

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

Status: Submitted

Last Updated: 08/02/2018 09:34 PM

## Technical Review Coversheet

**Applicant:** Knox County Schools (U411C180052)

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

|  | Points Possible | Points Scored |
|--|-----------------|---------------|
| <b>Questions</b>   |                 |               |
| <b>Selection Criteria</b>                                |                 |               |
| <b>Significance</b>                                      |                 |               |
| 1. Significance  | 30              | 26            |
| <b>Quality of the Project Design and Management Plan</b> |                 |               |
| 1. Project Design/Management                             | 50              | 44            |
| <b>Total</b>   | 80              | 70            |

# Technical Review Form

Panel #14 - EIR Early Phase Tier 1 (Content) - 14: 84.411C

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

Applicant: Knox County Schools (U411C180052)

## Questions

### Selection Criteria - Significance

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

- (1) The national significance of the proposed project.
- (2) 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.
- (3) The extent to which the proposed project demonstrates a rationale (as defined in the NIA).
- (4) The extent to which the proposed project represents an exceptional approach to the priority or priorities established for the competition.

### Strengths:

(1) The applicant establishes the national significance of the proposed project by outlining the shortage of STEM workers in the US, the strong wages for STEM occupations, and the growth rate in job availability which surpasses other occupational fields (p 2-3). Computer science is also a focus of this proposal, which indicates that "20% of career track jobs were in occupations that value coding skills" (p. 3). Due to these demands, the applicant stresses the need to expose children early to STEM courses and positions. Additionally, the proposal states that "minorities continue to be underrepresented" in those earning STEM college degrees (women earn only 16% of computer science bachelor degrees and underrepresented minorities 11%).

(2) It is clear from the proposal that Knox County Schools have made significant efforts to "increase access to and efficacy of STEM education" (p. 5). There are already STEM cohorts of teachers, math partnerships, elementary STEM supports, a STEM newsletter, a STEM resources page, technology integration support, STEM certifications, and community outreach to industry partners. However, as the proposal notes, not all elementary schools provide a strong STEM program, and many students do not have access to advanced STEM/computer science education. It is a strength of this proposal that this project will target "high needs students" at the elementary level and allow them to delve deeper into STEM content outside of school in a year-long institute with engaging content which will supplement the existing strategies that KCS is implementing.

(3) The rationale for the project is clear; the proposal will create an outside of school institute in order to engage elementary students who might be at risk academically, linguistically, or economically, with enriching STEM opportunities. It is a strength of the project that it will focus on elementary students, as the applicant noted, introduction to STEM in elementary school allows students to develop early interests in science and math which will hopefully carry through to secondary school and inform course-taking and eventual career paths (p. 3). The proposal also provides a local rationale for the project, focusing on the strong STEM job growth and salaries in Tennessee.

(4) The proposal cites research from the National Research Council stating that "out-of-school STEM programming has been found to contribute to student interest in and understanding of STEM" (p. 7). Knox County schools, in this proposal, has created a project that is likely to impact student STEM achievement with a rationale supported by prior research (Priority 1) and is focused on rich STEM programming (Priority 3). This represents a unique approach to the priorities established for the competition.

**Weaknesses:**

(1) While the applicant provides relevant statistics regarding the shortage of workers for important STEM fields and indicates that certain groups are underrepresented among those pursuing STEM degrees, there is other data that could have been provided to strengthen the proposal. First, disaggregating racial/ethnic groups instead of grouping them together as “minorities” would provide a more nuanced picture of the issue. Additionally, in order to determine actual underrepresentation it is important to know the overall percent of the population that group represents. So, for example, if only 11% of computer science degrees are earned by “minorities,” how does that compare to the population enrolled in college or the overall population in the US? Also, the issue goes beyond STEM degree underrepresentation and into the workforce, data which is not mentioned in the grant.

(2) While the proposed project will supplement existing strategies employed to strengthen STEM education in Knox County, it is not clear as to how the project will build on the existing strategies, if it will at all. Right now, this project seems separate from the STEM curriculum in Knox County. It may strengthen the proposal if the project did integrate into the existing strategies in order to promote general STEM proficiency.

(3) No weaknesses noted in regard to the rationale.

(4) In order to meet the criteria for Priority 3, “projects must address the following priority area: Creating or expanding partnerships between schools, local educational agencies, State educational agencies, businesses, not-for-profit organizations, or institutions of higher education to give students access to internships, apprenticeships, or other work-based learning experiences in STEM fields, including computer science (as defined in this notice)” (Federal Register, Vol 83, #76, page 17395). While this project offers an “externship,” it is for one day only (p. 10), which does not seem to meet the intent of the criteria – which is for students to participate in internships, apprenticeships or other work-based learning experiences.

**Reader's Score: 26**

**Selection Criteria - Quality of the Project Design and Management Plan****1. In determining the quality of the proposed project design, 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 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.**
- (3) The extent to which performance feedback and continuous improvement are integral to the design of the proposed project.**
- (4) The mechanisms the applicant will use to broadly disseminate information on its project so as to support further development or replication.**

**Strengths:**

(1) The goals, objectives, and outcomes to be achieved by the proposed project are outlined in the appendix of the application. They are clearly specified and most are measurable. It is a strength of the proposal that each outcome includes percentage targets. For example, under Goal 1, Outcome 1, the proposal states “50% of students will show an increase in STEM basic knowledge...” (p. e63).

(2) The proposal outlines the project staff and their general responsibilities including 5 current KCS staff members, the lead evaluator, and additional staff members to be hired by KCS (TAI Facilitator, Institute Leaders, Curriculum Developers, Data Analyst, School Security Officers, and student TAI Mentors (p. 16). A detailed timeline is included in the

appendix which lists tasks, the personnel responsible, and the quarter in which the task will be completed. It is a strength of the proposal that the timeline is detailed by quarter, giving a good description of the general activities of the project. Additionally, the completion of quarterly financial reports are listed in the timeline, which allows the project managers to determine whether or not the project will be completed within budget (also mentioned on p. 19). The management plan seems adequate to ensure the project will be completed on time and within budget, including responsibilities and timelines for accomplishing project tasks.

(3) The proposal states that performance feedback and continuous improvement are integral to the design of the project. It is a strength of the proposal that regular meetings occur between the evaluation team and KCS and that a “feedback loop” will ensure that partners, parents, and other stakeholders provide input (p 18).

(4) The applicant will use many mechanisms to broadly disseminate information on its project. The proposal includes scholarly products (publications in peer-reviewed journals and book chapters) and presentations to local and wider audiences. It is a strength of the proposal that a variety of locales for dissemination are identified.

### **Weaknesses:**

(1) While the goals, objectives, and outcomes are mainly measurable, there are questions related to the outcome targets. For example, many outcomes state that there will be an increase in a score (like Goal 1, Outcome 1 and 2), however there is no information about what kind of increase would be meaningful (that is, a statistically significant increase? An increase of 10%?). Other outcomes fail to provide the metric by which the outcome will be measured; Outcome 4 for Goal 1 states “90% of students will successfully create a video game...” However, there is no indication of the measure that will be used to determine what “success” is for this objective. To strengthen this section, it would be helpful to plan for outcomes that measure the quality of a service and not just that a service has been provided and to articulate a specific measure and amount of improvement that will allow the project to determine whether or not the outcome was met successfully. Additionally, to measure the acquisition of general STEM knowledge, including an outcome related to standardized testing in science might be a more meaningful measure than pre/post tests which are not standardized and generally always show an increase in scores. Finally, the Goals chart is not complete, as the column “TAI Component” is not filled in.

(2) There are a few areas in which the management plan could be strengthened in order to insure that all objectives will be met on time. One weakness of the management plan is that it is difficult to determine what the acronyms mean and, by extension, who is responsible for the task. For example, on p. e54-56, the table uses TF, GDM, and KCSF as responsible parties, however there is no legend to indicate who those people are. Additionally, some activities occur every quarter (“Regular meetings w/KCS provide formative feedback”), but there is no indication of how often they occur within the quarter. That would be helpful in order to determine the quality of the management plan. Finally, specifically linking the tasks with the objectives would help to indicate how the project is assuring that all objectives will be met.

(3) It appears that performance feedback and continuous improvement are important to the design of the project and that data is regularly shared with stakeholders, however it is not clear from the proposal what mechanisms are in place to ensure that continuous improvements are made based on this data, nor is it clear which person (or groups) make the decisions to revise or change aspects of the project.

(4) While there are strengths in the dissemination plan, there are also gaps in the proposal. To strengthen the application, it would be helpful for the proposal to identify how “information regarding program design and outcomes will be made available...” and how the results will be “made publically known” (p. 20). There is no indication in the proposal that resources will be shared online, which would be one way perhaps that information on the project could be shared to support further development or replication.

**Reader's Score:** 44

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Last Updated: 08/07/2018 08:34 PM

## Technical Review Coversheet

Applicant: Knox County Schools (U411C180052)

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

|  | Points Possible | Points Scored |
|--|-----------------|---------------|
| <b>Questions</b>   |                 |               |
| <b>Selection Criteria</b>                                |                 |               |
| <b>Significance</b>                                      |                 |               |
| 1. Significance  | 30              | 27            |
| <b>Quality of the Project Design and Management Plan</b> |                 |               |
| 1. Project Design/Management                             | 50              | 47            |
| <b>Total</b>   | 80              | 74            |

# Technical Review Form

Panel #14 - EIR Early Phase Tier 1 (Content) - 14: 84.411C

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

Applicant: Knox County Schools (U411C180052)

## Questions

### Selection Criteria - Significance

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

- (1) The national significance of the proposed project.
- (2) 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.
- (3) The extent to which the proposed project demonstrates a rationale (as defined in the NIA).
- (4) The extent to which the proposed project represents an exceptional approach to the priority or priorities established for the competition.

### Strengths:

Knox County Schools (KCS) proposes to launch a STEM education program under Absolute Priority 1 and Absolute Priority 3, targeting elementary students in Knoxville, TN. Think About It: SySTEMatiCally Preparing Students for the Workforce (TAI) would begin in five elementary schools and scale up to at least 10 school (p. 18), serving 570 unduplicated students over five years (p.e61).

The Applicant presents evidence showing that 16 of the 20 fastest growing occupations are in STEM related industries. Also noteworthy is that only four of the fastest growing STEM occupations require advanced degrees. That could be notable for high need students or students groups who may not be prepared for or want to go to college. More good news for all groups is that STEM workers earn 26 percent more than non-STEM workers.

The proposed strategy is a new strategy for the Applicant, but it appears to be well thought out and STEM industry partners have already been recruited (p.6). Schools were chosen to participate to demonstrate that the program could be effectively implemented in diverse school settings and communities (p.7). Three of the targeted schools have 56 percent and above of their students living in poverty. Four schools have 10 percent or more of their student population with disabilities.

The Applicant presents a wide range of research findings (p. 2-4) suggesting that STEM should be introduced to children as soon as they enter elementary school. The project intentionally focuses on elementary grades 3 – 5. Students are introduced to the STEM field, including learning expeditions with STEM industry professionals. The project activities are designed to build skills and competencies that research shows to be necessary in STEM professions, i.e., collaboration and communication skills. The logic model clearly shows need, activities, outputs as well as short- and long-term outcomes.

Additionally, it cites research showing the value of offering STEM focused opportunities outside of regular school hours (p. 10). That is done by offering week-long, full day STEM Institutes when students are out of school and parents are working (summer, spring and fall school breaks). To families struggling financially this would amount to free Tech camps that might normally be unaffordable to them.

The Applicant has put together a comprehensive program targeting high-needs elementary students with components that meet Absolute Priority 1 – Demonstrates a Rationale and Absolute Priority 3— Field-Initiated Innovations—Promoting Science, Technology, Engineering, or Math (STEM) Education, With a Particular Focus on Computer Science . For

example, the project's STEM Institutes create partnerships with STEM businesses and give students externships that allow them to shadow STEM professionals (p. 12). As the Institutes progress, among other skills, students would learn programming, build STEM vocabulary and work with industry partners on a TED Talk Capstone project.

High school students would be engaged as mentors and receive community service hours and a technology stipend to purchase technology of their choice, such as laptop, Chromebook, iPad, etc. (p. 17). There is so much on the program's menu that students should remain engaged and the fact that institutes and other activities occur quarterly provides a good pace for activities.

**Weaknesses:**

Relative to the standards to meet Absolute Priority 3, there are a few clarifications that would strengthen the proposal:

1. How would the mentorships qualify as work-based experience for the high school students? Examples of what they might do to support the elementary students would be helpful.
2. What are the distinctions between externships and expeditions (p. 10)?

**Reader's Score: 27**

**Selection Criteria - Quality of the Project Design and Management Plan**

1. In determining the quality of the proposed project design, 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 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.
- (3) The extent to which performance feedback and continuous improvement are integral to the design of the proposed project.
- (4) The mechanisms the applicant will use to broadly disseminate information on its project so as to support further development or replication.

**Strengths:**

The Applicant includes goals, objectives and timelines that are specific and measurable (pp. e54 – e56, e63, e64, and e117 – e120).

The management plan is very thorough. The Applicant includes background information on the credential of staff with responsibilities for implementing the project (p. 14, 17). The Applicant has presented a well thought out plan on how staffing will be utilized.

Feedback listed as beginning in the fall of 2018 and occurring every quarter thereafter (e55). The applicant would make an intentional effort to ensure feedback from multiple stakeholders, including parents. A plan to engage parents throughout is a strength of the project as too often parents are simply told about programs and then asked to give their consent for their student's participation. This project plan includes opportunities for parents to share input. Other stakeholders to be intentionally engaged include classroom teachers, industry partners, and mentors (p.18). The Applicant has developed surveys to capture information following each Institute to inform it of changes needed before the next Institute begins. A survey tool could ensure that feedback is obtained on specific areas as needed.

The Applicant has a dissemination plan which includes hiring facilitator whose responsibilities will include dissemination of results, and the project's evaluators will be used at the project's end. The plan includes using the district's learning days

which take place annually and Teacher Learning Days which occur three times a year. Plans also include presentations at educational workshops and conferences, specifically the National Conference of Teachers of Mathematics (NCTM) and Tennessee STEM Innovation Network (TSIN) Summits and other evaluators in local and national school districts (p. 19, 20) to share best practices and results with local schools not selected for participation in the project. It states that priority will be to disseminate information to policy makers and the educational community at all levels. It will also seek to publish in national publications.

**Weaknesses:**

The timeline does not show benchmarks or milestones and most activities are shown as beginning quarterly. More specific timelines might lend to better tracking of activities.

The Applicant does not identify who would comprise the "district-wide staff" slated for training on best practices and lessons learned" on page 17, i.e., their roles, positions, etc., in relation to the project.

The plan for dissemination is general, i.e., targeting education conferences and policy makers and puts a lot of expectation on the evaluators submitting information to peer journals at the project's end. It does not describe why it targets district learning days to disseminate information. What is the content of those days which make them valuable as a dissemination mechanism? It's stated that dissemination opportunities will be pursued as they become available, yet the timeline indicates quarterly dissemination—assigned to all. A stronger dissemination plan would identify a communications person(s) to lead the project's dissemination efforts and to be intentional about what information to release and the most appropriate audience(s). Perhaps bringing onboard a media specialist within the district's communication office would help. That person or persons would likely be have local media contacts and if they are familiar with the project, could pitch story ideas to various media at appropriate times. There is no reference to using social media or traditional media to talk about the project's success.

**Reader's Score:**     **47**

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**Status:**           Submitted  
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Status: Submitted

Last Updated: 08/06/2018 10:29 PM

## Technical Review Coversheet

**Applicant:** Knox County Schools (U411C180052)

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

|  | <b>Points Possible</b> | <b>Points Scored</b> |
|--|------------------------|----------------------|
| <b>Questions</b>   |                        |                      |
| <b>Selection Criteria</b>                                |                        |                      |
| <b>Significance</b>                                      |                        |                      |
| 1. Significance  | 30                     | 28                   |
| <b>Quality of the Project Design and Management Plan</b> |                        |                      |
| 1. Project Design/Management                             | 50                     | 45                   |
| <b>Total</b>   | 80                     | 73                   |

# Technical Review Form

Panel #14 - EIR Early Phase Tier 1 (Content) - 14: 84.411C

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

Applicant: Knox County Schools (U411C180052)

## Questions

### Selection Criteria - Significance

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

- (1) The national significance of the proposed project.
- (2) 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.
- (3) The extent to which the proposed project demonstrates a rationale (as defined in the NIA).
- (4) The extent to which the proposed project represents an exceptional approach to the priority or priorities established for the competition.

#### Strengths:

The Knox County Schools' proposal aims to serve about 370 elementary students and improve their knowledge and interest in STEM. The proposal establishes a national significance stating that increased STEM exposure supports developing literacy skills. The proposal also addressed the rationale for their project, stating that working with younger students will prompt more student to join and stick with STEM in the future (pg. 3). Knox County schools also plan to recruit woman and students of color in order to support their development in the STEM fields in the future.

#### Weaknesses:

The proposal addressed the priority of supporting students that are underrepresented in STEM, but failed to compare the two groups (women and students of color) to the whole population, which would have helped make the argument that the proposal is nationally significant. The one-day internship can be strengthened to support students' development of work-place experience and career readiness in the future.

Reader's Score: 28

### Selection Criteria - Quality of the Project Design and Management Plan

1. In determining the quality of the proposed project design, 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 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.
- (3) The extent to which performance feedback and continuous improvement are integral to the design of the proposed project.
- (4) The mechanisms the applicant will use to broadly disseminate information on its project so as to support further development or replication.

**Strengths:**

Think About It proposes to have STEM Institutes throughout the academic year and focuses the institutes during breaks. Having institutes during breaks will allow for students to continue to be academically engaged because research shows that students can regress skills during breaks. The proposal sets high attendance goals. High expectations for student attendance will support more learning and engagement with the content taught. On pages 13- 16, the applicant explains in detail the management plan and the partnership with WestEd to ensure continuous improvement.

**Weaknesses:**

Academic outcomes are strong, but not all objectives are specific. For example, objective 1 would be stronger if there were a Criteria for Success. What does it look and sound like to be successful at “identifying STEM habits of mind.” Another way to strengthen the proposal would be to implement standardized testing to be able to determine the growth of the students rather than simply a pre and post-test.

**Reader's Score:**     **45**

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**Status:**             Submitted

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