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

Status: Submitted
Last Updated: 09/13/2023 12:42 PM

Technical Review Coversheet

Applicant: Alabama State Department of Education - AMSTI (S411C230211)
Reader #1:   **********

	Points Possible	**Points Scored**
Questions		
Selection Criteria		
Significance		
1. Significance	20	20
Quality of Project Design		
1. Project Design	30	28
Quality of Project Personnel		
1. Project Personnel	10	9
Quality of the Management Plan		
1. Management Plan	10	9
Sub Total	70	66
Priority Questions		
Competitive Preference Priority		
Competitive Preference Priority 1		
1. Promoting Equity	5	2
Competitive Preference Priority 2		
1. Workforce Diversity	2	0
Sub Total	7	2
Total	77	68

Technical Review Form

Panel #8 - EIR Early-Phase - 8: 84.411C

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

Applicant: Alabama State Department of Education – AMSTI (S411C230211)

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 factor:

Reader's Score: 20

   Sub

   1. **(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 use of virtual tutors interacting with students "in the VR space ... who will work in conjunction with classroom teachers to target student math learning" (p. e22) is a strong alternative to existing strategies for content instruction. This "immersive VR presents a unique opportunity that allows students to be fully immersed in a mediated, interactive instructional session facilitated by high-quality, remote teachers" (p. e20)

      The applicant describes that the project builds from studies of VR effectiveness on student engagement and learning (e.g. Cai et al., 2021; Mahmoud et al., 2020; Luo et al. (2021). (p. e14)

      The applicant proposes to "build, improve, and perform a randomized controlled trial (RCT) of CurioXR, a virtual reality program aimed to supplement mathematics learning" with Alabama's "largely rural and … historically marginalized students" (p. e17)."

      Weaknesses:

      No weakness noted.

      Reader's Score: 20

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: 28

    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 applicant presents an almost perfect conceptual framework to support their proposal. Research cited that the results of a "meta-analysis conducted by Merchant et al. (2014) included 69 non-immersive VR studies across three forms of VR (games, simulations, and virtual worlds) used in K–20 … indicate that all three forms of VR resulted in increased learning gains" (p. e21). Additional research cited that describe the positive effect on student academic achievement of VR in a K-12 setting such as Luo and colleagues (2021) and Di Natale et al. (2020) (p. e21).

   The use of VR in a school setting presents "new and innovative opportunities for interactive sessions" (p. e22) and "access to high-quality teachers" (p. e20), that will help students in Alabama rural schools that "are on a criteria shortage list, which means between 30 percent and 83 percent of math or science teachers in the districts do not have a certificate in either subject" (p. e19)

   The applicant describes three components for the conceptual framework when using the CurioXR VR technology: a blended implementation structure, innovative and immersive VR lessons using cutting-edge technology, and instructional design supporting student engagement and teacher involvement (p. e25). The applicant should be commended for explicitly including the teacher involvement with regards to a remote and new technology.

   Research supporting each of these components is cited. For example, "studies of blended learning environments suggest the approach has promise in K–12 pre-algebra and algebra classes (e.g., Koedinger et al., 2010; USDOE, 2010), especially for struggling students (Fazal & Bryant, 2019)" (p. e25).

   Weaknesses:

   The project would have benefited from including research that cites the specific use of CurioXR targeting student math learning in addition to the research cited about VR.

   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)**

   Strengths:

   The applicant does a very good job presenting their objectives, and outcomes for the proposed project. Table 4. Project Objectives and Responsibilities, by Organization and Project Year on p. e31 lists three high level objectives which are further detailed in extensive details in the Detailed Project Timeline and Management Plan by Project Objectives and Performance Measures is included in the appendix on pp. e107-e112. For example, Objective 1 has twenty-one unique objectives with start and end dates which will guide and hold the project staff accountable.

   The applicant will use the NWEA MAP Algebra assessment, a computer-adaptive measure of students' algebra knowledge that covers four domains: equations and inequalities; numerical and algebraic expressions; functions; and descriptive statistics" to measure student outcomes (p. e34).

   Weaknesses:

   No weakness 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:

The applicant's proposed project is very strong and should be appropriate to the needs of the target population. The applicant identifies two target populations.

1) "Make high-quality, diverse math teachers available to rural Alabama students" (p. e20) as "between 30 percent and 83 percent of math or science teachers in the districts do not have a certificate in either subject" (p. e19).

2) 2700 10th grade Algebra 1 rural students (p. e9), of which "less than 22% of students are proficient in math, and only 11% of economically disadvantaged students are proficient" (p. e19).

The development and implementation of the Algebra 1 VR modules will be developed and supported in "50 high schools across Alabama that have not used CurioXR (VRedu's product) in the past, with over 50% of sites being rural" (p. e9), successfully address the needs of the target population.

Weaknesses:

The applicant would have benefited with including information how the necessary technology such as internet bandwidth will be met at each of the participating schools.

Reader's Score: 14

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 the following factor:**

Reader's Score: 9

1. **(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 personnel proposed to carry out this project seem to be strongly aligned with the activities, goals, and objectives. Experienced classroom teachers with "qualifications for consideration will include a master's degree, degrees in the field of math, and at least five years' experience teaching Algebra 1"… "will be contracted to help build [the] modules" (pp. e22-23).

Applicant describes that virtual tutors are selected will have "similar mathematics qualifications and experience" (p. e23)

Applicant describes that "they will look to include diverse staff" and "cultural competence and cultural humility will be a priority at every level of project planning, development, implementation, evaluation, and iteration." Additionally, "WestEd's key personnel, including Aleata Hubbard, a woman of color and expert in technology-based learning" (p.

e28) will be leading the evaluative component of the project.

"Both WestEd and CurioXR will hire three interns each from Alabama A&M, a public, historically black" university (p. e29).

The project personnel identified to lead (Dr. Steve Schneider) and support the project, "Dennis Engle, the Director of ALSDE's Alabama Math, Science, and Technology Initiative (AMSTI), and … Dr. Melissa Shields, Assistant State Superintendent in the Office of Student Learning" have relevant training and experience in the field of education as detailed in their resumes on pp. e57 – e67.

Weaknesses:

The project would have benefited by including details as to how the three Alabama A&M interns will be recruited by WestEd and CurioXR to support the project.

Reader's Score: 9

Selection Criteria - Quality of the Management Plan

1. **The Secretary considers 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:**

Reader's Score: 9

Sub

1. **(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.**

   Strengths:

   A Detailed Project Timeline and Management Plan by Project Objectives and Performance Measures is included in the appendix from pp. e107 -e112 has clear and quantifiable performance measures including the number of teachers and students per phase of the project, clearly defined roles and specified individuals who will support and lead each of the activities.

   Fidelity (# of students,# of teachers - p. e107; "at least 90% of the treatment teachers to implement at least 20 weeks of CurioXR" – p. e110), feedback (ex/ "75 percent of students participating in the implementation study indicate that they believed their time in VR was engaging" p. e108), and impact (Ex/ "Measure and assess the impact of CurioXR student outcomes" p. e110) are clearly defined to accomplish the project tasks.

   Weaknesses:

   It would be helpful if the performance measures listed in the Detailed Project Timeline and Management Plan on pp. e107-e112 were more directly aligned to the individual activities and had specific end dates (the activities have start and end dates; not the performance measures). For example, under Objective 2, the first performance measure to "Create and refine materials and train an onboarding team" does not have a clear end date. This could be addressed by aligning performance measures with their corresponding activities.

Sub

   Reader's Score: 9

Priority Questions

Competitive Preference Priority - Competitive Preference Priority 1

1. **Competitive Preference Priority 1:**

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

   Under this priority, an applicant must demonstrate how the project will be implemented by or in partnership with one or more of the following entities:
   (a) Community colleges (as defined in the NIA)
   (b) Historically Black colleges and universities (as defined in the NIA)
   (c) Tribal Colleges and Universities (as defined in the NIA)
   (d) Minority-serving institutions (as defined in the NIA)

   Strengths:

   "Both WestEd and CurioXR will hire three interns each from Alabama A&M, a public, historically black" university (p. e29) that "will allow students to get valuable experience with education and research organizations, which can lead to important connections and interest in related fields for their career" (p. e17). According to the letter of support submitted by the AAMU Regional Inservice Center Director, interns at CurioXR will "gain experience in computer science, programming, and using virtual reality technology to support education" and interns at WestEd will "gain experience in education research, evaluation, and improvement based on the current project" (p. e126).

   Weaknesses:

   The partnership could be stronger with members from AAMU participating on the project leadership team, implementation team, etc. to share their valuable insights and perspectives.

Reader's Score: 2

Competitive Preference Priority - Competitive Preference Priority 2

1. **Competitive Preference Priority 2:**

   Supporting a Diverse Educator Workforce and Professional Growth to Strengthen Student Learning (up to 2 points)

   Projects that are designed to increase the proportion of well-prepared, diverse, and effective educators serving students, with a focus on underserved students, through building or expanding high-poverty school districts' capacity to hire, support, and retain an effective and diverse educator workforce, through adopting or expanding comprehensive, strategic career and compensation systems that provide competitive compensation and include opportunities for educators to serve as mentors and instructional coaches, or to take on additional leadership roles and responsibilities for which educators are compensated.

   Strengths:

   N/A

Weaknesses:

N/A

Reader's Score: 0

Status: Submitted

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Technical Review Coversheet

Applicant: Alabama State Department of Education - AMSTI (S411C230211)
Reader #2: **********

		Points Possible	Points Scored
Questions			
Selection Criteria			
Significance			
1. Significance		20	20
Quality of Project Design			
1. Project Design		30	27
Quality of Project Personnel			
1. Project Personnel		10	9
Quality of the Management Plan			
1. Management Plan		10	9
	Sub Total	70	65
Priority Questions			
Competitive Preference Priority			
Competitive Preference Priority 1			
1. Promoting Equity		5	2
Competitive Preference Priority 2			
1. Workforce Diversity		2	0
	Sub Total	7	2
	Total	77	67

Technical Review Form

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

Applicant: Alabama State Department of Education – AMSTI (S411C230211)

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 factor:**

Reader's Score: 20

Sub

1. **(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 applicant's unique proposed project builds on a virtual reality (VR) strategy from CurioXR that already exists, and it is also innovative because it will improve its current VR technology and expand it to support high-needs Algebra 1 students and provide high-quality teachers for live tutoring sessions for students in rural communities (p. e14).

   This proposed project addresses the shortage of math teachers in Alabama, especially in rural and poverty-stricken communities. Approximately 30% of math teachers in these communities do not have a teaching certificate. Additionally, less than 32% of Alabama's students are proficient in math. (p. e19)

   Research evidence shows that VR learning strategies engage and motivate student learners (Di Natale et al., 2020; Olmos-Raya et al., 2016; Riner et al., 2022; Shi et al., 2016; Stepan et al., 2017). The VR strategy is a supplement to syncronous instruction, not a replacement. (p. e20)

   Weaknesses:

   No weaknesses noted.

   Reader's Score: 20

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:

   The applicant's proposed project centers on three high-level drivers: 1) A blended implementation structure; 2) Innovative and immersive VR lessons; and 3) Instructional design supporting student engagement and teacher involvement. (pp. e24 – e25)

   The applicant provides extensive research evidence that supports the investment in these three drivers. It appears in Table 1 (p. e25). Studies of blended learning environments suggest the approach has promise in K-12 pre-algebra and algebra classes (Koedinger et al., 2010; USDOE, 2010), especially for struggling students (Fazal & Bryant, 2019). (p. e25)

   Immersive VR lessons may support student learning (Di Natale et al., 2020; Riner et al., 2022) (p. e25).

   The design will include mastery instruction via the virtual tutor and this has been shown to increase student outcomes (Nebra 2016; Shuell, 2001). (p. e25)

   Weaknesses:

   The applicant fails to provide any research evidence that CurioXR is an effective intervention for rural Algebra 1 students.

   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)**

   Strengths:

   The applicant provides a detailed project design.
   The applicant presents three essential objectives that appear on Table 4 (e31) and also in Appendix J.3 (pp. e107 – e112). These objectives include: 1) Develop and continually improve approximately 46 new virtual reality modules; 2) Evaluate and implement the impact of Curio XR; and 3) Disseminate findings and track interest. cost, and sustainment (p e31).
   The applicant shares a number of detailed performance measures (measurable outcomes). One performance measure states: 1) Measure and assess implementation fidelity of CurioXR with the expectation that at least 90% of the treatment teachers implement at least 20 weeks of CurioXR. (p. e110)

   Weaknesses:

   The applicant fails to provide specific goals. The applicant appears to consider goals and objectives to be synonymous. Goals are broad, long-term outcomes and objectives are specific, short-term tasks.

   Many outcomes are not measurable. They are more of a completion checklist. (pp. e107 – e112)

   Reader's Score: 4

3. **(3) The extent to which the design of the proposed project is appropriate to, and will successfully address, the needs of the target population or other identified needs. (15**

Sub

   points)

   Strengths:

   The applicant considers the following students to be their target population: rural, living in poverty, high minority students, and who are far below grade level (US DOE, 2012). (p. e14)

   The applicant's strong plan is to create Algebra 1 modules that will connect with their target population. Additionally, all modules will be aligned with the Alabama State Board of Education's state standards. (p. e27)

   Weaknesses:

   The applicant fails to provide research data that confirms that a VR intervention will improve the outcomes for their target population. (p. e27)

   Reader's Score: 14

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 the following factor:**

Reader's Score: 9

   Sub

   1. **(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:

   All partners for this proposed project, the Alabama State Department of Education, Curio XR, and WestEd are all committed to diverse workplaces and seek to have their employees represent the communities they serve. They have pledged to seek diversity for the following positions, researchers, facilitators, teachers, tutors, interns, and other support staff. (p. e28)

   Key personnel have outstanding credentials. For example, overseeing the entire project will be the Assistant State Superintendent in the Office of Student Learning, who has served the students of Alabama for her entire career. Also, another individual will serve as the Principle Investigator (PI). He has managed many research projects and grants. (p e29)

   Weaknesses:

   The applicant fails to address how it will encourage applications from persons who are members of the following groups that have been traditionally underrepresented based on gender, age, or disability.

   The proposed project would benefit from the inclusion of certified math teachers.

Sub

Reader's Score: 9

Selection Criteria - Quality of the Management Plan

1. **The Secretary considers 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:**

Reader's Score: 9

Sub

1. **(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.**

Strengths:

The proposed project has an adequate management plan.

Clearly defined responsibilites are found in Table 4 (p. e31) and in Appendix J.3 (pp. e107 – e112). In Table 4, responsibilities as assigned globally to organizations. In Appendix J.3, responsibilities are assigned to both organizations and staff. In Table 4, responsibilities are assigned to milestones. In Appendix J.3, responsibilities are assigned to activities.

Detailed, informative timelines also appear in both Table 4 (p. e31) and in Appendix J.3. In Table 4, the timeline is divided up in annual events. In Appendix J.3, the timeline is divided up into extraordinarily specific start dates and end dates.

Milestones only appear in Table 4 (p. e31). Some examples include: 1) Recruit and hire virtual tutors to help enact the modules; and 2) Disseminate findings to research audience. (p. e31)

Weaknesses:

The applicant fails to align its performance measures with measurable outcomes. Additionally, the proposed project would benefit from assigning responsibilities to individuals as opposed to institutions. This would help with accountability and to keep the project on time and within budget. (pp. e107 – e112)

Reader's Score: 9

Priority Questions

Competitive Preference Priority - Competitive Preference Priority 1

1. **Competitive Preference Priority 1:**

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

Under this priority, an applicant must demonstrate how the project will be implemented by or in partnership with one or more of the following entities:
(a) Community colleges (as defined in the NIA)

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

Strengths:

The applicant plans to partner with Alabama A & M which fulfills (b) because it is a Historically Black College and University (HBCU). The proposed partnership will provide three years of internships for Alabama A & M students. These opportunities will allow students to gain research experience and to improve their network possibilities. (p. e17)

Weaknesses:

While reading about the proposed project, it is difficult to ascertain how much of a partnership exists in the three years of internships. The application would have benefited from additional details about the internship and its partnership with Alabama A&M.

Reader's Score: 2

Competitive Preference Priority - Competitive Preference Priority 2

1. Competitive Preference Priority 2:

Supporting a Diverse Educator Workforce and Professional Growth to Strengthen Student Learning (up to 2 points)

Projects that are designed to increase the proportion of well-prepared, diverse, and effective educators serving students, with a focus on underserved students, through building or expanding high-poverty school districts' capacity to hire, support, and retain an effective and diverse educator workforce, through adopting or expanding comprehensive, strategic career and compensation systems that provide competitive compensation and include opportunities for educators to serve as mentors and instructional coaches, or to take on additional leadership roles and responsibilities for which educators are compensated.

Strengths:

Not applicable.

Weaknesses:

Not applicable.

Reader's Score: 0

Status: Submitted
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Technical Review Coversheet

Applicant: Alabama State Department of Education - AMSTI (S411C230211)
Reader #3: **********

	Points Possible	Points Scored
Questions		
Selection Criteria		
Significance		
1. Significance	20	20
Quality of Project Design		
1. Project Design	30	25
Quality of Project Personnel		
1. Project Personnel	10	7
Quality of the Management Plan		
1. Management Plan	10	9
Sub Total	70	61
Priority Questions		
Competitive Preference Priority		
Competitive Preference Priority 1		
1. Promoting Equity	5	2
Competitive Preference Priority 2		
1. Workforce Diversity	2	0
Sub Total	7	2
Total	77	63

Technical Review Form

Panel #8 - EIR Early-Phase - 8: 84.411C

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

Applicant: Alabama State Department of Education - AMSTI (S411C230211)

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 factor:

Reader's Score: 20

Sub

1. **(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:

   - This innovative proposal describes "a virtual reality program aimed to supplement mathematic learning" based on a partnership between the Alabama State Department of Education (ALSDE), CurioXR, and WestEd (e17).
   - This proposal is based on immersive VR as an evidence-based strategy shown to "engage and motivate student learners," particularly "complex conceptual learning" (e20) which is needed for subjects such as mathematics.
   - This project demonstrates a promising new strategy that's an alternative to traditional mathematics education to address the teacher shortages in Alabama, particularly teachers who are neither certified in math nor science (e19).

   Weaknesses:

   - No weaknesses noted.

   Reader's Score: 20

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: 25

Sub

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:

   - This proposal provides a very strong conceptual framework which supports the project. The application states there are three evidence-based "drivers that contribute to increasing student learning and passing rates in Algebra I:
   o A blended implementation structure,
   o Innoative and immersive VR lessons using cutting-edge technology, and
   o Instructional design supporting student engagement and teacher involvement" (e24 – e25, e101).

   Weaknesses:

   - This proposal states that CurioXR "has a history of partnering with local universities across multiple states" (e106) does not provide previous evidence of how CurioXR has developed modules that have led to student achievement in mathematics.

   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)**

   Strengths:

   - The applicant presents three objectives which are clearly outlined as:
   o Create, test, and refine modules and features to optimize the functionality of CurioXR to support student engagement and learning
   o Implement and test the efficacy of CurioXR in our high-need sample, and
   o Disseminate findings and track progress on cost and sustainability (e107 – e112).

   Weaknesses:

   - Goals of this project are not clearly specified in the application. It is unclear if the applicant intended to use the overarching objectives as goals.

   Reader's Score: 3

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:

   - The target population will be served well by this proposal and is generally described as "largely rural and include[s] historically marginalized groups in STEM, students in the lowest achievement quartile, and students from low-income backgrounds"
   - At least 50 teachers and 3,490 students in grade 10 in predominately rural high schools in Alabama will be engaged in this project (e17).
   o Less than 22% of students across all grades are proficient in math (e19).
   o Only 11% of economically disadvantaged students are proficient in math (e19).
   - The proposal states that "CurioXR will partner with ALSDE [to] confirm that all of the content [they] develop is inclusive, engaging, and reflective of the diversity of the state of Alabama. This content will be intentionally tailored to capture local examples to best engage students across different income groups, races, ethnicities, regions, languages, and different geographies, including urban, rural, and suburban communities" (e106).

Weaknesses:

- The project does not specify whether the research supports the use of immersive VR for students within the target population (e20).

Reader's Score: 13

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 the following factor:

Reader's Score: 7

Sub

1. **(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 applicant notes "the project will intentionally seek to enlist diverse researchers, regional facilitators, experienced teachers, tutors, interns, and other support staff" and that "cultural competence and cultural humility" will be a priority (e28).
- The proposal mentions Aleata Hubbard, a woman of color and expert in technology-based learning as key personnel at WestEd (e28).
- The proposal includes the hiring of 3 interns from Alabama A&M.
- The experiences of key project personnel are extensive, relevant to the proposal activities, and will likely add significant value to the project's overall impact (e57 – e90). For instance, the Principal investigator (PI), Dr. Steve Schneider, "has decades of experience managing large-scale research projects and center grants" (e29).

Weaknesses:

- This proposal seeks to 1) contract experience classroom teachers to help build 46 instructional Alegebra I CurioXR modules, and 2) implement "high-quality, remote teachers" from Alabama as virtual tutors to faciliate the immersive VR experience, but provides no details as to how these teachers will be recruited for their services.
- The proposal does not provide a plan to support the recruitment of diverse tutors from Alabama A&M.
- The project does not discuss how it will use the unique perspectives of the interns from Alabama A&M, but rather describe how this work "provide[s] diverse students with valuable industry-related work experience" (e29).

Reader's Score: 7

Selection Criteria - Quality of the Management Plan

1. The Secretary considers 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:

Reader's Score: 9

Sub

1. **(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.**

   Strengths:

   - The proposal clearly states the roles and tasks of each team member (e29 – e30), and these responsibilities seem appropriate given the described skills and experiences of the team members (e29 – e31, e107 – e112).

   Weaknesses:

   - There are specific start and end dates for activities, but no timeline was presented for the project performance and evaluation measures.

   Reader's Score: 9

Priority Questions

Competitive Preference Priority - Competitive Preference Priority 1

1. **Competitive Preference Priority 1:**

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

   Under this priority, an applicant must demonstrate how the project will be implemented by or in partnership with one or more of the following entities:
   (a) Community colleges (as defined in the NIA)
   (b) Historically Black colleges and universities (as defined in the NIA)
   (c) Tribal Colleges and Universities (as defined in the NIA)
   (d) Minority-serving institutions (as defined in the NIA)

   Strengths:

   - This proposal describes an internship program with Alabama A&M, a Historically Black College and University (HBCU), that would support 3 students over 3 years of the project (e17).

   Weaknesses:

   - The relationship between the project and Alabama A&M does not seem like a true partnership since Alabama A&M is simply a source of interns and not included in the leadership for this project.

Reader's Score: 2

Competitive Preference Priority - Competitive Preference Priority 2

1. **Competitive Preference Priority 2:**

Supporting a Diverse Educator Workforce and Professional Growth to Strengthen Student Learning (up to 2 points)

Projects that are designed to increase the proportion of well-prepared, diverse, and effective educators serving students, with a focus on underserved students, through building or expanding high-poverty school districts' capacity to hire, support, and retain an effective and diverse educator workforce, through adopting or expanding comprehensive, strategic career and compensation systems that provide competitive compensation and include opportunities for educators to serve as mentors and instructional coaches, or to take on additional leadership roles and responsibilities for which educators are compensated.

Strengths:

N/A

Weaknesses:

N/A

Reader's Score: 0

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Status: Submitted
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Technical Review Coversheet

Applicant: Alabama State Department of Education - AMSTI (S411C230211)
Reader #1:   **********

	Points Possible	**Points Scored**
Questions		
Selection Criteria		
Quality of the Project Evaluation		
1. Project Evaluation	30	26
Sub Total	30	26
Total	30	26

Technical Review Form

Panel #4 - Early-phase Tier II Panel - 4: 84.411C

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

Applicant: Alabama State Department of Education – AMSTI (S411C230211)

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: 26

> **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 methods of evaluation are mostly thorough. The evaluator will conduct an independent evaluation of the implementation and efficacy of the CurioXR intervention on Algebra 1 student outcomes, including an impact study designed to meet What Works Clearinghouse (WWC) standards without reservations (e32).

> The evaluator will then conduct an impact study (aligned to research questions one and two), utilizing a cluster randomized controlled trial (RCT) that is expected to meet the WWC standards without reservations (e32). Recruitment will target 50 rural schools who will likely only have one Algebra 1 teacher. However, recruitment will aim for a range of student demographics to boost generalization. Half of the 50 schools will be randomly assigned to use CurioXR as a supplement to their Algebra 1 course and the other 25 schools will teach business as usual (e33).

> The applicant states that the design will allow participation from approximately 3,490 students: 790 in formative stages, 1,350 in the treatment group, and 1,350 when the control group uses the CurioXR program (e14). The proposed study is powered for a minimum detectable effect size of 0.11 to 0.12 for student outcomes (e34).

> The evaluator will conduct an attrition analysis using WWC guidelines. Baseline variables with baseline effect size differences greater than .25 will be considered non-equivalent, whereas baseline variables with baseline effect size differences between .05 and .25 will be considered within the range of statistical correction (e37).

> Further information about the impact results and mediation analysis is also provided. The evaluator will interview a sample of at least 20 participating teachers (12 treatment, 8 control) and 10 tutors. The interviews will explore teaching approaches, resources, and, when applicable, use of CurioXR. A variety of course artifacts, including course syllabi, in-class activities, homework assignments, and exams, will be collected from both treatment and control teachers to understand the nature of course instruction. The evaluator will also analyze CurioXR usage data to better estimate use and engagement throughout the year (e35-36).

Weaknesses:

The treatment as described will involve students engaging in synchronous learning with a virtual tutor where they will both put on headsets and join the same virtual room (e23). The tutor's qualifications include a master's degree and at least five years' experience teaching Algebra 1 (e22). The control environment is instruction as usual from a local math teacher. It is not clear what the qualifications are of the local math teacher and if the tutor's qualifications are higher with regards to graduate level education and years of teaching experience. This indicates that the comparison between the treatment and control group is not just about immersive virtual reality, but possibly more (i.e., education, experience). Teacher education levels could be considered a covariate that could influence the effect of the independent variable on the dependent variable.

Reader's Score: 18

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 methods of evaluation for providing performance feedback and periodic assessment of progress toward achieving outcomes is appropriate. The applicant states that during the first two and a half years of the evaluation, performance feedback and periodic assessment of progress will be addressed through formative evaluation. Usability studies, a classroom feasibility study, and a classroom implementation study will be used to build towards the impact study (e38-39). Research questions three and four address implementation and are designed both to provide performance feedback during initial stages and to document key factors that should be considered during replication and further scaling of CurioXR.

Additionally, the formative evaluation will provide structure for consistent, periodic feedback to the applicant on the progress of CurioXR towards its development goals. All parties will participate in virtual, bi-monthly calls to discuss upcoming project goals and review progress to date on development, testing, and other project components. The evaluator will also be responsible for monitoring and tracking all activities and reporting to the applicant to make sure all goals stay within their scope and timeline. Any deviation or concern on progress or performance will be discussed among all stakeholders, including the Program Officer (e41). The evaluator will actively engage in formative evaluation studies to provide critical feedback for program development.

Weaknesses:

It is not clear how programmatic change will be managed if the performance feedback indicates that the progress towards achieving the intended outcomes is not as expected. The overall feedback loop for feedback and continuous improvement is not sufficiently described.

The applicant states that performance feedback will be provided to CurioXR (e40). It is not clear why the feedback is provided to the owner of the intervention instead of the applicant.

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 evaluation plan clearly explains the project mediators, outcomes, and measurable thresholds for acceptable implementation. The impact analyses that are aligned to research questions one and two will be based on valid and reliable measures that include: NWEA MAP Algebra and Opportunities to Learn scales. The evaluation will include moderator

analyses (research question five) and mediator analyses (research questions six and seven) to explore the relationships among implementation context, intermediate outcomes, and student achievement outcomes. Implementation context questions (research questions three and four) will be answered with data from multiple sources, including artifacts from teacher trainings to determine participation and coverage. These include observations, interviews, and monthly virtual tutor and teacher logs describing teaching activities using CurioXR and other curricular materials. Acceptable thresholds of implementation will be accounted for within professional learning measures, teacher logs, and observations (e38). Thresholds will be based on tracking the usage of CurioXR and measuring it against the prescribed implementation model (e.g., number of times used and minutes per week, number of activities completed) derived from the feasibility and implementation studies.

To measure students' outcomes for the first research question, the evaluator will use the NWEA MAP Algebra assessment (e34).

The outcome listed is: Student Opportunities to Learn. To measure students' opportunities to learn in their Algebra 1 courses, the applicant will administer a student survey at the end of the year. The survey will include four opportunities-to-learn measures adapted from studies that provided evidence of sufficient validity and reliability for the measures (e34).

Regarding covariates, the evaluator will work with CurioXR and district staff to collect data about students, teachers, tutors, and schools, to be used in the moderation analyses (e34).

To measure the quality of instructional activities, the evaluator will administer a monthly log to tutors and teachers across the year during the impact study to provide an accurate picture of the instructional activities in both treatment and control classrooms. Specifically, tutors in treatment classrooms will be asked about how they are differentiating their mathematics teaching to individualize instruction in the virtual reality environment. Classroom teachers in the treatment condition will be asked how they are monitoring student progress in the dashboard and using the results to inform their subsequent classroom teaching (e35).

Three of the logs completed by both treatment and control teachers will include the following measures adapted from a RAND study of inquiry-based instruction: inquiry-based practices intended to actively engage students and promote problem solving skills (alpha = 0.83); inquiry-based activities intended to facilitate critical thinking (alpha = 0.77); discussion (alpha = 0.74); and developing conceptual understanding (alpha = 0.58). In addition, the evaluator will perform at least 50 observations of treatment and control classrooms during the impact study, with the aim of the observation sample to include all teachers. The evaluator will also review at least 10 lesson recordings from each VR (virtual reality) tutor (e35).

Research questions five, six, and seven explore mediating and moderating effects, which will unpack how key project components and contextual factors can influence outcomes. Research questions eight and nine are exploratory but will provide evidence of longitudinal impact of CurioXR and could provide evidence of replicability (e32).

Weaknesses:

It is not clear what are the specific key project components and what are the project resources and inputs. The logic model indicates instructional design principles and program components on the left side of the graphic, but implementation structure, innovative VR lessons, and instructional design are aligned underneath the project resources and inputs (e101). With regard to the mediation analyses (e35), the applicant indicates that qualitative data would be collected through interviews, artifacts, and homework assignments. However, the applicant did not discuss how that qualitative data would be analyzed.

Reader's Score: 4

Status: Submitted

Last Updated: 09/29/2023 04:44 PM

Technical Review Coversheet

Applicant: Alabama State Department of Education - AMSTI (S411C230211)
Reader #2: **********

	Points Possible	Points Scored
Questions		
Selection Criteria		
Quality of the Project Evaluation		
1. Project Evaluation	30	25
Sub Total	30	25
Total	30	25

Technical Review Form

Panel #4 - Early-phase Tier II Panel - 4: 84.411C

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

Applicant: Alabama State Department of Education – AMSTI (S411C230211)

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: 25

> **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 methods of evaluation are excellent and are likely to produce evidence about the project's effectiveness that would meet the What Works Clearinghouse standards without reservations. The impact study to be conducted in Year 4 of the project will use a cluster Randomized Control Trial (RCT) approach with randomization occuring at the school-level for all Algebra 1 teachers (e32). There will be 25 schools in both the treatment and control conditions (e33). The analysis of the intervention's impact will use an intent-to-treat (ITT) approach with schools and their teachers and students will be retained in their originally-assigned groups (e36). The dependent measure will use a standardized test for algebra achievement and is a What Works Clearinghouse (WWC) acceptable measure for student outcomes (e32; e34).

> With an estimated 2,700 students in the treatment condition, the applicant indicates that the study will have a minimum detectable effect size of about 0.11 (e34; e115).

> The applicant has included sufficient descriptions of many of the considerations in the research study design including: the use of scale scores on the dependent measure to account for the time of year the test was taken (e34); discussions of reliability and validity of many of the measures used (e34; e38); a description of covariates and moderation analysis (e34; e117); how random assignment will be made (e36); attrition (e37); baseline equivalence (e37); how "opportunities to learn" will be operationalized (e38; e120-121); power analysis (e115); analytic considerations in the use of hierarchical linear modeling (e116-117); and treatment of missing data (e118-119).

> **Weaknesses:**

> The impact to be studied is described in the narrative as a test of CurioXR (a virtual reality headset) and its Algebra 1 supports (e14). In the treatment condition, this is actually a "set" of variables in addition to the VR (virtual reality) headset with five additional variables: a (1) remote, (2) master-degree trained (3) diverse teacher using (4) specialized materials developed and tested over two years and (5) individualized tracking of student progress via a dashboard for the local teacher (e22; e35). In the control group it is merely the local teacher conducting the usual

lessons on the same business-as-usual (e36) content. This means the comparison between treatment and control groups is not just the use of immersive VR, for which the research-based rationale is provided (e20-23). It is so much more-- including an additional teacher (of "diverse" background) with presumably more education and highly-developed instructional materials. The research study might have been stronger using teacher education levels as a covariate (including remote teachers) and some measure of teacher "diversity," and with the control teachers using the same instructional materials as the treatment teachers. In the current design there will be no way of assessing or teasing out the relative contributions of each variable to the outcomes.

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 primary focus of the proposal is to test the efficacy of the use of the CurioXR headset and supports (e14). Over 2.5 years the evaluator will conduct usability studies, a classroom feasibility study, and a classroom implementation study (e38-41). Each of these builds on the last and will provide sufficient performance feedback to the development team and permit periodic assessment of progress toward achieving the intended outcomes associated with the CurioXR instructional support module for Algebra 1. Each study makes use of iterations, classroom observations, and interviews (e39-41). Each round of testing and observation will result in actionable recommendations to CurioXR (e40).

During the usability, feasibility, and implementation studies, periodic feedback will be given to Alabama State Department of Education on the progress of CurioXR towards its development goals (e41). All parties will participate in virtual, bi-monthly calls to discuss project goals and progress on development, testing, and other project components (e41).

Weaknesses:

The process and sources of data for "continuous improvement" (e31) are ill-defined, especially given that in each phase of the usability, feasibility, and implementation studies the actionable recommendations are only summarized once per cycle (e40).

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 key project components are clearly identified in the abstract (e14), Logic Model (e101), and in the timeline (e107-112).

The applicant has provided a full discussion of the mediators (instructional activities and fidelity of implementation) and the mediation analysis (e33).

Outcomes for the project and in the research study are identified as increased opportunities to learn and increased scores on the Algebra 1 assessment (e33; e101; e120-121). These dependent measures are both well described.

Various measures for acceptable implementation include artifacts from teacher trainings to determine participation and coverage: observations; interviews; and monthly virtual tutor and teacher logs describing teaching activities using CurioXR and other curricular materials (e38).

Sub

Acceptable thresholds of implementation will be defined during each stage (usability, feasibility, implementation, and impact studies (e38).

Weaknesses:

Qualitative data from interviews, course syllabi, in-class activities, and homework assignments are to be used in the mediation analysis (e35), but it is unclear how this data will be coded by raters to remove subjectivity and whether the coding will involve those who are blind to condition.

Reader's Score: **4**

Status: Submitted

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