Welcome to the Prospective PI Webinar for those interested in submitting Integration Projects to the Cyberlearning and Future Learning Technologies program.

My name is Janet Kolodner, and I am a co-lead, with Chris Hoadley and John Cherniavsky, of the program. We also have program officers from a variety of programs around NSF on our team – across CISE (Computer and Information Science and Engineering), EHR (Education and Human Resources), SBE (Social, Behavioral, and Economic Sciences), and Engineering.

-- new slide – Outline of Presentation

The presentation today will have five parts: a description of the Cyberlearning and Future Learning Technologies program, presentation of the key components of a Cyberlearning proposal, some examples of Cyberlearning proposals and some lessons about structuring a project that can be gleaned from those, guidelines for preparing a Cyberlearning proposal, and, finally, a discussion of the relationship between Cyberlearning and other programs at NSF, This webinar will be focused on Integration proposals; I will also talk about the other types for comparison.

Before getting to the details, however, I want to point out that the purpose of today's webinar is to help you make your way through the solicitation and understand what is being asked for; please do not use this webinar as a replacement for reading the solicitation, as the solicitation itself has far more detail than we can provide in the time we have available.

As you have questions, please type them in. I will look at them at times in the presentation when I have a slide up that says "Questions" and try to answer questions then. Sometimes, for timeliness reasons, I might have to wait until the end. The EDC folks will take notes when I answer questions, and they will post the questions and answers along with the webinar slides, audio, and script after the webinar is over.

-- new slide – What is the Cyberlearning Program

We begin by describing the program

-- new slide – Vision of the Cyberlearning Program –

We want to begin with the vision of the Cyberlearning and Future Learning Technologies program as laid out in the solicitation.

I'm sure that all of you are aware of a whole variety of new technologies that are becoming available. Tablet technology became affordable only in the past few years, new wearable hardware/software technologies seem to be springing up on a regular basis. Augmented reality is becoming more available and affordable, and as broadband becomes more powerful, it is becoming possible to share ever more sophisticated dynamic visuals in real time.

Each new technology that is invented or becomes available expands opportunities for fostering or assessing learning, and a big part of the vision behind the Cyberlearning program is that new and emerging technologies will expand and even transform learning and education. Some technologies will provide opportunities for seeing inside phenomena and understanding them better, others provide opportunities for access, others for collaboration and communication, and so forth. New and emerging technologies can offer new opportunities for learning and for fostering learning, opportunities for helping people developing interests, possibilities for better learning outcomes, and more -- throughout a person's life.

In addition, the scholarly literature tells us a lot about processes involved in learning, how to foster learning, how to assess learning, and how to design for learning, and the second part of the vision behind the Cyberlearning program is that the best new learning technologies and the most productive ways of using these technologies will be informed by that rich scholarly literature.

Finally, the last part of the vision is that with these new technologies and ways of using technology in place, we have new opportunities to learn more about learning -- about processes involved in learning, about how to foster learning, about how to assess learning, and about how to design learning technologies and technology-rich learning environments.

The Cyberlearning Program vision is that technology will be used in the most productive ways possible to help people of all ages deepen their understanding, enhance their capabilities, and develop interests and dispositions.

-- new slide – Cyberlearning Program Purpose and Goals --

With that in mind, the purpose of the Cyberlearning program, and its goals, are to, first, advance design of the next generation of learning technologies that can accomplish this vision. That is, we support projects aimed at inventing, exploring, and learning how to effectively use new technologies to help people advance their understanding and capabilities. And, second, those projects will also be aimed at bettering our understanding of how learning happens -- the processes involved in learning and how to better foster and assess learning, especially when learners are learning with technology or in a technology-rich environment.

This program is meant to help both researchers and practitioners grow their imaginations about what's possible with technology – through development of prototypes that show what's possible with technology and research that advances imaginations about what can be learned and understanding of how learning happens and how to foster learning.

-- new slide – A Cross-Directorate Effort

This is an ambitious program, and its goals will be best met if researchers from across research traditions and disciplines team up to achieve these goals. For this reason, this is a cross-directorate program. The Computer and Information Science and Engineering; Education and Human Resources; Engineering; and Social, Behavioral, and Economic Sciences Directorates are participating in this program.

-- new slide – Cyberlearning Program Scope –

Proposals to the Cyberlearning program can focus on any population, discipline, or context for learning, as long as projects are aimed toward advancing imagination about what is possible with technology, are informed by what is known about how people learn, and have potential to make a real difference.

While many programs at NSF support projects that focus on STEM learning, that is not a requirement for Cyberlearning; the program seeks projects that focus outside of STEM as well (for example, language learning or history), and we encourage projects that are innovative in addressing outside-of-school learning contexts as well as school.

Proposals can focus on any technologies, integrations of technologies, and interactions with technologies – hardware, software, or a combination, interactions with technology or their integration into learning environments – again, as long as the project aims to advance imagination about what is possible with technology, is informed by what is known about how people learn, and has potential to make a real difference.

Finally, when the solicitation refers to learning, it is referring to people deepening their understanding, advancing their capabilities, becoming aware of when to use new knowledge and capabilities, coming to take the initiative to use what they are learning, and so forth – the things needed to interact productively in the workplace and the world.

That means that when the solicitation refers to "how people learn," it is referring to processes involved in learning, representations used by those processes, conditions

under which learning processes tend to be effective, and influences on those processes and representations.

We take a broad view on which processes, understanding that cognitive, neurobiological, behavioral, cultural, social, volitional, epistemological, developmental, affective, and other processes and conditions all affect each other and influence what is learned.

This program seeks projects that focus on collective learning as well as those that focus on individual learning.

-- new slide – Cyberlearning Proposal Types

This program supports four types of proposals.

Exploration proposals (EXPs) are for exploring new technologies and their possibilities and exploring the answers to fundamental questions about learning. They are funded for 2 to 3 years and $550,000. These proposals will be due in December.

Development and Implementation Projects (DIPs) are for learning more about the potential of an emerging technology and answering fundamental questions about learning. These projects are funded for 3 or 4 years, and you can ask for up to $1,350,000. These proposals will be due in January.

Integration projects (INTs) can be 4 or 5 years in length, and you may request up to $2.5 million dollars. These are the program's largest projects, and they are for the purpose of integration –coherently integrating several emerging and/or developed technologies that have already shown promise, incorporating promising technologies into the lives or learners or organizations, or extending a promising innovation in ways that would allow it to be used by a larger population or variety of learners, ... and for answering foundational research questions related to learning that can only be answered in the context of such an integration. Note that these are not scale-up, efficacy, or effectiveness studies. Proposals are due in mid-July, and Letters of Intent for these projects were due in mid-May. This same schedule will be in effect in upcoming years. If you have not already sent in a letter of intent for this year (2014), then you are not eligible to send a proposal for this year's Integration grants competition.

Finally are Capacity-Building Projects (CAPs). Each of the three types of projects just listed requires that you have an appropriately interdisciplinary team in place for your project. One purpose of capacity-building projects is to help you grow an interdisciplinary team that will work together long-term on Cyberlearning projects and request Cyberlearning program support in an upcoming competition. You can ask for up to $50 thousand dollars for that.

Or, a capacity building proposal, can be for purposes of strengthening the cyberlearning community, for example, a workshop for introducing communities to each other or aimed at enhancing the strengths of the cyberlearning community. You may ask for up to $100 thousand dollars for this purpose.

Capacity-building proposals can be submitted any time; we make sure to gather together and move forward on anything we've not moved on by the target dates that are listed.

-- new slide – Deciding which type …

How do you decide which to apply for?

Exploration projects are for when an innovation is new and its properties and uses are not well understood or for when a technology has not been used for fostering or assessing learning in the past.

Development and Implementation Proposals (DIPs) are appropriate when the innovation has a bit of a track record; you've tried it out and understand its affordances and challenges to using it well, and you know some things about the research you might carry out in its context. You will want to put in a DIP project only if you have completed the equivalent of an EXP, that is, if you have all of the results in hand that would be expected from an EXP.

Integration projects (INTs), as I said earlier, are for focusing on integration. It is expected that technologies being studied in these projects will have a track record but that the integration requires further intellectual activity. Note that THESE ARE NOT SCALE-UP PROJECTS OR EFFECTIVENESS OR EFFICACY STUDIES, **and they are not for primarily about getting technologies ready for deployment**. Rather, like the other types of Cyberlearning projects, these are for opening up our imagination about what's possible when technologies are integrated with each other or into the lives of learners or organizations. So, as I said earlier, they might focus on coherently integrating several emerging and/or developed technologies that have shown promise, incorporating promising technologies into the lives or learners or organizations, extending a promising innovation in ways that would allow it to be used by a larger population or variety of learners, or some combination … along with answering foundational research questions related to learning that can only be answered in the context of such an integration.

--new slide – other NSF programs you might consider

This slide shows other NSF programs you might consider if you are thinking that Cyberlearning is not the right program for you. I will go over these at the end of the webinar; I did want to include them here, however, to give those of you who are new

to NSF an idea of other programs that might be more appropriate for your work. There are others as well.

-- new slide – Questions

For questions and answers asked at this time, see the associated Q&A file.

-- new slide – Key Components

There are a variety of programs at NSF that support research around the theme of learning with technology. The Cyberlearning Program is only one venue for proposals related to Cyberlearning.

This program is for projects that push the envelope further in terms of imagining, inventing, and exploring new technologies and ways of using them in support of learning, carry out foundational research on how people learn that could not be done except with the proposed technology, and that help us know how to design and use these new types of learning technology.

We expect each project in the portfolio to make contributions in all three areas. Every proposal to the Cyberlearning Program should include all 3 key components in the context of addressing a pressing learning issue or technological opportunity:

-- a technological innovation
-- research focusing on advancing theory about how people learn, fostering or assessing learning, or designing for learning, and
-- research uncovering principles for design and use of the new genre (in the solicitation, this is referred to as "broad use and transferability")

Your innovation may or may not be brand new – it does need to be representing a new or emerging genre for designing or using technology and it does need to push beyond state of the art; you need to take advantage of what the technology makes possible as well as what we know about how people learn. You will refine the technology and/or the way it is used to address the stated goals, learn more about learning in its context, and draw out lessons that will allow others to design and use applications that fit your new model.

-- new slide – EXAMPLES

I'll present a lot more specifics about what we mean by each of these parts this later. But first I want to show you two examples of funded Cyberlearning Integration projects to anchor all of these descriptions in something concrete.

As I go through these examples, please notice the pressing issue and technological opportunity being addressed, the technological innovation and in what ways it represents a new genre (or type), the research on learning, and the research pointing towards how to design and use the new genre.

And note that these are highly competitive; we have funded only three of these in three years. Given that our budget is in the neighborhood of $18 million per year, it would be very hard for us to fund more than 2 of these per year.

-- new slide – Dorsey, …
The first project I want to tell you about is being carried out by Chad Dorsey, Bob Tinker, and Bill Finzer of Concord Consortium, along with Uri Wilensky of Northwestern. This is a very strong team; all of these PIs are experts in how people learn, in design of learning technologies, and in technology development itself.

The pressing educational need they focus on is supporting middle and high school students working on extended and authentic scientific investigations – long-term investigations of several weeks. There is plenty of software and hardware to support individual pieces of such investigations – for example, probe ware for collecting data, Netlogo for modeling and simulation, fathom for analyzing data – but no platform, until these guys started working on it, that links hardware and software supporting those functions in ways that allow looking over data from investigation to investigation and otherwise linking investigations to each other without being overwhelmed. That's what these folks are working on.

Their innovation is a web-based platform the deeply integrates all these functionalities and that scaffolds their integrated use of tools as students carry out series of investigations.

During the course of their 4-year project, they have integrated the technologies and designed the scaffolding, and they have been trying it out in a variety of classrooms, collecting data about its use and learning in its context and refining the technology. They've been doing this in the context of three different project-based science units, each used over at least a 2-week period. Over a school year, students participate in all 3 units, and the researchers are able to see how student needs and capabilities progress in that time and refine the technology based on students' varying needs.

Their research advancing how people learn focuses on development of scientific capabilities and understanding when students have the tools of scientists available to them, the kinds of scaffolding that influence that development, and other influences on that development.

Their research promoting broad use and transferability focuses on extracting out design and use principles for designing other such integrated platforms.

-- new slide – Resnick etc.

This second Cyberlearning Integration project I want to tell you about is a brand new one, recently awarded to Mitchel Resnick and Natalie Rusk at the MIT Media Lab, Mimi Ito of UC Irvine Information School, and Urs Gasser at Harvard's Berkman Center for Internet and Society at Harvard. These co-PIs have a variety of expertise they bring to bear on their project. Mitchel and Natalie have been designing and studying Scratch for many years and are world leaders on designing and using tools and resources for fostering computational literacy, and especially creating the cultural context that helps children get excited about such learning and encourages them to take on responsibility for their own learning and for helping others learn. Mimi Ito is a cultural anthropologist with expertise on children and youth's relationships with media and communications, and Urs' expertise is in internet privacy.

The pressing need they focus on has to do with the digital divide. For many populations, the tools and resources for computational expression that we take for granted are not available. They don't have home computers with Scratch or Alice or Minecraft on them, and their teachers are not asking them to describe scientific processes using such tools. These children will find it hard to enter college and a workforce where computational fluency is taken for granted.

This team's innovation is infrastructure for making kids in these populations aware of what they might do on the computer, providing them easy and inviting ways in, and supporting their integration into communities of kids who regularly construct things with technology. The infrastructure includes interest-based microworlds customized to interests of youngsters in these inner-city populations as well as integration of the technology into the goings-on in the public libraries in their neighborhoods.

Their technology development involves developing, trying out, and refining a variety of interest-based Scratch microworlds, offering them through the libraries, and trying out and refining ways of making that integration into libraries work.

Their research on advancing understanding of how people learn focuses on mapping out the development of skills, understanding , and interests in computation and technology and the influences on that development, so as to contribute to our deeper understanding of needed supports, pathways, and outcomes related to computational fluency.

And while their implementation uses Scratch, this is not simply a Scratch project. Their research on promoting broad use and transferability of technology for supporting computational fluency and design of the environments in which that can happen effectively for inner city kids focuses on ins and outs of designing microworlds that are easily accessible and at the same time technologically

sophisticated enough to be inviting and on setting up a socio-technical infrastructure that invites and sustains participation, especially among populations that are not used to valuing computational fluency.

-- new slide -- How do you develop …

Now that you've seen some examples, I want to give you some advice about developing a competitive Cyberlearning proposal.

-- new slide – Developing a competitive proposal

There are two issues I'll address – the content and the mechanics, and as I address content, I'll talk both about what is necessary and what reviewers will be looking for.

-- new slide – Every project needs the 3 integrated parts

Every project needs the 3 parts specified in the solicitation, all integrated through a common purpose and done by a team that has the expertise to be successful. Let me go over each, beginning with the purpose, as your proposal should be achieving the purpose you put forth.

-- new slide – Purpose

Every proposal should make its purpose clear early on. You should be aiming to achieve some pressing societal need related to learning and have some vision of the way technology can be used to achieve your goals. I have a few pressing needs listed here; there are others listed close to the beginning of the solicitation. Or, choose your own; the list in the solicitation is not meant to be complete. In the examples, the pressing needs were around helping kids learn science deeply and about fostering computational fluency among populations that are not naturally drawn to such endeavors.

Whatever purpose you choose to address, it should be something important; achieving it should have potential to make a big difference.

-- new slide -- purpose – what will reviewers be looking for?

Reviewers will be judging how important what you want to accomplish is and how well you have justified its importance. They will also want to see that you know

what it will take to achieve that purpose and will be looking to see the extent to which your technology and research aim you toward achieving your goals.

-- new slide – What is an "innovation"?

What is an "innovation"?

We move on to the innovation, the first technical part of your proposal. For the purposes of this program, we want you to think about an innovation as a new or emerging technology that can be used for fostering and/or assessing learning, or a new or emerging configuration of learning technologies or socio technical systems for those purposes. It should have potential for high impact; it should be focused on the needs of learners as they are engaged in learning. The innovation should aim beyond state of the art and be informed by prior research – research on processes involved in learning, research on use of the technology, and research on how to use the technology to promote learning. For Integration projects, you should be integrating beyond-state-of-the-art learning technologies with each other or integrate such technologies into the lives of learners or organizations. **Your innovation needs to be more than a new app or piece of software; you should think about whatever you are developing as a representative of a genre or as a model of some new type.**

If you look back at the examples later on, you will see that each focuses on the resources, representations, and experiences learners need to develop understanding and competence, and each is informed by what the literature tells us about cognitive issues in learning targeted content and skills as well as developmental issues and what the literature has to say about fostering sustained engagement.

And for each, even when a new operating system or new way of interacting is created, there is a lot that will live on from the project and that will be able to inform future implementations – how-to's of integrating software functions, how-to's of pedagogy when learners can have certain kinds of experiences that technology makes possible, how-to's about what software should show learners so that they can make sense of phenomena, how-to's about using technology to bring new kinds of participants into a learning environment, and so forth.

-- new slide – What counts as a "genre"?

A new "genre" may be a new type or category of learning technology, a new way to integrate or configure learning technologies, a new technology-rich learning environment, or a new way to configure a socio-technical system. This slide names several types of genre we've funded through the Cyberlearning program. You'll see the Dorsey project under the 2nd type – a new way to integrate or configure learning

technologies. The Resnick example is of the fourth type – configuring socio-technical systems to foster learning.

For Integration projects, the genre might or might not be new; its integration into the lives of learners, organizations or communities may be what's new about it.

-- new slide – what counts as iterative refinement?

The solicitation asks you to use a process of iterative refinement to make your innovation better over the life of the project and to draw out lessons about design and use. In iterative refinement, you are developing and then trying out your technology in appropriate situations, gathering data about its effectiveness, the way it is used, and what happens, then analyzing that data to identify challenges and opportunities, and then refining the innovation based on that analysis and trying it again. In some cycles, you might refine the technology itself; in others, you might refine the way it is used.

You begin with a well-imagined and laid out design that you justify in the proposal, and you go from there. Be specific in the proposal about how and where you will try it out, what data you will collect to understand its effectiveness and the ways it is being used, and how you will analyze that data and use it to make decisions about refining the technology or its use or the pedagogy around it.

The formative evaluation part of your endeavor happens during iterative refinement. You will need to collect data about effectiveness so that you know whether your refinements are actually making the innovation better; you will need to collect data about the ways the innovation is being used and what happens while it is being used so that you know what it is about the innovation that needs refinement.

There is literature on design-based research that the solicitation points you to; it is worth being familiar with this approach.

-- new slide – innovation – what will reviewers be looking for?

So what will reviewers be looking for when they judge your innovation? They will look to see what new genre you are proposing, including how well it might advance the state of the art. They will judge how well the design and use of your innovation are informed by what is known –about technology, learning, the needs of your target population, educational practices, and so forth. They will want to see, by the way, how you are building on specifics of what is reported in the primary literature and not simply how you are using what is reported in lay articles and secondary sources.

They will judge how well they think your innovation will address your stated purpose. And perhaps the biggest part of making that judgment will be their analysis of the experiences you expect learners to have.

They will be looking to see how you envision the experience of learners and judging to what extent they think learners' needs will be addressed. <u>So make sure you make the experiences of learners clear</u>. You are allowed to put up to 5 screen shots (no more than 5) in supplementary documents to help make the experiences of learners clearer; we strongly urge you to take advantage of this extra-page allowance. We also urge you to refer to those screen shots in the proposal itself; part of your job as a proposer is to help reviewers understand what the experiences of your learners will be.

Reviewers will also want to know how you will build and refine your innovation; they will be especially interested in your proposed initial design and your iterative refinement process.

-- new slide -- Questions

See the accompanying Q&A file for questions asked and answered at this time.

-- new slide – what is "research advancing understanding of how people learn"?

The second part of each Cyberlearning project is research advancing understanding of how people learn. Proposals should present clear research questions and methods to address them. You may or may not be working from hypotheses; the important thing for these proposals is that you make clear the questions you will be answering. Which brings us to the second point. **Your research questions should inform theory**. Any research question that includes the name of your system is probably not adding to theory but rather focusing on the evaluation of your system; remember that your system is representative of a genre, and you are using it to help us learn about learning and about functions technology might take on.

The theory you address could be about processes involved in learning, theory about how to foster learning, theory about how to assess learning, and/or theory about how to design for learners. The research should be carried out in the context of your iterative refinement, and it might inform about development of understanding or capabilities, cognitive needs during learning, social needs during learning, perhaps under what circumstances certain kinds of feedback is useful or how to collect or analyze certain kinds of data; you will use literature on how people learn to inform the design and use of your innovation, and you should be aiming to also contribute back to the literature on how people learn. **Don't wait until the end to carry out your research; integrate it with your iterative design.**

We can again look back at the examples to give you a better idea. Dorsey et al focus on how to scaffold sustained inquiry when learners have tools like those of scientists available; that's how to foster learning. And they look at how understanding and capabilities develop in that context, adding to what is known about development. Resnick et al focus on how to entice in those who are not naturally drawn to computational expression – also a focus on fostering learning. And they focus on development too – of capabilities and understanding, also on the social pathways that influence that development.

-- new slide – Research on how people learn – what will reviewers be looking for?

When reviewers read this part of your proposal, they will be looking, first, for the specific research questions you will address. They will look at how well formed they are and how well they are informed by the literature. They will judge their importance to the field. They will look to see what theory your research will contribute to.

They will also judge your research methods, study design, and study context, especially looking at how well your methods are matched to answering your questions and how well your questions and methods are matched to the stage in your innovation's development.

Especially important is that your research add to theory – it could be theory of how people learn, how to foster learning, how to assess learning, and/or how to design for learners; the important thing is that you add conceptually to what is known already, going beyond adding an evaluated example.

For integration projects, your research questions should be important questions that can only be answered when the proposed integration is in place.

In the past, PIs have been confused about the relationship between hypotheses and questions. Your hypotheses help you to develop research questions. Your research questions tell reviewers about exactly how you will explore your hypotheses.

-- new slide – what do you mean by 'research promoting …'?

Finally, every Cyberlearning proposal needs to include a plan for extracting lessons about the new genre that is being developed. What does it look like in practice? What are its affordances? How should it be used? What are the challenges to its effective use? What design principles should be used for creating new instances? For making it work in different kinds of situations? We expect that you will be collecting data during iterative refinement that will help you answer questions like these.

In particular, for Integration projects, you should be extracting rules of thumb or principles about design, use, and/or integration that others will be able to use in developing similar applications and/or carrying out similar enactments. Dorsey et al are extracting out guidelines about the ins and outs of tool integration and its scaffolding; Resnick et al are extracting guidelines for designing inviting but appropriately sophisticated microworlds for getting started with a new set of capabilities of new domain and for designing a socio-technical system that will invite in those who don't think about themselves as technology people or learners. What they learn about those things will remain long after there technologies, themselves, are obsolete.

-- new slide – Research on broad use …

Remember that research on broad use and transferability is the research you do to better define or describe the new or emerging genre you are creating or refining. How should applications be designed? How should they be implemented? How should they be integrated into the life of the learning environment?

With this in mind, reviewers will be looking, first, to make sure you understand what your genre is. Then they will be looking to see what you see as important with respect to identifying how to design and use that genre.

They will look to see how well the proposed work will yield progress on those goals and for what we will know at the end of the project about how to use technology to promote or assess learning that we didn't know before.

They will also be judging the scope of what you are proposing. How far beyond your particular implementation will the things you are learning about design and use apply? Are you aware of how far they might apply? How cautious are you in making those claims?

-- new slide – team requirements

Doing all of this will require the right team. Indeed, this solicitation sets a very high bar on getting the right team together; we believe that's necessary to achieve the program's vision.

The solicitation states requirements about team membership. You need on your team all of the expertise needed to achieve your technical and research goals. Some of that team will be the researchers themselves -- PIs, co-PIs, senior investigators, post-docs, and students. Your team may also include implementation and/or enactors (e.g., teachers). Your team also includes advisory board members. Among all of those people, the team should have expertise on learning processes, targeted content, targeted technology, targeted learners, and practices of educating in the

targeted environment. <u>And the team must include expertise at designing learning experiences; note that people who know how to analyze learning are not always the same people who know how to design for learners and learning.</u>

One more thing about your advisory board – it should have two kinds of participants – those who complement the researchers and those who can contribute to critical review; they may be the same people or they may not be. <u>Be clear in your Collaboration and Management Plan how you will use advisory board members for both purposes. This is an important solicitation-specific criterion reviewers will be evaluating.</u>

Participants in your project – PIs, co-PIs, sub-contractors, advisors, and so forth – should be those who can best contribute to the project. There are, however, some budgetary issues with respect to what for-profits can ask for and what can be paid to organizations in foreign countries. Look in the Grant Proposal Guidelines for specifics about those restrictions, or send an email with your specific questions.

-- new slide – Your team – what are reviewers looking for?

Finally, with respect to what reviewers are looking for, they want to be assured that your team can successfully carry out the work. They want to see that your proposal that was written by your whole team and to know how the team will be used in carrying out the project. Your proposal should clearly include the voices of all of the experts, and you have up to 3 pages in the Collaboration and Management plan to make clear how the team will collaborate to carry out the project.

-- new slide – Questions

See associated Q&A file for questions asked and answered at this time.

-- new slide – Integrating the parts

So how do you pull all of this together? We have some advice.

First of all, take a look at section V.A of the solicitation. It provides specifics about what sections you should include, the order in which you should sequence them, and the content you should have in each section. We encourage you to name and sequence the sections of your Project Description according to these guidelines.

So what do the guidelines say? They tell you, first, to make the pressing issue and/or opportunity you are addressing clear very early on, and to make sure you are always keeping it in mind as you develop the rest of the proposal.

Your innovation should address your issue, and your plan for iteratively refining it should clearly state how what you know about addressing that issue is informing that plan.

Your research questions should be questions that can be answered in the context of your innovation, usually questions that could not be answered without the innovation. New experiences learners can have with your technology and new data that can be collected may suggest new things that can be learned about learning or new ways of answering questions about learning. Integrate your research with your iterative refinement; think about what data you can collect in each iteration that will help you answer your questions.

Your plan for extracting out design and use lessons should also be integrated with your iterative refinement. As you are collecting data to refine your innovation, collect data and analyze it in ways that will allow you to help others know how to design and use similar applications.

Again, the proposal preparation instructions in the solicitation provide specifics of what to include in each section of the proposal to make the different components and their integration clear.

-- new slide – In the end, …

In the end, you should generate three products -- (1) at least one minimally-viable product that is representative of your new genre that that points the way into the future of learning technologies and provides a venue for carrying out your two types of research, (2) new knowledge about how people learn, how to foster learning, how to assess learning, and/or how to design for learners, and (3) new understandings about how to design and use the new genre you are proposing.

-- new slide – Where can you find more guidance?

Some of you know about the Common Guidelines for Educational Research. These are guidelines put together and published by NSF and the Department of Education (IES) together. They don't quite fit Cyberlearning proposals, because they assume a sequential approach to research and development. However, they do give advice about how to integrate the parts of a research and development project coherently. We suggest you look at this document; there is a pointer to it in the solicitation.

In general, Cyberlearning proposals will combine Type 2 (exploratory/early state) or Type 3 (design and development) with Type 1 (foundational) research. Usually Integration proposals will combine Type 3 with Type 1 research.

-- new slide – Common guidelines …

This slide shows you the 3 types in the Common Guidelines that you might want to read about and that might provide you with help in organizing your project. We did not include large-scale field-testing, scale-up, efficacy, and effectiveness studies here, as we don't expert Cyberlearning projects, even Integration Projects, to engage in those activities.

--new slide – where can you find (reprise)

Looking back again at where you can find guidance, I also want to point out again that the literature on Design-Based Research might also be helpful to you in figuring out how to integrate all the parts; there are pointers to this literature in the solicitation as well. And, of course, the solicitation and the Grant Preparation Guide (the GPG) provide advice. The section of the solicitation with instructions for preparing a proposal includes a lot of advice about how to organize the proposal so that reviewers will be able to find what they are looking for.

-- new slide – Questions

see associated Q&A file for questions asked and answered.

-- new slide – NSF's criteria

Remember: Reviewers need enough information in your proposal to be able to judge your project's merit – both its importance and its chances of success. Provide them with enough information in the proposal so that they don't have to guess at what you are planning to do or why you are planning to do things the way you propose; reviewers tend not to trust "trust me" proposals. Make sure they will easily find the answers in your proposal to all the questions asked in previous slides.

They will judge the intellectual merit of your proposed work and its potential for broader impacts. Intellectual merit has to do with the solidity, rigor, and intellectual interestingness of your proposed work. Reviewers will judge this by reading the descriptions of your innovation and research.

Broader impacts is the potential for your proposed work to address some important societal need. Reviewers will judge this by examining the pressing need you present as your project's purpose and judging the extent to which your project realistically addresses that need.

Both potential for intellectual merit and for broader impacts are equally important in Cyberlearning and Future Learning Technologies projects

-- new slide – Mechanics

Okay, we're on the home stretch – mechanics – how to submit, the budget, required and allowable documentation, IRB approval, and the things that would cause us to send your proposal back without review.

-- new slide – Submitting

The easiest way to submit to NSF is through Fastlane, but you can also submit through grants.gov.

Collaborative proposals, however, must be submitted through Fastlane. These are the ones that have several budgets attached to one project narrative.

Be sure to follow all the rules in NSF's Grants Preparation Guide and solicitation.

-- new slide -- Budget –

Budget – your scope of work and budget must match; you don't have to ask for the maximum if you are proposing something smaller. Neither of the projects I presented, by the way, was awarded the full $2.5 million dollars possible for a Cyberlearning Integration Project.

There is a 2-month cap on the salary of personnel with academic positions (tenure-track people whose salary is covered by the institution). NSF will pay no more than 2 months of salary across all of your NSF-funded proposals in any year <u>unless you can justify it</u>.

No cost sharing is allowed; that means that you and your organization cannot contribute anything to the project beyond what you are asking from NSF. You should, however, discuss in the proposal the relationship between the proposed project and other projects you are working on if they provide infrastructure for what you propose. If you have particular questions about what counts as a contribution, send an email to one of us, and we'll help you sort it out.

We do not pay undergraduate tuition, and we will pay only for equipment needed specifically for your project.

In the past, we've been asked whether for-profits can charge profit; organizations can charge overhead at whatever are their government-approved rates, but we do not contribute profit beyond that.

-- new slide – Allowable documentation

Cyberlearning proposals require all of the following documentation:

-- a collaboration and management plan, in the supplementary documents; the solicitation tells you what belongs in it; please include everything it asks for; please do not include content that belongs in the 15 pages of the Project Description itself.

-- a list of all known participants – PIs, co-PIs, senior investigators, post-docs if you know who they are, advisory board members, subcontractors, and so forth. Use the format specified in the solicitation.

-- letters of commitment from project partners. These, too, go in supplemental documents. It is not necessary to have letters from PIs, co-PIs, and senior investigators; we assume your institution has those people sign off. We do, however, want letters from organizations you will work with, subcontractors, and advisory board members. Let those people write their own letters, please; if all the letters are clearly written by you, reviewers will notice and wonder how excited those collaborators are about the project. Please make sure to get agreements and letters from everybody you list as participants; people should know you listed them as advisory board members.

-- if you have a post-doc who is not one of the co-PIs on the proposal, you need a post-doctoral mentoring plan

-- NSF proposals must all have data management plans; these plans need to tell us both about how you will share the data and how you will take care of it; look in the GPG for more detail about what they should include.

-- and, of course, every proposal needs reports of current and pending support and facilities, as well as 2-page bios of all senior personnel, each with a maximum of 10 citations. You may also want to include 2-page bios of advisory board members.

Also, as I noted earlier, we strongly urge you to include up to 5 screen shots in the supplemental documents to show what learners' experiences will be and to refer to those in the Project Description.

Nothing else at all is allowed. If required documentation is missing or if you include extra documentation, your proposal will be returned without review.

-- new slide – IRB approval

The one thing I want to say about this is that we need to have your approval in hand before we can recommend funding. So time your IRB request appropriately. Integration panels will be held in October, probably, and we will make negotiate with those we are considering funding in November and aiming to recommend awards in December or January. Keep those dates in mind as you think about submitting to your IRB for permission.

-- new slide – Critical information about your submission

Which brings us to the things –omissions or additions that would cause return of your proposal without review.

-- missing collaboration and management plan
-- missing data management plan
-- missing post-doc plan if you have a post-doc in the budget
-- extra documents beyond those that are allowed
-- formatting problems, for example, your project description going over 15 pages, use of tiny type, or very narrow margins
-- and failure to specifically identify Intellectual merit and broader impacts in your project summary

-- new slide – Questions

See the associated Q&A file for questions asked and answered.

-- new title slide – Other related programs

I have spent all of this time talking about this one program, though I did mention earlier that there are other programs you might want to send proposals to.

-- new slide – Selected Cyberlearning alternatives

This slide shows you some of those programs and lists key differences between them and the Cyberlearning program; I will not go over all of them, as you will have access to the slides. But notice that if you are specifically focusing on technology for learning some particular STEM content, it would be better to apply to DRK-12, AISL, or an undergraduate education program. And if you are focusing on the ins and outs of using a technology but without actually working on design or refinement, then REAL is more appropriate. If your focus is on humans and computers interacting and you are focusing primarily on the technology or interactions and not specifically

on the nitty-gritty details of fostering or assessing learning, then CHS is a better program to apply to. If you are focusing on a new way of approaching curriculum, then DRK12, REAL, ECR, or an undergraduate education program would be appropriate. If your aim is to get a product out to market, then you should apply to SBIR or STTR. If your focus is on computer science education, then CE-21. And so forth.

-- new slide – Questions

We're happy to take questions at this time. We are also happy to receive questions by email, and we will respond to those as quickly as we can.

See associated Q&A file for the remainder of questions that were asked and answered.