



National Science Foundation
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Frequently Asked Questions (FAQ) for Computing Education for the 21st Century (CE21)

[NSF 10-619](#)

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1. **The scope of CE21 seems quite broad. Am I reading it right?**

Yes. The scope is very broad. We are interested in advancing the knowledge base for the teaching and learning of computing for diverse learners across the K-14 academic pipeline, in classrooms and in out-of-school settings, in standalone computing classes, and infused through courses in other disciplines. Please note, however, that this initial CE21 solicitation has an emphasis on middle and high school and specifically encourages efforts that align with the CS 10K Project. CS 10K aims to introduce a new high school curriculum in computing-centered around the proposed new CS Principles AP course and to get that curriculum taught by 10,000 well-prepared teachers in 10,000 schools by 2015. For further descriptions of the CS 10K effort, see

- <http://csprinciples.org>, which gives information on the existing NSF award to the College Board that is funding the initial development of the proposed new CS AP course and its ongoing pilots,
- <http://www.collegeboard.com/csprinciples>, which provides information on the course framework from the College Board,
- <http://csprinciples.cs.washington.edu>, which provides information to college and university officials committing to give credit and/or placement for the new CS AP course (making it a reality), and gives information on the five 2010-2011 pilot courses, and
- <http://computingportal.org/cs10k>, which contains resources on the larger, CS 10K Project.

2. **Will CE 21 support education at the elementary and middle school levels?**
Yes, but it focuses special attention on the middle and high school years, and that emphasis will determine the balance of awarded projects in our portfolio. Certainly it is important to introduce the concepts of computational thinking at a very early age, but any successes that we have in engaging students in elementary and middle school will be lost if they see no academic computing curriculum in their four years of high school. Likewise, any improvements we make at the college level will have little impact if students don't sign up for initial computing courses.
3. **To what extent is it necessary to explicitly address underrepresentation in a CE21 proposal?**
All CE21 proposals must address broadening participation. The longstanding underrepresentation of nearly 70% of our population in computing represents a loss of talent and creativity to the workforce that we can ill afford in an increasingly competitive global economy. As a result, the CE21 solicitation includes a third merit review criteria on broadening participation; any proposal that does not address that criteria will be considered unresponsive. Successful proposals will include a convincing effort to engage and retain a diverse student population. It will not be sufficient, for example, to merely situate the work in schools with a high minority enrollment, or to include a member of an underrepresented group on the proposal team, or to propose interventions that appeal to "all students." While these are all potentially strong aspects of any proposal, successful CE21 proposals will likely also describe the demographics of their target audience, demonstrate knowledge of the relevant literature on underrepresentation and show awareness of best practices and related efforts, have a concrete plan for improving representation, and have clear metrics and assessments for their intended outcomes.
4. **Much of the work of the Demonstration Projects funded under the previous BPC program was on engagement. Are interventions aimed at engagement appropriate for the CE21 program?**
Yes. Engagement is crucial. Many of the BPC projects looked at culturally-sensitive ways to engage students from specific demographics and those efforts are important to CE21 as well. To be funded under CE21 though, they will also have to include a focus on building the capacity of the students. All CE21 proposals need a strong education research component. Proposers focusing on engagement should describe that research, being careful to delineate what computational concepts they are teaching through their engagement activities, and how they are to measure their successes.
5. **As a computer scientist, I'm a little unsure of what is meant by "education research."**
Education research is basic or applied research conducted to advance knowledge in the field of education or bearing on educational problems. The Wikipedia definition (http://en.wikipedia.org/wiki/Educational_research) offers some accurate nuances, particularly those framed as: "In his book entitled Fundamentals of Educational Research, Gary Anderson has outlined ten characteristics that can be used to further understand what the field of educational research entails:
- Educational research attempts to solve a problem.
 - Research involves gathering new data from primary or first-hand sources or using existing data for a new purpose.
 - Research is based upon observable experience or empirical evidence.
 - Research demands accurate observation and description.
 - Research generally employs carefully designed procedures and rigorous analysis.
 - Research emphasizes the development of generalizations, principles or theories that will help in understanding, prediction and/or control.
 - Research requires expertise familiarity with the field; competence in methodology; technical skill in collecting and analyzing the data.
 - Research attempts to find an objective, unbiased solution to the problem and takes great pains to validate the procedures employed.
 - Research is a deliberate and unhurried activity which is directional but often refines the problem or questions as the research progresses.
 - Research is carefully recorded and reported to other persons interested in the problem."
6. **I am interested in using computation in novel ways in STEM classrooms. Would that**

be in the scope of CE21?

Maybe not. With the CE21 solicitation, we aim to get students engaged in computing, aware of the range of computing careers and applications, and well-prepared to begin a college major in computing-related or computationally intensive fields. We want to prepare students to be creators, not just users, of technology. If the primary focus of your work is using technology to advance learning, you might better apply to the Cyberlearning: Transforming Education (NSF 10-620) solicitation. If the primary focus of your work is to teach computing or computational thinking and you are using technology as a tool to accomplish that, then CE21 would be appropriate.

7. **Should K-12 teachers be included in the project team?**
The answer is "yes," if your project includes work in K-12. Your team should contain expertise on all of the critical elements of the proposal. For the K-12 arena, that almost certainly includes K-12 teaching expertise. You should also be sure that your project has the support of the principals and administrators in any schools that you are planning to work in (and demonstrate that with appropriate letters of support).
8. **Should proposals include letters of support?**
Yes, but only where necessary to document partnerships. Having large numbers of letters of support does not help your review prospects and may hurt them by detracting attention from the significant letters that do strengthen your case. Letters should demonstrate that you have the level of support from your partners that you need to carry out your project, as proposed. Meaningful (not *pro forma*) letters from, for example, principals, superintendents, department heads, and appropriate industry representatives should be included. Letters of support are not needed from PIs or CoPIs, though their responsibilities should be clear from the Project Description.
9. **What is a Planning Grant? What kinds of activities could it support?**
Planning grants are small; though they may be up to \$200,000, they will generally be less than \$100,000, for up to 18 months. Because CE21 calls for the formation of new teams of researchers, teams with expertise in computer science education, education research, and broadening participation, the CE21 program includes Planning Grants, designed to allow teams the time and resources needed to position themselves to put together an effective Type I or Type II proposal. Typical activities include travel for geographically dispersed participants, meeting support, gathering of baseline or demographic data, building relationships between organizations, and the piloting of key interventions. Support is not typically available for the actual writing of the proposal.
10. **What is the difference between a Type I and a Type II project?**
Type II proposals are to study the large-scale deployment of interventions that have been shown to be effective. There must be a credible research base that supports the effectiveness of the intervention. Type I projects are smaller and more focused projects that aim to build the research base needed for a Type II proposal. In most cases, successful Type I proposals will investigate interventions that have the possibility of large-scale impact and thus are good candidates for a Type II effort.
11. **There are other related NSF programs. How do they differ?**
There are a number of other closely-related NSF programs that may be better fits for your proposed work. They include
 - **Advanced Technological Education (ATE), [NSF 10-539](#).** With an emphasis on two-year colleges, the ATE program focuses on the education of technicians for high-technology fields. It supports curriculum development, professional development of college faculty and secondary school teachers, career pathways to two-year colleges from secondary schools, and career pathways to four-year institutions from two-year colleges.
 - **Cyberlearning: Transforming Education, [NSF 10-620](#).** Cyberlearning supports research that explores the opportunities for learning made possible by new technologies: helping learners capitalize on those opportunities, developing new practices that they enable, and investigating how they can be used to promote deep and lasting learning of content, practices, skills, attitudes, and/or dispositions needed for engaged and productive citizenship.

- **Discovery Research K-12 (DR K-12), [NSF 10-610](#)**. DR K-12 seeks significant advances in student and teacher learning of the STEM disciplines. Its projects begin with a research question or hypothesis about how to improve preK-12 STEM education with innovative educational resources, models, or technologies, and then they develop, implement and study the effects of those innovations.
- **Innovative Technology Experiences for Students and Teachers (ITEST)**. ITEST seeks mechanisms to ensure the breadth and depth of the STEM workforce. A large variety of possible approaches and implementation models for building students' capacity to participate in the STEM workforce and their scale-up can be implemented and studied. The ITEST Solicitation is being revised.
- **Math and Science Partnership (MSP), [NSF 10-556](#)**. The MSP program supports innovative partnerships to improve K-12 student achievement in mathematics and science. MSP projects are expected to raise the achievement levels of all students and significantly reduce achievement gaps in the mathematics and science performance of diverse student populations. MSP projects contribute to what is known in mathematics and science education and serve as models that have a sufficiently strong evidence/research base to improve the mathematics and science education outcomes for all students.
- **Robert Noyce Teacher Scholarship Program, [NSF 10-514](#)**. The Noyce program aims to encourage talented STEM majors and professionals to become K-12 mathematics and science teachers. It provides funds to institutions to support scholarships, stipends, and academic programs for students who earn teaching credentials and commit to teaching in high-need K-12 school districts. It also supports STEM professionals who enroll in master's degree programs leading to teacher certification, and professional development for exemplary mathematics and science teachers to become Master Teachers.
- **Transforming Undergraduate Education in STEM (TUES), [NSF 10-544](#)**. TUES projects contribute to the development of exemplary undergraduate STEM education. Typically projects create learning materials and strategies, implement new instructional strategies, develop faculty expertise, design assessments and evaluations of student achievement, and/or conduct research on undergraduate STEM education.