

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

Status: Submitted

Last Updated: 05/22/2019 04:54 PM

Technical Review Coversheet

Applicant: BSCS Science Learning (U411B190029)

Reader #1: *****

	Points Possible	Points Scored
Questions		
Selection Criteria		
Significance		
1. Significance	15	13
Quality of Project Design		
1. Project Design	25	20
Strategy to Scale		
1. Strategy to Scale	20	17
Adequacy of Resources/Quality of Management Plan		
1. Resources/Management Plan	20	14
Quality of the Project Evaluation		
1. Project Evaluation	20	0
Sub Total	100	64
Total	100	64

Technical Review Form

Panel #3 - EIR Mid Phase - 3: 84.411B

Reader #1: *****

Applicant: BSCS Science Learning (U411B190029)

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:

(1) The potential contribution of the proposed project to increased knowledge or understanding of educational problems, issues, or effective strategies.

(2) The extent to which the applicant demonstrates there is unmet demand for the process, product, strategy, or practice that will enable the applicant to reach the level of scale that is proposed in the application.

Strengths:

The applicant proposes that science proficiency is a nationwide problem based on the 2015 National Assessment of Educational Progress (NAEP), and that the lack of science proficiency begins in elementary grades (e24). Students from rural areas, low-income households, or minority groups fall further behind in science as students progress through the grade levels (e25). This proposal addresses the need for teachers to develop effective teaching strategies in order to increase the science proficiency of students in grades four and five who live in rural areas, are from low-income households, or are in a minority group. Building on the successful implementation of past projects, the project has the potential to increase the knowledge by implementing effective strategies involving content and pedagogy for teaching science for online programs.

Since many elementary science teachers have little training in science and science pedagogy, an unmet demand exists for professional development to train elementary teachers in science content and pedagogy particularly in rural areas where traveling to professional development is difficult due to the distance to most face-to-face professional development sites. An online professional development program will address the unmet demand for professional development opportunities by removing the constraints of traveling to professional development sites. The online format has the potential to provide valid data to the amount of current knowledge concerning the effectiveness of online programs.

Additionally, adopting the Next Generation of Science Standards with a program designed to build an affinity to science during students' formative years has the potential to increase the number of students continuing to take high-level science courses in middle and high school. This has the potential to address the unmet demand of students entering the STEM pipeline.

Weaknesses:

While the applicant proposes an online professional development program to meet the needs of teachers in rural areas, there is no evidence that this will address the specific needs of students in low-income households, or minority groups by increasing the pedagogical and content knowledge of teachers.

Reader's Score: 13

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:

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

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

Strengths:

The project builds on 15 years of research and development and align the activities to meet the vision for teaching and learning expressed in the Next Generation Science Standards (NGSS) (e23). The project will continue the successful implementation of a similar project (e27) which provided strong evidence of effectiveness by meeting What Works Clearinghouse (WWC) Evidence Standards without reservations (e28).

The project has three main goals of increasing teacher's science content knowledge, improving teacher's science pedagogical content knowledge, and increasing teacher's ability to use their content and pedagogical content knowledge in planning and teaching (e30-31). The applicant includes specific strategies, outcome, and measures designed to meet the three main goals of the project (e34-36).

The project will serve three cohorts of teachers in years 2 through 4 (e24). The project has three phases: 1. a five-day summer Institute designed to begin the professional development and to introduce the cohorts in order to build a learning community, 2. monthly fall activities of teaching model lessons and analyzing student work online study groups, 3. winter and spring monthly meetings focused on a different science concept, writing and implementing individual lessons and sharing their analysis of the teaching experience (e32-33). The cohort model combined with face-to-face and virtual meetings has the potential to allow the participants from the 19 LEAs to develop a community of learning and learn from each other's successes and struggles. The virtual meetings are particularly valuable since many of the participants will be from small schools in rural areas where there may not be sufficient numbers of grade four and five teachers to support a learning community.

The structure of the project has the potential to ensure that the goals, objectives, and outcomes can be achieved.

The conceptual framework of the project is defined and includes strategies, activities, and outcomes (e29). The conceptual framework is based on situated cognitive theory of teacher learning (1989) and cognitive apprenticeship instructional model (1988) (e33). These three phases of the project and the activities included in each phase build on each other (e33). The job-embedded nature of the situated cognitive theory and the cognitive apprenticeship instructional model which has the potential to increase teachers' understanding of students' thinking and ability to plan lessons to designed to address difficulties in learning specific science content.

Weaknesses:

The lack of clarity of the measures makes it difficult to determine if the goals, objectives, and outcomes are measurable. For example, Measure 3.3 (e35) states that teacher feedback on the program will be collected monthly through surveys; however, the survey instrument was not included or described. Measure 4.3 (e35) states that classroom observations will be conducted, yet the observation protocol is not described or provided. Also, Measure 4.5 (e35) is not specific, and no standardized measure is stated to assess student achievement. The project would be stronger if more detail was provided regarding the specifics of the measures to be used. Also, the project serves each cohort for only one year. It is not clear if the applicant will provide any follow-up professional development after that one year to ensure the program continues to be implemented with fidelity.

The criteria for selecting the local professional development leaders is not clear in Measure 2.1 (e34). It is not clear how

the interviews stated in Measure 2.3 (e34) will be used to determine if local professional development leaders can facilitate the program with fidelity since no interview protocol was provided to indicate criteria for facilitating the program with fidelity. The selection of instructional leaders would be stronger if the criteria included watching them teach a model lesson since they will be responsible for ensuring that the teachers can effectively implement the model and individually written lesson with fidelity to the program goals.

Reader's Score: 20

Selection Criteria - Strategy to Scale

1. The Secretary considers the applicant's strategy to scale the proposed project. In determining the applicant's capacity to scale the proposed project, the Secretary considers the following factors:

(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.

(2) The extent to which the proposed project will increase efficiency in the use of time, staff, money, or other resources in order to improve results and increase productivity.

Strengths:

A significant barrier that has existed in past projects for the applicant is their reliance on BSCS staff to deliver all components of the program face to face (e37), which made the program difficult to scale due to the limited number of BSCS staff available, geographic constraints, and the desire from many districts and teachers to receive professional development providers who understand the local context (e37). The applicant plans to address this barrier by implementing a local STeLLA professional development leader-development program to prepare and support local leaders to lead the professional development for teachers. BSCS will mentor the local leaders throughout the project by observations and data from the online professional development delivery system (e38).

Including the online component of the program will also be more efficient for the participants' arrangements for travel and possibly childcare will be minimal which has the potential to increase participation and retention in the cohorts.

The development of local leaders has the potential to ensure that the project will reach the level of scaling that is proposed. The training of local leaders also has the potential to ensure the efficient use of time, staff, money, and other resources since the local leaders will have access to local data and personnel involved with these resources.

A second barrier stated is the ability of LEAs to sustain the program after the grant period. The applicant plans to meet this barrier by providing professional learning experiences in year 5 to those teachers who were assigned to the control group (e38) through the local leaders. Also, the applicant will provide ongoing free access to all materials associated with the project across the region, including lesson plans, professional development leader guides, classroom video and video analysis tools. The applicant will also conduct bi-annual meetings across all partners to develop long-term sustainability plans (e38). The project includes opportunities for ongoing refinement throughout the project (e37).

The applicant will provide both the treatment and the control teachers stipends for participating in the data collection process as well as to help with travel expenses to the face-to-face meetings in the summer sessions (e45, e47) which has the potential to increase participation since traveling to professional development sites has been noted as a barrier to obtaining effective professional development in the rural areas to be served. This will increase the probability that the applicant will bring the project to scale as well as increase the efficacy of the use of time, staff, money, and resources.

The applicant is working with funding from the Minnesota Department of Education to introduce a portion of the STeLLA

program online to teachers across that state that will increase the potential to scale to a statewide level (e37).

Weaknesses:

While local leaders will be trained to lead the professional development of teachers (e38), it is unclear if the local leaders will be provided stipends to attend the summer training or if the local leaders will continue to receive BSCS support after the grant period to ensure that the program continues to be implemented with fidelity. The timeline provides milestones for each year (e40). The proposal would be stronger if the timeline was more specific.

The applicant plans to conduct bi-annual meetings across all partners to develop long-term sustainability plans (e38). However, it is not clear where the meetings will be held and if travel stipends will be provided for face-to-face meetings if the meetings are not held locally since the partners are 19 LEAs. Therefore, it is difficult to determine if the project will increase the efficient use of time or money when planning the bi-annual meetings.

Reader's Score: 17

Selection Criteria - Adequacy of Resources/Quality of Management Plan

- 1. The Secretary considers the adequacy of resources and the quality of the management plan for the proposed project. In determining the adequacy of resources and quality of the management plan for the proposed project, the Secretary considers the following factors:**
 - (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.**
 - (2) 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.**
 - (3) The potential for continued support of the project after Federal funding ends, including, as appropriate, the demonstrated commitment of appropriate entities to such support.**
 - (4) The extent to which the costs are reasonable in relation to the objectives, design, and potential significance of the proposed project.**

Strengths:

Resumes of the management plan are provided (e62-94), and additional descriptions of the qualifications of the management plan are provided (e117-11). Milestones and responsibilities of the management plan are provided and include FTE's (e40, e116). The management's qualifications indicate that they will be able to bring the proposed project to scale on a national or regional level by working directly, or through partners, during the grant period. Letters of support from partner organizations are provided (e98-100). The LEAs provided letters of support indicating that instructional leaders will participate and lead the training with the teachers. All professional development materials will be made available across the region, including lesson plans, leader guides, classroom video, and the video analysis tools and processes (e43) which will allow instructional leaders to continue to support teachers.

The project has partnered with PIMSER (the Eastern Kentucky University Partnership Institute for Math and Science Education Reform), Tennessee Aquarium, and Instruction Partners (a Tennessee-based non-profit supporting schools and districts in reform efforts) to build local capacity and support dissemination and long-term sustainability (e23-24). These partners have also committed to serve as regional hubs with the responsibilities to provide and identify local PD leaders, assist in recruiting schools and teachers, assist with improvement of the program and materials, and support efforts to build regional capacity for sustainability and continued scaling (e43). This will encourage and support the

participants throughout the project.

Involving the partners in several components of the project has the potential to scale the project to a state level by since the partners will be familiar with the internal workings of the project and can use their influence to engage state and local leaders in the distribution of the project.

The budget includes stipends and travel costs for teacher participants, funds for local leaders and coordinators, as well as costs for dissemination and sustainability activities (e45).

Weaknesses:

At a cost of \$5,040 per teacher and a per student cost of \$210 and no external funds available through the partners, many LEAs may not be able to participate. While the applicant states that the cost per student decreases dramatically if teachers continue with strategies learned long term (e44), the initial cost of the project is prohibitive for LEAs located in the high-poverty areas proposed by the applicant and there is not guarantee this reduction in cost will occur. The applicant states that the LEAS will provide in-kind support \$196,032 (e129). However, it is not clear if this amount is intended to be from each LEA or if this amount is the total for all 19 LEAs. The Tennessee Aquarium has agreed to provide \$261,376 to support the participation of four STeLLAR staff (e129). However no additional external funds are available during the grant period or after. Also unclear is whether these meetings will continue after the grant period for additional support for the teachers. The applicant did not discuss avenues for funding after the grant period.

Therefore it is not clear if the corporate partners will be involved in the project after the grant period.

Reader's Score: 14

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:

(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 this notice).

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

(3) The extent to which the methods of evaluation will provide valid and reliable performance data on relevant outcomes.

(4) 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:

N/A

Weaknesses:

N/A

Reader's Score: 0

Status: Submitted

Last Updated: 05/22/2019 04:54 PM

Status: Submitted

Last Updated: 05/20/2019 10:27 AM

Technical Review Coversheet

Applicant: BSCS Science Learning (U411B190029)

Reader #2: *****

	Points Possible	Points Scored
Questions		
Selection Criteria		
Significance		
1. Significance	15	14
Quality of Project Design		
1. Project Design	25	21
Strategy to Scale		
1. Strategy to Scale	20	17
Adequacy of Resources/Quality of Management Plan		
1. Resources/Management Plan	20	18
Quality of the Project Evaluation		
1. Project Evaluation	20	0
Sub Total	100	70
Total	100	70

Technical Review Form

Panel #3 - EIR Mid Phase - 3: 84.411B

Reader #2: *****

Applicant: BSCS Science Learning (U411B190029)

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:

(1) The potential contribution of the proposed project to increased knowledge or understanding of educational problems, issues, or effective strategies.

(2) The extent to which the applicant demonstrates there is unmet demand for the process, product, strategy, or practice that will enable the applicant to reach the level of scale that is proposed in the application.

Strengths:

The applicant states that "In science education very few studies meet the standards of research that enable us to make causal claims about the impact of PD on student learning." (p. e27) Project results will add to the understanding of effective strategies for PD, particularly as related to science education.

The applicant cites research indicating that elementary students are lacking in achievement in science. (p. e25) STeLLA has already "demonstrated evidence of effectiveness on teacher and student outcomes." (p. e27) Because of low achievement in science, the opportunity to participate in a program that has shown gains will address an unmet demand for this project.

Providing a background of the difficulty teachers have with the "departure from current practices required by contemporary visions of science teaching and learning" (p. e25) promotes the understanding of the need for elementary teachers to have additional training in science education.

Weaknesses:

The relationship between science education and STEM outcomes has not been adequately established. While improvement may cause STEM outcomes to improve, the applicant does not provide background or evidence that this will likely be the case.

Reader's Score: 14

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:

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

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

Strengths:

Pages e34 through e36 provide a chart which states the objectives, strategies, outcomes and measures for the project. Almost all of the outcomes are clearly specified and measurable.

The framework under which the professional development has been designed is based on research so that the PD has the elements required to be effective. Page e29 and e30 states five requirements for professional development that the project includes.

Exhibit 3 (p. e29) addresses the components of the project in a visual that includes a broad timeline with the inputs and outcomes. This depiction underscores the strategies used to maintain effectiveness. Additionally, the "substance" of the activities is given support through the descriptions provided on pages e30 and e31 and supported through "cognition theory of teacher learning" as stated on page e33.

Weaknesses:

Strategy 4.5 (p. e35) has a measure that addresses student achievement. Increased achievement is the ultimate goal of the project, but the applicant does not provide a measurable outcome for this strategy.

Reader's Score: 21

Selection Criteria - Strategy to Scale

1. The Secretary considers the applicant's strategy to scale the proposed project. In determining the applicant's capacity to scale the proposed project, the Secretary considers the following factors:

(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.

(2) The extent to which the proposed project will increase efficiency in the use of time, staff, money, or other resources in order to improve results and increase productivity.

Strengths:

Efficiency and availability of professional development is clearly addressed through the movement from in-person only PD to more on-line components. This addresses the barrier of scheduling and participant limits as stated on page e36.

The "reliance on BSCS staff to deliver the program" (p. e37) is also a barrier to scaling, so the use of local leaders will allow for centralized PD that can then be disseminated to the participant LEAs.

The provision for "ongoing free access to all materials associated with the project" encourages participation and continuation of the project in future years while also increasing the efficiency of funds (no cost) and the use of time (no travel). (p. e38)

Weaknesses:

Though the training of local leaders is a strategy to address the barrier of BSCS reliance for the PD, the applicant doesn't indicate necessary information such as whether or not the local leaders receive monetary compensation for their participation. Without knowing whether or not there is funding involved here, an evaluation of whether or not this will increase productivity or efficiencies can't be made. In addition, bi-annual meetings are cited as a strategy to address sustainability and continued scaling (p. e38), but the application doesn't provide information about when, where, or costs associated with these meetings.

Reader's Score: 17

Selection Criteria - Adequacy of Resources/Quality of Management Plan

1. **The Secretary considers the adequacy of resources and the quality of the management plan for the proposed project. In determining the adequacy of resources and quality of the management plan for the proposed project, the Secretary considers the following factors:**
 - (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.**
 - (2) **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.**
 - (3) **The potential for continued support of the project after Federal funding ends, including, as appropriate, the demonstrated commitment of appropriate entities to such support.**
 - (4) **The extent to which the costs are reasonable in relation to the objectives, design, and potential significance of the proposed project.**

Strengths:

The applicant provides a clear overview of the strategies to be implemented each year along with the responsible entity. (p. e40). The relationship between the strategy to be accomplished is connected back to Exhibit 5 (p. e34) so that milestones are evident. This basic chart (Exhibit 7, p. e40) makes it easy to determine who is responsible for each strategy and indicates that none of the people or organizations are going beyond their ability to complete the project on time.

Assigned staffing for the project have strong backgrounds indicating successful experience and the ability to carry out required activities. (pp. e62-e94)

Utilization of the partner groups, PIMSER, Instruction Partners, and the Tennessee Aquarium assists with creating connections that could extend beyond the grant period. Each of these organizations will serve as hubs for the project and could be used in the future in a similar manner for continuation of grant activities. (p. e43)

Weaknesses:

The applicant states "the cost per student decreases dramatically" once the project is complete. (p. e44) There is no evidence of what they might expect this project to cost districts or schools who want to participate in the future. They expect the cost per student during the project to be about \$210, or \$5,040 per teacher which is reasonable for its implementation and evaluation.

Reader's Score: 18

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:

(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 this notice).

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

(3) The extent to which the methods of evaluation will provide valid and reliable performance data on relevant outcomes.

(4) 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:

N/A

Weaknesses:

N/A

Reader's Score: 0

Status: Submitted
Last Updated: 05/20/2019 10:27 AM

Status: Submitted

Last Updated: 05/22/2019 01:13 PM

Technical Review Coversheet

Applicant: BSCS Science Learning (U411B190029)

Reader #3: *****

	Points Possible	Points Scored
Questions		
Selection Criteria		
Significance		
1. Significance	15	0
Quality of Project Design		
1. Project Design	25	0
Strategy to Scale		
1. Strategy to Scale	20	0
Adequacy of Resources/Quality of Management Plan		
1. Resources/Management Plan	20	0
Quality of the Project Evaluation		
1. Project Evaluation	20	19
Sub Total	100	19
Total	100	19

Technical Review Form

Panel #3 - EIR Mid Phase - 3: 84.411B

Reader #3: *****

Applicant: BSCS Science Learning (U411B190029)

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:

(1) The potential contribution of the proposed project to increased knowledge or understanding of educational problems, issues, or effective strategies.

(2) The extent to which the applicant demonstrates there is unmet demand for the process, product, strategy, or practice that will enable the applicant to reach the level of scale that is proposed in the application.

Strengths:

NA

Weaknesses:

NA

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:

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

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

Strengths:

NA

Weaknesses:

NA

Reader's Score: 0

Selection Criteria - Strategy to Scale

1. The Secretary considers the applicant's strategy to scale the proposed project. In determining the applicant's capacity to scale the proposed project, the Secretary considers the following factors:

(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.

(2) The extent to which the proposed project will increase efficiency in the use of time, staff, money, or other resources in order to improve results and increase productivity.

Strengths:

NA

Weaknesses:

NA

Reader's Score: 0

Selection Criteria - Adequacy of Resources/Quality of Management Plan

1. The Secretary considers the adequacy of resources and the quality of the management plan for the proposed project. In determining the adequacy of resources and quality of the management plan for the proposed project, the Secretary considers the following factors:

(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.

(2) 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.

(3) The potential for continued support of the project after Federal funding ends, including, as appropriate, the demonstrated commitment of appropriate entities to such support.

(4) The extent to which the costs are reasonable in relation to the objectives, design, and potential significance of the proposed project.

Strengths:

NA

Weaknesses:

NA

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:

(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 this notice).

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

(3) The extent to which the methods of evaluation will provide valid and reliable performance data on relevant outcomes.

(4) 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 proposal includes clear research questions aligned to each section of the evaluation (p. e46) which provides structure for remainder of the proposal. The proposal outlines a clear plan for randomized controlled trial for the impact evaluation (p. e47) including a discussion of attrition, random assignment by schools and a power analysis related to sample size (e107) which, if executed correctly, should meet the requirements of the What Works Clearinghouse without reservations. The analysis of the moderating variables will provide useful information for program implementation as well as for future replication in a variety of settings (p. e48). The proposal includes many data collection methods that will review the implementation of planned program activities in a manner that will be informative to program staff and provide data for program decisions (p. e49). The use of both study administered and state administered measures of science content knowledge provides good alignment between program activities and the demonstration of student learning (p. e50). The equating measures identified in proposal will help to align the different state assessment being used in the study (p. e50). The use of both multiple-choice items as well as a video prompt reviewed by teachers will provide strong evidence of teacher knowledge of the content being taught in the program (p. e51). The teacher observations will also provide strong evidence to address the question regarding effective teacher practice (p. e51). All of the measures identified for the impact analysis have demonstrated adequate psychometric evidence and the qualitative measures will be administered in a manner that will produce reliable results (p. e51). The proposal includes strong evidence to measure each of the program components and includes measurable implementation thresholds for each indicator (p. e52).

Weaknesses:

Limited information is provided about attrition information in the proposal (p. e47) which is required for the What Works Clearinghouse without reservations. The proposal would have been strengthened had a consideration of inter-rater reliability been added to the psychometrics of the teacher observations (p. e51).

Reader's Score: 19

Status: Submitted
Last Updated: 05/22/2019 01:13 PM

Status: Submitted

Last Updated: 05/22/2019 06:45 PM

Technical Review Coversheet

Applicant: BSCS Science Learning (U411B190029)

Reader #4: *****

	Points Possible	Points Scored
Questions		
Selection Criteria		
Significance		
1. Significance	15	0
Quality of Project Design		
1. Project Design	25	0
Strategy to Scale		
1. Strategy to Scale	20	0
Adequacy of Resources/Quality of Management Plan		
1. Resources/Management Plan	20	0
Quality of the Project Evaluation		
1. Project Evaluation	20	15
Sub Total	100	15
Total	100	15

Technical Review Form

Panel #3 - EIR Mid Phase - 3: 84.411B

Reader #4: *****

Applicant: BSCS Science Learning (U411B190029)

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:

(1) The potential contribution of the proposed project to increased knowledge or understanding of educational problems, issues, or effective strategies.

(2) The extent to which the applicant demonstrates there is unmet demand for the process, product, strategy, or practice that will enable the applicant to reach the level of scale that is proposed in the application.

Strengths:

NA

Weaknesses:

NA

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:

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

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

Strengths:

NA

Weaknesses:

NA

Reader's Score: 0

Selection Criteria - Strategy to Scale

1. The Secretary considers the applicant's strategy to scale the proposed project. In determining the applicant's capacity to scale the proposed project, the Secretary considers the following factors:

(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.

(2) The extent to which the proposed project will increase efficiency in the use of time, staff, money, or other resources in order to improve results and increase productivity.

Strengths:

NA

Weaknesses:

NA

Reader's Score: 0

Selection Criteria - Adequacy of Resources/Quality of Management Plan

1. The Secretary considers the adequacy of resources and the quality of the management plan for the proposed project. In determining the adequacy of resources and quality of the management plan for the proposed project, the Secretary considers the following factors:

(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.

(2) 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.

(3) The potential for continued support of the project after Federal funding ends, including, as appropriate, the demonstrated commitment of appropriate entities to such support.

(4) The extent to which the costs are reasonable in relation to the objectives, design, and potential significance of the proposed project.

Strengths:

NA

Weaknesses:

NA

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:

(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 this notice).

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

(3) The extent to which the methods of evaluation will provide valid and reliable performance data on relevant outcomes.

(4) 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:

In order for an evaluation study to meet the WWC standards without reservations it must have appropriate randomization of subjects and have minimal/limited attrition. Schools will be randomized appropriately into intervention and control schools.

It is expected that the schools and students will be heterogeneous on numerous demographic variables. The applicant indicates that there will be a differential impact analysis which will provide potential intervention adopters the opportunity to determine the quality of the fit between this intervention and their educational community. A cost analysis will be performed which will allow other settings to conduct a cost-benefit analysis of their own to determine the appropriateness of this intervention.

The PCK assessment has appropriate reliability. The study administered science assessment has acceptable internal reliability. The ratings of videos of classroom instruction allows for actual observation of teaching rather than self-reports, a significant positive addition to the assessment.

The key research questions are appropriate and well framed. Mediator effects are proposed and will be tested. Outcomes are identified. Minimally acceptable thresholds of acceptable implementation have been established. These elements of the evaluation plan are well explained and understandable.

Weaknesses:

The applicant states that the evaluation study will consist of "a cluster RCT that is designed to minimize attrition and be free of confounds". No information is provided as to how attrition will be minimized, or how confounds will be controlled. There is insufficient information provided to determine if the evaluation study will meet WWC standards without reservations.

Z-scores will be generated for the state science assessments of Kentucky and Tennessee and the data sets combined. This is appropriate if there is evidence of an acceptable level of equivalence between the two state exams. However, no such equivalence in content or difficulty is established in the application.

No information is provided as to the construct validity or other types of validity for the study-administered science assessment tool.

The application would be strengthened if a minimally acceptable level of inter-rater reliability was established for observation of teaching.

Reader's Score: 15

Status: Submitted

Last Updated: 05/22/2019 06:45 PM

Status: Submitted

Last Updated: 05/16/2019 10:59 AM

Technical Review Coversheet

Applicant: BSCS Science Learning (U411B190029)

Reader #5: *****

	Points Possible	Points Scored
Questions		
Selection Criteria		
Significance		
1. Significance	15	15
Quality of Project Design		
1. Project Design	25	20
Strategy to Scale		
1. Strategy to Scale	20	17
Adequacy of Resources/Quality of Management Plan		
1. Resources/Management Plan	20	17
Quality of the Project Evaluation		
1. Project Evaluation	20	0
Sub Total	100	69
Total	100	69

Technical Review Form

Panel #3 - EIR Mid Phase - 3: 84.411B

Reader #5: *****

Applicant: BSCS Science Learning (U411B190029)

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:

(1) The potential contribution of the proposed project to increased knowledge or understanding of educational problems, issues, or effective strategies.

(2) The extent to which the applicant demonstrates there is unmet demand for the process, product, strategy, or practice that will enable the applicant to reach the level of scale that is proposed in the application.

Strengths:

The applicant's project is likely to increase the knowledge related to effective strategies which may solve a key educational problem, science education. The significance of the applicant's project is related to transforming their face-to-face professional development for elementary teachers to an online platform. The applicant's strategies have already shown significant promise as reviewed by What Works Clearing House (WWC). If the applicant is afforded the opportunity to extend their existing professional development model to an online platform, it will be significant in determining if the same level of effectiveness can be achieved as related to science learning outcomes. The significance of the project is also related to a focus on the most important developmental years related to science, elementary school years. If students develop an appreciation and affection for science in these formative educational years, the research is clear related to a higher probability for these students to continue to want to explore STEM. The unmet demand for a project of this nature is related to the fact, that more districts are eager for more professional development opportunities for teachers, especially in science. The Next Generation Science Standards (NGSS) is a framework for teaching science more effectively, and many of the districts partnering with this applicant are adopting the NGSS, hence, an unmet demand. Furthermore, the significance is related to science being at the core of STEM, and without a quality education in the early years which includes science, the nation's competitiveness in a 21st century global workforces will be in a precarious standing. The applicant demonstrated this understanding, by including partners who are committed to STEM. The two partners who represent a focus in STEM, PIMSER and Tennessee Aquarium. PIMSER provides support for improvements in STEM education. Tennessee Aquarium like the majority of aquariums in the US are directly involved in STEM initiatives. They offer multiple after-school and summer programs, to help students to learn about marine science, hence, STEM career opportunities.

Weaknesses:

There were no weaknesses identified.

Reader's Score: 15

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:

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

(2) 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 provided objectives and outcomes for the proposed project (page, e34). The majority of these outcomes are clearly specified and measurable. Furthermore, the objectives, strategies and outcomes are all directly aligned to the applicant's project. The applicant's project is grounded around a framework based on supported peer-reviewed research. The framework consists of all the necessary components for a project focused on professional development for teachers. Some of the components are related to professional development, summer institute for teachers and lesson planning work in online study groups. Given the online modality for this applicant proposed professional development, bringing teachers together during the summer institute is a best practice when the educational lessons are delivered solely online. The face-to-face component provides the necessary human touch points not possible in a 100% online training environment.

Weaknesses:

The applicant's objectives, and outcomes were not all clearly specified and measurable. There were no specific goals provided with the objectives, and one of the most important outcomes in Exhibit 5 (page, e35) was not clearly specified, hence, measurable. The outcome is related to student achievement. The student achievement outcome associated with Strategy 4.5, was not clearly specified and there was no reliable measure provided to assess the science learning outcome, which is at the core of this project. The other outcomes not clearly specified were associated with Strategies 1.3, 2.5, 3.4 and 4.6.

Reader's Score: 20

Selection Criteria - Strategy to Scale

1. The Secretary considers the applicant's strategy to scale the proposed project. In determining the applicant's capacity to scale the proposed project, the Secretary considers the following factors:

(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.

(2) The extent to which the proposed project will increase efficiency in the use of time, staff, money, or other resources in order to improve results and increase productivity.

Strengths:

The barrier that prevented the applicant from extending their intervention, the professional development curriculum is only designed to be delivered face-to-face (page, e36). As astutely noted by the applicant, face-to-face delivery requires significant travel time for teachers, and this is a significant barrier. The applicant's strategy is to convert the face-to-face professional development curriculum to a blended and completely online delivery while maintaining all of the face-to-face components. Given the ubiquitous nature of online programs today, this is a feasible solution. The applicant has a well-articulated and convincing plan to increase efficiency. The applicant will use an efficiency model by moving to a local leadership model. Using this model, this will allow the applicant to serve 7x more students (page, e39). Instead of the applicant's staff providing the professional development, local leaders and school-district personnel will lead the professional development training, once they have the required skills and knowledge to implement the program with fidelity. Also, the applicant will make refinements to the program based on data from the program evaluation. Most importantly, as noted by the applicant in making any refinements, it will be important for them to maintain the effectiveness/impacts on teaching and learning.

Weaknesses:

As related to the proposed project increasing efficiency in the use of time, staff, money, or other resources in order to improve results and increase productivity, there is a concern with the local leadership model. The local leadership model is being proposed as a strategy to overcome one of the barriers. It was not clear whether or not stipends would be paid, this information could not be found in the grant. If stipends will be used and this is not part of the budget, this could create a budget issue.

Reader's Score: 17

Selection Criteria - Adequacy of Resources/Quality of Management Plan

- 1. The Secretary considers the adequacy of resources and the quality of the management plan for the proposed project. In determining the adequacy of resources and quality of the management plan for the proposed project, the Secretary considers the following factors:**
 - (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.**
 - (2) 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.**
 - (3) The potential for continued support of the project after Federal funding ends, including, as appropriate, the demonstrated commitment of appropriate entities to such support.**
 - (4) The extent to which the costs are reasonable in relation to the objectives, design, and potential significance of the proposed project.**

Strengths:

The applicant provided the qualifications and experience of the project lead and key personnel assigned to this grant. In reviewing the details, the résumés, the qualifications and experiences of these key personnel are appropriate based on the number of years cited and previous work experience cited by the applicant. The amount of time the key personnel will be assigned to this grant (FTE) was provided by responsibilities. In reviewing these FTEs it is noted that the time will be sufficient and provide the needed reasonable resources for this grant. The applicant timeline and milestones are organized by objectives, strategies, responsible person and timeline, hence, demonstrates the applicant has clearly considered the entire project plan in advanced of being awarded any grant. All of the strategies in Exhibit 7, page e40, are the specific strategies outlined earlier in the grant, hence, clearly understands all of the strategies for effective implementation. The applicant's organizational chart and reporting relationships illuminates the applicant's capacity to manage this grant successfully. The applicant's organizational chart demonstrates their understanding of needing partners to help to scale successfully. The partners include STEM partners, school-level and district-level partners. The nature of the applicant's project makes it highly-likely to be sustainable. All of the professional development materials will be made available, the lesson plans, leader guides, videos, etc.

The applicant clearly and convincingly outlined why they feel the costs are reasonable in relation to the objectives, design, and potential significance of the proposed project (page, e44). The cost per student and cost per teacher were provided.

Weaknesses:

The only concern is related to sustainability. Although the applicant indicated that they would make the professional development components available to the districts, it was not clear if there would be a cost associated with providing the districts access to the material.

Reader's Score: 17

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:

(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 this notice).

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

(3) The extent to which the methods of evaluation will provide valid and reliable performance data on relevant outcomes.

(4) 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:

N/A

Weaknesses:

N/A

Reader's Score: 0

Status: Submitted
Last Updated: 05/16/2019 10:59 AM