1. **How many schools will be selected and are there any grant priorities?**

Twenty (20) schools will be selected to be part of this five-year research study examining success of students going through a three course sequence in computer science (CS) and their attitudes toward careers in CS. Ten (10) of the selected schools will also participate in a work-based learning (WBL) component of the study. All Rhode Island public High Schools and charter high schools are eligible to apply. Priority will be given to Title I eligible schools.

2. **What is the course sequence that students will go through?**

The three courses all twenty (20) schools offer are:

- **Intro to Computing and Data Science (Intro to CS)** using URI's curriculum and PD for research study consistency in 10th grade, with cohorts beginning the sequence in the Fall of 2020, 2021, and 2022.
- **AP CS Principles (AP CS P)** using Code.org’s curriculum and PD for research study consistency, to at least twenty (20) 11th grade students who took *Intro to CS* the prior year.
- **AP Computer Science A (APCSA)** using TEALS curriculum and PD for research study consistency, to 12th grade students who have taken the prior two courses.

<table>
<thead>
<tr>
<th>Sophomore Year</th>
<th>Junior Year</th>
<th>Senior Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intro to CS (20 Schools)</td>
<td>AP Computer Science Principles (20 Schools)</td>
<td>AP Computer Science A (20 Schools)</td>
</tr>
<tr>
<td>*WBL Course (10 Schools)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Ten (10) of the twenty schools will add a CS4RI WBL course sophomore year as part of the research study. This course will prepare students to complete a WBL project with industry partners.*
Professional development (PD) is required for all three courses in the sequence, the WBL course if selected, as well as a Broadening Participation in Computing online course. Educators receive a $2000 stipend to attend each PD.

3. **What is the timeline for the research project?**

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fall 2019</td>
<td>Spring 2020</td>
<td>Summer 2020</td>
<td>Fall 2021</td>
<td>Spring 2022</td>
</tr>
<tr>
<td>Intro PD for teachers (URI)</td>
<td>26 teachers for Cohort C1 students</td>
<td>2 teachers for C3</td>
<td>2 teachers for C3</td>
<td>2 teachers for C3</td>
<td>2 teachers for C3</td>
</tr>
<tr>
<td>WBL Course PD for teachers (URI)</td>
<td>26 teachers for C1</td>
<td>1 teacher for C2</td>
<td>1 teacher for C3</td>
<td>1 teacher for C3</td>
<td>1 teacher for C3</td>
</tr>
<tr>
<td>AP CS Principles PD for teachers (TEAL S)</td>
<td>20 teachers for C1</td>
<td>20 teachers for C1</td>
<td>20 teachers for C1</td>
<td>20 teachers for C1</td>
<td>20 teachers for C1</td>
</tr>
<tr>
<td>BPC PD for teachers (URI)</td>
<td>20 teachers for C3</td>
<td>23 teachers for C1 &amp; C2</td>
<td>25 teachers for C1, C2 &amp; C3</td>
<td>4 teachers for C1 &amp; C3</td>
<td>4 teachers for C1 &amp; C3</td>
</tr>
</tbody>
</table>

This is a five-year research project that began in October 2019. Year one of the project is a planning year for the CS4RI team and schools. During the summer of 2020, professional development will begin in preparation for the first cohort of students beginning coursework in their sophomore year. Three cohorts of students will be part of the research study ending in June 2024. See table above.
4. **What if we cannot offer the required 10th grade courses in School Year 2020-2021, but we can the following year, can we still be part of the project?**

Priority will be given to schools that are able to start in SY 2020-2021. However, there is some flexibility. Each school needs to have a minimum of 60 students take the pathway and generate AP CS Principles exam scores over the five years of the project to meet the research parameters. We planned for schools to do this with 3 cohorts of approximately 20 students. If a school can commit to 2 cohorts of 30 students (instead of 3 cohorts of 20), starting a year later, then you will be eligible. This type of request should be clearly described in the grant application.

5. **We have a CS pathway already, do we have to use the sequence prescribed in this project?**

Yes. The validity of the research study requires consistency in the pathway courses, curriculum, and teacher PD. The PD and curriculum are free and each teacher receives a substantial stipend to be trained in each of the courses. We expect that some schools may want to modify their current CS course offerings to participate in this project.

6. **We teach AP Principles but do not use the code.org curriculum. Is this allowed in the research study?**

No. The validity of the research study requires consistency in the pathway courses, curriculum, and teacher PD. The PD and curriculum are free and each teacher receives a substantial stipend of $2000 to ensure uniformity in professional development and delivery of the AP Principles course.

7. **Does the course sequence in the research study meet CTE Board Standards?**

Yes. This sequence is consistent with the current CTE Board standards. The three-course sequence, the WBL project, and the university credits provide a strong framework for a CTE program. Ultimately, it is the school’s responsibility to demonstrate that all the standards are fully met and implemented. The [CTE Standards and Possible Evidence Matrix](#) are available on the RIDE website. Schools seeking CTE program approval need to follow the annual [CTE Program Approval process](#). Winning the CS4RI High School Grant does not guarantee CTE Board approval. The continuous improvement cycle built into the research grant will allow for shifts in policies that may arise during the grant period.

8. **The course sequence is close to our CTE Board approved program. If we decide to modify the course offerings, what are the steps that would need to take place?**
RIDE approved CTE programs are allowed to modify their course sequence as long as they continue to meet CTE Board standards. Programs must receive approval from RIDE and the CTE Board for any changes. To initiate this approval, contact Paul McConnell at RIDE (paul.mcconnell@ride.ri.gov).

**PROFESSIONAL DEVELOPMENT**

**9. We already have a teacher trained in one of the pathway courses. Do they have to get re-trained?**

Yes. For consistency of the research study, we need to ensure all teachers are trained in the most up-to-date curriculum for each course in the pathway. The PD and curriculum are free and each teacher receives a substantial stipend of $2000 to be re-trained, and a separate $2,000 stipend to attend a PD in broadening participation in computing.

**10. We have to list the educators who will be teaching the courses in the grant application. What if one of our teachers is trained and then is no longer able to offer the course?**

The project allows for a limited number of trainings of replacement teachers upon request to, and approval by, RIDE. The PD training for the course and the online Broadening Participation in Computing course would still be free and include the $2000 stipend for each PD to the new teacher.

**11. When will the PD take place?**

Professional development for the courses in the 3-course sequence and the CS4RI WBL course (for those selected to participate in the WBL component) will occur during the summers of the research project period. The Broadening Participation in Computing course, teaching techniques for diversity, is an online course that requires teachers to be in active classrooms to make full use of the pedagogy and will be offered during Fall semesters of the grant period. The content and practices taught in the Broadening Participation in Computing course is applicable to all classrooms. Summer PD dates for the 2020-2021 school year are:

- CS Principles: July 13th-17th at University of Rhode Island, South Kingstown Campus
- WBL Course (10 schools): July 20-14th at University of Rhode Island, Providence Campus

**12. Does it have to be the same educator teaching all of the courses?**

No. It is not required that it be the same educator for all three courses.

**13. Are all educators required to take the PD in teaching techniques for diversity in CS?**
Yes. Equity is a central tenet of CS4RI and the research project. All educators teaching courses in the three-course sequence and the CS4RI WBL course receive an additional $2,000 stipend to attend the online Broadening Participation in Computing PD in teaching techniques for diversity in CS.

WORK-BASED LEARNING COURSE

14. **What is involved in the WBL component of the study?**

PD is provided for the 10 educators who will teach the semester-long WBL course taken by approximately 26-30 students at each of the 10 selected schools during the spring of sophomore year. In addition to the academic content, students will engage in a WBL semester-long project that explores the software development stages and includes field trips to various local businesses. The students will work with industry mentors to engage in the software development process and create a project that solves a need. The WBL course and project are designed to meet the current Governor’s Workforce Board’s (GWB) recommendations for standards of quality. It provides students with a rigorous, relevant, interactive and integrated project. Students reflect on their progress throughout the project. At the end of the semester, students will present their project to industry representatives for review. Essential skills are embedded and reinforced throughout the duration of the course.

15. **How many hours of WBL will students earn in the WBL course and project?**

Students should be able to demonstrate 80 hours of a rigorous WBL experience through the development of the project; time spent with industry mentors; related field trips to connect with industry partners; corresponding classroom time allowing students to practice and gain essential skills, academic skills, and technical skills; and the final presentation of their project to industry partners. See [RIDE’s WBL Frequently Asked Questions](#) for further details.

16. **When will the PD for the WBL project occur?**

PD for the WBL course, as well as the other courses in the sequence, will take place during the summers of the grant period. The WBL PD for selected schools is scheduled to occur the week of July 20-24th at the University of Rhode Island Providence Campus.

17. **What cost is associated with the WBL project?**

The grant covers the cost of the PD and stipend for the educator, curriculum, bus transportation, and substitute pay on the days of the field trips to local industries. RIDE staff members are dedicated to coordinating mentors, associated field trips with local businesses, and substitute reimbursement outside of the grant award.
18. **How much of the WBL do we have to arrange?**

Very little. RIDE has staff members dedicated to this project with a substantial part of their job being arranging uniform WBL Industry Projects for the 10 schools implementing the WBL component. RIDE will arrange the Industry visits and will pay for busses and substitute teachers. The school is responsible for working with RIDE on localized logistics within the school, but RIDE will do most of the coordination with industry.

19. **How will the schools that are included in the WBL component be selected?**

The application allows for schools to specify whether they want to be considered to be one of the schools to implement WBL, or if they want to be considered for just implementing the pathway without WBL. If more than 10 schools indicate an interest in implementing the WBL component, the selection of schools will be based on a balanced match of schools in the control and treatment groups. School demographic will be taken into consideration.

20. **If we are not selected to implement the WBL of this project, can we still implement WBL?**

Yes, but the research study examines AP CS Principles exam scores at the end of 11th grade from students who have taken the **Intro to CS course PLUS the WBL course**, and those students who have only taken the **Intro to CS course** during 10th grade. For that reason, schools that are implementing their own WBL must plan for those activities to occur after the AP CS Principles exam in the 11th grade. In other words, the local school developed WBL activities would occur during the 12 grade for schools not in the treatment group of the research study. To ensure all grantees are able to benefit from the learnings that emerge from the 10th grade WBL course, RIDE will work to share promising best-practices and resources developed through that course with grantees implementing WBL in 12th grade.

21. **What are the continuous improvement activities related to the grant?**

The purpose of the continuous improvement activities is to improve the components of the program. Schools will be asked to collect small-scale data such as exit surveys, etc. to inform improvements to program components, discuss these data formally at quarterly meetings, engage as needed with RIDE staff and research consultants, and possibly pilot a change to the model.

22. **What is suggested language for a course catalog description for the WBL course?**

This half-year course teaches students about the software development process used in industry, combined with students performing an Industry Project form of work-based learning (WBL). The lessons focus on the four primary steps of the software development process: Ideation and Validation (market analysis), User Interface and User Experience Design, Implementation (coding), and Testing.
Students learn about the concepts in class with their teacher, and work in small groups with an industry mentor throughout the course to create an original software product. At the end of the course, students present the product to a review panel comprised of industry professionals.

### RESEARCH STUDY MEASURES AND METRICS

#### 23. What are the key measures in the study and how will that information be gathered?

- **CS Attitude Collection Surveys.** These instruments are designed by Educational Development Center (EDC) and will be administered by the teacher in 10th CS courses.
- **CS College/Career Intent Surveys.** These instruments are designed by the EDC and will be administered by the teacher in each of the courses offered in the pathway.
- **RIDE data sharing that will include the school providing to RIDE and EDC:**
  - Student demographic information and student report card grade information in all courses offered in the pathway.
  - CS AP exam scores of students in courses offered in the pathway

A parental awareness document will require signatures to be gathered by each school. Districts will assure data sharing agreement through the Grant Agreement. EDC will support the gathering of data at the local level.

**Overview of Data Needs for CS4RI High School Grant:**

<table>
<thead>
<tr>
<th>Instrument/Secondary data</th>
<th>Topic Area</th>
<th>Source</th>
<th>Data collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online feedback surveys</td>
<td>Implementation of: Intro to CS course, WBL, and PD</td>
<td>Intro to CS and WBL Students in Cohorts 1 and 2, Teachers who attend PD</td>
<td>Cohorts 1 and 2 students and teachers complete online at end of Intro to CS and WBL courses; Teachers complete PD survey at end of PD sessions</td>
</tr>
<tr>
<td>Interviews and focus groups</td>
<td>WBL and 3-course sequence implementation</td>
<td>Cohorts 1 and 2 students and all teachers</td>
<td>Spring of school years 2019-20, 2020-21, 2021-22</td>
</tr>
<tr>
<td>Small scale data collection including student work, exit tickets, observations, short teacher surveys</td>
<td>Continuous Improvement</td>
<td>Students and teachers in Cohorts 1 and 2</td>
<td>Over the project period</td>
</tr>
<tr>
<td>Online student CS interest, attitude, and intentions survey</td>
<td>Interest in Computer Science, Intentions to pursue CS careers</td>
<td>Students in each cohort will complete survey online</td>
<td>Four times for each cohort—Beginning and end of sophomore and junior years starting in: Fall 2020/Spring 2021 Fall 2021/Spring 2022 Fall 2022/Spring 2023 Fall 2023/Spring 2024</td>
</tr>
<tr>
<td>Online student engagement survey</td>
<td>Student engagement</td>
<td>Students in each cohort will complete survey online</td>
<td>Annually for each cohort: Spring 2022, Spring 2023, Spring 2024. School-level pre-intervention baseline survey data will be taken in spring 2021.</td>
</tr>
<tr>
<td>----------------------------------</td>
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<td>--------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>

RIDE student data:
- AP CS-Principles exam scores
- AP CS A exam scores
- Student attendance
- Computer Science credits earned
- Student grades

<table>
<thead>
<tr>
<th>Computer Science proficiency, persistence, and student engagement</th>
<th>RIDE will gather through eRIDE</th>
<th>Annual data for students in each cohort</th>
</tr>
</thead>
</table>

24. **The grant application states that we are required to have 20 students take the AP CS Principles exam. How do we ensure that?**

Research consistently shows that AP students are better prepared for college than students who don’t take AP. They are more likely to enroll and stay in college, do well in their classes, and graduate in four years. The AP CS Principles exam is a key metric in the research study. We need a large enough number of students for the research study to be valid. **Schools will need to plan ahead in their recruiting strategies and messaging to account for school demographic representation in the courses, as well as natural attrition which occurs after an introductory course.** Outlining the school’s recruiting and retention strategies is a required element in the application process.

25. **What happens if we don’t get 20 students taking the AP CS Principles exam?**

The research study requires sufficient numbers of students taking the AP CS Principles exam to ensure validity. If you are short a few students one year, then we ask that you make every effort to increase numbers and make it up the next year.

26. **We have questions about the 12th grade CS A course. Should we still apply for the grant?**

Yes. The research study measures student performance on the 11th grade CS Principles exam, so results from AP CS A are not essential to the study. While AP CS A is recommended for the third course in the CS pathway, we are not requiring that 20 students take the AP CS A exam. Furthermore, if you wish to propose an alternative AP CS A curriculum, or an alternative third CS course of comparable rigor, please describe your request in the proposal.

27. **The grant will cover the cost of CS AP exams for up to 20 students. What if we have more than 20 students take the exam?**
RIDE only guarantees coverage of costs for 20 students taking a CS AP exam. RIDE will award requests for additional students based on availability of funds.

**GRANT FUNDING**

28. **What can we spend the facilities funding on?**

Grant funds are to be spent on CS teaching facilities used, at least in part, for this project. Each school is required to provide a minimum of 1-to-1 computers for students to use while in school in all of the courses in this program (e.g. a computer lab).

*Some possible uses of funding* include purchase/upgrade computers, purchase/upgrade AV for the classroom(s), and materials for the CS classroom(s).

*Expenses NOT allowed* include non-CS-education expenses, any professional development cost including course cost and travel (this is separately covered by RIDE for the CS courses of this project), any curriculum costs (the curriculum used in this project is free), and any cost not related to the instruction of this project (e.g. Maker Labs, robots, VR glasses, etc).

29. **When will the grant funds arrive?**

Grant award funds will be made accessible upon execution of the signed grant agreement. Discretionary grant funds for the CS teaching facilities must be encumbered by Dec. 31, 2020.

**STUDENT RECRUITMENT & RETENTION**

30. **What are the best practices for recruiting students from under-represented groups?**

1. **Develop Recruitment Goals**
   a. Look at the student population in your school. Who is not represented in your classroom?
   b. Identify target students.
   c. Leverage existing relationships with students, colleagues, families, and community members (PTA/PTO, teacher groups, school committee, etc.) and partner with people who already interact with your target audience.
   d. Develop multiple content messages to relate to different populations and connect with your target students.
   e. Use multiple ways of communicating – flyers, announcements, emails, personal invitations, peer word of mouth, social media, etc.

2. **Implement Strategies**
a. Disseminate information about CS courses using targeted messages to specific students.

b. Communicate in both large-scale settings and small, individual, and informal conversations.

c. Encourage students especially if they are hesitant.

3. **Support Students**

a. After initial enrollment, keep lines of communication open with all students but especially with target population who may benefit from one-on-one meetings.

b. Be aware of perceptions, peer attitudes, and other challenges students may be facing.