3-J-5, e113-116).
5. A GANTT Chart is provided to clarify how project activities are aligned with 5 objectives during Spring, Summer, and Fall of the three project phases: Co-design/PDSA Cycles; Pilot; Analysis, Refinement, & Dissemination. This chart also includes the numbers of computers (700 total) to be build by students throughout the 5 year grant term (J-6, e118).
6. The co-design process will support matching strategies that have been successful in other settings with the needs of rural students using the Stanford D. School Design Thinking process (empathize, define, ideate, prototype, and test) (p.10, e30).
7. Professional learning communities will support reflection, coaching, knowledge building, and capacity of the educators involved in the project (p.11, e31).
8. Students will find meaning and relevance in the project expeditions which focus on computational thinking, design thinking, and digital expression. Related activities will be structured to promote ideas that are unique, personally and culturally relevant, and reflective of the students' communities (p. 11, e31).
9. Table 1 clearly outlines four two-week long expeditions, which include high-interest, theme-based units. In the table, there are descriptions of the participants, knowledge elements, and deliverables for each expedition. Knowledge elements include items such as graphic design, algorithmic art, human/computer interaction, machine learning, and AI (p.12,32).
10. Following the co-design process, a web portal will be created to host lectures, how-to videos, materials lists, teacher training materials, videos and support forums where teachers can connect with and learn from other

Sub

educators (p.13, e33).

Weaknesses:

None noted.

Reader's Score: 10

2. (2) The extent to which the goals, objectives, and outcomes to be achieved by the proposed project are clearly specified and measurable. (5 points)

Strengths:

1. The applicant has clearly specified its five goals, objectives, and outcomes in Table 2 that includes specific activities under each objective along with measurable details and descriptive outcomes for each activity which demonstrates a clear coherence between the project activities and the achievement of the intended goals (p. 15-16, e35-36).
2. All measures are clearly identified and are specific. Specific measurement instruments to be used are also included in table 2, making the data to be gathered for evaluation purposes clear and easily understood (p. 15-16, e35-36).

Weaknesses:

None noted.

Reader's Score: 5

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. (15 points)

Strengths:

1. The applicant provides a vignette highlighting a vision of a student's experience in the program, highlighting the evolution of a student's sense of identity in relation to CS as a result of participating in proposed activities (p. 14, e34).
2. The proposal holds great promise in motivating students given the high-interest nature of the activities involved, along with the connection to real career opportunities.

Weaknesses:

1. It is unclear if the applicant will be directly involved with the schools at the local level. Direct interaction is important, particularly in rural communities, to recruit participants and establish trust when working as co-designers of content.

Reader's Score: 12

Selection Criteria - Quality of Project Personnel

1. The Secretary considers the quality of the personnel who will carry out the proposed project. In determining the quality of project personnel, the Secretary considers:

Reader's Score: 6

Sub

- 1. The extent to which the applicant encourages applications for employment from persons who are members of groups that have traditionally been underrepresented based on race, color, national origin, gender, age, or disability. In addition, the Secretary considers the qualifications, including relevant training and experience, of key project personnel. (10 points)**

Strengths:

1. The implementation leadership team is divided into four categories, the leadership team, the co-design team, the professional development team, and the research and evaluation team. This team approach promotes a broad range of perspectives on project activities, which also providing focused expertise to support programmatic success (p. 17, e37).
2. The personnel on the leadership team are highly qualified to successfully lead this project. The leaders have extensive experience in educational leadership, evaluation, project management, educational research, and STEM/CS (e65-94).

Weaknesses:

1. The project teams did not include leaders from participating school districts. It is important that the local leaders have a voice in the activities and planning if this is truly a process of co-creation. It seems that there is a distinction to be made between “doing to” or “doing for” as opposed to “doing with” (p. 17, e37).
2. The proposal lacks evidence of hiring practices that encourage applications for employment from persons who are members of groups that have traditionally been underrepresented based on race, color, national origin, gender, age, or disability.
3. The narrative and commitment letters provided by the applicant do not reflect recruitment of teachers to support the proposed activities.

Reader's Score: 6

Selection Criteria - Quality of the Management Plan

- 1. The Secretary considers the quality of the management plan for the proposed project. In determining the quality of the management plan, the Secretary considers:**

Reader's Score: 7

Sub

- 1. 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. (10 points)**

Strengths:

1. A GANTT Chart is provided, which helps provide helpful timeline details over the five-year grant term. The details provided in the chart clarify how project activities are aligned with five objectives during Spring, Summer, and Fall of the three project phases: Co-design/PDSA Cycles; Pilot; Analysis, Refinement, & Dissemination (J-6, e118).

Sub

2. Table 4 provides a timeline of specific activities and milestones under each objective by year. The table also includes the personnel responsible by group (Leadership Team, Co-Design team, PD team, Research and Evaluation Team) (p. 18, e36).
3. Responsibilities of each of the Organizational Partners is clearly outlined in Table 5 (p.19, e39).

Weaknesses:

1. It is unclear how the Co-design and PD teams will work directly with schools in managing the proposed activities.
2. The process for recruiting teachers for participation is not clear.
3. While the applicant plans to use rapid-cycle feedback, it is unclear how that process will be applied as details are not included in the timeline (22 & J-6, e 40,118).

Reader's Score: 7

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 with or without reservations as described in the What Works Clearinghouse Handbook (as defined in this notice). (20 points)**

Strengths:

Weaknesses:

Reader's Score:

2. **(2) The extent to which the methods of evaluation will provide performance feedback and permit periodic assessment of progress toward achieving intended outcomes. (5 points)**

Strengths:

Weaknesses:

Reader's Score:

Sub

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. (5 points)

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 (up to 3 points).

Projects designed to promote educational equity and adequacy in resources and opportunity for underserved students in middle school or high school that examine the sources of inequity and inadequacy and implement responses, including rigorous, engaging, and well-rounded (e.g., that include music and the arts) approaches to learning that are inclusive with regard to race, ethnicity, culture, language, and disability status and prepare students for college, career, and civic life, including one or more of the following:

- (a) Student-centered learning models that may leverage technology to address learner variability (e.g., universal design for learning (as defined in this notice), K–12 competency-based education (as defined in this notice), project-based learning, or hybrid/blended learning) and provide high-quality learning content, applications, or tools.
- (b) Middle school courses or projects that prepare students to participate in advanced coursework in high school.
- (c) Advanced courses and programs, including dual enrollment and early college programs.
- (d) Project-based and experiential learning, including service and work-based learning.
- (e) High-quality career and technical education courses, pathways, and industry-recognized credentials that are integrated into the curriculum.

Strengths:

1. The proposed project will serve four racially diverse public school districts and 17 middle schools with 58-100% free-and-reduced lunch eligibility (e13).
2. The proposed plan is inclusive of students with disabilities. Such students, if enrolled in the related courses regardless of disability category or functional ability, may participate (p. 2, e13).
3. This project serves a rural population . The interventions proposed are essential in meeting the needs of rural areas where equity in access to resources, opportunities, and expertise in STEM learning is an ongoing challenge. The proposed activities also build the capacity of educators to lead and facilitate STEM learning and engagement (p. 4, e15).
4. The proposal serves groups historically underrepresented in computing, students in the lowest achievement quartile, students with disabilities, and low-income students (e18).

Weaknesses:

None noted.

Reader's Score: 3

Competitive Preference Priority - Competitive Preference Priority 2

1. Competitive Preference Priority 2:

Addressing the Impact of COVID-19 on Students, Educators, and Faculty (up to 3 points).

Projects that are designed to address the impacts of the COVID–19 pandemic, including impacts that extend beyond the duration of the pandemic itself, on the students most impacted by the pandemic, with a focus on underserved students and the educators who serve them through:

(a) conducting community asset-mapping and needs assessments that may include an assessment of the extent to which students, including subgroups of students, have become disengaged from learning, including students not participating in in-person or remote instruction, and specific strategies for reengaging and supporting students and their families; and

(b) using evidence-based instructional approaches and supports, such as professional development, coaching, ongoing support for educators, high quality tutoring, expanded access to rigorous coursework and content across K–12, and expanded learning time to accelerate learning for students in ways that ensure all students have the opportunity to successfully meet challenging academic content standards without contributing to tracking or remedial courses.

Strengths:

1. The proposed project is designed to address needs of rural, underserved students who experienced a widening digital divide during the COVID-19 pandemic (J-1, e112).
2. Collaboration with students and educators will help shed light on historical inequities and those brought on by the pandemic, particularly in regard to student learning (J-2, e113).
3. The application of Universal Design for Learning (UDL) and technology support in the learning experiences holds promise in successfully accelerating student learning (J-2, e113).
4. This proposal addresses the concern of the digital divide that was exacerbated by the pandemic as under sourced districts struggled to educate students remotely, particularly in rural areas (p. 3, e23).

Weaknesses:

1. Given the varied nature of experiences during the pandemic, a needs assessment would be helpful to inform the process of addressing the needs of students (and educators) relating to this competitive preference priority.
2. If needs are not known or fully understood for the communities involved, it is impossible to know if strategies applied are effective in overcoming the COVID_19 related challenges.

Reader's Score: 1

Status: Submitted
Last Updated: 09/01/2022 02:56 PM

Status: Submitted

Last Updated: 10/07/2022 12:45 PM

Technical Review Coversheet

Applicant: WestEd (S411C220011)

Reader #1: *****

	Points Possible	Points Scored
Questions		
Selection Criteria		
Quality of the Project Evaluation		
1. Project Evaluation	30	24
Total	30	24

Technical Review Form

Panel #10 - EIR Tier 2 - 9: 84.411C

Reader #1: *****

Applicant: WestEd (S411C220011)

Questions

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: 24

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 with or without reservations as described in the What Works Clearinghouse Handbook (as defined in this notice). (20 points)

Strengths:

The application proposes a Cluster Randomized Control Trial (RCT) to evaluate the impact of FRACTAL (Furthering Rural Adoption of Computers and Technology through Artistic Lessons) on students. The proposed impact evaluation design, if well implemented, has the potential to produce reliable evidence about FRACTAL's effectiveness that would meet the What Works Clearinghouse (WWC) standards without reservations.

In line with WWC recommendations, the application proposes a thorough and feasible randomization approach. The proposed use of school-level variables (e.g., race/ethnicity of students, enrollment, and percentage of free or reduced-price lunch) to establish baseline equivalency between control and intervention schools is both practical and appropriate for the impact evaluation. As recommended by the WWC guidelines, the application demonstrates that the sample size is adequate, and the statistical power is sufficient to elicit acceptable minimum detectable effect sizes. The application also provides reasonable justification for not applying corrections for multiple comparisons. Moreover, the application clearly demonstrates that all outcome and impact measures have acceptable reliability indices of at least .70.

The planned analytical approaches and proposed statistical equations align with WWC guidelines and best practices in educational research. For example, the proposed multilevel impact models for confirmatory analysis are appropriate for the nested structure of the data where students are nested within teachers and teachers and students are nested within schools. Similarly, the proposed mediation analyses, if well implemented, have the potential to provide useful data for understanding the processes and conditions under which FRACTAL impacts student outcomes.

Weaknesses:

The application does not discuss a convincing teacher (and school) recruitment plan and does not demonstrate how the project will meet the recruitment goals. For example, the application does not indicate if all the target schools currently offer arts and STEM subjects as electives or if the availability of these courses is a criterion for eligibility for participation in the study.

Sub

Reader's Score: 16

2. (2) The extent to which the methods of evaluation will provide performance feedback and permit periodic assessment of progress toward achieving intended outcomes. (5 points)

Strengths:

The application proposes appropriate methods that if well implemented will provide performance feedback and permit periodic assessment of progress toward achieving intended outcomes. Specifically, the proposed four-part fidelity evaluation is logical and has the potential to generate meaningful quantitative and qualitative data for understanding the extent to which FRACTAL was implemented as intended, uncover variations in implementation, and highlight the factors that facilitate or hinder successful implementation across the participating schools. Moreover, involving teachers in the semester-long iterative Plan, Do, Study, and Act cycles and the myriad of qualitative and quantitative data to be collected from teachers before, during, and post-implementation are practical and appropriate for gathering timely feedback to address gaps in implementation and make necessary program adjustments.

Weaknesses:

The application does not discuss any plans for obtaining feedback from students as key recipients and end-users of FRACTAL. The proposed performance feedback methods focus solely on inputs from teachers and administrators. This is a significant omission given the claim in the narrative that FRACTAL is driven by culturally responsive pedagogy. It is not clear if and how the voices of the rural students would be collected and/or used to improve the program to enhance replicability in other rural areas.

Reader's Score: 4

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. (5 points)

Strengths:

The application clearly articulates the key project components, outcomes, and a measurable threshold for acceptable implementation. For example, the application clearly identifies and proposes to test the mediating effects of student interest and engagement in STEAM + CS on the extent to which participation in FRACTAL elicits the expected student outcomes. Moreover, the logic model shows clear and logical connections among program inputs, activities, outcomes, and impacts. The application also identifies reasonable fidelity thresholds (e.g., the expectation that at least 50 of 57 teachers to be recruited would attend at least 80 percent FRACTAL training and deliver at least 90 percent of the program).

Weaknesses:

The logic model identifies students' college attendance and majors in computer science and STEM fields as potential impacts but does not discuss when and how these variables will be measured. Given that the participants are 6th-8th grade students, it is not clear if the applicant would conduct a longitudinal follow-up to determine the students' eventual college and career choices.

Reader's Score: 4

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Last Updated: 10/07/2022 12:45 PM

Status: Submitted

Last Updated: 10/07/2022 03:42 PM

Technical Review Coversheet

Applicant: WestEd (S411C220011)

Reader #2: *****

	Points Possible	Points Scored
Questions		
Selection Criteria		
Quality of the Project Evaluation		
1. Project Evaluation	30	27
Total	30	27

Technical Review Form

Panel #10 - EIR Tier 2 - 9: 84.411C

Reader #2: *****

Applicant: WestEd (S411C220011)

Questions

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: 27

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 with or without reservations as described in the What Works Clearinghouse Handbook (as defined in this notice). (20 points)

Strengths:

On pages 22-25 (pp.e42-e45 in the packet) the applicant articulates an evaluation strategy that will, if well implemented, meet What Works Clearinghouse standards without reservations. The plan accounts for attrition at the school level (schools are the unit of assignment) and teacher level (p.23). The plan for evaluation includes both confirmatory and exploratory research questions aligned with project outcomes (e.g., Table 6, pp. 20-21). Confirmatory impact questions are focused on student-level outcomes (e.g., attitudes toward STEM, computational thinking).

Additionally, the evaluation team will collect data to understand the business-as-usual, comparison condition (p. 22, p. e42 packet) which will allow for a better understanding and interpretation of program outcomes.

Weaknesses:

It is not clear how the evaluation team will meet the recruitment targets (i.e., three teachers per school) and/or how teachers will be motivated to take on the work required for participation.

Reader's Score: 17

2. (2) The extent to which the methods of evaluation will provide performance feedback and permit periodic assessment of progress toward achieving intended outcomes. (5 points)

Strengths:

The plan for evaluation includes an in-depth planning period which includes eight teachers and 100 students (p. 2; p.e22 packet). In addition, there is a strong plan for monitoring implementation and revising program activities as needed (p. 21, p. e41 packet) including fidelity of implementation reporting system.

Sub

Weaknesses:

none

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. (5 points)

Strengths:

Project components are clearly outlined in Table 2 (pg. 15) and the logic model (p. e106 packet). Page e120, Appendix J.7 clearly articulates the evaluation plan for exploring potential mediators. Page 21 of the application (p. e41 packet) describes the thresholds for acceptable implementation (i.e., recruiting n=57 teachers; providing all three-day blended training; at least 50 teachers attend a minimum of 80% training sessions).

Weaknesses:

none

Reader's Score: 5

Status: Submitted

Last Updated: 10/07/2022 03:42 PM