



IES Funding Opportunities Webinar: Grant Writing Workshop for Exploration Projects

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U.S. Department of Education

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EDUCATION SCIENCES

**IES Funding Opportunities Webinar:
Grant Writing Workshop for Exploration Projects
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**Transcript
April 09, 2011**

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I'm Allen Ruby from the National Center for Education Research (NCER), joined by Amy Sussman from the National Center for Special Education Research (NCSER). We are here to talk with you today about Exploration projects.

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Our agenda is to give you a brief introduction to the Institute of Education Sciences (IES) and talk about our two grant programs: Education Research Grants and Special Education Research Grants, which both include the research goal known as "Exploration." Then, we will talk in more detail about the Exploration goal, discuss the four sections of the research narrative, and how they may differ for the Exploration goal versus other research goals, and end with a little information about submitting your application and the review process it goes through.

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Here is some information about IES and its organizational structure. Our director is appointed by the President and confirmed by the Senate, and s/he works with the National Board for Education Sciences (NBES). There are four centers within IES.

There's the National Center for Education Statistics (NCES). You may be familiar with their work on collecting nationally representative data surveys, such as the Education Longitudinal Study (ELS) or the Early Childhood Longitudinal Study – Kindergarten (ECLSK). They also run a State Longitudinal Data Grant program for states to develop their own administrative datasets.

There's also the National Center for Education Evaluation & Regional Assistance (NCEE), which does large-scale causal analyses of interventions that are often chosen by Congress, the Administration, or IES itself and are carried out by contractors. Then, there are the two grant-making centers: NCER and NCSEER. It is in these two centers

where there are Program Officers like myself and Amy, here to work with applicants and grantees and provide advice to them, so you should always feel comfortable contacting us.

Also, the Institute has a Standards & Review Office that is part of the Office of the Director, which is responsible for all the peer reviews of grant applications and provides the separation between the Program Officers and the grant review process—allowing us to work more closely with you.

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The research objectives of the Institute are to look at what works to improve student educational outcomes, so that we can promote and disseminate it; to identify what does not work, so we can stop using it; and to find out what works for whom and where, because we know many education interventions don't work every place for every student and teacher. This knowledge will allow us to use these interventions appropriately in the appropriate places and to understand why things work, so we can understand how to improve education and build on this understanding.

What works or doesn't work is in terms of student outcomes. IES is interested in identifying which interventions improve student outcomes.

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This is key to writing an application to IES. All our research is to support improving student outcomes and that makes it challenging for certain interventions. For example, if you're doing research on issues that are far upstream of students (e.g., school boards and principals and sometimes even teachers), tying it back to student outcomes can be difficult, but it's essential that you do that in your application.

Let's take a look at some of the outcomes for the Education Research Grants Program. Education starts at Pre-K (or ages 3 to 5) with the outcome of school readiness. For special education, work can start at birth, looking at developmental outcomes (e.g., in children who are at risk for or have disabilities). When we move to Grades K through 12, we have a mixture of both the education and special education outcomes. Education outcomes could be focusing on academic outcomes in the major subject areas (i.e., reading, writing, math, and science); looking at behaviors, interactions, and social skills that support learning in school (e.g., attendance, time on task, paying attention, or behavioral issues); and looking at high school graduation. Meanwhile, special education outcomes could be looking at functional outcomes to improve the transitions to employment, independent living, and postsecondary education for students with disabilities.

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For older students, looking at postsecondary education now, the main outcomes we're examining are enrollment persistence and completion. Postsecondary education is confined to grades 12 through 16. So, we're looking at undergraduate, vocational, and community college degrees (not graduate programs); achievement in gateway math and science courses; and achievement in introductory writing courses. Going to adult education now, we look primarily at reading, writing, and math in the areas of adult basic education, adult secondary education, and English language learner education. Those are the outcomes we're interested in, and we would suggest that they be addressed in any application you make to IES.

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Turning to our two primary research grant programs (i.e., the Education Research Grants Program and the Special Education Research Grants Program), these programs are organized by research topic and research goal. When you apply, you will apply to both a specific topic and a specific goal under one of these two grant programs.

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There are 10 topics under the Education Research Grants Program, which is also known as 84.305A. One change from last year is under the Education Technology topic. In the past, we did not accept applications to do Exploration work, but we have opened it up this year. So, you can propose to do an Exploration project in any of these 10 topics. They're organized partly by core subject area, partly by student population, and partly by organization. Examples of topics focused on core subject areas are Mathematics & Science Education and Reading & Writing. Examples of topics focused on student population are Early Learning, Postsecondary & Adult Education, and English Learners. Examples of organizations and critical roles include Effective Teachers & Effective Teaching. And then there is a catch-all topic--Improving Education Systems, which picks up all the larger topic areas—policies, organization management, and leadership.

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Under the Special Education Research Grants Program, which is also known as 84.324A, we have 11 topics. Some of these parallel the ones we saw under the Education Research Grants Program—Math & Science, Reading, Writing, & Language Development—and some are specifically for special education, such as Autism Spectrum Disorders, Families of Children with Disabilities, and Transition Outcomes for Secondary Students with Disabilities. So, you will choose under one of these two grant programs and within the grant program you will choose one of these topics to apply to.

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Now, let's move down specifically to the Exploration goal.

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There are five research goals to which you can apply. Exploration is the one we'll be focusing on today, and we'll go in-depth on that in a moment. There's the Development & Innovation goal, if you want to develop an intervention. There's the Efficacy & Replication goal, if you want to causally evaluate an intervention. The Effectiveness goal is for interventions that have already gone through efficacy evaluations and you want to do a further independent evaluation of them. Then, there's the Measurement goal if you want to develop or validate an assessment.

So, we'll switch now to focusing on the purpose of the Exploration goal.

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Exploration projects really have two purposes. One is to identify malleable factors that are associated with student outcomes, and we've already talked about what type of student outcomes we mean by "student outcome." Or we want to look at factors and conditions that may mediate or moderate the relations between a malleable factor and the student outcomes. So, let's explore what we mean by that.

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The first phrase is "malleable factors." What is a malleable factor? A malleable factor, malleable meaning changeable, is something that can be changed. Something that can be changed but also something that is in under the control of the education system. That's what we're looking for: any type of factors that can be changed by and under the control of the education systems and are somehow linked to the student outcomes we talked about earlier. Some examples of malleable factors might be student characteristics (such as student behavior, student skill, student knowledge), teacher characteristics (such as the type of instruction, their background, their credentials), school characteristics (such as the size, the climate, how it's organized), and then actual education interventions (such as practices, curriculum, instructional approaches, education programs, or policies). These are all changeable and under the control of the education system.

I'll be talking about various projects that we've already funded in the past. For example, if we were thinking about a policy-oriented project, Dick Murnane at Harvard took a look at Massachusetts' high school exit exam that students had to take in order to graduate. Students who failed the math exit exam and the English exit exam are allowed to retake the test. But he found that low-income students were less likely to take the test and

were more likely to drop out of high school. The decision to retake the test is a student behavior and is malleable. You can imagine somehow working with students to increase their test-taking and retest-taking, and that the school system could be actively involved in encouraging low-income students to take the test again, if they did fail (in an attempt to increase their chances of passing it and, therefore, to graduate high school). This is an example of a malleable factor under the control of the education system.

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Exploration projects may be looking at underlying processes that enhance or inhibit learning and this type of work may contribute to the development or modification of an intervention under the second goal, Development & Innovation. For example, we have a project in the Special Education Grants program by Paul Morgan who is doing an analysis of the Early Childhood Longitudinal Study -- Kindergarten Cohort, and he's looking at students with mathematic difficulties in kindergarten, trying to predict how they will do in mathematics in Grades 1 through 5. He is looking at their math growth trajectory and has found that students with repeated learning problems in kindergarten subsequently have major problems throughout their elementary school career.

His argument is we need more systematic monitoring of kindergarten children's mathematic acquisition and early intervention to prevent students from struggling in mathematics throughout elementary school. While he's not creating a new intervention, he is saying, "I've identified an issue that needs an intervention in kindergarten and this would then support something trying to develop an intervention to either identify these students or intervene with them, so that their math problems don't follow them through elementary school.

A more focused project, a development project, is by George Newell at Ohio State. He's videotaping high school teachers who are teaching argumentative writing, and he's going to try to link their instruction to student success in writing arguments. He's using pre- and post-assessments for the students and some of them are National Assessment of Educational Progress (NAEP) items, some of them are writing samples. His hope is that once you identify such instructional techniques that are linked to better student writing, he or someone else can go on and actually develop a writing intervention that all teachers can do.

Another possible outcome of this work is to contribute to the development of a conceptual framework to be used in developing or revising an assessment under the Measurement goal. This is new this year in the Request for Applications (RFA). It was in response to some Measurement researchers, who weren't sure whether they could do this or not, so I can't give you an example of a project that has been funded. A similar grant on a larger scale is being done by Gary Troia at Michigan State, who is doing a

survey of the State's writing standards and writing assessments. He's trying to understand how similar they are and how easily they could be adapted to meet the Common Core State Standards that have come out.

In addition, he's also looking at standards and assessments for Grades 9 through 12 to see how they link up with writing expectations for postsecondary education and entry-level employment expectation. His work may lead to the development of new writing assessments that may be better tied—for example—with what colleges and employers are expecting of their students and employees in the future.

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One other thing that Exploration projects can do is to identify the factors that mediate or moderate the underlying processes or the intervention. Again, these can contribute to the development or modification of interventions and how they're implemented. If we find that certain students react differently or use these processes differently, it may be that an intervention should only be aimed at certain students in order to take advantage of that.

An example of this is by Alysia Roehrig at Florida State University. She was looking at a mentoring coaching program catered to beginning teachers (the program was related to student outcomes). She wanted to see, if there was something about the relationship between the different mentors and the teachers that affected the relationship between teachers being mentored and students doing better in English. She found a mediator was the amount of time spent between the mentor and the mentee, and also what they focused on seemed to affect this relationship. If they focused on substantive teaching issues, it seemed to make a stronger relationship between mentoring and student outcome. For moderators, she found that beginning teachers who were more self-reflective created a stronger link between their instruction and student outcomes. Also, how comfortable the mentors were with mentoring led to a stronger relationship.

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One other area that Exploration projects can address is identifying existing education interventions that are linked to beneficial student outcomes. Here you're not doing a causal evaluation of the intervention. What you're trying to do is see if there is a relationship between the intervention and student outcomes. This may then lead into an Efficacy & Replication project that would actually do the causal analysis. For example, we have Henry May at the University of Pennsylvania. He's looking at the International Baccalaureate (IB) Program using Florida State data and also some data from the IB North America Database.

He's looking at relationships between taking the IB program and postsecondary outcomes such as high school GPA, SAT scores, access to college, acceptance rates to college, and GPA in college. He's also doing quite a bit of descriptive analysis of the IB program. He presented at the American Educational Research Association (AERA) last year and showed that the IB program is now being offered in more diverse schools and in more rural schools than in the past, but it's not having as much success attracting minority and economically disadvantaged students into the program. So even before he's looking at the relationship, he's trying to get a descriptive idea of how the IB program is working. Those are the things Exploration projects should be doing.

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They shouldn't be looking at non-malleable factors, the factors that can't be changed, and they shouldn't be looking at malleable factors that are outside the control of the school system. Now, let me take a moment there. There are many factors outside of the control of the school system that do impact the school system, so sometimes it's how you pose the question. One example is the issue of homelessness. A rising number of students are homeless. Certainly, their impact on certain schools can be large, but we wouldn't expect the education system to be reducing homelessness.

However, the education system may need to address the issue of a rising number of homeless students. For example, in an Exploratory project by John Fantuzzo at the University of Pennsylvania, he actually mapped the homeless student population among the elementary schools in Philadelphia. He found that some schools had a much larger percentage of homeless students, and these students were not doing as well. His work would then lead to either the need to modify instruction in those schools to address the issue or perhaps to provide greater resources at those schools, because these students were very resource poor in their home life. So, a malleable factor inside the control of school systems sort of depends on how you frame the issue. That's a good reason to talk to a Program Officer, if there is an issue you're interested in, to see if there's a good way of framing the issue, so that it is under the control of the school system.

Exploration projects should not be developing education interventions. That's the purpose of Development & Innovation projects. If you're looking at intervention, it should be an already existing intervention. You should not be saying, "I want to develop an intervention as part of my project."

Finally, Exploration projects should not be testing the causal impact of an education intervention. Again, that's for the Efficacy & Replication goal—so please don't apply to evaluate an existing education intervention and its impact. However, and we'll talk about this more, under Exploration you can do small-scale, tightly-controlled experimental studies to identify factors that might be used as an example in the development of a

new intervention. The example I'll give is Scott Ardoin, at the University of Georgia, looking at how to improve reading fluency.

So he has an experiment looking at two approaches people use in reading. One is to read one text multiple times versus reading multiple texts one time. In his case, he's having one randomly assigned group is reading a text four times, while another group is reading 4 different texts one time apiece. Then his reading outcomes are looking at reading fluency, retracing (which means students go back and have to reread to understand something), and vocabulary development.

If one of these approaches turns out to be more effective than another, it could contribute to any intervention that's seeking to increase reading fluency and vocabulary development. That would be acceptable on an Exploration project. If he had come in and said, "I have program to read four different texts and I think it's the best program out there and I want to evaluate it," his Program Officer would have directed him to go to the Efficacy & Replication goal.

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Let's take a moment to think about some questions and see if they fit under the Exploration goal.

Exercise Question: *If you were a Program Officer and someone called up and said, "Could I look at the issue of do middle school girls score higher on English achievement tests than boys? Would you say that fits under the Exploration goal?"*

Exercise Answer: *You, as the Program Officer, would probably say, "No. The variable here is sex—girls versus boys—that's not malleable by the education system."*

Exercise Question: *Is hands-on science teaching associated with better science grades for boys?" Would that fit under the Exploration goal?"*

Exercise Answer: *Your answer here would be "Yes," because what we've done is taken the first question and changed it to say the variable is something under the control of the education system. Is how we do instruction associated with a difference between girls and boys? Hands-on science teaching, a school, a teacher, a district can manipulate that and then we can see if the outcome is an academic outcome. Science grades is our outcome, which is an academic outcome.*

Exercise Question: *Is increasing foster care payments linked to better attendance by foster children?*

Exercise Answer: Here, we would say this doesn't fit under Exploration because the education system has no control over foster care payments. Again, we could go back to that example of the earlier project I told you about, the homeless children. You could certainly look at the population of foster students across the district and see how their achievements differ and whether schools need to somehow address them if they have different numbers of foster children, but those are under the control of the education system. The foster care payments are not.

Exercise Question: Does the Bluebird reading curriculum cause higher student achievement on reading tests? Would this fit under the Exploration goal?

Exercise Answer: The key word here is "cause." You see this is a causal analysis, so your Program Officer would say you really should apply to the Efficacy & Replication goal to do this type of causal analysis. If you could justify looking for a relationship, not a causal one but any relationship between Bluebird reading curriculum and student achievement on reading tests, you could come under this goal. For example, you might argue that this is an important curriculum but we're not in a position to do an experimental study at this time, so we'd like to gather some initial evidence of its promise that we could then use to justify a larger causal study.

It might be the case that a large efficacy study has already been done on this reading curriculum and it did find a relationship. Then, you realize that in these data from this previous experiment there's actually information on teacher implementation of the reading curriculum or maybe on how teachers were trained to use this curriculum, so you would like to explore if that led to different student outcomes. Then, you might come in and do a further analysis along those lines.

Exercise Question: Do students with certain types of disabilities have shorter attention spans? Would this fit under Exploration?

Exercise Answer: The answer would be yes. There may be something the education system can do to teach students to have a longer attention span that would help these students be successful in instruction.

If you have questions like these, I mean it's very easy to e-mail or call your Program Officer and say, "Here is my topic I'm interested in. Here is my research question I'm interested in. Does it fit under Exploration?" That's our job, and you should take advantage of us rather than writing the application and then finding out later that it's not a perfect fit, when you could have adjusted it to be a good fit.

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New this year in the RFA, we've tried to make it clear the type of products we expect from all projects for all the research goals. For the Exploration project, we'd really like to see a clear description of the malleable factors or the moderators and mediators that you're examining, how you identified and measured them, and then of course the evidence regarding their relationship with the student outcomes.

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Your conceptual framework should be in your application but will also get further developed during your project—a conceptual framework explaining why you believe there should be a link between the malleable factor and the student outcome or the mediator and moderator.

Finally, have a conclusion based on your results of whether your findings could lead to further research. Would you recommend someone take your finding to go on to develop or modify any existing interventions? Or if you were looking at an intervention, should we go on to a causal analysis of that intervention or is there a need to develop a new or modified existing assessment tool? That's what we're hoping to see come out of these projects.

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So, now we are moving on from the conceptual to the practical and applied part by looking at the four sections of the research narrative.

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The research narrative is the key portion of your application. It covers the substance of your proposed work. It's really what the peer review panel focuses on, and it's composed of these four sections: Significance, Research Plan, Personnel, and Resources. The discussion I'm going to have now should be supplemented by reading the RFA and talking with your Program Officers. I'm just glancing over it and you will probably want to get more detail from them as you write your application.

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In general, the Significance section's purpose is to describe the overall project and to provide a rationale for it. You're trying to convince the peer reviewers why this project is important.

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For an Exploration goal that means you're going to describe the malleable factors or the moderators and mediators and describe how you will measure them. You're going to describe the relationship you expect with specific student outcomes, so you're going to have to describe your student outcomes as well, and then you're going to present your theoretical rationale for this relationship.

It's sometimes helpful to provide a graphic such as a logic model or a change model to make it clear to the reviewers what the pathway is between the malleable factors and the student outcomes. Sometimes, you may have a direct link between the malleable factor and the student outcomes. Sometimes, it's actually quite indirect. It might be a principal action that affects teacher instruction, which then affects student learning. So as it gets more complicated, graphics can sometimes make it clearer what the pathway is.

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You should then present your empirical evidence, if there is any, for this expected relationship—any previous literature that has looked at this issue or looked at related malleable factors. If you're looking at an existing intervention, you really need to justify why you're looking at it under an Exploration goal rather than an Efficacy & Replication goal, because the peer reviewers will say, "You know, we're only going to get part of the answer under the Exploration goal. It would be much better if we got a true causal finding under the Efficacy & Replication goal." So you have to explain why we're starting in an Exploration goal.

You want to describe the practical importance of studying your malleable factor and the mediators and moderators—what do we already know, how will it be useful to both education research and education practice. Again, if you're looking at an intervention, one way to argue that it's significant is that it's a widely used unevaluated intervention, and that it's important to get some information on it. This is often the case for Exploration studies looking at interventions. For example, the IB program is very widely used and it's growing in size and there have been no causal analyses of it. That project would be a first step to trying to get some useful information, because it would be very difficult to set up an experiment looking at the IB program, but there was quite a bit of past data available to look at student outcomes.

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Then in the Significance section, you want to discuss how your work will lead to the next step. Are you intending that it will lead to the development of a new intervention or modify one? Will it lead to an intervention that might be rigorously evaluated under the Efficacy goal or will it lead to a Measurement project? So, you want to be very clear that

this Exploration project you're proposing doesn't just end; that it has a useful next step to lead us down the chain of research goals.

We often advise people to end the Significance section with an overall importance paragraph to summarize your previous arguments. This reminds the peer reviewers of all your arguments. As they go into the next section (the Research Plan), they are clear in their mind why this is an important issue.

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We've often seen two common problems within the Significance section. One is just an unclear description of the malleable factor, and this often happens when people write about their malleable factor as if they're writing to the folks within their own field. They don't realize that the peer reviewers all work in the education field but may not work in the same specific area. If you're working in education leadership, you may talk about distributed leadership within the school, and that would be fine for the reviewers who have worked in education leadership, but other reviewers may not be familiar with a term like that. You want to be very clear in the description of your malleable factor, so that someone from outside your specific field will understand it. Explaining all your terms and any underlying assumptions is important.

If there are multiple components, it's important to show how these work together, and a graphic may be clear here. Finally, it's the issue of why your malleable factor is strong enough to generate a relationship with student outcome, and this can be a theoretical argument, empirical argument, you may have some previous data on it, or it may be just a practical argument. But you just want to think if I was reading this and I didn't know much about it, would I imagine this malleable factor as important enough to effect a student outcome. If you wouldn't, then you need to posit it so that its expected relationship with student outcome is clear.

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The second problem we often see is a lack of a theory of change, and I'm using the term "theory of change" here to mean a well-specified conceptual framework that theoretically links the malleable factors to the student outcome. Again, discuss why your malleable factor would be related to student outcomes theoretically, or if you're looking at mediators or moderators, why they would affect such a relationship and, if you lay out a clear theory, why this factor leads to student outcomes. Then, it's very easy for reviewers to understand your research plan, what you're measuring, and why you're measuring. A clear graphic here can be helpful such as a logic model.

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So, we'll move on to the next section of the research narrative, the Research Plan.

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In the Research Plan, you're detailing the methodology you'll use to score the relationships you describe in the Significance section. This is a key point. Sometimes, we see applications where it seems as if the Research Plan was written separately from the Significance section. So, you're not answering questions that were posed in the Significance section or you're asking new questions that were never discussed in the Significance section. It's very important that you make sure the two sections integrate well.

You also want to lay out your Research Plan as a step-by-step process so it's clear. It's often helpful to put in a timeline, either in the narrative itself or in the appendices, where you show how everything will get done over time.

Question: *"What is a morphologic model?"*

Answer: *Think of a set of boxes going from the malleable factor, to what do we expect it to affect, to what will it affect, and then to what student outcomes will it affect. It's just stating the believed pathway of the malleable factor's relationship with the student outcome.*

As I mentioned, you may say getting principals to go into the classroom and observe instruction and to give advice to teachers is my malleable factor. Then, we would say, "Okay, so what's that going to do? I get the principal to go to the classroom, they talk, they observe the teacher, and then they talk to the teacher. The hope then is that the teacher changes their instruction. The instruction changes and then hopefully the student learning changes, and the student learning is then reflected in the outcome of student test scores, student grades, or something of that nature. That's a slightly more complicated model.

You could think of a much simpler model where you're thinking about teaching students to keep their mind on their reading, because students' minds wander. People's minds wander while they're reading, so you may have an intervention that stops that. We have a project along those lines doing that. A student gets the intervention, student mind wandering is reduced, and the student then has a clear understanding of what they're reading. This is displayed in some student outcome, be it writing about something in their reading, or an oral question or a test, or a quiz or a test they take. It's just trying to show how the malleable factor is related to the student outcome.

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There are multiple methods you can propose in your Research Plan. You may do primary data collection and do analysis of those data. You may do secondary data analysis from existing datasets. These could be collected by IES or other sources nationally represented. They may come from other people's experiments or other people's research as well. You may do a combination. You may do primary data collection that feeds into a secondary data set and you'll analyze them both together, or they may be complimentary analyses, or you may do some meta-analyses that go beyond simple identification of the mean effect of the intervention.

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There are a number of ways that you could do primary data collection. It might just be an observation study. You may go out and see what's going on in a classroom and a school. Or you may be more formal and do surveys—surveying students or giving diagnostic tests or other kinds of assessments.

A combination of the first two is being done by Rebecca Silverman at the University of Maryland. She's going into three elementary schools and following 210 students, half of whom are monolingual in English; the other half are bilingual in Spanish and English. She's going to follow these students from second- through fifth-grade and their teacher. She's going to use classroom observations and diagnostic testing to try to identify instructional practices that are linked with improving vocabulary breadth and depth.

She's looking at the relationship between growth and vocabulary and the observed and instructional practices in the classroom. Her goal, if she manages to identify such instructional practices, would be to develop an intervention that takes advantage of those practices that are found to be related. She would then lead into a Development goal.

In addition to observation studies and surveys, you can do small-scale tightly controlled experiments. Conducting these experiments are to determine causal relationships between potential targets of interventions and student outcomes or the mediators and moderators. In most cases, this is for future work under the Development & Innovation goal. Again, it's not permissible to test the impact of a fully developed intervention. You're supposed to apply to the Efficacy & Replication goal for that.

Paul Cirino, at the University of Houston, is looking at algebra instruction, and his issue is how to teach different components of algebra, specifically procedures versus concepts of algebra. Does it matter in what order you teach them? So, he randomly assigned students to three groups where they get procedural instruction only, and then

they get the conceptual instruction, or first they get the conceptual instruction and then the procedural, or they get both over the whole period of time.

He'll be trying to see, if one of those would lead to better algebra outcomes. You would then say, "Well, look, I have evidence that teaching it in this order has an impact on students, so when I go to do development work on an algebra program I'm going to teach in that order."

Interestingly, he's also tied that up with some secondary data analysis where an earlier project he was involved in watched third- through fifth-graders in their math classes. At the time of this project, he's going to follow them into eighth- and ninth-grade when they take algebra for the first time and look at what they knew in third- and fifth-grade (specifically their math knowledge and skills and cognitive tests they had taken) and see if those third- and fifth-grade scores are predictive of how they do in algebra. So, he is not testing an actual intervention, but trying to identify some activities or factors that might be important for interventions that are going to address algebra in the later grades of those students.

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You can also just focus on secondary data analysis. There are data from other existing research studies, and some people then compiled data from several different sources, or they may even recode existing data in other ways. There are a lot of nationally representative datasets. Many of the states and districts now have administrative data records that are being used for research. Tim Sass, who was at Florida State for this project, used the Florida State data to look at the relationship of special education credentials of teachers on student outcomes. His finding was that special education students who were in regular education classrooms did better in reading and math when they had a teacher with a special education credential.

That's not causal, but that's a relationship where you could imagine somebody might say, "This is interesting. We may want to try a program where we have classrooms with a large number of special education students to make sure we have a special education certified teacher in there and see if the outcomes do better." I mean you could imagine even randomly assigning your special education credentialed teachers among those types of classrooms to see if there really was a causal relationship.

The types of analyses I've discussed have covered almost all these: the descriptive analyses, correlational analyses, some predictive analyses, and causal analyses. This is the first year the RFA has specifically mentioned doing causal analyses. Previously, under one of our topics--Cognition in Student Learning—causal analyses were often done, because they were done by psychologists doing these small-scale studies and

they were very useful identifying things that could be used in development innovation. So, we wanted to open it up to all the topics.

Anyone can do a causal analysis in Goal One, if it's in preparation of doing a Development project because it's better to come into a Development project with causal evidence rather than relational evidence. Just a note: also under the Development & Innovation goal, we have made it clearly explicit that you can do a causal analysis under there because obviously the evidence is better if you can do it within the constraints of the goal. So, our point here is that it's stronger to have this type of evidence.

Again, we just keep stressing, please don't come into the Exploration goal to do an evaluation of an intervention. It's quite likely to be rejected. Other types of analyses you might propose would be moderation analyses and mediator analyses.

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In your Research Plan, you want to discuss your setting, your population and sample, and the sampling plan and procedures you're going to be doing, if you're collecting primary data. If you're collecting secondary data, you should discuss the sampling plan and procedures that were used. Is your sample large enough to do the analysis? If you're collecting primary data, what are the issues regarding missing data and attrition? How will you handle them? If you're using secondary data, you should discuss what type of missing data and attrition problems that secondary data analysis had.

Talk about the external validity of the population you're looking at. Is it broad? Is it very specific? I mean, it's okay if it's very specific. It's just you want to make clear to the peer review panel that you're not claiming your work will be applicable to the entire population. You want them to be clear that you understand to whom this applies.

If you're combining datasets, you should show how the linking will be done. It's very important to show that if you're doing secondary data analysis, you understand your datasets. So, you want to do some preliminary data analyses if possible—maybe just some simple descriptive analyses (e.g., some counts) to show you know the dataset well enough to use it; you know some of the problems and issues that you have dealing with this, and that it can be done, especially on the data-linking.

For meta-analyses, you want to discuss your study search procedures and what your inclusion and exclusion criteria will be.

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Then, you want to discuss your measures—how you are going to measure your malleable factor, moderators and mediators, student outcomes you'll be looking at, and any other outcomes. If you're looking at teachers, you want to discuss your teacher outcomes as well. How reliable and valid are your outcome measures? Are they proximal and distal measures? It's often times useful, if you're looking at a measure of vocabulary breadth—you probably want to have a very sensitive measure. Maybe it's a vocabulary test link to the text the students are reading, but you may also want to have a more distal one, such as the state reading test where it might be less likely to be related to something as small as this—but something might show up and people might be more interested in that. You probably want to have a combination of both.

Researcher-developed outcomes are seen as less relevant to some audiences versus broad interest, such as an end-of-course test, so you want to have a balance there. If you're using a large number of outcomes, you want to address the multiple comparison issue. This issue is important, because at a 5 percent significance rate, if you use a large number of outcomes, we're likely to get a significant relationship just by chance.

You want to discuss your other key variables. And then for primary data collection, you want to talk about how you're actually going to collect the data and code it, how you're going to develop the measures from the data, and check and maintain the reliability. For meta-analyses, you'll want to demonstrate that you're coming in with what you think are a sufficient number of studies (with the relevant information to carry out the meta-analyses), the coding scheme, and your data extraction procedures.

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As you go into the analysis section, you want to link it back to your research questions. How will this specific analysis address your research question? You want to show your model, if you're using a statistical model, and you want to show how it answers your research question. If you're going to also do analyses for moderators and mediators as well as the main effect relationships, you'll probably want to show separate models for those. Because we are in education, we have to deal with nesting of data (i.e., students in classrooms and schools and districts), so it will be important to discuss how you're addressing this clustering and attrition and missing data. If you're looking at different groups, make sure you compare them at the start of the study and look for any attrition bias throughout the study. If you're making assumptions, you may want to talk about sensitivity tests of those assumptions.

If you're using both qualitative and quantitative methods in your study, it's important to link the two. In some mixed-methods studies, people underplay the qualitative analysis, doing it because they think it's necessary, but not linking it to the quantitative analysis or

showing how it complements it. Joan Herman at University of California, Los Angeles (UCLA) was looking at reclassification criteria for English as a Second Language (ESL) students in Arizona and Colorado. It was an interesting comparison, because Arizona has a statewide criteria and Colorado has a district set criteria. So, her quantitative work was following two cohorts of students (one in elementary school and one in middle school) and looking at when they were reclassified and comparing how successful they were in achievement, comparing them before they're reclassified and after, comparing them to students who classified under different systems, and comparing them to students who were not ESL students in the first place to see if their growth was a lot higher, similar, or less.

She also had a strong qualitative component. In Colorado, she surveyed the districts to identify what their reclassification criteria were in order to compare students. She also identified a sample of about 20 schools from each state to do observations. These schools were selected, because they were either very effective or less effective schools for the students who were reclassified. So, she had a nice combination of quantitative and qualitative that complemented each other.

For meta-analyses, you want to discuss your effect size statistics, your weighting function, how you'll be handling outliers, and any adjustments you might make.

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Question: *“Since exploratory is to be within the education system, is it appropriate to look at the school system itself as all-inclusive schools versus schools with contained classrooms?”*

Answer: *That would be fine. You could compare different school systems. For example, Joan Herman's study was comparing in Colorado districts that used different criteria for reclassifying ESL students. So, that was actually a comparison of school systems. But this question here is if I want to look within a district at inclusive schools versus contained classroom schools; that would also be acceptable.*

Question: *“Why do boys and girls have different outcomes?”*

Answer: *So, the assumption there is there's something malleable of how boys and girls behave or learn. I'm trying to think of how best to pose the question. If boys and girls have different behaviors or have different ways of learning, those would be things to look at because those might be conceived as malleable by the education system. We would probably expect that you would come in with a theory; let's say why boys and girls have different outcomes in reading. We would probably expect you to come in with some theory for the difference between them that you wanted to test. Then, you would*

discuss how making that determination could then lead to a development project that would help them.

For example, in most cases, high school science teachers are male. There was an argument that male teachers might be prejudiced in terms of girls learning science. So, if you came in with that theory, that would certainly fit because that's something that's malleable by the education system.

If you came in with the theory that there's something different about brain structures between boys and girls, that would be much more difficult to argue as a malleable factor under the control of the education system, and we might not be the right place for that type of research.

Question: *"Is state-level policy considered an intervention?"*

Answer: *It certainly is. Joan Herman's work on reclassification in Arizona was looking at a state-level policy on when a student should be reclassified. The difficulty there is if you're looking at only one state-level policy, then you have to think about the relationship of one policy for all these student outcomes. Do I have a time difference from the policy change, so I can look at a pre- or post-? Do I have multiple states with different policies, so I can try to get an idea of how different policies may be related to the student outcomes?*

Question: *"Is the power analysis required in Exploration study?"*

Answer: *If you're doing a quantitative analysis, you do want to be able to argue that "Yes, I have the power to be 80% sure that I can find a relationship here." So, yes, you should discuss the power analysis for an Exploration study.*

Let's move on to the Personnel and Resource section. You can imagine that these are the key sections. They're the most important sections. They're what the peer reviewers consider the most. If you don't have the personnel to do the job or you don't have the resources to do the job, it certainly will count against you. So, let's talk a bit about these two sections.

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Under the Personnel section you want to describe your key personnel and you want to make sure that you link each person and their expertise to their role in the project. We often get Personnel sections that say, "Now here's so-and-so, they have a degree in this, they've done these grants before, their expertise is in this," and the reviewers say "Well, what are they doing on this project?" You really want to be able to say, "This is

so-and-so, they have expertise in this, and that's why they're doing this part of the project. That's where their expertise will be used."

If you're proposing a certain methodology, show that you have the person who can use that methodology. If you're covering a specific topic area or content area, show you have a substantive person for that area. Do not say, "I'm going to hire somebody with this expertise." The peer review panel might not be convinced or they'll score you lower because of that. Reviewers consider if you have project management skills—if somebody on the grant managed a project of this size before. If you're new and you haven't managed a project of this size, you may want to bring in somebody with those kinds of skills, because there will be concerns over management issues.

You should also give the time contributions for each person. The point here is to say, "Here's what's being done in the project, I have a person with the expertise to do it, and they're going to spend enough time on the project so they can get it done." You may want to orient your CVs the same way. We have 4-page CVs, plus one page for other sources of support. You may want to write them in such a way to show that this person has expertise in this aspect of a project. So, if you have a 20-page CV, you may want to pull out just those things regarding that person's work on this project to show they have the skills.

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Some personnel strategies for the Principal Investigator (PI): If you're a senior researcher and applying, make sure you're on there for enough time to be a PI. We get projects in with somebody saying they're going to be on a project for 3 percent of their time; that's not taken seriously. You should be on there for a large enough time that people say, "Yes, they're making a contribution." That's doesn't mean you need to be on there for 30 or 40 percent of your time, but enough time that you'll be actively involved in overseeing the project. Also, sometimes we get senior researchers saying they'll be there for 1 month during the summer, and the peer review panel says, "But the project is continuing all year long, how can you only be on there for 1 month during the summer?" So, make sure you have enough time on there and that it's adequate to cover the work over the course of the year.

Make your credentials clear. Reviewers are from different fields within education, and you may be well-known within one field but not well-known outside it. I'm not saying to boast, but just make clear the work you're doing and why you're qualified.

For younger researchers, we do have projects where they are the PI/the project director but, again, it's important to show that you have the expertise not only to lead this work, but to manage the project. To be honest, reviewers are often more comfortable if there is a senior person on the project that they know you can turn to if something goes wrong. They don't have to be the PI but could be a co-PI, a co-investigator, or could be an advisory panel that's there for a certain amount of time—an adequate amount of time—just some way of showing the reviewers that you have someone to talk to on a regular basis to make sure the project continues along well.

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Somebody wanted me to point out that in Exploration projects we want you working in authentic education delivery systems (e.g., schools and classrooms) rather than working with college students in labs. Let me get back to Resources now.

Again, you want to show that the institutions involved have the capacity to support the work. So, don't just use a university boilerplate; show that you have the resources specifically for this project. You want to show that all the organizations involved understand and agree to their roles—what each institution (e.g., the schools or the school districts) will contribute to the project. You want to show that you have strong commitment of schools and districts and alternatives in case you do get attrition.

If you've received an Exploration grant before, we would like you to discuss how it worked out—did this contribute to education practice or to education research and did it contribute to a further research goal? For example, did it go on to an Efficacy or Development goal? That shows that you have the capacity to take Exploration work and promote it into further research under our other goals.

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I'm actually going to step outside of the research narrative. You're allowed to have appendices that don't count toward the 25-page limit on your research narrative. One of these is Appendix C, where you back up the commitment of support from research institutions, consultants, and state or districts of schools who are taking part. You want to have letters of support. There's no page limit here, so you can have letters of support from everyone. You want those letters to be detailed. You want them to understand what their role is, to say "I understand that I'm going to allow this project to come into my school and do surveys, do classroom observations, or collect student data regularly over the course of this period."

The reason we really want detailed letters is because one of the most difficult issues we have is schools reducing their participation in the research. One reason why we think schools and districts drop out is they don't understand what has to be done. When the

project comes along and says, “Okay, we need to do a survey and take up an hour of your time,” the school says, “We don’t have an hour. We’re dropping out.” So, you really want to be clear that the schools, districts, or states know what their commitment is to the project.

The other major issue is data. Often times, we have people proposing to use data that may not be publically available, and may be restricted or administrative data. We want you to come in with a letter saying you’re going to have permission to use those data. Sometimes districts or states are not willing to give that permission unless you get funded, but they often will provide an intermediary letter that says, “We’re willing to provide data if it meets our requirements and this project gets funded,” and that’s enough for the review process. We would then come back to you afterwards saying, “You need to get a letter saying that you will have access to the data.”

I mentioned earlier, you really should show your data can be used for your work, and display a knowledge of the missing data and attrition and subgroup that is available to do analyses. If you’re merging data, show that it can be done.

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You have Appendix A, which has a 15-page limit. You can put figures, charts, tables, a timeline, a staffing chart—anything like that you can put here. If you’re going to be using any measures (e.g., a researcher developed an outcome measure for vocabulary breadth), you can put that here, so the panel can see it.

If you’re doing a resubmission, you must spend up to three pages addressing the comments on your last application and how you’ve addressed them. You must do that in order to be reviewed this time. Or you may argue that your application is new. It’s actually so different it should be considered a new submission, but you must argue here why it should be considered a new resubmission. Otherwise, it may not be sent forward for review. This is because the peer review panel gets very frustrated, if it doesn’t see that its past comments are being addressed. They’ll often get frustrated to the point of giving a low score to the application, so it’s really not worth being reviewed, unless you argue how you’ve addressed the past review comments.

Appendix B has a 10-page limit. Here, if you’re looking at an intervention or an assessment, you can provide examples of that intervention. Let’s say you’re looking at a new curriculum and you wanted to see the relationship between the IB program and student outcomes, you may put in some examples of some materials used in the IB program. If you felt that the peer reviewers might not be familiar with the intervention or the assessment, here’s a chance to show them what it’s composed of, or partly composed of. This is different than Appendix A where we have examples of measures.

Those are examples of measures in Appendix A you're going to use. Appendix B is examples of the intervention or the assessment that is used in the intervention you're looking at. Then, Appendix C contains the letters of agreement and there's no page limit on those.

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Your budget is also a separate section. It's not part of the research narrative. You should provide a clear budget and a discussion of the budget—what we call the “Budget Narrative.” You need a budget for the overall project and you need a budget and a budget narrative for any sub-awards you're making. We have an application submission guide on our website, which will describe the budget categories.

You should also check the RFA. There are specific budget requirements for each of the research goals and grant programs. So, you may read the RFA and talk to the Program Officer. Make sure there's agreement among the research narrative and the budget and the budget narrative. Sometimes, we see applications come in where in the research narrative they have a survey and in the budget there's no budget for a survey. So, again, the peer reviewers are skeptical about how you can do a survey without having funding for the survey. Just make sure everything you proposed to do is covered in the budget.

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If you're only doing secondary data analysis or only doing a meta-analysis, the award for the Exploration goal is a maximum of 2 years and maximum grant of \$700,000, and that's direct and indirect costs. If you're doing primary data collection and analysis, with or without a secondary analysis, it's a maximum of a 4-year program and a maximum of \$1.6 million total cost. Now, let me just stress that you shouldn't just come in for the maximum—maximum years or maximum budget. You really are going to need to justify why you need the maximum, if you're going to come in at the maximum level. If you can't justify it, you should ask for less money. Asking for less money is fine. I mean, if you have a very small project, there's no reason not to come in for a quarter-of-a-million dollars or \$100,000, if that can get the work done. There's no need to say, “Oh, I'm not going to be taken seriously, if I don't do the maximum.” Unless you have a good reason for asking for the maximum, you probably shouldn't.

This year we've made it very clear that if you propose more than the maximum number of years or the maximum grant award, we will not accept your application for review. It will be returned to you without being reviewed.

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Let me just end with some admission and review issues.

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The dates and the deadlines are important for our two parent grant programs, Education Research Grants and Special Education Research Grants. Submission sessions are held twice a year. There's one competition, but it's held twice a year. So, the deadline is June 21st or September 20th that you have to submit an application by. We do ask for a Letter of Intent in April and in July. While it's not required, it does two things: (1) it gives us an idea of how many peer reviewers we need and in what areas; and (2) the Program Officers review these Letters of Intent and respond to you. So, if you've sent in a Letter of Intent, and they say, "This is really not fitting here well, let's talk about it," they'll send you back an e-mail asking you to talk with them.

Letters of Intent don't take a great amount of time to do. They're submitted online. You're really just putting in who you are, who (possibly) some of the other applicants are, a short description of what you want to do, and a very rough estimate of your budget and time. Don't spend much time on that. Even if you don't submit a letter, you can still do an application, but it's still helpful to let the Program Officer know you're going to submit an application at some point.

The Application Package, that's the form you actually fill out and submit, will be posted at the same time that the Letter of Intent is due. We purposely stagger them, so people don't submit the wrong application package to the wrong competition. We have one package for the June submission deadline and one package for the September submission deadline.

You don't have to start at the first start date. You can start any time for the first round from March to September. If September is better for you, propose starting in September; it won't count against you. We've often found people proposing to start in March have difficulty getting post-docs or graduate students that they thought they could hire and they have to wait until July, so their project may not get off the ground until later. Think about what the best start date is for you and take advantage of the wide range.

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When you apply, you'll want to go to this website at the top here. Here's where you get the RFA. It will tell you where to go for the Letter of Intent, the application package, and the submission guide. So, this is the first place you can go to get all this information.

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For your grant submissions, you have to go to [Grants.gov](https://grants.gov). That's the government-wide grant submission website. Your institution has to be registered there. That's a process. If you're from a university, you're undoubtedly registered there, but if you're from a small, non-government organization or a small organization that has never applied for a grant before, please go do that several weeks ahead of time and look in our submission guide to understand how to register yourself on Grants.gov. Your authorized representative will then complete the process, if you filled out the application package. The deadline is 04:30:00 p.m., Washington, DC time. It's much safer to do this earlier. Grants.gov does get overloaded, when people are submitting on the last day of submission. If you're late because you didn't submit earlier, it's quite likely that you won't be accepted to review and your application will be returned to you.

Grants.gov does have a helpline. If you use that, get a case number each time, so that you can tell us that you did try to receive help. You'll get several e-mails that they received your grant and that your application has been validated or rejected due to errors you've made. This is another reason to submit early. If you submit early and then get an e-mail from Grants.gov saying you're rejected due to an error, you have time to resubmit. If you submit on the same day, you won't have any time to resubmit. Then, the U.S. Department of Education will assign you a grant number starting with R305 or R324.

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This is when the Standards and Review Office takes over in the application review. They'll first do a compliance screening to make sure you meet all the format requirements (e.g., your research narrative must be 25 pages or less. If it's more than 25 pages, they'll cut off the extra pages). They'll then do responsiveness screenings. All applications have to go to a specific grant program, and then within the Education Research and Special Education Grants programs they need to go to a specific topic and goal, so they'll be looking for "Did you submit to the right grant program and to the correct topic and goal?" If so, you'll get assigned to a review panel. Two to three reviewers will first read it. One will have substantive expertise and one will have methodological expertise. If they score it high enough, then it will go to the full panel.

As I mentioned, many of the panelists will be generalists, but there will probably be an expert in every procedure you discuss. You'll get individual scores on the Significance section, the Research Plan, the Personnel, and the Resources section and you'll get an overall score. So far, we've been able to fund all applications that get outstanding or excellent scores by the review panel. If you score below that we do encourage resubmissions. Probably slightly more than 50 percent of the applications resubmitted

are funded, so come back, talk to your Program Officer, and address the reviewer comments.

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If you're interested in the actual peer review process, here's the website for the Standards and Review Office where they tell us how the review process works. You can learn more about it there. If you're interested, another way to learn about the process is to be a reviewer. If you are interested, if you have a strong academic background in an area with some publications and some past research, you could send any of the Program Officers your CV and a request to serve as a peer reviewer, and we can forward that on to the Standards & Review Office. It's up to the Standards & Review Office to decide whether or not they would like to invite you to be a peer reviewer. But it is a good way to learn the process.

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You'll then receive e-mail notification on the status of your application, whether you're funded or not, and you will also receive copies of the reviewer comments. Again, we definitely recommend that you think about resubmitting and talk to your Program Officer about this.

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This is just one in a series of webinars. You can see the website that lists the webinars and the availability. They range from the Basic Overview, to how to do an application, through Grant Writing Workshops for each of the five research goals, and workshops for early career researchers in minority-serving institutions. We also run a set of training programs – grant research training programs that your institution may be interested in applying for. Then, there's some on the overview of the special education funding opportunities.

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For more information, we suggest you take a look at the funding website, read the RFA, and then decide what Program Officer you think is most appropriate. Contact them by e-mail and set up an appointment, and then talk to them over the phone. They are listed in the RFA, and they're also listed on the website.

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On behalf of Amy and myself, I appreciate you taking the time to listen to me today, and also, if you have any other questions, I'll be glad to stay around for a few minutes, if you'd like to e-mail any questions. Otherwise, please do contact us. Our job here is to work with applicants. Thank you and enjoy the rest of your day.

This concludes today's webinar, the Grant Writing Workshop for Exploration Projects, part of the Research Funding Opportunities Webinar Series. Copies of the PowerPoint presentation and a transcript from today's webinar will be available on the IES website shortly. Thank you and have a wonderful day.