

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

STATE OF FLORIDA
DEPARTMENT OF EDUCATION
AMERICAN INSTITUTES FOR RESEARCH

FLORIDA'S RACE TO THE TOP
STUDENT GROWTH IMPLEMENTATION
COMMITTEE MEETING

University of Central Florida
Teaching Academy Building
Orlando, Florida

Thursday, May 19, 2011

Volume 1

DEPARTMENT OF EDUCATION:

KATHY HEBDA, Deputy Chancellor for Educator Quality
JUAN COPA, Director, Research & Analysis

AIR MEMBERS PRESENT:

JON COHEN, Ph.D., Executive Vice-President
HAROLD DORAN, Ed.D., AIR, Principal Research Scientist
CHRISTY HOVANETZ
MARY ANN LEMKE

American Court Reporting
850.421.0058

1 (Whereupon, the meeting was called to order
2 by Kathy Hebda, after which the following
3 occurred:)

4 * * * * *

5 MS. HEBDA: Good morning, everyone, and
6 welcome to the next meeting of the Student
7 Growth Implementation Committee under Race to
8 the Top. I'm Kathy Hebda, I'm the Deputy
9 Chancellor for Educator Quality with the
10 Department of Education. I'd like to not only
11 welcome our committee members this morning but
12 welcome our audience that might be watching over
13 the web, and anybody present in the room. If
14 there are audience members present in the room,
15 we are very, very pleased that you're here.
16 We'll have hard copies of the power point for
17 you at the lunch break, and we also would remind
18 you that this is a webcast and is always open to
19 the public. We are very pleased that folks are
20 interested in this meeting. This is a working
21 group. The committee members, the ones that
22 will be speaking during this time and doing the
23 work of the committee, and we appreciate your
24 participation.

25 Members, I'm going to let you begin by
American Court Reporting
850.421.0058

1 directors for Florida PTA, and I'm here
2 representing parents.

3 MS. WESTPHAL: Lori Westphal. I'm a
4 teacher for hard of hearing at (inaudible) Early
5 Learning Literacy Center, Lake County.

6 MR. CAMPUTARO: Joseph Camputaro,
7 kindergarten teacher, Lee County schools.

8 MS. NOYA: Cristina Noya, St. Lucie County
9 assistant principal.

10 MS. FRAKES: Stacey Frakes. I'm an
11 instructional coach Madison County.

12 MR. FOERSTER: Sam Foerster, associate
13 superintendent in Putnam County.

14 MS. FEILD: Gisela Feild, administrative
15 director, Miami-Dade County.

16 MS. TOVINE: Gina Tovine, assistant
17 superintendent Levy County.

18 MS. STEWART: Pam Stewart, deputy
19 superintendent, St. Johns County.

20 MS. BROWN: Anna Brown, director for
21 assessment of performance management,
22 Hillsborough County Public Schools.

23 MS. WOODHOUSE-YOUNG: Tamar
24 Woodhouse-Young. I'm a math teacher in Duval
25 County.

American Court Reporting
850.421.0058

1 introducing yourselves one more time. Most of
2 you were here in person at the last meeting, but
3 if you were participating from afar or not quite
4 in the room, I'm going to let you do that. If
5 you would just say your name and your position
6 and who you represent, and we'll start with
7 Ronda.

8 MS. BOURN: I'm Ronda Bourn. I'm
9 supervisor of special projects at the Northeast
10 Florida Educational Consortium.

11 MS. EDGECOMB: Doretha Edgcomb, school
12 board member, Hillsborough County Schools.

13 MS. KRISHNAIYER: Latha Krishnaiyer,
14 Broward County.

15 MR. MOREHOUSE: Lawrence Morehouse,
16 president of Florida Education Department and
17 professor of USF.

18 MR. LeTELLIER: John LeTellier, music
19 teacher, Stanton Weirsdale Elementary School,
20 Marion County.

21 MS. ACOSTA: Sandi Acosta. I'm a middle
22 school science teacher at Kenwood KA Center in
23 Miami.

24 MS. KEARSCHNER: I'm Linda Kearschner, I'm
25 a business owner and I'm on the board of

American Court Reporting
850.421.0058

1 MR. TOMEI: Lance Tomei. I'm the director
2 for assessment accreditation in data management
3 in the College of Education here at UCF.

4 MS. MARSALA: Nicole Marsala, 8th grade
5 U.S. history teacher in Broward County.

6 MR. MURPHY: Jeff Murphy, director of
7 student services Florida Virtual School.

8 MS. HALL: Stephanie Hall, Brevard County.

9 MS. HEBDA: Thank you very much, committee
10 members. I appreciate that. Just for
11 housekeeping purposes, was the sound okay?
12 Could you hear everyone.

13 MR. ROBERTS: You need to be a little bit
14 louder.

15 MS. HEBDA: Okay. Members, just for the
16 folks that may be watching online, we do have
17 the microphones placed around the table so if
18 you could just direct your voice towards those
19 microphones, it should pick it up fine.

20 I want to go through with you -- you have
21 in your packet a power point that we will use
22 just like we did last time when you were here
23 that will kind of keep us framing your
24 discussion and the process that you'll use
25 throughout the next two days.

American Court Reporting
850.421.0058

1 The first couple of things on that just to
2 get everything set up before I turn it over to
3 our experts, you have two sides that cover the
4 meeting agenda for today and tomorrow. We begin
5 at 8:30 each day and will adjourn at 5:00 today
6 and at least by 5:00 tomorrow, no later than
7 5:00 tomorrow.

8 One of the things that I would say about
9 the agenda, you can -- I won't read every line
10 to you; you can see that on your own. Our
11 contractors, the American Institutes for
12 Research that worked with you the last time at
13 the last meeting, what we've asked them to do
14 this time for your benefit since your big goal
15 this time is to work towards recommendations to
16 the commission for a value added model to be
17 used with FCAT data, is to provide you not just
18 the results of all the data requests that you
19 made of them at the last meeting but also a
20 method for you to make and work towards that
21 decision. And they developed a process that
22 will help you do that and track the information
23 that you receive from that data analysis and
24 from the results of those data runs, and that
25 will help you as work towards making your

American Court Reporting
850.421.0058

1 So I know this work you're doing today is very
2 important, and on behalf of the Commissioner,
3 Chancellor, and the Department of Ed and State
4 Board of Ed, I really want to say how much we
5 appreciate your time and attention and your
6 devotion to this task and the expertise that you
7 bring with you, and just keeping in mind,
8 though, that it is the beginning.

9 So here you are. You may remember these
10 slides from last time. This is the process for
11 sort of the year one of the grant with
12 relationship to student growth. You already
13 identified the initial models that you wanted
14 and selected models for comparison. That's what
15 you did at your last meeting and determining --
16 you had a discussion of the variables and
17 business rules. One of the things we'll do
18 after I finish these introductory slides is
19 we're actually going to spend a couple of
20 minutes reminding you of what those decisions
21 were. In case you don't have your notes with
22 you or any of those sorts of things, we'll lay
23 out very succinctly where you've come so far.
24 That will help remind you where you are and what
25 you're going to do next, and of course, anybody

American Court Reporting
850.421.0058

1 decisions over the next two days. So I think
2 that's something that you can look forward to
3 and feel comfortable about because I know that
4 you may be thinking, well, you asked for a lot
5 of information last time and how are you going
6 to receive that information and how will you
7 make decisions about that information. And they
8 have a process to help you do that.

9 So as I mentioned, the purpose of this
10 committee -- just to remind everyone and
11 everybody who might be watching -- the purpose
12 of this committee is to make recommendations and
13 the June 1st recommendations that you make,
14 those that go to the Commissioner, you need to
15 make a final selection by June 1st. That's
16 really the first order of business that you
17 have. It's not the last. June 1st is just a
18 beginning. It's a process, the beginning of a
19 process. It's a very important step, no doubt,
20 but it is a first step and you'll be working
21 throughout the remaining years of the grant to
22 improve the models and recommendations that you
23 make, look at how those models can be
24 communicated, lots of things like that that you
25 have on your agenda for the next three years.

American Court Reporting
850.421.0058

1 who's watching the proceedings, we'll also help
2 them know exactly what's happened if they miss
3 the first meeting.

4 So you finished all that at the last
5 meeting. What's in the loop here is what you're
6 going to do today and tomorrow. You're going to
7 evaluate those selected models, the results of
8 those things, how they run data using those
9 models and the variables, and the business rules
10 that you discussed; and you're going to compare
11 those things. Remember, I told you we have a
12 process that will help you the next two days to
13 do that comparison in a way that you can feel
14 comfortable about, there will be times for you
15 to stop, reflect, always opportunities for
16 questions and clarifications as you go
17 throughout that process the next few days.

18 Then after the final selection is made by
19 the Commissioner on June 1st then there will be
20 reporting of results. School districts will get
21 their data that was used to evaluate the model,
22 the final model selected, data they can use to
23 make local decisions about how they're going to
24 use it in evaluation systems and their scales
25 for ranking folks or rating individuals making

American Court Reporting
850.421.0058

1 decisions about performance next year. That's
 2 the process they'll be going through this summer
 3 after that data is provided to them.
 4 So that's where you are in your timeline.
 5 Again, this is the goal of the meeting.
 6 It's a simple goal; it's an important goal.
 7 Just reminding you again that your goal is to
 8 make recommendation. The Commissioner does have
 9 the responsibility to make the final selection.
 10 Then, of course, as that model is implemented
 11 next year and the following year and the year
 12 after that, every year there's a process built
 13 into the grant to make sure we analyze how
 14 effective the model was and ways to make
 15 improvements in the model as we go.
 16 One other reminder before I turn it over to
 17 our AIR partners is their role throughout this
 18 process, just like you saw in the very first
 19 face-to-face meeting you had, their role is not
 20 to make a recommendation. That's your role.
 21 Their role is to fulfill your request for data,
 22 provide information, answer your questions, lend
 23 expertise to the process, but the decision are,
 24 in fact, yours. I want to make sure that
 25 everybody is very, very clear about that.

American Court Reporting
 850.421.0058

1 gifted, age, class size, homogeneity of class,
 2 mobility, and school effects that will all
 3 appear in the models as well.
 4 Just to reiterate some of the milestones,
 5 when initially presented we looked at eight
 6 different models. We selected three and at AIR
 7 we went ahead and evaluated those three models
 8 and some variants of those models. So you'll
 9 actually be seeing more results than for just
 10 three models today. I believe there are results
 11 for seven different models that we'll be looking
 12 at today. We provided guidance and direction.
 13 We'll show you how we incorporated the business
 14 rules that we made decisions on from last time.
 15 We'll talk specifically about how we identified
 16 and defined each one of the variables from the
 17 last meeting, and so today we'll be looking at
 18 all of these results making some initial
 19 recommendations to have it finalized by June
 20 1st.
 21 So I'd like to call Dr. Harold Doran up to
 22 start discussing through some of our initial
 23 results and findings.
 24 DR. DORAN: Good morning, everybody. Thank
 25 you for having us back. So last time that I was

American Court Reporting
 850.421.0058

1 Remember, I told you we're going to walk
 2 through the background of the decisions made so
 3 far and I want to bring everybody up to date,
 4 I'm going to call on Dr. Hovanetz to please do
 5 that part for us.
 6 DR. HOVANETZ: Good morning. Just a brief
 7 reminder of where we've been and how we got to
 8 where we are today to look at the results that
 9 we have. A mere six weeks ago we were sitting
 10 here all together and we had our first
 11 face-to-face meeting where we actually narrowed
 12 it down to have AIR look at three selected
 13 models, a covariat model with fixed and random
 14 effects and a sustained differences model. We
 15 selected variables that we wanted them to
 16 include in the model and we selected business
 17 rules to guide the evaluation as well. We
 18 looked at and pulled out of Senate Bill 736 the
 19 three specific variables -- students with
 20 disabilities, English language learners, and
 21 attendance -- and defined each of those
 22 variables for inclusion in the evaluation.
 23 We also had a webinar on April 14th where
 24 we did additional identification of variables to
 25 be included in the analysis. So we identified

American Court Reporting
 850.421.0058

1 here I was really sick; this time I feel great.
 2 This time Jon is actually the sick one, so the
 3 coughing is coming from him not me.
 4 This has been for us at AIR in working with
 5 DOE a really exciting six weeks. There have
 6 been a number of things that we really have an
 7 opportunity to look at, think about, analyze
 8 that we're going to bring to you today. So I
 9 think this is exciting.
 10 I'd also like to say because I've been
 11 doing value added for a while and it's my
 12 opinion, which I think is a pretty substantiated
 13 opinion, that the work that this group is doing
 14 is the most comprehensive value added for
 15 comparison and in-depth analysis of different
 16 models that I know of that has ever happened to
 17 go into operation, at least people who have done
 18 the studies, and they thought about value added
 19 models. The depth of what this group has done
 20 has been very, very substantial and we're going
 21 to present a very substantial amount of results
 22 today.
 23 Before I get started, I wanted to stop real
 24 quickly and look back at where we were and see
 25 if anybody had any questions that were pressing

American Court Reporting
 850.421.0058

1 from the last time we were together, any
2 particular concerns or issues, or if we're just
3 ready to move on.

4 Hearing none, why don't we start? All
5 right.

6 One of the commitments that we have in
7 terms of implementing the value added models and
8 coming back to this group is we want to be clear
9 about what we call an estimand. What are the
10 different value added models actually estimating
11 in clear terms, because these are statistical
12 models that are doing something that has to be
13 understood in terms of their transparency, in
14 terms of what they are estimating.

15 Essentially, there are two types of models
16 that we're going to present today. We reviewed
17 three genres of models last -- two genres of
18 models, what we called the layered and
19 persistence model or the learning path models
20 and the covariate models. So now let's talk
21 about what are the models actually estimating,
22 the differences model is -- we say this, expect
23 students who score the same in the pattern here
24 to score the same and to continue to score the
25 same, and assumes the same amount of growth for

American Court Reporting
850.421.0058

1 each student in each achievement model. So
2 students within performance level one are
3 expected to have the same level of growth that
4 all other students in that performance level.
5 Students in the third performance level have a
6 similar expectation.

7 I'll show you a graphic in just a moment.
8 The covariate adjustment models, these models
9 expect students who score the same in prior
10 years to score the same the next year. Expected
11 growth may vary within achievement level. It's
12 that last part that makes these two models
13 different.

14 In the first model, students within a
15 similar performance category have similar growth
16 expectations. In the latter, students in a
17 similar performance category can have different
18 growth expectations. That is the key difference
19 between these two models.

20 Let's look at a visual display. Sometimes
21 it's good to look at the human language
22 interpretation of what the models are actually
23 estimating and some others like to look at some
24 of the plots. I'm going to try to present
25 information in multiple ways today so that it

American Court Reporting
850.421.0058

1 really saturates and we understand what we're
2 estimating.

3 The green line is the line that would be
4 fit through a covariate adjustment model, and
5 essentially, one of the things that we see here
6 in this red line is the simple differences
7 model. It essentially has a slope of one within
8 each of the performance categories, whereas the
9 other model has a slope of whatever it is. It's
10 not necessarily one; it doesn't have to be
11 constrained to be one. But it's not the same
12 within a performance category where you see the
13 red line expects lower growth for students at
14 the lower end of the score distribution relative
15 to the covariate adjustment model. The
16 important point that we want this group to
17 recognize is that the models differ in terms of
18 their expectations for growth for students
19 within a particular performance model. My team
20 want to add anything?

21 DR. COHEN: Yes, I want to add a little
22 bit. This is -- we've boiled it down to just
23 two classes of models earlier.

24 DR. DORAN: The web books have -- the web
25 books have these, is that correct.

American Court Reporting
850.421.0058

1 MS. HEBDA: Is that correct.

2 DR. COHEN: Just to make sure that everyone
3 followed, the X axis is the kids' score last
4 year; the Y axis is the kids' score this year.
5 The little blue dots -- okay. We've plotted all
6 the kids in grade seven, these are their math
7 scores. We chose a grade as an example so you
8 can see the true relationship. The covariate
9 adjustment model gives you the best fitting line
10 if you were to fit that. So it minimizes the
11 amount of dispersion around that prediction.
12 Does that make sense?

13 Every kid who got -- and the echo models
14 have some other covariates in it -- but as I
15 said a little loosely, but the general idea is
16 that every kid who got a 1500, you go up to the
17 covariate adjustment model, they would land on
18 that green line, come over and you might expect
19 1600; it comes out to about there. So every kid
20 has the same expectation if you have the same
21 scoreboard.

22 Does everyone understand what the green
23 line is?

24 The red line, it's just a simple
25 difference. All we did was we said we're going

American Court Reporting
850.421.0058

1 to look at your score and subtract out the
 2 average growth from within that group. We'll
 3 just look at the average growth for kids who
 4 started at the same achievement level; and
 5 instead of having a best fitting slope, it has a
 6 slope of one. You look, it's hard for you to
 7 see in some places where these lines differ.
 8 But you do see that they cross a number of
 9 times. Where the red line is above the green
 10 line, that means that you're predicting higher
 11 performance among the kids than is typically
 12 observed. The green line is what's typically
 13 observed; it's also the line hit by the
 14 covariate adjustment model.

15 So down here the difference in models
 16 predicting less growth than is typically
 17 observed. That would tend to say that teachers
 18 teaching these students would typically exceed
 19 that more readily. At the other end you see
 20 this is where it goes if you follow this, at the
 21 end of this group, teachers teaching these kids
 22 would have a harder time exceeding that because
 23 you're expecting more growth than is typically
 24 observed. Does that make sense? That's the
 25 difference between the covariate adjustment

American Court Reporting
 850.421.0058

1 model and simple differences model. So we're
 2 clear? Questions? Okay, back to Harold.

3 DR. DORAN: All right. Let's go to the
 4 next slide. So let's talk about a summary of
 5 the models that have been estimated. Let me
 6 talk through this and then I'm going to give you
 7 something that you're going to keep next to you
 8 throughout today and tomorrow. The first model,
 9 what we call Model 1, we call it a two-level
 10 model -- a two-level model that includes teacher
 11 effects, controlled for one year prior
 12 achievements, we call those lags -- so one year
 13 prior achievement is called one lag -- and
 14 control variables that are ELL or English
 15 language learners, SWD or students with
 16 disabilities, and attendance, and we estimate
 17 teacher effects as random effects. I'm going to
 18 talk about random effects in just a moment.
 19 I've got a reminder slide in here in terms of
 20 what they are.

21 We call it a two-level model because the
 22 data are students at the first level, teachers
 23 at the second level. That's the terminology
 24 that we use here. Okay. That's Model 1.

25 Model 1A is the same as Model 1 except that
 American Court Reporting
 850.421.0058

1 we have two years of prior achievement data.
 2 What I mean by that is in this regression we
 3 have what's called a dependent variable --
 4 that's the current year's score -- and then we
 5 use two prior years of achievement data. We
 6 call those lags. So one lag means in the
 7 regression model, one of our independent
 8 variables is a prior test score. If we had two
 9 lags then we're using two prior test scores.
 10 The rationale for that and whether or not that
 11 matters is going to become clear as we look at
 12 some of the results comparing Model 1 and Model
 13 1A.

14 Model 2. It's the same as Model 1 but
 15 estimated with fixed effects. Let me say
 16 something now and we'll talk more about this
 17 throughout the day if we need to. We estimated
 18 the model with fixed effects just as we said we
 19 would. We're not presenting them today although
 20 we can fully talk about them. Let me explain
 21 why.

22 Algebraically, mathematically, we know that
 23 the random effects and the fixed effects are
 24 guaranteed to be the same as the number of kids
 25 in a class gets larger. That's the constraint
 American Court Reporting
 850.421.0058

1 that has to be in place. They can be the same
 2 and they estimate the same quantity. Early on
 3 in the analysis we saw that the models with
 4 fixed effects were yielding unstable results.
 5 We spent quite a bit of time looking into this
 6 and we know why. There is a business rule --
 7 there were a couple of issues. There is a rule
 8 that allows for students, I forget exactly how
 9 to say this -- Christy or Jon, remind me --
 10 students who are taught by multiple teachers to
 11 be partitioned across these multiple teachers.
 12 Essentially what was happening is there's
 13 teacher one who has a group of kids, teacher two
 14 who has the exact same group of kids, okay? Two
 15 different teachers, exact same group of kids.

16 In a fixed effect model you can't have
 17 that, all right? The term we use is called
 18 co-linearity. We have to remove one of those
 19 teachers. We're estimating the same exact
 20 thing. In fact, you can remove one of those
 21 teachers because they're duplicated without any
 22 consequence on model estimation.

23 There's another condition happening in the
 24 data which causes near co-linearity. They're
 25 not exactly the same kids but they're pretty
 American Court Reporting
 850.421.0058

1 close to it. It would almost have the exact
 2 same number of kids but they might be off by one
 3 kid or two. That causes for a problem in the
 4 mathematical estimation of the model. What was
 5 happening was that those teacher effects were
 6 causing -- those teachers in the data, without
 7 conditions it appears to be true -- were causing
 8 for the results to be unstable. In fact, if we
 9 remove some of those issues and we estimate the
 10 model with fixed effects and we correlate it
 11 with the random effects, they are correlated
 12 better than 0.9. A correlation ranges from -1
 13 to 1; a correlation of 1 means there is a
 14 perfect relationship between the two, a 1 to 1
 15 correspondence. A correlation of zero means
 16 there is no correspondence between the two
 17 estimates. The closer you get to 1, the greater
 18 that correspondence between those two is. A
 19 correlation better than 0.9 tells us what we
 20 hypothesize about this. When we were here last
 21 time six weeks ago that the models were
 22 estimating the same thing and that turns out to
 23 be true in the data.

24 The issue here is and the reason we're not
 25 presenting it is because there is a business

American Court Reporting
 850.421.0058

1 rule that prevents these models from being
 2 estimated and presented in a reasonable way to
 3 this group, but we do know that we could rely on
 4 the fact that both algebraically and in the real
 5 world the results are highly correlated when we
 6 remove that particular issue and when we don't
 7 take it into consideration.

8 Do you want to add anything?

9 DR. COHEN: No, that's basically it. You
 10 wind up having to toss out a lot of teachers
 11 because of fixed effects model; it's not true
 12 with the random effects model. You don't want
 13 to really toss out a lot of the teachers, you
 14 don't really want unstable estimates.

15 DR. DORAN: All right. Model 3 and
 16 variance. A three-level model that includes
 17 teacher and school effects. Control for two
 18 prior achievement -- two years of prior
 19 achievement, two lags, and varies as to which
 20 variables are included. That's the general
 21 class of Model 3. So we have teacher and school
 22 effects. It's a three-level model because the
 23 data are structured in this -- we have students,
 24 teachers, and schools. That's the terminology
 25 that we use. We have two-level models and the

American Court Reporting
 850.421.0058

1 three-level model.

2 Model 3A has no additional variance.

3 That's it. The description that we see.

4 Then we have Model 3A1. Model 3A1 is Model
 5 3A but it differs only in terms of the number of
 6 prior achievement test scores. It has one lag,
 7 not two.

8 Model 3B. This is the description, but it
 9 includes ELL, SWD, and attendance. We use two
 10 prior test scores -- oh, there's a note there.
 11 It always uses two prior test scores.

12 Model 3c, ELL, SWD, attendance, and the
 13 following additional variable -- class size,
 14 homogeneity of class composition. Let me
 15 explain that variable. That is a variable that
 16 describes how similar students are within a
 17 class, all right. So we construct a variable,
 18 call it the homogeneity variable, and it's
 19 essentially -- I think we've got another slide
 20 that describes it, but I'm going to mention this
 21 now. I have to find the easel to talk about
 22 things multiple times. It is the difference
 23 between the students at the 75th percentile
 24 within a class and the 25th percentile within a
 25 class. So if students within a class are very

American Court Reporting
 850.421.0058

1 similar in terms of their prior test scores,
 2 that difference will be small.

3 If students within a class, if a teacher
 4 has a class that is very different in terms of
 5 their ability, that number will be very big.
 6 It's a spread. It's essentially a spread
 7 between kids within class. How different are
 8 kids within a class.

9 Mobility, student mobility, and difference
 10 from modal H. Christy will describe those in
 11 just a moment when we get to those slides. And
 12 we use one or two years of prior achievement
 13 data -- here again, this one uses two prior
 14 achievement scores, okay.

15 And last, Model 4 is the differences model.
 16 All right. This is the language description,
 17 the narrative description of what these models
 18 are doing. In your folders you have this -- can
 19 everybody pull this out to make sure we all have
 20 this here? I'm going to refer to this as the
 21 scorecard throughout the day, today and
 22 tomorrow.

23 This is the same as what you see here, but
 24 you're going to want to keep this next to you
 25 throughout the day. We're going to talk about

American Court Reporting
 850.421.0058

1 the models and all of our slides use labels like
 2 1, 1A, 3A, 3A1, and so forth, and we don't want
 3 you to get lost in the details of the models.
 4 So what we've created is this little scorecard;
 5 and essentially what you see is Model 1 and its
 6 key characteristics. So, for example, Model 1
 7 has one lag and had teacher effects only. No
 8 school effects. The covariates that are
 9 included are SWD, ELL, attendance, and the
 10 effects, the teacher effects are random, and
 11 school effects if they are included. There's no
 12 school effects in Model 1.

13 All right. Now I'm calling this a
 14 scorecard because one of the things that we're
 15 hoping we will do is by the end of the day we
 16 have to make a recommendation, and Sam is going
 17 to facilitate a conversation. What we have over
 18 here in terms of notes, these are the primary
 19 evaluation criteria by which we'll be looking at
 20 these models today. We have data that show you
 21 how these models stack up against each other
 22 based on those criteria.

23 One of the things we're hoping this
 24 scorecard will be used for is as we talk about
 25 precision, for example, and the precision of the
 American Court Reporting

850.421.0058

1 different models, you will come up with your own
 2 ranking system and maybe you'll use a 1 to 10
 3 scale. Maybe you'll use a 1 to 50 scale. Maybe
 4 you like happy faces, pluses, minuses, whatever
 5 is comfortable for you, and if you like a model,
 6 for example, and you're using -- you might put
 7 for that particular model, Model 1, a precision
 8 plus or an 'A'; or if you don't like it, you
 9 might put an 'F' based on the data and the
 10 results. And essentially you might use that to
 11 have a ranking for each model on your own
 12 personal scale for precision. Then include
 13 school effects. Do you like to include school
 14 effects? And so forth.

15 By the time we get to Sam and he
 16 facilitates the conversation about whether or
 17 not you're ready to make a decision or intend to
 18 make a decision on a model, you'll be able to
 19 look at this and you'll look across the rows,
 20 and you'll say, well, I look at Model 1 and I
 21 have all the sad faces. They're all minuses
 22 there. In my own opinion in these criteria, I
 23 can eliminate that model from my choice. I look
 24 at Model 3B. I have all those pluses there.

25 Then your decision by the time you get to the
 American Court Reporting

850.421.0058

1 conversation with Sam is not random.
 2 Have you forgotten anything? You've
 3 evaluated the models based on empirical
 4 criteria. There's going to be a ton of
 5 discussion and other things that you care about
 6 perhaps beyond this, but the goal here is we
 7 have to have a process by which we evaluate the
 8 models that's better than our opinions on what
 9 we think the world should look like. So we made
 10 an attempt not only to estimate a large number
 11 of models with multiple areas, but to also come
 12 up with what we believe are reasonable
 13 indicators that you can use as the lens by which
 14 you can evaluate the model, then this decision
 15 is yours. It's not us standing here telling you
 16 this model needs to compute, it's statistically
 17 very nice. It looks good, the plot looks good,
 18 and we remove hopefully all of it. Keep this by
 19 your side throughout the day.

20 Jon, go ahead.

21 DR. COHEN: I just want to help with a
 22 little bit of organization here. It's not
 23 entirely clear from the chart -- I mean, it's
 24 there but it doesn't just pop out at you --
 25 Model 1 doesn't include school effects. It's

American Court Reporting

850.421.0058

1 only teacher effects. Model 3 includes teacher
 2 and school effects. We've tried to have at
 3 least pairs of models so you can evaluate
 4 different decisions, and essentially there are
 5 four -- these models vary along four dimensions.
 6 One dimension we've already talked about.
 7 Covariate model versus differences model. That
 8 would be Model 4 versus all the other models.
 9 Model 4 is the differences model that we just
 10 talked about; all the other models are covariate
 11 models.

12 The second dimension is whether you include
 13 school effects in addition to teacher effects;
 14 whether you're simultaneously estimating school
 15 effects and Model 1 does not include a school
 16 effects estimate, Model 3 does.

17 The next decision is how many years of
 18 prior achievement do you include? We recorded
 19 those as lags and you'll see them in the first
 20 two columns, so we have one teacher effect only
 21 and one -- we have two lags and one lag in each
 22 Model 3 and Model 1, if you want to look at
 23 those.

24 Finally, the question is which covariates
 25 do you include? And we have everything that

American Court Reporting

850.421.0058

1 ranges from none to a few to the kitchen sink.
 2 MR. TOMEI: Quick question. I'm looking at
 3 the chart and it appears that the lags for 3A
 4 and 3A1 may be inverted, based on what's on the
 5 slide; is that correct?

6 DR. COHEN: Right, 3A and 3A1 are inverted,
 7 yes, thank you for that. So 3A should have a
 8 checkmark under two lags; 3A1 should have a
 9 checkmark under one lag. Thank you for that.
 10 That's a good catch.

11 DR. DORAN: Let's all make that change to
 12 make sure we're all on the same page.

13 MS. FEILD: Shouldn't 3B have the covariate
 14 ELL, SWD, and attendance based on that?

15 DR. DORAN: Yes. Thank you.

16 DR. COHEN: Excellent. Thank you.

17 COMMITTEE MEMBER: Would you say that
 18 again, please?

19 DR. DORAN: Yeah, SWD under row 3B under
 20 covariates, in 3B under covariates, write SWD,
 21 ELL, and attendance. Under Model 3A in that
 22 row, remove the checkmark under one lag and
 23 instead put the checkmark under two lags. In
 24 the row below it, Model 3A1, put a checkmark in
 25 the column for one lag and remove the column for
 American Court Reporting
 850.421.0058

1 two lags. Thank you for that catch; I'm sorry
 2 for the error.

3 DR. COHEN: Okay, so there are four
 4 dimensions to the models. Differences versus
 5 covariate, four versus everybody else. Only
 6 teacher effects and school effects, Model 1
 7 versus Model 3, the number of prior year
 8 achievement -- those are called lags -- and the
 9 particular covariates. So these are the four
 10 dimensions you want to be thinking about.

11 DR. DORAN: Yes, go ahead?

12 MS. FEILD: I have a general question.
 13 When we talk about your data, are we only
 14 talking about students that have been promoted?
 15 In other words, if you're looking at three years
 16 of data, would that be progression from 3rd
 17 grade to 4th grade to 5th grade, or would we be
 18 including data 4th grader retained, 4th grade,
 19 5th grade?

20 DR. DORAN: Christy, how did we do retained
 21 students? Did we have -- if we had, say, a 5th
 22 grade student who was retained, would we be
 23 using the retained data -- would we use two
 24 prior years of data or would we only use the
 25 data if they were promoted in this sequential
 American Court Reporting
 850.421.0058

1 order?

2 DR. HOVANETZ: We would use the prior
 3 years.

4 DR. DORAN: Any scores.

5 MS. FEILD: Regardless of the grade level.

6 DR. DORAN: I don't remember that --
 7 (inaudible) -- if we use any prior school --

8 DR. HOVANETZ: With the exception of 3rd
 9 graders, we do not use any 3rd graders.

10 MS. FEILD: What about retained 3rd
 11 graders? No?

12 DR. DORAN: No. Remember, we cannot
 13 estimate teacher effects in 3rd grade because
 14 there's no prior achievement data. So the only
 15 -- you have students who have two 3rd grade
 16 scores because they were retained for some
 17 reason, you'd get biased effects because of
 18 that.

19 MS. BROWN: On the chart 3C in the
 20 covariate, it lists gifted but I don't see
 21 gifted on the slide as a covariate.

22 DR. DORAN: Gifted is in the model. It
 23 should be on the slide.

24 DR. COHEN: It's actually in every model
 25 that includes SWD, it also includes gifted.
 American Court Reporting
 850.421.0058

1 DR. DORAN: Let's add that. Any place you
 2 see SWD, also add gifted.

3 DR. COHEN: It should say exceptional
 4 students.

5 DR. DORAN: I was so certain I had this
 6 right.

7 MS. EDGECOMB: I want to make sure that I
 8 understand our responsibility under the section
 9 called Notes where you talked about using some
 10 kind of quoting system, some smiley faces, the
 11 plus and minuses. Do we each do these
 12 individually? Is that correct?

13 DR. DORAN: That's right.

14 MS. EDGECOMB: What will help the process
 15 so that we limit subjectivity in doing this?

16 DR. DORAN: Good question. When we talk
 17 about precision, we're going to show what we
 18 need by precision and we're going to show you
 19 results. We'll actually show you how the models
 20 vary in the terms of their precision. We'll
 21 find precision. Then we'll show which models
 22 are more precise and less precise, and then
 23 you'll be able to make your judgment based on
 24 data. Which of the models are more or less
 25 precise? Each of these criteria are associated
 American Court Reporting
 850.421.0058

1 with data, so there's no virtually no
 2 subjectivity in that regard. Whether or not the
 3 models are precise is an empirical question.
 4 Whether or not they are school effects, we show
 5 you the consequences of school effects or not,
 6 and there's data. Same thing with parsimony,
 7 classification, accuracy, and lags. There are
 8 data that we will present associated with each
 9 of these criteria and you can make a judgment on
 10 whether Model 1 is better than Model 2 based on
 11 the results of what we show you.

12 Christy?

13 DR. HOVANETZ: Just for clarification, this
 14 is just an advance organizer for you all to take
 15 into -- we're not necessarily going to ask you
 16 to keep track of points or numbers, but just for
 17 you to be able to reflect in an organized way
 18 and that we're all doing it the same way. So
 19 when we're talking about Model 3A, you can look
 20 at 3A and see the notes that you've taken for
 21 that specific model to help refresh your memory
 22 because there are seven different models that
 23 have not -- very fancy names.

24 DR. DORAN: Yes, ma'am?

25 MS. BROWN: I just want to clarify the
 American Court Reporting
 850.421.0058

1 gifted SWD. Was gifted included as a separate
 2 covariate in each of these situations, in
 3 addition to SWD, or included as SWD?

4 DR. DORAN: Included as a separate
 5 covariate.

6 MS. BROWN: Thank you.

7 DR. DORAN: Yes?

8 MR. LE TELLIER: Under, for example,
 9 precision, what you said is totally objective.

10 DR. DORAN: Virtually.

11 MR. LE TELLIER: Or virtually. If you come
 12 out there with the data because -- especially
 13 with its title precision, is there an absolute
 14 precise way for all of us to know this is the
 15 model that was the most precise versus us
 16 guessing it?

17 DR. DORAN: Yes. We're going to show you
 18 -- we're going to define precision, we're going
 19 to talk about what are we looking for when we
 20 talk about precision. That's a question. Then
 21 we're going to say what's the statistic that
 22 tells us what defines precision, what statistic
 23 defines precision. Then we've got criteria.
 24 How do you know a model is more precise than
 25 another? What are we looking for in that

American Court Reporting
 850.421.0058

1 statistic? Then there's a why. Why do you care
 2 about this? So each of these criteria will be
 3 structured around those four things: What's the
 4 question? What's the statistic that answers
 5 that question? What's the evidence -- what are
 6 we looking for in that statistic? And then why
 7 do you care about this?

8 Yes.

9 MR. TOMEI: Kind of related to the question
 10 on gifted, within SWD how many different
 11 categories did you look at independently?

12 DR. DORAN: We looked at -- Christy, remind
 13 me.

14 DR. HOVANETZ: We going to talk about this
 15 in two slides.

16 DR. DORAN: Yeah, right, we're just about
 17 to transition over --

18 MR. TOMEI: We know from research in other
 19 areas, we know there are differences among the
 20 different --

21 DR. DORAN: Yes.

22 DR. HOVANETZ: There are --

23 DR. DORAN: I'll get to this and then I'll
 24 pass it over to Christy for the actual operation
 25 lies -- where the variables are.

American Court Reporting
 850.421.0058

1 I'm going to actually get a glance -- this
 2 is a slide we talked about last time. I already
 3 mentioned this when I was talking about the
 4 differences between the fixed and random effects
 5 earlier. But I want you to recall that fixed
 6 and random effects are different ways of
 7 estimating the same thing. In fact,
 8 mathematically we know that they're expected to
 9 be the same. They're expected to be no
 10 different from each other under the condition
 11 that classes get bigger. You have a lot of kids
 12 in a class, then the numbers start to look about
 13 the same. How many? I don't know exactly, 20
 14 or 25 or 30 kids in a class; those numbers
 15 should convert to the same value.

16 The reason we estimate these different
 17 models is because there are different classes of
 18 statisticians, some people who like to treat
 19 these models as fixed effects, some who like to
 20 estimate the most random effects. There are
 21 statistical nuances, there are certain
 22 properties of the random effects that people
 23 like in certain properties of the fixed effects
 24 that people like, and essentially what we've
 25 shown is that when we remove those teachers who

American Court Reporting
 850.421.0058

1 are near colinear, the models are essentially
2 doing what we hypothesized; they're estimating
3 the same thing. There is essentially no
4 difference in what is being estimated.

5 And when I talk about what, I'm talking
6 about this thing called a teacher effect,
7 value-added effect.

8 Christy, why don't I toss this over to you
9 to do what's next?

10 DR. HOVANETZ: We'll update the scorecard
11 or note taking device and make copies of it so
12 you'll have a new one.

13 Since we already had started talking about
14 the variable discussion, just to be very clear
15 why we are talking about including variables in
16 the models to begin with; and just to refresh
17 our memory as to the discussions that we had on
18 April 4th and 5th and again on the 14th at our
19 webinar, the reason we are looking at adding
20 controlled variables is to reduce the variances'
21 unequal distribution of students that
22 (inaudible) in teachers' courses. There's
23 limited debate. We had this conversation back
24 on the 4th and 5th and we did on the 14th about
25 whether or not adding a lot of controlled

American Court Reporting
850.421.0058

1 control, whether or not it was already being
2 measured by another variable that we were
3 looking at, and also whether or not it could be
4 explained by pre-test data. That was the
5 framework that we were operating under to put
6 variables into the model for evaluation.

7 We evaluated a lot of variables where we
8 thought let's just see what this looks like and
9 we'll base our judgments on the results, but we
10 will be using the same framework as we're
11 considering the results of these variables, not
12 just whether or not they're significant but
13 whether or not it does make a difference in the
14 precision of the model and whether or not
15 policy-wise it's the right variable to be
16 included. So just keep those same conversations
17 in mind that we had before.

18 Okay. This is the list of variables that
19 have been evaluated within the models. Students
20 with disabilities status was done with a
21 dichotomous variable for each of the individual
22 disabilities. So we can either play a game
23 where you guess which variables are D, E, Z, or
24 I can just tell you. We did not include the
25 exceptionality codes listed here based on the

American Court Reporting
850.421.0058

1 variables is going to make a difference in the
2 model, whether or not it's going to make it more
3 precise and whether or not it's going to
4 actually level the playing field for teachers.

5 Some of the rationales for including
6 student characteristics is to eliminate that
7 bias, but the policy implications of it is
8 student who want to set it for differing
9 expectations for different students. So just a
10 little reminder or refresher about the
11 conversation that we were having on these
12 variables before.

13 Reminder on the framework that we operated
14 under when we were talking about which variables
15 to include. First of all, we went through and
16 we looked at the variables that were in Senate
17 Bill 736, the SWD, the ELL, and the attendance,
18 and then we had the brainstorming session where
19 you all listed out 20 or so variables that we
20 had conversations about initially on the 4th and
21 5th and then went through each of them in detail
22 on the 14th and made judgments about them then.
23 When we talked about including variables in the
24 evaluation, we talked about whether or not it
25 was a variable that was within the teacher's

American Court Reporting
850.421.0058

1 recommendations of this group last time. So as
2 a reminder, occupational and physical therapy
3 were not included as variables. Z is a not
4 applicable variable; U is a established
5 conditions; T is developmentally delayed; M is
6 hospital or homebound; C is orthopedically
7 impaired; F is speech impaired; and L is gifted.
8 Those are not considered disability categories
9 that we evaluated within these models.

10 We had 14 different SWD exceptionalities
11 that we did evaluate within the model. Four of
12 these exceptionality codes have been collapsed
13 and so we will only be presenting on ten of
14 these exceptionalities. What happened is there
15 were three codes that were collapsed into the W
16 code, which is intellectual disability, back in
17 2007-08; so you won't see as many disabilities
18 or exceptionality codes as we talked about
19 because they don't exist in the data anymore.
20 So that's where you'll see a difference in what
21 we talked about versus what's being presented.

22 Gifted status was done as it's own
23 independence variable. Dichotomous variable.
24 The student was listed as gifted or not listed
25 as gifted. With the students with disabilities

American Court Reporting
850.421.0058

1 codes, we had talked about looking at primary
2 and other exceptionalities. This is only
3 looking at primary student disability. We did
4 not look at secondary or other exceptionalities.
5 It's only primary.

6 For English language learner status, this
7 is also a dichotomous variable. Students have
8 to be coded as LY or currently receiving ESL
9 services, and they can only be coded as LY for
10 two or fewer years. So if a student is in his
11 third year of receiving services, they are not
12 considered an ELL student for our purposes.
13 Yes.

14 MS. ACOSTA: Just to clarify, the LY
15 classification has really no bearing on their
16 ESOL level, so in other words they could have
17 been receiving for two years and have reached
18 ESOL level four or still be in ESOL one, and
19 they'll be treated equally?

20 DR. HOVANETZ: Yes.

21 For attendance, we treated attendance as a
22 continuous variable the number of days the
23 student was in attendance at the school. So if
24 a student was in multiple schools, we added the
25 number of days in attendance in all of those

American Court Reporting
850.421.0058

1 class, a larger difference is a less homogenous
2 class and this was done on a continuous
3 variable.

4 The mobility calculation, also a continuous
5 variable, we looked at the number of transitions
6 a student made from school to school. If we
7 have only one record for the student, the
8 student had zero transitions. If we have two
9 records for the students in different schools,
10 that's considered one transition. So each time
11 a student changed schools during the school
12 year, it's counted as a transition. We did
13 encounter some students that had two records
14 with two entry dates into the same school. If
15 there was a 21-day period between the exit date
16 of the school and the following entry date into
17 that same school, they were considered to have
18 made a transition. If they spent time somewhere
19 else, it may not have been in Florida, but we're
20 not at that school that actually made
21 transitions.

22 Age is also a continuous variable. We
23 looked at and calculated the modal age for the
24 grade as of September 1st and took the
25 difference between the modal age and the

American Court Reporting
850.421.0058

1 schools to get the total number of days the
2 student was in attendance. It's a continuous
3 variable, just the number of days present. Just
4 as a reminder for this particular variable, this
5 is information that comes in during survey five
6 which is end of the summer and so for the
7 evaluations we've been able to include this in
8 the simulations that we've been doing, but this
9 is going to be a data capture that will work
10 with the Department if we choose to include it
11 to be sure that we can get timely information on
12 attendance.

13 Class size is a continuous variable. We
14 did not use state determined class sizes. We
15 actually just counted the number of students
16 enrolled in a course and that was the number of
17 students or the class size for that particular
18 course.

19 Homogeneity of class composition. Harold
20 mentioned this already, but in order to
21 determine the homogeneity of a class we looked
22 at the score at the 25th percentile and the 75th
23 percentile and took the difference. If it's a
24 small difference between the 25th and 75th
25 percentile, it's a homogenous or more homogenous

American Court Reporting
850.421.0058

1 student's actual age to come up with the age
2 difference.

3 And I will turn it back to Dr. Doran.
4 DR. DORAN: All right.

5 DR. HOVANETZ: Well, first, do you have any
6 questions about variables?

7 MR. MOREHOUSE: I have a question about how
8 you define homogeneity. Is it devised strictly
9 on test scores?

10 DR. HOVANETZ: Yes, strictly on prior
11 student achievement.

12 MR. MOREHOUSE: And what do you mean by
13 "unique course" or "each unique course"?

14 DR. HOVANETZ: For a unique course, we
15 looked at the district and the school, the
16 courses offered, the course number, the period
17 the course was offered, and the teacher for
18 which the course was offered. So a unique
19 course is any course number that is unique by
20 school and by district and period.

21 Lance.

22 MR. TOMEI: I have a question about the
23 class size statistic. How are the data
24 collected and how stable is that particular
25 statistic between data collection points?

American Court Reporting
850.421.0058

1 DR. HOVANETZ: We are only looking at
2 survey two data and survey three data, so it's
3 that second week in October and that second week
4 in February, and it's whichever students are
5 enrolled during those two specific weeks in that
6 particular course in that school, in that
7 district with that period number. That's
8 considered the number or the count of enrollment
9 for class size.

10 MR. TOMEI: I'd like to ask the P-12 reps
11 on the committee. Do you see that as a fairly
12 stable statistic or is that one where there
13 could be variance in the statistic itself that's
14 not going to be captured in the reported data
15 that will be used in the model?

16 MS. FEILD: Why not -- it was sort of a
17 combination question. First, what was the self
18 count within the class period teacher that was
19 used to either aggregate the data or not?
20 Secondly, how are we handling semester courses
21 in the high schools? Generally, the kids are
22 FTE's, did we account for that?

23 DR. HOVANETZ: Yes and no. So
24 unfortunately we don't have a minimum class size
25 to a discussion that we can have, but based on

American Court Reporting
850.421.0058

1 the estimations that we did for these particular
2 models, we did not limit the number of students
3 that had to be in a course in order for a
4 teacher to generate a value-added score.

5 With respect to semester versus full year
6 courses, we did not look at whether or not it
7 was a half-year course or a full year course.
8 The data that we received showed us if a student
9 was enrolled during survey two or survey three,
10 if they were enrolled in the same course in
11 survey three that they were enrolled in survey
12 two, that course was eliminated. So the data
13 information that we have shows each of the
14 students' enrollments in the school in that
15 particular course.

16 MS. FEILD: So the data polled for the
17 courses, what was exactly polled? Are we
18 polling only reading and math courses
19 traditionally?

20 DR. HOVANETZ: Yes, we are polling only
21 courses that are listed in the course code
22 directory as a reading course and/or as a math
23 code.

24 MS. FEILD: And does that include the ESL,
25 reading through ESL and ESE?

American Court Reporting
850.421.0058

1 DR. HOVANETZ: I have an entire course code
2 directory that I can show you there are 166
3 courses that were polled for reading and 90
4 courses that were polled for math, and it's
5 based on the Department's determination in the
6 course code directory of what is a math course
7 and what is listed as a reading or English
8 language arts course. And in your packet it
9 shows specifically there's a course code
10 directory on how those determinations were made
11 by the Department. It's a separate handout that
12 was behind your Power Point on the right-hand
13 side and the reading courses are courses that
14 are identified as requiring a reading
15 certification to teach them or a course that is
16 mandated by the State Board of Education as a
17 remedial course, a remedial reading course.

18 Math courses are identified by the prefix,
19 those are a little bit more simplistic to
20 identify. English language arts was determined
21 by a committee and then also by the course code
22 prefix. So I have a list of all the courses
23 that were included for the particular analysis.

24 MS. YOUNG: I remember the discussion about
25 attendance, but I didn't remember the outcome.

American Court Reporting
850.421.0058

1 For students that are in multiple courses during
2 the day and they have a tendency to leave after
3 lunch, did we -- do we have data for that or
4 just the whole day or they're marked present for
5 the whole day, that's it?

6 DR. HOVANETZ: Yes. There was no way to
7 capture by course at this time.

8 MR. COPA: Christy mentioned this but just
9 one thing to add. As we talked last time in
10 April, we have limitations on what we currently
11 have to model, but one of the outcomes of one
12 out of this process is to look at different ways
13 to capture the data, improvements in the data
14 systems, and we have already started
15 conversations at the department level about
16 capturing a lot of this information such as
17 attendance at a course level as opposed to the
18 daily attendance that's currently collected.

19 MS. FEILD: Referring back to Lance's
20 question, I think there will be issues.

21 Probably not monumental, but I know there are
22 districts that offer some of the core courses
23 within a semester. For example, algebra which
24 is not going to be dealing with an end of
25 course; a lot of districts are planning on

American Court Reporting
850.421.0058

1 offering it as a semester so students can
2 request -- . So we'll have to take that into
3 account.

4 DR. HOVANETZ: And that's okay, though,
5 because we will still have the district, the
6 school, and the course number for that
7 particular student. So we do have that
8 information right now and in the evaluation.

9 Other questions? Ask as many questions as
10 you want today. Today is all about just getting
11 you information, making sure that you're
12 comfortable with the results based on the models
13 we've selected or you selected, and we want to
14 get all the information because we'll start
15 making decisions tomorrow, or you'll all be
16 starting to make decisions tomorrow about which
17 ones we're leaning towards.

18 MS. EDGECOMB: In one of the earlier slides
19 when you began talking this morning, you talked
20 about the importance of data availability and
21 accuracy. Is the assumption that all districts
22 have in place the capacity to provide those two
23 characteristics about data and input?

24 DR. HOVANETZ: That's a great question. I
25 think a lot of the data that we are using is
American Court Reporting
850.421.0058

1 accurate because it's been used for other
2 purposes. There are some pieces of information
3 that will hopefully get more accurate as we
4 continue to use them, but this is the best
5 available information and as we select which
6 variables to be included and highlight that with
7 the districts that there will be more attention
8 paid to insuring the accuracy of those. We'll
9 also have quality check processes in place where
10 districts are signing off on their data, just as
11 they do with other school accountability
12 measures for school grades and AYP, so they'll
13 have the opportunity to review the data before
14 these results come out. But it's a great
15 question.

16 MS. EDGECOMB: Okay. Can I continue just a
17 little bit with that? Is there going to be a
18 timeline when all the districts do or perhaps
19 for those districts who aren't up to par that
20 will give them the opportunity to develop some
21 systems that, data collection or dashboards or
22 whatever, to get those things in place knowing
23 that these are the expectations?

24 DR. HOVANETZ: Sure. As Juan has
25 mentioned, they are in the process of revising
American Court Reporting
850.421.0058

1 how data is currently being collected and
2 putting in new data collection procedures. All
3 the information we're reporting here is
4 information that has been collected for decades.
5 So they have a system in place to capture this
6 data information that we talked specifically
7 about here. I think those need to be refined.
8 The department will be working on that to assist
9 districts and process these in order to be sure
10 that is all reflected accurately.

11 MS. FEILD: So let me make sure I
12 understand the premise of the analysis, so an
13 elementary teacher who is sitting in a classroom
14 with 25 kids; at the end of the year you'll look
15 at the data for the 25 kids. You'll see whether
16 those kids were there for both FTE's. If only
17 20 of them were there for both FTE's, those 20
18 will comprise her data analysis, correct? Is
19 that correct?

20 DR. HOVANETZ: If the student was enrolled
21 in survey two or three, they're included in the
22 analysis right now.

23 MS. FEILD: "Or" did you say or "and"?

24 DR. HOVANETZ: Right now, it's "or". So
25 the information that we have is for --
American Court Reporting
850.421.0058

1 MS. FEILD: I thought you said "and" at the
2 beginning.

3 DR. HOVANETZ: Or. We have survey two
4 information and survey three information. The
5 data set that we have has students that were
6 enrolled in survey two and enrolled in survey
7 three. If their survey three records is
8 identical to their survey two record, the survey
9 two record was removed from our data study. So
10 if they're in survey two and not in survey
11 three, the assumption is that they were there
12 for a majority of the year. Or that's the
13 assumption we made based on the data. So if
14 they are enrolled in any of the courses with
15 that teacher, they're accountable with that
16 particular teacher.

17 MS. FEILD: So a child who switches schools
18 will be counted in both schools?

19 DR. HOVANETZ: Correct.

20 MS. FEILD: So he's in teacher A at the
21 beginning of the year, they move and in January
22 they move to a different school with a different
23 teacher?

24 DR. HOVANETZ: Correct.

25 MS. FEILD: And the driver here was the
American Court Reporting
850.421.0058

1 course not the teacher, correct? We were
 2 talking here about reading endorsement, but if a
 3 teacher is a social studies teacher in a high
 4 school who happens to have a reading endorsement
 5 and is teaching two periods of intensive reading
 6 and she has 25 kids, which we have now a lot --
 7 right, 25 kids in each course, tenth grade for
 8 periods of European history, two periods of
 9 intensive reading, she will have data for those
 10 50 kids and those two intensive reading courses?

11 DR. HOVANETZ: Yes, this is based on the
 12 courses the student are holding.

13 MS. FEILD: I could go on. I could ask
 14 another question. Elementary school,
 15 self-contained teachers who are teaching both
 16 reading and math would have two value-added
 17 scores, a reading score and a math score?

18 DR. HOVANETZ: Correct.

19 MS. FEILD: Assuming the school coded that
 20 as a self-contained?

21 DR. HOVANETZ: Correct.

22 MS. FEILD: So if in fact the school is
 23 departmentalizing it but they did not code the
 24 teacher as departmentalized, which we know they
 25 do, then the teacher will be attributed math

American Court Reporting
 850.421.0058

1 scores in essence and in fact that teacher
 2 didn't really have math scores.

3 DR. HOVANETZ: Correct.

4 MS. FEILD: I think this alludes to Miss
 5 Doretha's comment on accurate scheduling and
 6 data pieces in the past; that was not important.

7 DR. HOVANETZ: Correct. We don't have
 8 actual runs of which teacher was assigned
 9 reading and which teacher was assigned math by a
 10 particular teacher, but one of the things we
 11 found is an elementary school teacher was more
 12 likely to have multiple teachers than a middle
 13 school or high school teacher was. Elementary
 14 schools are doing a good job of parsing out the
 15 students taking spelling, the students taking
 16 writing, the students taking reading, the
 17 students taking math; and so they have multiple
 18 course enrollments, it's not just fourth grade.
 19 So that's been a big shift in the data over the
 20 last five or ten years. But we are seeing that
 21 more students in elementary school have multiple
 22 courses associated with them.

23 MR. COPA: Just another disclaimer again.
 24 These are all great questions, and again back to
 25 the issue that we're operating under the

American Court Reporting
 850.421.0058

1 constraints of what we have currently collected
 2 for this modeling purpose, but just so everyone
 3 is aware as well, both the law requires a roster
 4 verification process to be in place for this
 5 when this is operational, the Department with
 6 partner districts. Hillsborough is one, NEFEC
 7 is another one, and also Osceola County of
 8 developing a teacher-student data link roster
 9 verification system through a grant process with
 10 SELT, which is -- I don't know what -- I can't
 11 think of what the acronym is right now, but they
 12 have a grant through the Gates Foundation. So
 13 we're working with them over the next year and
 14 coming months and we'll be putting forth a
 15 process in place working with our district
 16 partners and open to the entire state on a
 17 roster verification system to improve that data
 18 that will be so fundamental to this purpose so
 19 that we can deal with those issues such as the
 20 variability in how schools or districts may
 21 report this course information, since it hasn't
 22 been used for this high stakes accountability
 23 purpose in the past.

24 MR. LE TELLIER: Going on with what you
 25 were saying with the count two and three if the

American Court Reporting
 850.421.0058

1 student moves from one school to another, is the
 2 teacher that had them for the second count or
 3 the October -- would that affect their
 4 value-added model at the number three?

5 DR. HOVANETZ: That's a great question.
 6 That goes to the growth expectations and
 7 attributions, which is in a few slides, but
 8 maybe I'll skip to it now just to address your
 9 specific rule.

10 This is important for just kind of the
 11 fundamental understanding of how we determined
 12 expectations. Students' growth expectations are
 13 determined on the courses they are enrolled in,
 14 so if the student is enrolled in a reading
 15 course their expectation is based on that
 16 reading course. If a student is enrolled in
 17 multiple reading courses, their expectation is
 18 based on multiple course enrollments regardless
 19 of which teachers they had. It's based on the
 20 number of courses the student has taken in that
 21 subject to develop the student growth
 22 expectation. Harold will talk a little bit more
 23 about what those expectations are, but
 24 essentially we looked at students enrolled in 1
 25 to 6 reading courses, 1 to 6 math courses and

American Court Reporting
 850.421.0058

1 found the expectations of students in two or
2 more reading courses higher than a student
3 enrolled in just a reading course, but the
4 difference between a student enrolled in 2 and 3
5 reading courses was not significant. So the
6 expectation of growth for a student is based on
7 the number of courses they're enrolled in.

8 The attribution of that growth is given to
9 each teacher that student had. So if the
10 student's growth expectation is based on one
11 course and they've had one teacher, that teacher
12 is fully accountable for that student's growth.
13 If a student is enrolled in two or more courses,
14 that growth expectation is a little bit higher
15 and that teacher -- both of those teachers that
16 that student had -- whether it's the same
17 teacher or different teachers, both of those
18 teachers are accountable for that higher growth
19 expectation.

20 So if Gisela and I both had reading courses
21 -- she was teaching one reading course and I was
22 teaching another and Stephanie was in our class,
23 she has a higher growth expectation because she
24 is taking two courses. I'm fully accountable
25 for what you do in meeting that higher growth

American Court Reporting
850.421.0058

1 expectation and Gisela is fully accountable for
2 you meeting that higher growth expectation. So
3 we're both accountable for that higher
4 expectation.

5 MS. FEILD: So how would the homogeneity of
6 the class composition -- how does that work into
7 a double portion? You'll have a lot of kids
8 who'll have English and intensive reading. So
9 how does that variable work?

10 DR. HOVANETZ: The homogeneity is a course
11 level variable and it's generated for each
12 particular course and it's used as a controlled
13 variable as a model.

14 DR. COHEN: So we drove right into the fine
15 details. So there's a difference between a
16 course and a class. I'm a student in school A
17 and move halfway through the year to school B,
18 I'm taking Algebra 1 in both schools; that's one
19 course. It's two classes. The homogeneity
20 variable is calculated for each class
21 separately. So if I was in a very broad diverse
22 -- diverse in terms of kids entering math
23 skills, in the first school I would have one
24 homogeneity variable that had a large number.
25 That is not very homogenous. Then I move to a

American Court Reporting
850.421.0058

1 school and I'm in a class and it's all kids who
2 are struggling with algebra just like I am, it
3 would have very little homogeneity. I have both
4 those variables in the model. So that's a class
5 level as opposed to a course level model.

6 I want to remind you all, you guys are the
7 working group and the committee, so the
8 attribution that Christy is talking about is
9 what was understood to come out of the committee
10 before. There's nothing that stops you from
11 revisiting that. We're here to implement your
12 affectations. So mathematically -- let's think
13 about the easiest case. You're a teacher who's
14 teaching just a team taught course and there are
15 two teachers in the classroom with the same
16 kids, and that's the only class you teach.
17 Let's say you're an elementary teacher; it's the
18 only class you teach. It doesn't matter whether
19 it's a hundred percent or fifty percent
20 attributable to you because all of it is like a
21 weighted average, right? So the average
22 multiplying everything by fifty percent, each
23 kid by fifty percent, it's the same as the
24 average is going to be if you multiplied each
25 kid by one. Does that make sense?

American Court Reporting
850.421.0058

1 The only time it makes a difference is when
2 you're teaching kids with a differential number
3 of courses. So I have some of my kids who I'm
4 their only teacher for, they count one; I have
5 some kids who are in my class and in another
6 reading class. Then do they count one or when I
7 calculate my average do they count as one kid or
8 do they count half as much as the other kids
9 because I would only be half-teaching them? The
10 decision that we understood from the last
11 meeting was that all kids should count equally
12 no matter how many other teachers are teaching
13 them. That was the attribution that Christy was
14 talking about.

15 Are there questions about that?

16 MR. LeTELLIER: I don't think I quite got
17 what I was trying to say, my point, across.
18 Survey 2, survey 3. Is that teacher that had
19 them at the survey 2 point accountable for what
20 the survey 3 teacher where they get them to?
21 Let's say that at the survey 2 point they're
22 with a highly effective teacher, and then
23 they're with the less effective teacher or a
24 very low effective teacher for the survey 3. So
25 we can see a growth that might do this. Is

American Court Reporting
850.421.0058

1 there a delineation --

2 DR. COHEN: There's no way to capture that
3 because you don't capture the kid's achievement
4 at a different point in time; you only have at
5 the end of the year.

6 So if a couple of your kids -- let's say
7 I'm not a great teacher and there's a great
8 teacher over there, and a bunch of my kids
9 transfer into that great teacher's class, I'm
10 going to get the benefit from that. That's just
11 the case because you don't have a measurement of
12 a year. I think it's maybe not all that likely
13 when kids transfer or leave your class they're
14 all going to go to teachers with particularly
15 high or particularly low --

16 MR. LeTELLIER: That's what --

17 DR. COHEN: It's an excellent question;
18 it's a good insight.

19 MS. TOVINE: For evaluation purposes,
20 though, it seems fair for teachers if students
21 included for their score could be ones that were
22 there for the majority of the year, similar to
23 the way you do student grading, and they have to
24 be there for both counts. I mean, it doesn't
25 seem reasonable that a student would come in in

American Court Reporting
850.421.0058

1 January or February or whatever time period, and
2 that child is now going to count in the
3 calculation --

4 DR. COHEN: That is a policy decision and
5 I'm going to hand that over to Christy. I don't
6 know what data we have to support it, but that's
7 the kind of recommendation I think the committee
8 can make.

9 DR. HOVANETZ: Yes, absolutely, and that
10 goes back to Gisela's point, too, is if you do
11 require the full year attendance and it's a
12 semester long course, is that appropriate? And
13 so being able to look at how we're capturing
14 attendance, data, and information, and being
15 able to make recommendations to the Department
16 on how to revise that is going to be essential
17 here.

18 Keep in mind as we're doing this, this is
19 with the data we have available and that was
20 what we talked about the last time we were
21 together and this is the best information we
22 have right now. You all are bringing up great
23 points in how to capture additional information
24 by course, by period, you know, by number of
25 days actually in attendance in that particular

American Court Reporting
850.421.0058

1 course in that school. So those are the kinds
2 of recommendations we can make to the -- this
3 group can make to the Department. You all have
4 the ability to say we'd like to see it done this
5 way, but right now this is the best available
6 information. Nicole?

7 MS. MARSALA: Does it have to be the same?
8 I mean, do we have to say -- I mean, maybe for
9 middle school and elementary where we don't have
10 the block scheduling; can it be two and three
11 where they have the block scheduling it could be
12 two or three, or does it have to be the same
13 everywhere?

14 DR. HOVANETZ: Again, that's a decision
15 that the committee is going to be able to make.
16 You all can decide how that's done. If you want
17 it to be that that student has to be with that
18 particular teacher for the entire year during
19 elementary school, again it's a decision
20 entirely up to the committee.

21 MR. LeTELLIER: Is this something that can
22 be made at some point as a business rule of some
23 sort? In talking with the Department, you know,
24 whether or not this could be something
25 implemented that we can look at because you were

American Court Reporting
850.421.0058

1 talking about attendance and how we would do
2 that, where we could just come up with some
3 simple rules that would articulate what we would
4 expect to be used?

5 DR. HOVANETZ: Yes, as soon as we have the
6 data capture process, we can implement whatever
7 business rule this committee is interested in
8 putting together.

9 MR. COPA: We're absolutely interested in
10 those recommendations on business rules because
11 they help inform the process that we'll put in
12 place.

13 MS. FRAKES: I just need some
14 clarification. If a student is enrolled in both
15 a reading class and a language arts class, does
16 that count as more than one of the same course?

17 DR. HOVANETZ: At this time based on the
18 information that we have, yes, they're
19 considered in more than one course.

20 MS. FRAKES: My concern is for especially
21 for those grades that test writing, such as 4th
22 and 8th grade, where in reading you're going to
23 have your core reading skills, but when you go
24 to language arts you're going to focus on that
25 writing and I just wanted to make sure I said

American Court Reporting
850.421.0058

1 that because I've heard a lot of feedback from
 2 teachers who have watched the webinar and
 3 language arts is taught quite differently when
 4 you're focusing on writing.
 5 DR. HOVANETZ: It's a fantastic point you
 6 make. Tomorrow afternoon we have a conversation
 7 about the course code directory that we don't
 8 want to overwhelm you with now, as we're trying
 9 to facilitate the process of having you all make
 10 recommendations to the commissioner. But for
 11 the process of this evaluation, we use the
 12 information the Department had for -- course
 13 code directly. The Department recognizes that
 14 this needs to be revised or evaluated at least
 15 to determine are these appropriate courses to
 16 have for the evaluation of teachers on their
 17 reading FCAT and on the math FCAT. And we have
 18 a list, the master directory of all the courses
 19 that were included. Like, I believe there are
 20 166 for reading and 90 for mathematics that were
 21 included for purposes of this evaluation.
 22 This summer, this committee's
 23 responsibility when we get together next will be
 24 to talk about which courses should be the ones
 25 included or required for the FCAT statewide
 American Court Reporting
 850.421.0058

1 evaluation. So they're bringing up fantastic
 2 points. The Department has fully recognized
 3 that's for tomorrow.
 4 Gisela?
 5 MS. FEILD: Let me make sure I understand
 6 the growth. Gina and I are sitting in the same
 7 English 1 9th grade class, we both happen to
 8 have the same 8th grade FCAT reading score
 9 whatever that happens to be; we're both not ELL,
 10 we're no SWD, we're not gifted, we're twins. I
 11 happen to have had some issues -- for some
 12 reason I'm also sitting in an intensive reading
 13 class or maybe Gina had parents who said I'm not
 14 putting her in intensive reading, right?
 15 MS. TOVINE: She's qualified but she's not
 16 enrolled.
 17 MS. FEILD: She's not enrolled. We both
 18 have scores that qualify. So we're both in
 19 English 1 with the same teacher, and I have an
 20 extra reading class with you. So when we build
 21 my expected growth, my expected growth will be
 22 higher than Gina's because I'm sitting in two.
 23 DR. HOVANETZ: Based on the recommendations
 24 of this committee last meeting, yes, there will
 25 be additional expectations if they're enrolled
 American Court Reporting
 850.421.0058

1 in multiple courses.
 2 MS. FEILD: Okay, so I teach her for
 3 English.
 4 And you, who is my reading teacher, will
 5 have different growth for each of us.
 6 DR. HOVANETZ: Well, she's not in my class,
 7 so I'm not -- but, yes, your higher expectation
 8 I will be accountable for, as well as your
 9 teacher that you're in the class with for Gina.
 10 And again, this is a decision the committee
 11 made last time about setting expectations and
 12 setting attribution. If we want to change how
 13 that's done, it's again something we should be
 14 talking about here and now on what that
 15 expectation should be. I would like to have
 16 some results presented first so you can
 17 understand what the expectations will take and
 18 how it's actually attributed. Jon?
 19 DR. COHEN: One thing that folks are
 20 discussing that maybe they shouldn't get lost is
 21 we kind of covered two topics. One is how do
 22 you attribute stuff and we can figure that out.
 23 Christy says we'll look at some data and figure
 24 that out. The other thing is the data
 25 collection. Right now with the data we collect
 American Court Reporting
 850.421.0058

1 we can't tell whether a course is intended as a
 2 one-term course or a year long course. People
 3 are concerned, well, the kid's only in my class
 4 for half the course, how can that be attributed
 5 to me? We don't know if it's half the course
 6 unless we know whether it's a full year or a
 7 half-year course, right? Gathering this data
 8 and - and the committee, I would recommend that
 9 the committee think for a couple of minutes
 10 about that issue and which data you need to
 11 support the kinds of analysis, the kinds of
 12 attribution you want because right now that's
 13 not in the state data system. Particularly it's
 14 not --
 15 PANEL MEMBERS: (Over-speaking.)
 16 DR. COHEN: So we could have.
 17 DR. HOVANETZ: The only thing we don't know
 18 with the identified data set is there is not a
 19 term that says that this is a full year course
 20 or if this is a semester course. So if a
 21 student is repeating a high school course, it
 22 will look to us as if it's a full year course
 23 rather than repeating a semester course, but
 24 that's an infrequent occurrence.
 25 DR. COHEN: We know how long kids were
 American Court Reporting
 850.421.0058

1 enrolled.

2 DR. HOVANETZ: Correct.

3 DR. COHEN: So we don't know about block
4 schedules. We don't have that.

5 DR. HOVANETZ: We don't technically have
6 that information. We have what district and
7 school and course number and period number and
8 we have which survey the student was enrolled in
9 it; and if they're enrolled in the same one
10 identical information for two in survey 2 and
11 survey 3, the assumption is it's a whole year
12 course. If they're only enrolled it in one
13 semester in survey 2 or survey 3, the assumption
14 can be it's a semester long course, but there's
15 no actual data that says semester or full year.

16 MS. BROWN: I'm confused and this will ask
17 everybody else. At least in our scheduling
18 system that we report, there's a cell for term
19 -- term 1, term 2, or term 3. Term 1 is for
20 semester, term 2 is second semester, term 3 is a
21 year long course. So I don't understand why
22 that data element isn't available to you.

23 DR. HOVANETZ: We'll get that data --

24 MS. BROWN: I think part of the problem is
25 sometimes schools semester-ize courses for GPA,
American Court Reporting
850.421.0058

1 for kids in graduation; and if that happens
2 after the collection period it's possible there
3 could be some error in that, but you're right.

4 MS. FEILD: But in general you should be
5 able to know. You should clearly be able to see
6 how that student is scheduled in that reading
7 course.

8 DR. HOVANETZ: Okay. We will be sure to --

9 MR. MOREHOUSE: I have a question.
10 Hillsborough County, for a term 3 full year
11 course, students get a grade for the first
12 semester, second semester; and those grades are
13 based upon what?

14 MS. BROWN: What do you mean by --

15 MR. MOREHOUSE: Is that material that's on
16 that first semester?

17 MS. BROWN: Correct.

18 MR. MOREHOUSE: Then they evaluated on
19 that. So why didn't -- wouldn't that be a test
20 score that's scored?

21 MS. BROWN: Because FCAT scores are only
22 given once a year, so that's the reason that you
23 only have that one option. But, I mean, that's
24 where we're trying to attempt to get at
25 attribution more on a semester level instead of

American Court Reporting
850.421.0058

1 just because we're actually converting our term
2 3 courses into term 1 and 2 even in elementary
3 because it's possible for a student to transfer
4 between two fourth grade teachers and have one
5 term 1 and another term 2, we can see fifty
6 percent partial attribution even though they
7 were enrolled in the same course for the entire
8 year.

9 MS. ACOSTA: I have a question actually,
10 maybe some of you can address this as well. I
11 think you partly answered it, Anna. I was
12 curious how many kids are actually impacted by
13 having semester courses for FCAT, for things to
14 get tested on the FCAT because at our school it
15 would be a rare student who would be enrolled in
16 a year-long course that had an FCAT test. Do
17 you see what I'm saying?

18 How many students are we talking about? Is
19 this very common that you only have a semester
20 course that's going to be tested on the FCAT?

21 MS. FEILD: I think part of the case in
22 Miami-Dade is, of course, recovery. They're
23 even talking now in terms of algebra making it a
24 semester course for course recovery, taking the
25 DOC in December. So it's really -- sometimes

American Court Reporting
850.421.0058

1 kids pass the first semester but fail the second
2 semester, so they're course recovery-ing at the
3 beginning of the next year just the second
4 semester or vice versa. So there's thousands in
5 Miami-Dade, thousands who fall in that criteria.

6 MS. BROWN: And what we see is that is
7 definitely the situation in our district, and
8 there are many, many students; but when you also
9 consider mobility which I know we're capturing,
10 but when students transfer school to school even
11 in elementary, when you're highly mobile you
12 show up in multiple places but it's very
13 important because you're still one FCAT score,
14 and so which teachers are given attribution for
15 that effort? It's a lot of students.

16 MR. TOMEI: I just want to make an
17 observation; I think this is an extremely
18 important conversation that we're having right
19 now for a couple of reasons. First of all, over
20 the course of this committee we're going to get
21 past the point where we're only talking about
22 FCAT scores as a measure, so Lawrence's comment
23 is an important one to keep in mind. What I'm
24 very concerned about is that the ultimate model
25 that gets put in place is going to be used for

American Court Reporting
850.421.0058

1 multiple purposes. It will be used to evaluate
 2 teacher effectiveness; it will be used to
 3 evaluate school and possibly district level
 4 effectiveness; and it will be used to evaluate
 5 teacher preparation program efficacy. What may
 6 work at some levels -- and I will go back to the
 7 class size -- the question I asked about class
 8 size and how stable that is between the
 9 measures. When you get a large enough end, if
 10 you're using data to evaluate a teacher
 11 preparation program that puts out a thousand
 12 students a year, it's probably not an issue.
 13 But for one individual teacher it could be a
 14 really big deal if that statistic is unstable.
 15 So we've got to keep in mind to protect the
 16 transparency and the integrity of the model for
 17 individual teacher accountability. I think
 18 that's the lowest common denominator and I think
 19 that has to be an important outcome of this
 20 committee.

21 So these conversations and comments like
 22 things are infrequent, well, if you're that one
 23 teacher that experienced that infrequent event,
 24 that doesn't mean a lot to you. We need to
 25 protect that teacher as well.

American Court Reporting
 850.421.0058

1 So again, I just want to emphasize that I
 2 think this is an extremely important
 3 conversation we're having.

4 MR. LeTELLIER: That goes back to the last
 5 time we met the reason why we took the norm
 6 referenced model and threw it out the window,
 7 the quantitative -- I think it was called the
 8 quantitative based because we were concerned
 9 about that lower two percent of teachers that no
 10 matter how good they were doing, they were in
 11 that lowest two percent, so you don't have a
 12 chance of getting support as effective, and I
 13 think that that is something that I will agree
 14 with that that we can't take the risk of just
 15 saying, well, we may have three or four
 16 teachers, I'll just put out a handful, that they
 17 may go by the wayside because that's certainly
 18 not fair to the teacher and it doesn't speak to
 19 the integrity of how we evaluate people.

20 So I agree with that and I think that the
 21 end result that I would see is moving towards a
 22 system that would go with the individual teacher
 23 for what they are doing so they're accountable
 24 for their work, and I think -- you know, in
 25 Florida we're all talking about aligning

American Court Reporting
 850.421.0058

1 everything to business models. You know,
 2 accountability is kind of something we haven't
 3 talked about too much, but all this stems out of
 4 a business model of being accountable for what
 5 your job is and making sure that you're reaching
 6 those goals or exceeding them. Well, if we're
 7 truly going to do that, it would have to be
 8 something that that teacher is able to reach.
 9 So I just wanted to piggyback off of that.

10 MR. TOMEI: I think part of that overall
 11 goal has to be that we need to do everything we
 12 can within the legal limits that we have in
 13 terms of what variables we can put in the model
 14 to mitigate to the greatest extent possible the
 15 unintended consequences of discouraging the best
 16 teachers from going into the locations that are
 17 in most need.

18 MR. LeTELLIER: Absolutely, and I just
 19 thought of this about an hour ago, is we had
 20 talked about unintended consequences. I can't
 21 remember what you -- what's the word you used
 22 last time?

23 PANEL MEMBER: (Inaudible.)

24 MR. LeTELLIER: And I've been dying to say
 25 this and I haven't said this publicly, but I

American Court Reporting
 850.421.0058

1 think we should: Every profession is going to
 2 have people that try to play the game, that are
 3 going to try and skirt around things and try and
 4 make it work for their benefit, but I would like
 5 to think that the majority and not just a simple
 6 majority, but the vast majority of teachers are
 7 not going to try to game the system. So what I
 8 guess we don't want is the reverse where we make
 9 it so that, okay, we've taken away the perverse
 10 incentive but we've made it so that it's not
 11 sustainable or obtainable to the teacher that is
 12 trying to do their best. I think that's
 13 something that's been weighing on my mind for
 14 the past month is making sure that we don't just
 15 rule out things so we say, well, there's a
 16 perverse incentive there for a handful of people
 17 that are going to take advantage of that and
 18 maybe there's some way that we can address that
 19 rather than just throwing out a specific
 20 variable that we figure, okay, how can we
 21 address if that happens.

22 But I really -- you know, being a teacher
 23 for the years that I have been and the people in
 24 this room, the teacher, the superintendents, I
 25 mean, the parents here, you guys know the

American Court Reporting
 850.421.0058

1 majority of teachers care, we love what we do.
2 We want to help kids and the last thing on our
3 minds is how do we game the system. So I think
4 that's very important, something that I just
5 want to share.

6 MS. EDGECOMB: In this discussion and maybe
7 I'm not hearing it correctly and maybe I
8 shouldn't get bent out of shape about it. I'm
9 worried about uniformity I'm hearing. Is that
10 something -- because I hear how people are
11 capturing and coding and talking about courses
12 and when they end, how they end, and what they
13 are and what they are not. If we're using the
14 motto that's supposed to be fair and formalized
15 instruction to capture and save information,
16 isn't there some importance and value in some
17 uniformity here?

18 DR. HOVANETZ: There is. I absolutely
19 agree. The Department has a directory that
20 defines each of the particular variables that we
21 are using, so I think they are well defined.
22 It's assuring and again they have been reporting
23 these variables to the Department for in many
24 cases decades. In the same way with actual data
25 elements, definitions, and particulars on how
American Court Reporting
850.421.0058

1 they're supposed to report it and when they're
2 supposed to report it, each one of them is very
3 defined.

4 It's assuring that they're following those
5 proper procedures, which I'm assuming the
6 majority of the districts are but continuing to
7 reiterate as soon as we do determine which are
8 the control variables or the covariates we're
9 going to be including in these models to
10 highlight those when they do that -- and I ask
11 for -- when they're at the consortium meetings
12 to be able to highlight and say these are the
13 particular covariates that are included in the
14 models, these are the data definitions that you
15 need to be paying attention to, and then also
16 through the review process to pay particular
17 attention to these covariates, but I agree,
18 uniformity is going to be paramount for insuring
19 the accuracy of these calculations. I think
20 that there are already a lot of processes that
21 the Department has in place to insure that and
22 continue to use this data and information that's
23 going to improve the quality of it, too. But I
24 absolutely hear that that is a concern and I
25 think it's going to just take additional PD and
American Court Reporting
850.421.0058

1 technical assistance with MIS directors and
2 others who are reporting on that information up
3 to the state to be sure that they are following
4 what's in the data element dictionaries.

5 MS. BROWN: If I can just piggyback on that
6 because uniformity is so important to the
7 validity of the entire process, and in my
8 experience what I can see the writing on the
9 wall where we're going to need to go is how we
10 clearly define those business rules for
11 eligibility because in some cases we may not
12 have uniformity in say, for example, course
13 assignment. But we can create uniformity by
14 creating the right business rule that looks at
15 those in an either/or situation, but then also
16 the process itself starts to find the anomaly
17 and when we start to find the thing that stands
18 out as different then there's just that
19 oversight that starts to correct everything
20 towards uniformity.

21 We've discovered that in our own district
22 when we're looking across large numbers of
23 schools and how individuals are scheduled, et
24 cetera, and we would do that major oversight and
25 you think that you have every one common, and
American Court Reporting
850.421.0058

1 then when you start to look at the data set you
2 go, what the heck is this? And then that is
3 where you go to that situation and say you've
4 got to fix it. And so through the process we'll
5 get there, but I can so respect and I would like
6 to piggyback on that, that that uniformity has
7 got to be part of the goal in order for there to
8 be any kind of validity for the comparisons that
9 are going to be made.

10 DR. HOVANETZ: And you make a fantastic
11 point, and when this committee makes a decision
12 about which model is actually going to be used
13 and the commissioner approves it, the first AIR
14 responsibility is to generate those value-added
15 scores for teachers in Florida and have those
16 posted this summer. That would be our first
17 opportunity to start looking for any type of
18 data anomaly for districts and schools to
19 review, to start looking at what the data and
20 information looks like in order to identify the
21 anomaly where we see something happening in one
22 of the districts but not the other 66 and be
23 able to start identifying where we need to
24 provide additional technical assistance.

25 MS. NOYA: Also, if you leave up to the
American Court Reporting
850.421.0058

1 interpretation of every district then we start
 2 doing everything differently, and that's been
 3 one of the problems across the state for years.
 4 So transparency, teachers are asking -- when in
 5 the summer? Are you going to do this late
 6 summer so when they come back and they're in a
 7 rush, they won't even see the transparency?
 8 DR. HOVANETZ: Juan is panicking because of
 9 what I said, but there's --
 10 MR. COPA: I just heard an audible groan
 11 with the word "posted", but this is very --
 12 districts have been very interested, of course,
 13 as we're developing part of Race to the Top
 14 their evaluation systems, information needed to
 15 inform those decisions regarding their
 16 evaluation systems, and we are committed to
 17 providing districts with data on the model that
 18 is eventually selected to help them form
 19 decisions. So it's really a provision of data
 20 to districts in a useable form to help folks
 21 start to understand what it means, make informed
 22 decisions about how to apply an evaluation
 23 system. So that's the key point we'll
 24 accomplish this summer.

25 MS. TOVINE: Once those results are
 American Court Reporting
 850.421.0058

1 actually run and they go back, some of them are
 2 selected, will this committee come back
 3 together, say, in the fall or whatever time
 4 period that is to kind of see how that's going
 5 and maybe look for some of those problematic
 6 areas and maybe could make some sort of
 7 recommendation how to do it differently?

8 MR. COPA: Gina, you didn't realize this
 9 was a four year commitment? Very clear, this is
 10 definitely not the last meeting of this group.
 11 This group will continue to meet throughout the
 12 four year process, not only dealing with -- we
 13 have this -- there's the sense that this is the
 14 end for the FCAT model as Cathy said at the
 15 beginning; no, this is really the beginning and
 16 so we will continue to review that. We will
 17 start working on those other models, the EOCs
 18 that will eventually come online starting with
 19 Algebra 1 which was just administered last week,
 20 so yeah, there's a lot of work to be done over
 21 the next three years.

22 MR. LeTELLIER: Juan, I think if I
 23 understand you correctly and what I think will
 24 make everybody feel a little better is what
 25 we're looking at is presenting the data with the

American Court Reporting
 850.421.0058

1 model that we use so that people can just look
 2 and say, okay, here's where we're at. We tweak
 3 it from there, nobody's jobs on the line because
 4 of the data coming out in the summer. I think
 5 that's what people are kind of --

6 MR. COPA: Absolutely, yeah. This is for
 7 information purposes.

8 DR. DORAN: That's a good point. This
 9 gives us the basis by which we can look at some
 10 of the data, changing some of those business
 11 rules wouldn't switch, for example, which
 12 value-added model necessarily look different,
 13 but it would change some of the things about
 14 attribution. So it's still us; we're still on
 15 safe ground on how we discuss what we intend to,
 16 even when the business rules perhaps don't
 17 change.

18 MS. FEILD: Which FCAT scores are you
 19 using? The old scale, the ten year scale?

20 PANEL MEMBERS: Over speaking.

21 DR. COPA: Correct, for the purposes of
 22 this summer you're well aware it's equated
 23 exactly to the old scale, but it's part of their
 24 work as well. It's no secret we're moving to
 25 new standards beginning this fall. It will be

American Court Reporting
 850.421.0058

1 applied starting with the spring 2012
 2 assessment, so any change in the assessment will
 3 likely result in further refinement of the
 4 models as well. So again, on to this continued
 5 responsibility of this committee.

6 DR. DORAN: The models that we've
 7 implemented are scaled independent, so even
 8 should the scale change the models can still be
 9 applied.

10 MS. FEILD: No, I understand that but we're
 11 making decisions on the model based on the old
 12 FCAT, and it's possible that with the new
 13 standard and the new scores the model we pick
 14 now may not be the best model with the new data.
 15 That's why I was asking and I think you answered
 16 it by saying that we will be able to tweak the
 17 model. What I suggest is that when we have the
 18 new FCAT data and we almost have to wait two
 19 years to have two years by this hearing, we have
 20 to revisit the model because maybe at that point
 21 some of the variables we're using are not
 22 appropriate or we have to change the model.

23 MR. COPA: Possibly, yes.

24 DR. HOVANETZ: Absolutely. Four year
 25 commitment.

American Court Reporting
 850.421.0058

1 MR. COPA: These are all empirical
2 questions. The commissioner must make a
3 selection by June 1st. When that becomes part
4 of State Board rules, I mean, that is something
5 that would happen in the future going forward
6 after we've had the work of this committee to
7 look at years of performance, refinements, and
8 models; and even when it becomes part of the
9 State Board rule you could further refine that
10 going forward, as well. So that's a key thing
11 to keep in mind. It's not something that we
12 will be etched in stone that cannot be changed.
13 The anticipation here, of course, is this will
14 be an evolving product.

15 MR. MOREHOUSE: I'm just curious. Is it
16 possible to develop a description, a course
17 description? There seem to be so many
18 variations in terms of how a course is
19 delivered, some courses will be graded one
20 semester, some are year long courses, some are
21 team taught, some are not taught; is it possible
22 to have a description of those options for the
23 committee so that any rules that we have to make
24 in my mind, it's hard to depend upon how those
25 courses are delivered and how they're graded and

American Court Reporting
850.421.0058

1 when they're delivered.

2 DR. HOVANETZ: Yes, and I think we can fold
3 this into our course code discussion that we'll
4 have tomorrow, too, as part of the ongoing work
5 of the committee as well. There are well
6 defined course descriptions that have standards
7 associated with them as well; the delivery
8 method of those is more the district discretion
9 on how the content is delivered, but we will
10 definitely role that into part of the
11 conversation.

12 Doretha?

13 MS. EDGECOMB: I apologize if this is a
14 stupid question up front, so if it's stupid I
15 apologize.

16 Is there any value, and I think I heard
17 Gisela say this, to recommend a model that had
18 limited number -- this is progressive -- limited
19 number of covariates and add onto it and over
20 time have a lot of them and take away from those
21 covariates?

22 DR. DORAN: I'll answer the question.
23 There is a criteria that we will evaluate today
24 that we call parsimony. Parsimony looks at
25 whether not --

American Court Reporting
850.421.0058

1 MS. EDGECOMB: Oh, is that what that means?
2 How many other people knew what that meant?
3 Okay.

4 DR. DORAN: Doretha, it's not a stupid
5 question. It's exactly a right on question. Is
6 there value in adding additional covariates over
7 time?

8 Well, given the covariates that we have we
9 can evaluate is it good to have some or more,
10 and we can provide you data that suggests
11 whether or not it's good to have some, only a
12 few, or whether it's good to have more and we're
13 going to look at exactly that question when we
14 go through the parsimony issue today.

15 MR. LeTELLIER: Can you define 'parsimony'?

16 DR. DORAN: Remember, when you go down the
17 criteria, if you have a question, we'll define
18 everything, we'll talk about what we're looking
19 for and why you should care about each one of
20 those things.

21 DR. COHEN: Other things being equal,
22 simpler is better.

23 MS. EDGECOMB: Absolutely.

24 MS. HEBDA: Okay. To keep things simple,
25 we'll take a 15 minute break. We'll regroup at

American Court Reporting
850.421.0058

1 20 minutes till.

2 (Whereupon, a short recess was had.)

3 DR. DORAN: The part of the conversation
4 that we're about to go in right now is very data
5 centric. We're going to start looking at some
6 of the data relatively soon. We've got a couple
7 of slides to get through. The conversation we
8 had this morning really should underscore how
9 important the quality of the input data is into
10 the statistical model. As I walked outside to
11 go to the Einstein, which was closed to get a
12 little snack, I looked at the guy laying the
13 bricks and he's being so very careful to make
14 sure that each and every brick fits right into
15 place, and if it doesn't he pulls out, he's
16 scraping the bricks, making sure they fit into
17 place because in the end that thing has to look
18 perfect. The reliability and the validity of
19 these models rests tremendously on the inputs
20 that go into this. Now that was an extremely
21 important conversation and we'll continue that
22 conversation; at this point we're going to
23 transition a little bit in from some of those
24 rules and decisions that were made at the last
25 meeting, which were fully amended by the way.

American Court Reporting
850.421.0058

1 There's no reason you have to hang your hat on
2 the things that were cited, as far as I know, in
3 terms of going forward when this becomes
4 operational.

5 But we're going to look now at some of the
6 data, and we will evaluate some of the models
7 based on the different categories that we've
8 laid out for you. So let's talk about a couple
9 of things and a couple of terms.

10 One, let's talk about this thing called a
11 deviation from an expectation. Given prior
12 scores and other characteristics of kids,
13 whether or not they're ELL, special ed, gifted,
14 so on and so forth, enrolled in two courses, we
15 have what is the average score of similar
16 students. That's what's called an expectation.
17 If you recall back to that scatter plot where we
18 had those regression lines, the expectation is
19 that line. Remember that line changes according
20 to students. So with students you have all
21 things being equal similar prior scores would
22 have the same expectation. Students who score
23 above that or below that have a deviation from
24 that expectation. In statistical terms that's
25 referred to a residual. It's the deviation from

American Court Reporting
850.421.0058

1 predicted score and we have a prior score, if
2 you just subtract the prior score from that
3 predicted score for each kid you get an expected
4 growth. And that's a statistic that we formed
5 some summary statistics on and we will show you
6 later on in the presentation.

7 Christy already went over those.

8 Let me talk briefly about this. The
9 expected scores change in terms of their
10 definition depending on which model we look at.
11 Now, for each model we form an expectation, and
12 I'm going to put an extra word in there. We
13 form what is called a conditional expectation.
14 It's conditional on what your prior score was.
15 Kids with two different prior scores have
16 different expectations, but kids who have the
17 same prior score have the same expectation.
18 It's also conditional on whether or not you were
19 SWD, special ed or gifted or so forth. So, for
20 example, I think Gisela was asking this question
21 earlier, two kids who are exactly identical on
22 all of their characteristics -- prior score and
23 categorization in gifted, special ed, and so
24 forth -- they're the same on all of those. They
25 have the exact same predicted score, everything

American Court Reporting
850.421.0058

1 that expectation.

2 What score did the student actually get in
3 testing that's sometimes called an observed
4 score. It's the score that the student actually
5 received. So we have an expectation, we have an
6 observed score, and this is the deviation that
7 gets aggregated, not residual. Essentially,
8 it's aggregated and it's a little bit more than
9 a mean but it's equivalent to a mean. We take
10 those residuals and we aggregate them within a
11 teacher's class. We formed some decisions about
12 whether the teacher had high value added or low
13 value added.

14 Expected growth is a little deviation from
15 the expectation. Later on in the presentation,
16 we'll show some slides about differences in
17 expected growth on different sub-groups of
18 students, so let me define what expected growth
19 is. We have the expected score, like I talked
20 about here, which is the predicted score --
21 given your prior score and any other
22 characteristics about you, what is your
23 predicted score -- minus your prior score, the
24 first lag and the most recent lag. We call that
25 for each kid the expected growth. We have a

American Court Reporting
850.421.0058

1 being equal, but you change one of those things.

2 So suppose students are exactly the same in
3 terms of their gifted coding and SWD coding and
4 everything, but they have two different prior
5 scores, they would have different expectations
6 and whether or not one student had a higher or
7 lower and depending on what their prior score
8 was. So all things being equal, kids with
9 similar prior scores have similar predicted
10 scores and similar growth expectations, but when
11 those things change they have different
12 expectations.

13 DR. COHEN: Harold, the numbering on this
14 chart is wrong.

15 DR. DORAN: In fact, you know what --

16 DR. COHEN: We have talked about this; this
17 is going to cause confusion.

18 DR. DORAN: Why don't I skip this because
19 this really doesn't add substance to some of the
20 criteria we're going to go through. We could
21 talk about those things contextually as we
22 encounter those models. Thanks, Jon.

23 All right, let's provide a big picture
24 before we start delving into some of the
25 specifics. Here's a big picture. There are a

American Court Reporting
850.421.0058

1 lot of models and many different variables. We
 2 have eight different models, seven grades in two
 3 subjects. There are more than 100 models that
 4 were estimated, and we have 18 different
 5 criteria by which we evaluate the models. If we
 6 wanted to spend time looking at each model for
 7 each grade for each subject against each
 8 criteria, we would need to be here for four
 9 years. This wouldn't be a four year contract;
 10 we'd be here for a very long time. It's not
 11 viable. Just simply cannot do it.

12 Now we're going to try and consolidate this
 13 information based on some things that seemed
 14 reasonable to do; I'm going to show you how we
 15 try to narrow some -- how we're facilitating
 16 this conversation today. The point here is that
 17 there is a lot to look at there are many
 18 different variants that were estimated from many
 19 different grades and subjects. But as we're
 20 going to show you, the key results are
 21 consistence across all grades. If we saw that
 22 models behaved differently across grades and
 23 across subjects, we would need to have pulled
 24 those models out and examined them. Why does
 25 grade seven Model 1 look so different than Model

American Court Reporting
 850.421.0058

1 extensive testing to make sure that the models
 2 behave in the way they're supposed to behave.
 3 We look at the standard errors which we'll
 4 define in just a little bit. We want to make
 5 sure that the models and the software behave in
 6 the right way.

7 There's an extensive amount of testing that
 8 we do on simulated data. Simulated data means
 9 we make up data according to some assumptions
 10 and we test out our models and we make sure the
 11 models give us back answers that we know they're
 12 supposed to give us back. Jon's going to expand
 13 on that as soon as I give him the microphone
 14 because we did an extensive number of
 15 simulations to make sure that things were
 16 working as expected. You want to talk about
 17 that?

18 DR. COHEN: Yeah, I'll talk briefly about
 19 it. There will be a technical report that has
 20 all this in here, but we're going to -- when you
 21 estimate a model you want to make sure that the
 22 model is unbiased, right? We want to have
 23 unbiased estimates of teacher effects and we
 24 want to make sure that the way we're doing
 25 things statistically isn't introducing a bias.

American Court Reporting
 850.421.0058

1 1 in grade four in math? We don't see the
 2 behavior of the models that would have required
 3 that. I'm going to show you in a moment.

4 Essentially, what we're going to do is
 5 we're going to choose a particular grade, grade
 6 seven, we chose grade seven because it's in the
 7 middle and because it's like the other models
 8 similar in its behavior to all the other models
 9 in all the other grades. Let's show you why.

10 Sorry, just a couple more things.
 11 Housekeeping. Actually, Jon, I'm going to turn
 12 this over to you real quickly because I know you
 13 have some of these statistics in your head, and
 14 before we look at some of the models let me talk
 15 through this and then I'll give the mic to Jon.

16 One, the estimators we're using for models
 17 are unbiased, consistent, and yield accurate
 18 standard errors. Let me be clear about one
 19 thing: The models that we estimated, that were
 20 developed, we have two kinds of data, real world
 21 data -- the FCAT data for kids who were actually
 22 tested in the state of Florida. The results
 23 that we'll present to you today were based on
 24 the real world data, but when we do development
 25 of statistical models and software, we do

American Court Reporting
 850.421.0058

1 What is a bias? If there's a true value then
 2 any deviation from that true value is a bias,
 3 right?

4 So in the real world we don't know how much
 5 value each teacher has. You can't know that
 6 about teachers. The teacher fairy can't land on
 7 your shoulder and whisper in your ear "Miss
 8 Jones is absent, add 10 points of value". But
 9 what we can do is we can make up data, right,
 10 and we can make up the data in different ways.

11 So we know the true values. So what we do, we
 12 define a process for making up the data and then
 13 process the random ones. You choose random
 14 trials from this population. We generate 200
 15 different data sets and then estimate the model
 16 200 different times. Again, this is on data we
 17 have made up so we know what the true values
 18 are.

19 Is there a pen here? I'm always happier
 20 when I have -- look between, oh, yeah. Let me
 21 roll this out here. Okay.

22 So every teacher effect that we're going to
 23 estimate under any model, this is a value-added
 24 scale, and this is -- you think of it sort of as
 25 a probability. It's a density function of the

American Court Reporting
 850.421.0058

1 value-added, we'll just give it a little Greek
 2 symbol there for the value-added just to have
 3 something to put up there.
 4 All right. So let's say a teacher's score
 5 is right in the center. So your value-added
 6 score is -- I don't know what the number is,
 7 maybe you're adding 20 points. That 20 points
 8 is a point estimate, but it's not really a point
 9 estimate because we don't know. All we have is
 10 we a probability distribution and they tend to
 11 come out to be normal probability distributions
 12 -- there are proofs that statisticians like to
 13 think about. So here's your point estimate.
 14 Each point estimate comes with a standard error,
 15 right? So you know that the teacher is very
 16 likely to be at this point, a little less likely
 17 to be at this point, way less likely to be down
 18 there, really unlikely to be up here. But it's
 19 a probability distribution; it's possible.
 20 So we estimate these standard errors. When
 21 we talk about precision, we're going to be
 22 leaning on these standard errors. If the
 23 standard error is smaller, the model is more
 24 precise. I have less uncertainty. If I had a
 25 curve like this, I would know with some

American Court Reporting
850.421.0058

1 certainty that this teacher was in at least in
 2 this range and did not fall out here. Is that
 3 clear?
 4 So more precise is better. It sounds
 5 better, it is better.
 6 So you can't observe the standard error, so
 7 there are statistical formula that you use and
 8 for these models they become very complicated.
 9 So we tested the statistical formulas for the
 10 standard error by generating lots of data where
 11 we knew the real answer, and we tested -- we got
 12 the standard errors and we counted the number of
 13 times that the estimates fell out in this range.
 14 We counted the number of times the estimates
 15 fell out in that range and the same on the other
 16 side, because the standard error and the normal
 17 distribution tell us we ought to have five
 18 percent following here plus here. We ought to
 19 have ten percent following here plus here. For
 20 all the models that we're showing you, we wound
 21 up with unbiased standard errors. So the
 22 standard errors did -- when you make up the data
 23 and you look at it over and over, it does
 24 reflect -- the standard errors do capture and
 25 tell you the right percentage of teachers who

American Court Reporting
850.421.0058

1 would fall outside that range of the true value.
 2 So it's important, it's technical. There
 3 will be a technical report on it for anyone who
 4 wants to read that. A couple of people here
 5 indicated they would like to see that. We can
 6 show you results if you want to see them. They
 7 look like numbers. We expect 10%, 10.1%, we
 8 expect 5%, we're looking at 4.89%. So we're
 9 getting lots of data back for lots of different
 10 models on lots of different situations. No one
 11 ever tells me they can't hear me.
 12 So I think that's it. The models are also
 13 unbiased. We got on average the right estimates
 14 back and consistent, that means as the sample
 15 size gets bigger the estimates get more precise
 16 and all the models we're working with have that
 17 characteristic as well. So as we move forward,
 18 rest assured standard error we're talking about
 19 are accurate standard errors when the data
 20 corresponds.

21 DR. DORAN: All right.

22 MS. BROWN: Before you leave, when you
 23 talked about precision, could you kind of define
 24 for me precision as accuracy?

25 DR. DORAN: Would you mind if we hold --

American Court Reporting
850.421.0058

1 DR. COHEN: It's easy. This standard error
 2 curve is more narrow, it's more precise. This
 3 means the estimate is more precise. If it's
 4 wider, it's less precise.
 5 MS. BROWN: Did you mention something about
 6 accuracy, though? I thought -
 7 DR. COHEN: All the estimates are giving us
 8 accurate estimates, unbiased. So we're taking
 9 accuracy and we're breaking it into two pieces,
 10 unbiased and precise. Is it centered around the
 11 right number and how much variation is there?
 12 DR. DORAN: We're going to talk a lot about
 13 precision in just a minute here. So here's the
 14 roadmap at the bottom of the slide. There's
 15 actually a little bit more. This refers back to
 16 the crib sheet that we've given you. We're
 17 going to look at the model's different size, the
 18 effects attributed to teachers. We'll talk
 19 about that, how precise the estimates in terms
 20 of what they yield, what are the expectations of
 21 growth established for different groups of kids,
 22 and what is the impact of various models on
 23 different groups of teachers?
 24 So this is big picture. Now we're going to
 25 start looking at some of the models across all

American Court Reporting
850.421.0058

1 grades in both subjects, and this is going to be
 2 the first thing that we're going to show you is
 3 a line graph that shows the magnitude of the
 4 effects. Let me actually just show you what
 5 we've got here. We're going to start with
 6 reading. This is all models, all grades. This
 7 slide and the next slide are the only time today
 8 that we will show you a statistic on all models
 9 for all grades as we go forward and as I'll
 10 explain in this particular slide here, this
 11 slide provides the justification for why we only
 12 look at one particular grade but all models. We
 13 always look at all models, but only for a given
 14 grade. In this particular slide, we look at all
 15 models for all grades, okay. This is the last
 16 time we'll do this, the only time we'll do it.

17 All right. Here on the X access we have
 18 each grade and on the Y access we have what
 19 we're calling the size of the effects. Now this
 20 here, the model, remember looking at your sheet
 21 differ in terms of a few characteristics. Some
 22 of them only have teacher effects and some of
 23 them have both the teacher and school effects.
 24 We'll actually define what that means to have
 25 both teacher and school effects in just a little

American Court Reporting
 850.421.0058

1 we're going to introduce this now but we're
 2 going to look at this in a very detailed way in
 3 just a little bit is what happens when we add
 4 the school effects back into the teacher
 5 effects. In part, we're not ready to evaluate
 6 this criteria yet because we really haven't
 7 defined why you should care about school and/or
 8 teacher effects just yet. This is a high level
 9 overview.

10 What happens if you add those school
 11 effects back in; essentially what we see is that
 12 the models behave similarly again. So adding
 13 school effects back in as opposed to having only
 14 teacher effects in some of the models causes for
 15 the behavior of the models to be similar. Let
 16 me go to the next slide because we see something
 17 similar in math, and I'm going to revisit the
 18 key point that we're looking for here. The key
 19 point, the key take away in the slide that I
 20 showed you before, in the slide that I'm showing
 21 you now is that the behavior of the models
 22 across grades for both reading and math is
 23 comparable. They're similar. So we're using
 24 this as a justification for why later we're only
 25 going to look at a single grade all models.

American Court Reporting
 850.421.0058

1 bit.
 2 But what we see here is that these are the
 3 covariate adjustment models and they behave very
 4 similarly. The effects are comparable across
 5 all grades. We don't see the lines
 6 criss-crossing in very unpredictable strange
 7 ways. We don't see something that looks
 8 extremely anomalous suggesting that Model 1 in
 9 grade four is behaving very differently than
 10 Model 1 in a particular grade. There are very
 11 tiny differences in the models across grades.
 12 So, for example, in this particular model here
 13 which is, I think, on this square Model 1 it's
 14 behaving similarly across all of these grades.
 15 The effects always appear to be the largest.
 16 We'll see why in a little bit. Then in here you
 17 don't see criss-crossing.

18 Up here is the simple differences model.
 19 Now it's measuring something different as we
 20 explained before, all right? It's not measuring
 21 the exact same thing as the other covariate
 22 adjustment models are, and so we see a big
 23 difference here between its effect and its
 24 relationship with the other models, all right?

25 What we've done over here on the right,
 American Court Reporting
 850.421.0058

1 You're not ready yet to evaluate any of the
 2 models based on the criteria, the precision, the
 3 accuracy, and so forth just yet. This is just
 4 the high level overview.

5 We see the same thing in math. We don't
 6 see the model here and here and here and
 7 criss-crossing lines which would suggest that
 8 Model 1 behaves very differently depending on
 9 what grade you're looking at. That's not what
 10 we see. We see a consistent pattern here and
 11 when we add the school effects back into the
 12 teacher effects. It's the only inference that
 13 we really want you to draw from these slides.
 14 That is, models behave similarly across grades.

15 MR. LeTELLIER: Can I ask a question? How
 16 large of a sample group do you look at because I
 17 don't think we have that anywhere in the info?

18 DR. DORAN: It was -- I'll tell you, I
 19 don't know the exact numbers but we do this by
 20 grades. The number of teachers in each grade
 21 ranges from 7,000 to 10,000 or so teachers per
 22 grade --

23 DR. COHEN: It's all for the entire state.

24 DR. DORAN: Yeah, the entire state.

25 There's no sample, it's a population of kids.

American Court Reporting
 850.421.0058

1 MR. LeTELLIER: And the second thing is
2 when we're looking at the effects of the
3 variables when deciding this, I know now we're
4 looking at sort of a macrocosm sort of dealing
5 with the big picture; are we going to look at
6 how those variables may affect an individual
7 class?

8 DR. DORAN: Yes. Not a particular teacher,
9 but on average across many teachers, yes. We
10 see exactly that.

11 MR. LeTELLIER: Versus just plugging in to
12 the whole state is what I'm saying because if
13 you -- in other words, you may have with the
14 attendance issue of a kid that missed 60 days
15 out of the 180 days, that certainly hopefully is
16 not the norm, but that may have great weight for
17 that teacher in that class. So if we only plug
18 that into those 10,000 teachers, it's going to
19 be a blip on the screen and won't show up.
20 That's my question.

21 DR. DORAN: All right. We don't look at
22 any one teacher where there's any particular
23 impact, so does adding that variable in change
24 your ranking from high or low. But one of the
25 things that we do look at is how correlated,

American Court Reporting
850.421.0058

1 what's the relationship of the teacher effects
2 across the different models. That tells us
3 whether there's a flip-flop of teachers being
4 highly classified and under one model then maybe
5 being classified differently under another
6 model. We do look at that. I can tell you now
7 even though that's something we'll talk about a
8 little bit later on, that the consistency of the
9 classifications across models is virtually
10 perfectly correlated. Okay?

11 MR. COHEN: Harold, we can say something --
12 when we get into covariates we can talk a little
13 bit about what the likely effect of differences
14 in rates of attendance would have on individual
15 teachers' value-added lists. We can look at
16 that. We can talk about it. We didn't pull out
17 any individual teacher. There's data as to that
18 question and again we're talking about
19 covariates.

20 MR. LeTELLIER: I wrote it down. I get the
21 general thing, but I don't know if anybody else
22 is understanding where I'm coming from is that
23 not missing something because it's in such a
24 large set of data and making sure that it -- in
25 other words, we make sure that a variable can

American Court Reporting
850.421.0058

1 affect a teacher in a certain way and we're
2 going to take that into account. Now obviously
3 if it only affects one teacher across the state,
4 is that the norm? No. But what we're saying is
5 if all teachers that would have a kid that
6 missed 60 days, let's say, whatever teacher that
7 was, is that an effect? Are we looking at that
8 in that way?

9 DR. DORAN: Yes. Before we go into the
10 different effects including attendance has on
11 the predictions of the --

12 MR. LeTELLIER: Attendance was just an
13 example --

14 DR. DORAN: Of the different covariates.

15 MR. LeTELLIER: Okay. Thank you.

16 DR. COHEN: I think it's math per grade
17 says a kid who missed 60 days, everything else
18 being equal, would have an expected scale score
19 of seven points less. So you would have one kid
20 who has an expectation of seven points less
21 among your whole class. So it may matter and
22 attendance is something that you want to think
23 about. You can't learn if you're not in school,
24 right?

25 DR. DORAN: One thing that I didn't tell
American Court Reporting
850.421.0058

1 you at the beginning of the day is for grade
2 seven. We brought data with us, some data
3 files, so if there are things that you're
4 curious about that we don't present or there are
5 some questions that we can look at, if I'm
6 talking Jon will crank through and maybe data
7 analysis done or if somebody else is talking, I
8 can crank through an analysis and we can try and
9 answer some of those questions. There are no
10 instances where we look at one teacher and look
11 at whether or not that particular teacher is
12 changing. We look at the population and how
13 things are behaving across the state.

14 MS. WESTPHAL: When you're looking at the
15 models, and I understand the purpose of this was
16 to justify why we just picked seventh grade to
17 look at, I see it in the reading and I see it on
18 that one. Is that not a significant difference
19 on the left between sixth grade -- fourth,
20 fifth, sixth grade versus seventh, eighth,
21 ninth, tenth?

22 DR. DORAN: So there's an interesting
23 finding here, all right. If I'm following what
24 you're saying, the significant difference is
25 that we see this downward trend.

American Court Reporting
850.421.0058

1 MS. WESTPHAL: Well, no, the consistency of
2 the models seven, eight, nine, ten versus four,
3 five, and six.

4 DR. COHEN: No, I think the important thing
5 to take away from this is that the model -- even
6 though it's developmental scales, the scales are
7 kind of different between grades, and so you
8 don't necessarily expect the same numbers in
9 each grade. What's important is the relative
10 ranking of the models. Model 1 always sees the
11 biggest teacher effect, Model 2 always sees the
12 next biggest effect, so the lines are parallel.
13 That's what you're looking for in this. There
14 are differences in the estimated effect size
15 across grades and there's a difference in the
16 pattern between math and reading. But that
17 confounded with the differences in the
18 measurement itself. We have run everything and
19 we've looked at all the data and the big
20 findings stay the same. We just didn't want to
21 try and present, you know, two subjects times
22 seven grades for this many models. You'd never
23 be able to look at the data.

24 MS. WESTPHAL: Well, let's say we're
25 looking at grade six. Two of the models or
American Court Reporting
850.421.0058

1 however many lines, it's hard to tell
2 color-wise, but there seems to be a bigger gap
3 between those two models than there does once
4 you get to 7th, 8th, 9th, and 10th.

5 DR. DORAN: You're right. There does seem
6 to be a bigger gap. Let's look at the issue
7 here, though. This particular model is harder
8 to observe because the lines are virtually on
9 top of each other. This particular model in
10 grade six shows the largest effects and what we
11 see as we go down, even though the gap
12 dissipates that is still the model that shows
13 the largest effects. So the fact that there is
14 a virtual difference here is not necessarily
15 meaningful. If we saw that this had the largest
16 effects in this particular grade and the
17 smallest effects in this particular grade, that
18 would be substantively interesting and would
19 require us to pull that model out and present it
20 to you and say this model behaves differently
21 across different grades, we need to look at it.

22 If the relative ranking of probable models
23 gives teacher effects across the different
24 grades, it remains almost constant.

25 MS. WESTPHAL: That makes sense.
American Court Reporting
850.421.0058

1 MS. BROWN: I have a question about -- and
2 we may get there and it's okay if you tell me
3 we're going to get there. But when we're
4 looking at this, it's obvious we're going to
5 have different patterns subject-wise, but
6 ultimately we have to pick one model. So are we
7 going to have some analysis about how one model
8 reacts in subject one and subject two? In other
9 words, will it have the highest effects in both
10 subjects or high here, low here? We need to
11 make that decision.

12 DR. DORAN: Yes, essentially what we're
13 going to do is we're going to look at all the
14 models in one grade and you're going to evaluate
15 that in reading, see how it behaves in reading
16 and how it behaves in math. I'll tell you now
17 that the models behave similarly across the
18 different subjects.

19 DR. COHEN: In most regards.

20 DR. DORAN: Pardon?

21 DR. COHEN: In most regards.

22 DR. DORAN: In most regards, yes. So
23 you'll see, I think -- I don't know, but part of
24 where you're going is you're wondering might I
25 choose Model 1 for reading and Model 3 for math
American Court Reporting
850.421.0058

1 or something like that?

2 MS. BROWN: Or if we are forced to make one
3 choice, we have to make a decision; so that's
4 important.

5 MR. COPA: You're not constrained in that
6 regard. If one model fits reading better than
7 math, you can have a separate model for math,
8 separate for reading.

9 DR. DORAN: So let's actually start looking
10 at some of these results and some of the data.
11 We're going to structure the criteria around the
12 following four issues. We're going to always
13 have a question, what are we looking for? What
14 do we want to know when we talk about precision?
15 Then we're going to give you a statistic. What
16 statistic gives us some evidence. Then the
17 third thing is what are we talking about in that
18 statistic? How do we know? What are we using
19 to judge it by? Then last why do you care?
20 Just sort of a simple this is why it matters to
21 you.

22 Then we're going to show you data and then
23 we're going to try to summarize what we observe
24 in the data.

25 We're going to first talk about precision.
American Court Reporting
850.421.0058

1 Precision in terms of its questions, what
 2 characteristics of value-added models lead to
 3 more precise estimates of the teacher effects?
 4 The statistic that we're going to look at is
 5 called the standard error. We're going to look
 6 at the standard error of the teacher effects.
 7 Let me talk about what a standard error is.
 8 It's actually something that's very
 9 familiar in polling, so for example if you look
 10 at the president's popularity rating and the
 11 president's popularity rating is 50% plus or
 12 minus 3 percentage points. That's typically
 13 what we see, right? That means, you know, it
 14 could be -- it's a little bit more than this but
 15 it's somewhere between 47% or somewhere between
 16 53%. We're pretty sure it's within a small
 17 range. That's standard error.

18 Now supposed the president's popularity is
 19 50% plus or minus 20 points. Well, is the
 20 popularity when I say 20 points, 30, or 70?
 21 That's a big range. It's a big range of
 22 uncertainty. The standard error tells you I've
 23 got a statistic, the president's popularity is
 24 'X' 50%, but how certain am I that it's within
 25 that range. It's a certainty statistic. Well,

American Court Reporting
 850.421.0058

1 if the standard error is big, we don't know. If
 2 there's a big range, it could be anywhere in
 3 there or is there a small range? I actually
 4 know it's in here. There are some statistics
 5 that we use, this is called the standard error.
 6 A small standard of error is more desirable
 7 than a large standard error. Let me apply that
 8 to a teacher effect. We're going to get a
 9 number; that number is a teacher effect or a
 10 point estimate. That number -- and then we get
 11 the standard error that tells us, well, how
 12 certain are we that this is where the teacher's
 13 ranking really is? A small standard error tells
 14 us, the variability is pretty small. A big
 15 standard error means we've got a lot of
 16 uncertainty. It's not very precise. So what
 17 are we looking for? We're looking for a model
 18 that yields with other things being equal
 19 smaller standard errors. This is what we want
 20 to see. These are data that we're about to show
 21 you.

22 Why do you care? Well, a standard error
 23 tells us that the estimated teacher effect is
 24 more precise. You don't want to estimate
 25 teacher effects with a lot of uncertainty.

American Court Reporting
 850.421.0058

1 Essentially, what you're saying is here's the
 2 teacher effects, the teacher has high value
 3 added. How certain are you? Not so certain at
 4 all. That would be bad.

5 Instead, we want the inference to be,
 6 here's the teacher effect, the teacher has high
 7 value added. How certain are you? Pretty
 8 certain. Standard error is relatively small.
 9 That's our goal, that's what we're looking for
 10 in the next couple of slides.

11 What I'm showing you here are what are
 12 called box and whisker plots of the teacher's
 13 standard errors. We've got them ranked by the
 14 different models, model 1, 1A, 3A, 3A1, 3B, 3C,
 15 and Model 4. Refer to your little cheat sheets
 16 so you can remember which is which.

17 Now this black dot in the center is the
 18 median standard error, okay, the median standard
 19 error. We see in all of these covariate
 20 adjustment models, Models 1 through 3, that they
 21 are on the same scale. I'm going from about 3
 22 to a little bit about 30. We're on the same
 23 scale. So those can be compared very easily and
 24 we can see the black dot is pretty close to
 25 being about the same, but you can see small

American Court Reporting
 850.421.0058

1 differences. Model 1A has smaller standard
 2 errors than Model 1 on average. That's what the
 3 black dot represents. You can look and you can
 4 see the standard errors are smaller under a
 5 couple of models, Model 3 has slightly smaller
 6 standard errors than almost all the others,
 7 right?

8 Now Model 4 is on a different scale. You
 9 can see it ranges from 0 and this goes up to
 10 800. There are some outlines up there. Now
 11 it's hard to compare Model 4 to the other ones
 12 because it's on a different scale. So one of
 13 the things I'm going to tell you is the average
 14 standard error of the simple differences model
 15 is much, much larger than the average standard
 16 error of some of the other models. Now that's
 17 what this little black dot is.

18 What we also see is a distribution. This
 19 is the standard error of the 25th percentile and
 20 this is the standard error of the 75th
 21 percentile, and then this shows the standard
 22 error of the 5th percentile and the standard
 23 error of the 95th percentile. So what are we
 24 looking for in these box and whisker plots?
 25 What would be desirable? Well, we want to see

American Court Reporting
 850.421.0058

1 that the black dot would be over to here to the
2 left indicating that on average it has a smaller
3 standard error -- by the way, this is math,
4 grade seven math. Two of the black dots over
5 here to the left indicating that the model has a
6 smaller standard of error relative to the
7 standard error of other models, these are
8 standard errors of the teacher effects.

9 Then we want to see smaller spread. We
10 don't want this box to be big. That's not
11 desirable. That means on average of small
12 standard error but there's a lot of variability.
13 What we want is the black dot to be on the left
14 and that box to be smaller. That would be
15 desirable. So what do you observe? Any
16 reactions to the teacher effects standard
17 errors?

18 MR. LeTELLIER: Model 3C, 3B, and 3A all
19 are about the same, the spread and they all have
20 similar low error range. That's what I would
21 quickly say.

22 DR. DORAN: That's a good observation. I
23 want to go to another person, but I want you --
24 I'm giving you an assignment. I want you to go
25 to your cheat sheet and I want you to find any

American Court Reporting
850.421.0058

1 these are empirical data. We're looking at
2 criterion, standard errors. That is an
3 important statistical criterion. We're not
4 bringing to you any opinions about which model
5 we think works differently here. We're showing
6 you the results of the empirical evaluation and
7 we can tell you now that these models behave
8 similarly across grade attendance to the similar
9 trends we see about these models in the
10 different grades, but notice what you see here.
11 I was asking the question the behaviors of the
12 models across the different subjects. We see
13 some relative consistency on this particular
14 criterion. It's an important criterion,
15 precision is important but it's not the only
16 thing. There are other things that we're going
17 to look at today.

18 Let's do something real quickly here. We
19 can just tell you an observation that you've
20 already made. Suppose we were to do the
21 ranking, which one took the smallest standard
22 errors on average, and if we rank them what are
23 the characteristics of those particular models?
24 Here's a chart that summarizes this for you. So
25 Model 3C has on average in both subjects a

American Court Reporting
850.421.0058

1 characteristics of those models that they have
2 in common.

3 Any other observations about box spots?
4 MR. TOMEI: They all have two lags, they
5 all have school effect and teacher effect.

6 DR. DORAN: An interesting observation.
7 Let me go over to reading. Go to reading, okay?
8 We're looking at the same charts, box and
9 whisker plots, reading grade seven, and we want
10 the inference to be the same. That little black
11 dot we want it to be to the left. Now,
12 remember, this one is on a different scale so
13 you know it looks like it's on the left. It's
14 on a very different scale. Its standard areas
15 are larger. Over here you can compare the black
16 dots. You can see that this one is smaller than
17 this one on average and this one is smaller than
18 this one, and we want less spread.

19 Can somebody make an observation here?

20 MR. TOMEI: Same three models. 3C has the
21 smallest of those.

22 DR. DORAN: Right. So one of the questions
23 that was asked earlier today is how will you
24 remove some of the subjectivity when we're
25 making these rankings? Well, these are data,

American Court Reporting
850.421.0058

1 smaller standard error. There are small
2 differences between the different models. You
3 see 3C and 3B are consistent in the first two
4 rows and both subjects, but there's a little bit
5 of a difference. But you don't see that that 1A
6 is over here and here and it's minor
7 differences, but pretty close.

8 So at this point one of the things that you
9 can do in your little notes make some decisions
10 -- and we're going to give you just a minute
11 here -- about what do you like about precision,
12 in that column precision, now you can make a
13 judgment about the terms of their precision.
14 I'm going to give you two minutes to do whatever
15 you want on that page plus ten, a one, or a plus
16 or a minus. We're going to do this as we go
17 forward with today because by the end when we
18 get to the last criteria, we don't want you to
19 be overwhelmed with "I forgot which model was
20 good at precision, which model was bad" --

21 MR. LeTELLIER: We are looking at reading
22 and math for all these categories?

23 DR. DORAN: Yes, for all these categories.

24 MR. LeTELLIER: So I'm going to suggest
25 just because -- I think it was Pam or Anna had

American Court Reporting
850.421.0058

1 mentioned about if we're bound to use the same
2 model for both and Juan said no; maybe we should
3 put a slash here so that we can look at both.

4 DR. DORAN: Yeah, put a little line through
5 it.

6 MR. LeTELLIER: This way we're evaluating
7 for reading and math, and at the end of the day
8 it's the same, great, but it'll be easier to
9 remember, I think.

10 DR. DORAN: Yeah, I wish I had given you
11 two sheets.

12 MS. FEILD: Can I ask -- when you ran them
13 going back to the models with the two year lag
14 ones that seemed to have better precision, did
15 that include every 7th grader in the state
16 regardless of whether they had two data points
17 or three data points, or was it only --

18 DR. COHEN: No, this only included the ones
19 that had both data points.

20 DR. DORAN: Let's say something about this.

21 You only put a student for two data points
22 --

23 MS. FEILD: No, no, we have -- these models
24 -- the top models all yielded two lags. That
25 means they would have had three data points.

American Court Reporting
850.421.0058

1 generate -- for a teacher we would only generate
2 data for the kids who have two lags?

3 DR. DORAN: No, no. We can make a decision
4 so that when students have two prior test
5 scores, there can be a decision, a policy
6 decision. When students have the two available
7 test scores, you use them and if a student has
8 perhaps only one of the two, then what we would
9 do is we could put in what's called just a code
10 that would indicate that one of those two scores
11 is missing and only use one of the scores. Of
12 course, if the student doesn't have anything,
13 then you can't use them at all. But I don't
14 think we can use them -- but you can make a
15 decision.

16 Use two where available and when it's not
17 available use one of the two, or maybe you just
18 use the most recent of the two.

19 MS. FEILD: So if we were to use that
20 combination meaning however many it's one set.
21 If you have two, three years with current, you
22 use three. Do we know how that affects the
23 precision of the model?

24 DR. COHEN: Not -- there's a standard error
25 for each individual teacher, each teacher's

American Court Reporting
850.421.0058

1 DR. DORAN: Correct. The correct score for
2 the --

3 MS. FEILD: In other words, your fourth
4 grade model for that component would never have
5 two lags.

6 DR. COHEN: Yes, we didn't estimate it for
7 the fourth grade for exactly that reason.

8 MR. COPA: That's a great question and it
9 leads to the policy implications of you need to
10 -- you know, considering precision but also what
11 are the consequences of selecting a model that
12 requires two lags.

13 DR. COHEN: Right.

14 MS. FEILD: Right. That's why I'm asking
15 -- but the first question is what was plotted
16 before.

17 DR. COHEN: It included only students for
18 whom you had both data points, and there's
19 nothing preventing me from making a
20 recommendation that says use two data points if
21 you have it; if you don't, don't.

22 MS. FEILD: Okay. So if we were to choose
23 a model that looks at two lags -- 3A, 3B, or 3C
24 -- let's say we all decided on 3B right now,
25 whatever. Does that mean that we would only

American Court Reporting
850.421.0058

1 estimate. So if a teacher had a lot of students
2 with only one year of prior data, the standard
3 error around their estimate would be a little
4 bit larger.

5 MR. LeTELLIER: So that wouldn't be as
6 precise.

7 DR. COHEN: Yes, we have a little less
8 precise estimates for teachers and a lot of the
9 kids in the classroom who didn't have the extra
10 data. You have more precise estimates for
11 teachers who did have the extra data.

12 MR. LeTELLIER: So what would be the
13 teacher implications on that one.

14 DR. COHEN: Well, that depends on your
15 classification which we're going to get to at
16 the end of the day. But you have variability in
17 teacher classification that are much more
18 important than that right now. The teacher
19 teaches a lot of students; they're going to have
20 a much more precise estimate than if they teach
21 a few students, and there are big differences in
22 teacher precision. If we page back a couple of
23 these, let's see -- you mentioned Model 3B, it's
24 right here. You have some teachers -- 25% of
25 your teachers have standard errors of 14

American Court Reporting
850.421.0058

1 developmental scale score points or less; 25% of
2 your teachers have, I don't know, let's call
3 that 18 developmental scale score points or
4 more. So there's some variation in that.

5 MS. FEILD: Right. I understand that. But
6 let's say that was the model we picked and let's
7 say that we're telling teachers this is your
8 standard error, but really if you happen to have
9 some kids -- happier kids don't happen to be
10 missing one data point; your standard of error
11 could be bigger.

12 DR. COHEN: And it would be reported as
13 larger. You would know that it was larger; we
14 would capture that in the model and you would
15 know that they had a larger stay there, just
16 like you know that this teacher has a standard
17 error and the ones down here have the smaller
18 standard error; you might have --

19 MS. FEILD: Right, I understand.

20 DR. COHEN: -- more up there, yeah.

21 MS. FEILD: And we know that the more years
22 of data you have the more precise you get, but
23 teachers have to understand that if their
24 children do not have the multiple years there
25 will be more error in terms of that child's --

American Court Reporting
850.421.0058

1 I'd have more teachers with smaller standard
2 errors. I want more teachers -- so really, what
3 you want is you don't want any - you don't want
4 a lot of teachers falling in high ranges; you
5 don't mind a lot of teachers falling in low
6 ranges. So you look at Model 3, the 3A one, and
7 Model 1, they're both pretty variable, but the
8 75% of the teachers in the Model 3A one have a
9 standard error of less than 24 points, whereas
10 with Model 1 you wind up with -- is it 1 or 1A
11 -- in Model 1 you wind up with, I don't know,
12 the 75th percentile and about 27 points. Right?
13 So you want more teachers down at that end of
14 the scale which is the reason we display it that
15 way so you can see where you have a lot of
16 outliers up here.

17 DR. DORAN: Pretty much what you see in
18 Model 3B.

19 DR. COHEN: Yeah, you've got a long left
20 tail. You've got lots of guys down here and
21 that's okay. We know about some teachers with
22 more precision.

23 MS. FEILD: I think that from a policy
24 perspective, right, we have to think about it
25 from the committee's perspective. If we choose

American Court Reporting
850.421.0058

1 DR. COHEN: That's right. That's right.
2 No one asked --

3 MR. TOMEI: Just for clarification, if you
4 would, go forward a couple of slides for me if
5 you would to that rank ordering again. We've
6 talked about precision, really two aspects of
7 precision. One is where is the midpoint of that
8 bell curve if you will and the other is how
9 compressed is the bell curve? It looks like the
10 rank order is based only on the midpoint, not
11 about the width; is that --

12 DR. DORAN: That's right. So this rank
13 order in here is based only on which one has the
14 smallest standard errors on average. If we're
15 to rank them on which has both the smallest and
16 the less variability, the table would be more
17 complex.

18 MR. TOMEI: And the reason I'm asking that
19 question is I think if you did that on the right
20 there on a map, 3A would hop above 1A. That's
21 what the graph suggests.

22 DR. COHEN: Let me -- let me. It's not
23 exactly the variability that we're interested
24 in. If I had this and I had a big wide bar that
25 went all the way down here, that would be good.

American Court Reporting
850.421.0058

1 a model that looks at two lags, three years of
2 data, then we have to be able to tell teachers
3 fourth grade teachers will never have that
4 precision. We would never be able to tell them?

5 DR. DORAN: No, no, there are other
6 factors. Two lags brings additional precision.
7 There are other things that yield more precision
8 as well. So the standard errors of the teacher
9 effects depend on a number of different things.
10 So, for example, it depends on the number of
11 kids within a teacher's class. It depends on
12 the homogeneity of the students within that
13 class. It depends on the number of lags that's
14 used. It could depend on some of the fixed
15 effects. So there are other factors, yes, those
16 grade four teachers will never have a prior lag
17 as the grade five teachers and up would. But
18 that's not the only thing that determines what
19 the standard error of the teacher fixed effect
20 is.

21 Jon, you wanted to say something about the
22 fixed effects, right?

23 DR. COHEN: Well, we very quickly started
24 focusing on the covariate model. The simple
25 differences model, Model 4, displayed on the

American Court Reporting
850.421.0058

1 top, you see the standard error is there. I'm
 2 eyeballing this. The standard error is around
 3 40 or 50 points. If you'll recall from this
 4 model, the estimated effects were also larger.
 5 The typical effects were estimated to have
 6 larger magnitude, either negative or positive,
 7 but larger magnitude. So fifty points relative
 8 to the size of the effect being estimated is not
 9 as bad. I want to make sure that we don't
 10 ignore this model unless the committee wants us
 11 to ignore the model.

12 I think the -- you can see why -- let me
 13 back up a bunch of slides and show you this
 14 model is finding bigger typical effects. It's
 15 because we're estimating something different.
 16 It's estimating deviations from a different
 17 line. Let me go back there and show you that
 18 again.

19 Remember the red line here, this is a
 20 simple differences model, and this is the one
 21 that shows you what is typical, what is
 22 currently typical. The magnitude of the effect,
 23 a typical student -- a teacher teaching only
 24 typical students with typical growth right here
 25 will appear to have a big effect. I don't know

American Court Reporting
 850.421.0058

1 how big that is on the scale. That's probably
 2 200 points on the scale down here just for
 3 teaching typical students, so there's that big
 4 gap. Up here you also have that similar sort of
 5 advantage, just not as a disadvantage in this
 6 particular range. You see more variability.
 7 See estimates of effect that have a greater
 8 magnitude because of deviations from a different
 9 set of lines.

10 Does that make sense? Okay. So now we can
 11 leave this model for as long as you guys want to
 12 leave it.

13 Next slide.

14 DR. DORAN: So moving on to the next
 15 criteria, we don't want to evaluate any model in
 16 isolation. Personally, you might care about
 17 precision more than you care about personal.
 18 Those are your own opinions. Sam's going to
 19 facilitate a conversation later on where you get
 20 to express which of these criteria you place
 21 more weight to. This is up to you, all right,
 22 but don't evaluate (inaudible) -- you get a
 23 model on one of these criteria. So why don't we
 24 move on to the next one unless someone wants me
 25 to stop here and explain more or have larger

American Court Reporting
 850.421.0058

1 discussion on precision? Yes, Stacey?

2 MS. FRAKES: Model 4, the distances model,
 3 is that correct?

4 DR. DORAN: Yes.

5 MS. FRAKES: And the others are the
 6 covariates?

7 DR. DORAN: That's correct. So Model 4 is
 8 the simple differences model and all of these
 9 are the covariate adjustment models, and Models
 10 1 and 1A are the ones that have the teacher
 11 effects and anything with a 3 -- here's an easy
 12 way to remember it -- anything with a 3 is a
 13 3-level model. It has students, teachers, and
 14 schools.

15 MS. FRAKES: Thank you.

16 DR. DORAN: Jon, is that why they were
 17 called Model 3?

18 DR. COHEN: I'll exclaim yes but I might
 19 not be telling the truth.

20 DR. DORAN: I actually just thought of that
 21 now and I thought, wow. Just because the way we
 22 write them and the analysis specifications.

23 DR. HOVANETZ: I will have to say, though,
 24 we did revise them to have simple differences,
 25 that's the reason why a two tiered model is 2A

American Court Reporting
 850.421.0058

1 and a three tiered model is 3A.

2 DR. DORAN: Well, it works out to be a
 3 beautiful heuristic device. If you have a 3
 4 next to the model, it has teacher, school, and
 5 student effects. So that's why I prepared that
 6 little summary sheet for you so you could follow
 7 along because we're going to refer to these
 8 models by number throughout the course of today
 9 and tomorrow.

10 Yes?

11 MR. LeTELLIER: Real quickly, the
 12 regression line that you just --

13 DR. DORAN: You want to revisit it?

14 MR. LeTELLIER: I don't know if we need to
 15 revisit it. It's on page 11 you just showed,
 16 but it shows the slope is straight, and my
 17 question is if you were going -- if a kid one
 18 year was 1,400 and the next year you're
 19 expecting him to be about 1,450 or something
 20 like that, if the kids in that area had a
 21 specific number that you're expecting them then
 22 would that line be straight or if you magnified
 23 it would it kind of wobble as it's going up?

24 DR. DORAN: Well, the simple differences
 25 model forces the slope of that line to be fixed

American Court Reporting
 850.421.0058

1 at one, okay. The covariate adjustment model
 2 takes all of those idiosyncrasies across and
 3 finds the line, the slope of that line, that
 4 best fits the data given some of those wobbles
 5 because you do expect some wobbles. Now you can
 6 do other things statistically to account for
 7 some of the curves and the data and you can fit
 8 a whole bunch of different things, but that line
 9 finds the best fit of that line through that
 10 cloud of data.

11 MR. LeTELLIER: Okay. I guess I was having
 12 a hard time with that because it just seemed
 13 like we're making that slope and now we're just
 14 -- all kids are following this where you may
 15 have one area of growth that may be higher or
 16 lower, and so we can't really account for that
 17 precision.

18 DR. COHEN: Well, we do in fact, and the
 19 other model where we could -- let's go back to
 20 that. We don't have a graph on this, but with
 21 the help of a graph we do have a bit of
 22 imagination as an interpretive dance. All
 23 right. Ignore the red line, ignore the man
 24 behind the counter, ignore the red line. We'll
 25 go to the green line, it's just a straight line.

American Court Reporting
 850.421.0058

1 Now let's suppose we include this covariate a
 2 little flag which we did, a flag that says this
 3 is an ELL student, a student who is in one of
 4 his first two years of ELL. There will be a
 5 separate line for those kids. It will be
 6 parallel to this line and in fact is parallel to
 7 this line and a little bit above this line.
 8 Then we had another dummy variable for students
 9 with autism spectrum disorder. I'm trying to
 10 remember; I believe that one actually had a
 11 positive intercept, also. That will be another
 12 parallel line that is a little bit above this
 13 line. I don't try to remember all the details.
 14 A kid who's been absent for 60 days will have a
 15 separate line that's again parallel but dropped
 16 this much. Katie's been absent for, I don't
 17 know, more days than that, but as per 100 days
 18 might have a line down here. So the covariates
 19 actually account for that sort of -- those sorts
 20 of differences among students given their
 21 measured characteristics. It doesn't try to fit
 22 just any individual differences in the data.

23 MR. LeTELLIER: Right, I understand that.
 24 I remember that from last time, if you're
 25 looking at the X and Y access the kids that are

American Court Reporting
 850.421.0058

1 at a 500 versus 2500, and if you go in that
 2 range all kids are going to fall along that line
 3 and that may not be precise at some point.
 4 Like, maybe the kids that are at 750, you
 5 actually would go up a little bit.
 6 DR. COHEN: You can see the scatter plot
 7 here. That's why we have the scatter in the
 8 background; you see it's pretty evenly
 9 distributed there, right? You see a little bit
 10 more variability down at the lower end than you
 11 do at the top end and a little bit less
 12 variability, but it cuts through the center of
 13 that cloud. So often what you'll see if the
 14 model doesn't fit if you have that kind of
 15 problem is this cloud won't really be centered.
 16 It will look more like a curve or a curve the
 17 other way and we don't see that.

18 MR. LeTELLIER: If we expected kids to be
 19 -- a kid's that at a thousand this year, we
 20 expect that he will be at a thousand next year
 21 in his next grade or wherever this line falls?

22 DR. COHEN: Whatever, yeah.

23 MR. LeTELLIER: Right. So I guess what I'm
 24 saying is that -- 'cause last time when we had
 25 discussed this, we were going to look at where

American Court Reporting
 850.421.0058

1 students were in that range, so similar students
 2 at a thousand where they would be expected to
 3 be. Couldn't there be a -- see, I guess maybe
 4 mathematically I am not going with your
 5 statistically. Couldn't there be that thousand
 6 range, all kids that were around a thousand
 7 maybe generally they were at 1,100. The kids
 8 that were at 1,200 maybe all those kids scored
 9 200 points higher and the kids that were
 10 underneath, let's say at 750, maybe they went
 11 down to a 720. That line can't take that into
 12 consideration because that's a single straight
 13 progression line.

14 DR. COHEN: That is right. We did look at
 15 some models that had curves in them and they
 16 didn't fit the data. We wound up seeing --
 17 you'll notice there's a mass of kids up here who
 18 are getting the highest possible scores and you
 19 -- you see highest possible scores; you don't
 20 see as many lowest possible scores. It's not as
 21 clear in here. But when you put the curves in
 22 then those start to drive the analysis, and so
 23 we wound up -- we actually did see residuals
 24 that didn't have that nice even pattern. So you
 25 had prediction errors which would translate into

American Court Reporting
 850.421.0058

1 mistaken attributes of teacher effect.
 2 You saw prediction errors that weren't
 3 constant across the range. So we tried and we
 4 didn't see that, I guess is the answer. I mean,
 5 there are literally an infinite number of curves
 6 we might try fitting. You know, we tried some.
 7 MR. LeTELLIER: Why does it have to be -- I
 8 don't know if I'm stating it -- why does it have
 9 to be a line? Why can't it just be whatever the
 10 students in that area --
 11 DR. COHEN: Well, that's exactly what this
 12 is. This says within the -- and the areas are
 13 defined by achievement level. It says, okay,
 14 kids in achievement level one we're expecting --
 15 I don't know what the number is -- a hundred
 16 point spread. Kids in achievement level two
 17 we're expecting 50 points. That's the simple
 18 difference; that's what the red line is doing.
 19 MS. BOURN: Can I take a stab at what I
 20 think you're asking? I think he's asking why
 21 can't you look at each score point along the
 22 axis and take the average of what the Y-axis
 23 would be for the score point and that's the
 24 expectation, instead of just using a line to
 25 describe the entire set of data.

American Court Reporting
 850.421.0058

1 MR. LeTELLIER: Yes, that was much more
 2 eloquent.
 3 DR. COHEN: I suppose we could certainly do
 4 that.
 5 MR. LeTELLIER: It doesn't make sense
 6 because what we were discussing last time, and
 7 I'm just throwing this out here, because what we
 8 were looking at, and I remember clearly
 9 conversations because I remember the number 140
 10 offhand, and we were talking about students next
 11 year, we were going from a baseline, those
 12 students would be -- the teacher would be
 13 assessed according to where the general kids at
 14 140 were the next year. And with a straight
 15 line with that big of a spread, there's no way
 16 to do that, and in the center of the line
 17 obviously as you moved the slope there's less
 18 movement and the outer parts move more.
 19 DR. DORAN: Can I ask for a clarification?
 20 Are you asking what would happen if we took a
 21 particular range of the X axis here of those
 22 kids that were in that range what the expected
 23 score on the Y axis? Is that what you're
 24 asking?
 25 MR. LeTELLIER: Yes.

American Court Reporting
 850.421.0058

1 MS. BROWN: He's also asking for multiple
 2 regression lines or regression line per --
 3 DR. COHEN: It wouldn't be a regression
 4 line. They're asking for each scale score
 5 point, right?
 6 MR. LeTELLIER: So it would look like this?
 7 You have a point at 1,000 and 1,100 and --
 8 DR. COHEN: You could do that when we
 9 estimate a model like that. What we do is we
 10 just have a separate point for each scale score
 11 point. What you give up there is you give up
 12 precision, the precision of the expected value
 13 and therefore the precision of the teacher
 14 effects would be much, much, much more variable.
 15 You've got 70 or 80 different scale score
 16 points, so you'd be dividing your sample into
 17 many smaller units. So you would give up
 18 precision, so you might see that this scale
 19 scores where the average is about there and this
 20 scale score point is here, but they might not
 21 even be any different. We can try something
 22 like that. That hadn't come up in the prior
 23 meetings as something to try.
 24 MS. GINN: Why would that be important if
 25 it was used?

American Court Reporting
 850.421.0058

1 MR. LeTELLIER: Well, because and I think
 2 it's a matter of looking at statistics versus
 3 mathematics, and if I'm the only one here that's
 4 fine; I don't want to beat a dead horse. But
 5 I'm thinking that more people are on this line
 6 than not just -- in real life a kid that scores
 7 1,000 that next year scores 1,100, and we say
 8 most of the children in that category that were
 9 1,000 last year are now 1,100; that's the
 10 expected growth. That's real life versus this
 11 line which is not going to take that into
 12 account, I don't think, as fully from what --
 13 PANEL MEMBERS: (Over-speaking.)
 14 MR. COHEN: Let me show you another fairly
 15 simply graph that we have that we just created.
 16 DR. DORAN: While he's creating that, I
 17 think that there may be just a little
 18 misunderstanding. Either it's me or we're just
 19 talking past each other. What you just said now
 20 was in the real world there are kids who have
 21 1,000; and there should be some prediction
 22 that's similar for those kids who had a score of
 23 1,000 the prior year, right?
 24 MR. LeTELLIER: No, what I'm saying is real
 25 life scenario, this year they're at 1,000; next

American Court Reporting
 850.421.0058

1 year we'll see they're at 1,100. We're going to
 2 see those two numbers. So when we're looking at
 3 outcome and we're saying where a teacher should
 4 have their students, we can visibly see that the
 5 general student that was at that level should be
 6 at such and such level.

7 MR. DORAN: That's what this is doing,
 8 that's what this is doing. This is showing for
 9 any given -- for any kid who had the same prior
 10 test score, what are they expected to do in the
 11 subsequent year? That's exactly what this line
 12 does.

13 DR. COHEN: There is a linear assumption
 14 here that that data goes in a line. He's saying
 15 couldn't we do something non-parametric where
 16 the line and plots go wherever it wants to.

17 MR. LeTELLIER: Yeah, I understand this
 18 plot. I see where the kids were the first year
 19 or the second year, but life is not linear.

20 DR. COHEN: It's often more linear than you
 21 think, but let me -- I have a question over
 22 here.

23 MS. BROWN: Well, I just want to see if
 24 this is where you're trying to go because it
 25 isn't linear when you look at each case in

American Court Reporting
 850.421.0058

1 point, and that's absolutely true. The purpose
 2 of this is to look at a large set so that we see
 3 on average because those -- if I'm understanding
 4 this correctly, all the points are actual
 5 performance, and that line is not a forced line.
 6 It's not a -- we have determined by some
 7 calculation that the line should be here because
 8 that's what we should expect of students; the
 9 line is actually where the average falls. So in
 10 a sense even though it is linear because when
 11 you draw a progression line through a scattered
 12 plot of points it will be a linear line, but
 13 this is actual performance and it's attempting
 14 to show the average over a large set of data.

15 The problem is going to go back to kind of
 16 where you were talking before. What if it's
 17 only that one kid, and that one kid really makes
 18 a difference for that one teacher?

19 MR. LeTELLIER: Well, yeah, let me just
 20 draw this.

21 MS. BROWN: Go, John, go.

22 MR. LeTELLIER: I'm just going to use three
 23 numbers here. What I'm saying is this: If we
 24 draw a line that goes like this, and I totally
 25 get that; what I'm saying is what if the kids

American Court Reporting
 850.421.0058

1 that were right here on average actually score
 2 here; that would make it here. The kids here on
 3 average score here and the kids here on average
 4 score here. When you connect those points these
 5 are still average. Again, that's not what I'm
 6 saying.

7 DR. COHEN: Let me show you what you would
 8 see. If this were the case you would see that
 9 on that graph.

10 MS. BROWN: You would see a plot line.

11 DR. COHEN: Let me draw you what you would
 12 see. If we try to defend it around this line,
 13 you would see a scatter plot that looks
 14 something like this.

15 MS. BROWN: So the scatter plot would have
 16 to be shaped --

17 DR. DORAN: You see that plot in the
 18 residual and you don't see that, you don't see
 19 that here.

20 DR. COHEN: Let me see if I can -- I have
 21 some data --

22 PANEL MEMBERS: (Over-speaking.)

23 MS. BROWN: Can I just say that in like
 24 common terms?

25 DR. COHEN: Yes.

American Court Reporting
 850.421.0058

1 MS. BROWN: Because now you're both saying
 2 the same thing and the point is if, in fact, the
 3 actual performance of the average group of
 4 students was the line like this, the scatter
 5 plot of points behind the line would also be a
 6 shade like this.

7 DR. COHEN: But the line will still be
 8 straight.

9 MS. BROWN: So in reality if actual
 10 performance is what you say, if there's a year
 11 and there's an anomaly in the scale of the test
 12 or the scoring or whatever, then the regression
 13 line would be funky like that because that would
 14 be the actual performance behind it.

15 DR. COHEN: Yeah, and it would be
 16 detectable. You look at the scatter plot and
 17 you say, you know, Jon, that dip there maybe you
 18 should be pitting a line with one person.

19 MS. BROWN: But typically this is what you
 20 see in this data set and it is feasible that
 21 that could happen.

22 DR. DORAN: There are data that we're not
 23 presenting that I can take over time on the
 24 computer and show you; if supposing the world
 25 was exactly as you were suggesting, Jon. We

American Court Reporting
 850.421.0058

1 would see the scatter plot like that, okay? Now
 2 we compute what's called the residual. The
 3 residual was the difference between the kids'
 4 observed score and their expected score.
 5 We did many, many analyses to look on those
 6 residuals to look at whether they fit particular
 7 patterns. They normally distribute it, how did
 8 those fitted values plot -- the fitted values
 9 plot against some of the residuals? Those
 10 strange trends would have shown up in our
 11 analysis of the residuals, and we would have
 12 thought we need to go back and fit cubic trends,
 13 quadratic trends, do some local smoothing, you
 14 know, use different polynomial terms to account
 15 for the bends in the data. We actually did do
 16 something like that back at the lab to see if
 17 those models fit the data better than these
 18 straight line models and they didn't. Not only
 19 did they not, but in all of our analysis of the
 20 residuals that we do that we're not presenting
 21 here, but if you want to see we can show you
 22 some of these things, we don't see those strange
 23 patterns of the curvature that we would get to.

24 Perfectly reasonable what you're asking to
 25 look at whether that's true or not because if we

American Court Reporting
 850.421.0058

1 all models are wrong, some models are useful.
 2 We can't fit a model that fits, you know, into
 3 every single one of these points. That would be
 4 what's called a saturated model and it's not a
 5 reduction of the real world. So we have to
 6 investigate which model is the best reduction of
 7 the real world data that we can apply and get
 8 reasonable inferences from. So that's what
 9 we're trying to do here. That's why we're
 10 looking at other fixed effects, other covariates
 11 and control variates. Adding those terms when
 12 they fit the data and then when they're
 13 excluded.

14 All right. Christy gave me the flag of
 15 five more minutes. Why don't I start on
 16 something and we'll finish it after --

17 We're going to start with spool effects
 18 now. We're going to define why we care and what
 19 we're looking for. So again, using the same
 20 questions that we looked at before, let's look
 21 at the question.

22 Should value-added models account for
 23 systematic differences between schools? The
 24 question is a straightforward question but it's
 25 a hard one to answer. Remember, some of the

American Court Reporting
 850.421.0058

1 do see that the role is not as linear as these
 2 models have turned out to be, because it's just
 3 a line, a straight line -- okay, perhaps the
 4 world isn't as straight as we made it here. We
 5 can test those assumptions, we did do some
 6 analysis. I can show you some of this stuff if
 7 you want to come over here to the computer and
 8 look and see.

9 DR. COHEN: Just for public record, the
 10 world is round.

11 MR. TOMEI: We're never going to be able to
 12 develop the perfect model. You develop the best
 13 model you possibly can and then to handle the
 14 extreme outliers you have to have some policies
 15 or business practices in place, you don't
 16 evaluate a teacher, you don't have a minimum end
 17 of student population and you don't make high
 18 stakes decisions about teachers based on a
 19 single year's worth of data. Those types of
 20 things will mitigate the kind of concerns you're
 21 expressing in ways that the best model in the
 22 world would never be able to capture 100% of the
 23 time.

24 DR. DORAN: There's a very famous
 25 statistician; his name is George Fox and he said

American Court Reporting
 850.421.0058

1 value-added models include school effects, some
 2 of them include only teacher effects. Let me
 3 talk about why that's important and what
 4 matters, all right?

5 When we think about school effects and
 6 teacher effects, a teacher effect is essentially
 7 in the world of value-added modeling the things
 8 that we think that teacher has done to cause the
 9 improved or not improved student levels of
 10 achievement. However, suppose there are other
 11 things happening in the school that are also
 12 cause for students to improve in their learning
 13 or not improve in their learning that the
 14 teacher is not responsible for.

15 Suppose there are qualities of the programs
 16 initiated by the principal or the curriculum
 17 coach or some other advocacy group within the
 18 school. There are things that are systemically
 19 happening in the school that are a cause or at
 20 least part of the cause of student change that
 21 are outside the control of the teacher. If you
 22 do not include school effects, those changes,
 23 those things have to go somewhere; and if you
 24 ignore them, they get pushed into the teacher
 25 effect. What would end up happening is if you

American Court Reporting
 850.421.0058

1 ignore school effects and let's say there are
2 good things happening in the school and let's
3 suppose those school effects are real and big,
4 what happens is they get pushed into the teacher
5 effects and those teacher effects may appear to
6 have higher added value rankings than they truly
7 deserve because they're getting some credit that
8 the school is doing.

9 I look really good because things that the
10 school does that I didn't initiate got pushed
11 into my effect or vice versa. Things that the
12 school is doing are dragging down a particular
13 teacher's effect. All right? So that's part of
14 the reason that we're interested in looking at
15 this. Are there things at the school level,
16 initiatives or programs that are also partly
17 because of changes in student growth that we
18 want to account for? When you do that then what
19 you do is you partition the variability and
20 growth. We get teacher effects and we get some
21 of the variability and growth that's due to the
22 school. Those are estimated.

23 So what do we look at? That's the
24 question. Should school effects be included?
25 What statistic do we look at? We're going to
American Court Reporting
850.421.0058

1 look at the variation in student growth between
2 schools.

3 Evidence in favor of a desirable model. If
4 the model suggests that there are systematic
5 school effects then the policy must decide how
6 much to attribute. We don't need to answer that
7 question today; the question will be: Should
8 school effects be included or not? I don't
9 think that's the goal; we're not going to answer
10 that, but you can attribute none, all, part,
11 some fraction of that. The issue here is should
12 we include school effects in the model or not?

13 Why? As I said, determining if and how
14 much of the school effects should be attributed
15 to the school, then also if the school is doing
16 something that the teacher is not responsible
17 for and you exclude school effects, teachers may
18 appear to be higher performing, higher value
19 added or lower value added than they may truly
20 deserve.

21 Let's look at something and think about
22 this as we get ready for lunch. This is the
23 only graphic I'll show you before we get ready
24 to -- I thought we'd finish our slides by 1:00
25 today. I was way off.

American Court Reporting
850.421.0058

1 These are the teacher effects on a standard
2 deviation scale, all right? Essentially, what
3 this means is this is Model 1, looking at your
4 sheet you'll see that Model 1 is one that
5 includes only teacher effects. What we see here
6 is that the teacher effects appear to be really
7 big, okay. The number 30 is not necessarily
8 meaningful saying ten points higher than this
9 model over here is irrelevant. What's important
10 here is that you see the magnitude of what's
11 happening here. So when you have teacher
12 effects, teacher effects appear to be really big
13 under this model and this model.

14 Now here in Model 3 we include teacher
15 effects and school effects. Note what happens
16 here. Teacher effects get smaller almost
17 always, always relative to this, teacher effects
18 get smaller and the school variability -- the
19 school effects -- are relatively big. What is
20 this graphic suggesting? This graphic is
21 suggesting that if you ignore teacher effects in
22 reading, if you ignore school effects in
23 reading, teacher effects appear to be very big.
24 When you then account for school effects and
25 teacher effects, that is, those systematic

American Court Reporting
850.421.0058

1 things that schools also do that may be outside
2 the control of a particular classroom, but also
3 are the cause for a relationship with an
4 improvement in student achievement or changes in
5 student achievement. Schools have an effect.
6 They seem to matter.

7 So essentially what you're doing is now
8 you're saying, well, we've got those teacher
9 effects but those teacher effects really aren't
10 as big as we thought. Some of what's happening
11 is because of the school. So we pull that out
12 of the teacher effects. That's why the teacher
13 effects are not as big under these models as
14 they are here.

15 Let's just look at the next subject and
16 then we'll leave and explore this issue when we
17 get back. The next graphic is the same but from
18 that, and we see a similar pattern. We see that
19 when teacher effects are included only the
20 teacher effects appear to be very big, but when
21 school effects are included alongside teacher
22 effects, they appear to account for a large
23 proportion of the total variance and scores and
24 teacher effects get smaller. Let me explore one
25 thing with you.

American Court Reporting
850.421.0058

1 Let's pretend for just a moment that we
 2 included school effects but suppose this part of
 3 the school effect was really small and this was
 4 really big, okay? And this was small and this
 5 was small and that was small. That would
 6 suggest that even after accounting for school
 7 effects, teacher effects are still really big.
 8 If that were the case, we might say school
 9 effects are not necessarily needed. Now I can't
 10 tell you how big the effect of the school should
 11 be before you make a decision, a policy decision
 12 on whether or not you include it. This is data,
 13 these are data that suggest that school effects
 14 seem to account for a large proportion of the
 15 differences in student achievement. Maybe
 16 schools matter.

17 When we come back from lunch, Kathy, I'll
 18 let you close this out soon, we'll explore the
 19 observations that we're making about the
 20 differences between models and whether or not
 21 you think school effects should be included or
 22 only teacher effects, and we'll talk about any
 23 questions you might have.

24 MS. HEBDA: Thanks, Harold. A lot to chew
 25 on during lunch. We're going to stop the

American Court Reporting
 850.421.0058

1 recording and break for lunch now.
 2 (Whereupon, a lunch recess was had.)
 3 DR. DORAN: Before we went to lunch, we
 4 started with the question of whether school
 5 effects should be included in the value-added
 6 model, in addition to teacher effects, or only
 7 teacher effects. Let's go back a step and talk
 8 about how do you do school effects, or what is a
 9 school effect? Is it a certain set of variables
 10 that you put in? Let me try and describe this
 11 in a way that is relatively straightforward to
 12 understand what the school effect is. But let
 13 me start with just the teacher effect and then
 14 we can generalize what the teacher effect is to
 15 the school effect.

16 When we estimate the regression model for
 17 teacher effects, essentially what we get is we
 18 get an expectation for all kids. We talked
 19 about this last time. We said what's the
 20 expectation for kids if they have a typical
 21 teacher or a teacher of average effectiveness?
 22 When you estimate a teacher effect, what we look
 23 at is Sam had some group of students. We look
 24 at the students in his class and how they
 25 deviated from that typical expectation. They

American Court Reporting
 850.421.0058

1 all have, let's assume, very high positive
 2 deviations from the typical expectation. What's
 3 the expectation? Remember that regression line?
 4 That's the expectation. Every kid in your
 5 class, Sam, had positive deviations from that
 6 typical expectation. So now we've got what we
 7 call a residual. It's a little bit more than
 8 just taking the average, but let's just work
 9 with this.

10 So now I've got for all the kids in your
 11 class, I take the average of those residuals.
 12 They're all positive, which means every single
 13 kid in your class for the sake of argument meets
 14 the typical expectation. Let's just say they
 15 beat that expectation by a lot. Your teacher
 16 effect would essentially be about the average of
 17 those residuals. They're all positive, you look
 18 really good relative to the typical teacher in
 19 the state.

20 Now I've got another teacher and so suppose
 21 now I have a group of students and I didn't do
 22 as well with those kids as would be expected.
 23 Suppose each of the students in my class fell
 24 below that typical expectation. Now I've got
 25 all those negative residuals and we take the

American Court Reporting
 850.421.0058

1 average of those in a sense, and now I look very
 2 low relative to the typical teacher. What's
 3 interesting is the teacher effect, you have
 4 those residuals the difference between how they
 5 perform and how they were expected to perform,
 6 and you average them in a class to get that for
 7 teacher one, teacher two, you get that for every
 8 teacher in the state.

9 Essentially, what the teacher effect is,
 10 the teacher effect is the deviation from -- the
 11 kids in that class -- is the deviation of the
 12 students in that class from the typical
 13 expectation. So we know what the expectation
 14 is, kids in a teacher's class in many respects
 15 -- kids in that teacher's class had in effect a
 16 deviation of plus ten. It just means maybe they
 17 scored ten points higher on average than the
 18 typical student, than was expected, or a
 19 negative teacher effect is one where the teacher
 20 has -- let's just call it negative ten. That
 21 means students in that class performed lower
 22 than was typically expected. That's the idea of
 23 the teacher effect. It's a deviation from the
 24 expectation for the kids in that class. You
 25 have positive deviations for all your kids; I

American Court Reporting
 850.421.0058

1 have negative deviation for all of my kids.
 2 Now the world is not that straightforward.
 3 Your class maybe some of them have positive
 4 deviations, some of them did not, so there's a
 5 little bit more than that. Again, you still
 6 take all of those residuals and we do a little
 7 math with those and we come up with, well, for
 8 the most part your kids did pretty well and for
 9 the most part my kids did not do as well. So
 10 the teacher effect is the deviation from that
 11 expectation.

12 The same concept applies to the school
 13 effect. So essentially what we've got is a
 14 group of kids who are within a school, from many
 15 schools, and essentially what we're looking at
 16 is those kids, how did they fare relative to the
 17 expectation? All of the kids in the school?
 18 Then kind of in this -- now when we actually do
 19 the math, mathematically now what we do -- now
 20 I've got this effect. See, all of the kids in
 21 this school on average perform lower than was
 22 typically expected. Now I look at, well, the
 23 kids in Lance's class, they're in that school;
 24 how did they perform relative to the school
 25 average? So now I've got kids in your class,

American Court Reporting
 850.421.0058

1 It's the deviation. Then the teacher effect is
 2 the deviation from that school effect. Yes?
 3 MS. ACOSTA: I have a question about the
 4 average that we get from -- including everybody.
 5 That includes students within that teacher's
 6 class so those kids are counted within the
 7 average and then separately? Do you see what
 8 I'm saying? As well as for all the things we're
 9 looking at. When we say we're going to get
 10 their regression line for everyone, that
 11 includes for example students with disabilities.
 12 So we make another line with just the students
 13 with disabilities; so they're in the initial
 14 line as well?

15 DR. DORAN: That's right. So let's just
 16 play it out a little bit. We've got
 17 expectations for kids with disabilities and some
 18 of those kids are in your class, so we've got
 19 observed scores, and we say did they beat those
 20 predictions? And they did and there are other
 21 kids who don't have disabilities who got a
 22 separate expectation for them when that variable
 23 is included in the model and did they beat that
 24 expectation? They did. So no matter who you
 25 taught, all the kids in the class beat their

American Court Reporting
 850.421.0058

1 they performed higher on average relative to
 2 other kids in that school. Me, kids in my
 3 class, did poorly relative to other kids in the
 4 same school. So now I've got two deviations for
 5 a school effect.

6 I've got an expectation, I expect all kids
 7 to learn. Then I've got a school effect. All
 8 the kids in the school, how did they fare on
 9 average relative to that expectation? The
 10 school effect is still a deviation just like the
 11 teacher effect is, but now I've got a second
 12 deviation, now I've got teacher effects. How do
 13 teachers now deviate from that average school
 14 effect?

15 How do you do this? It's a statistical
 16 thing, all right. We essentially see that it's
 17 kind of like the way I described it.
 18 Essentially what we get, and again, it's a
 19 little bit more than just an average, but
 20 essentially what we get are the residuals for
 21 all kids in a school. That's the school effect.
 22 And for the teacher effect, again, it's the
 23 residuals for the kids in a class and we see how
 24 far they deviate from that school effect.
 25 That's what a definition of a school effect is.

American Court Reporting
 850.421.0058

1 expectations. Now we've got those residuals and
 2 we'll average those together, say, and they did
 3 better than expected.

4 So where we were going with this is to
 5 these slides and asking the question should the
 6 value-added model include both school and
 7 teacher effects? Part of the reason that this
 8 is interesting to look at is because when you
 9 look at this here we see that teachers appear to
 10 be very different from each other. There are
 11 some teachers who would appear to have high
 12 value-added and some teachers who appear to have
 13 very low value-added. There's a big spread
 14 between the teachers. Okay?

15 But when we include a school effect what
 16 happens is maybe those teachers appear to look
 17 good as a function of something else that's
 18 happening systematically in the school. So when
 19 you include the school effect the teacher
 20 doesn't appear to be quite as good -- almost as
 21 good but not quite as good because some of the
 22 things that were being pushed out into the
 23 teacher effect are now accounted for by the
 24 school. So it's going to change and that's what
 25 we see in these graphics here. We see that when

American Court Reporting
 850.421.0058

1 schools are not included teachers appear to be
2 very different, but when schools are included
3 they seem to account for some total proportion
4 of the variance. It's not tiny, it's some
5 portion. And teacher effects are smaller than
6 when you only have teacher effects.

7 John, you had a question?

8 MR. LeTELLIER: Yeah, the counter would be
9 true as well if you had a negative school
10 effect, then that would change the teacher
11 effect as well?

12 DR. DORAN: It could.

13 MR. LeTELLIER: Okay. I'm not saying
14 that's going to happen, but that could happen?

15 DR. DORAN: It could happen.

16 DR. COHEN: Yes, it does happen. Some
17 schools are better than others -- not better.
18 Some schools show a higher student effect, some
19 schools show lower student effects. Can I say
20 something else?

21 DR. DORAN: Yeah, go ahead.

22 DR. COHEN: This is pure policy decision.
23 We're presenting the statistical data and the
24 data tell you go from policy decision to make.

25 This line here shows you that student
American Court Reporting
850.421.0058

1 growth varies somewhat by school, not as much as
2 it does by teacher, but it varies by school.
3 Meaning that if you take it out of the model,
4 any gross that's common within the school will
5 be attributed 100% to the teachers, and that's
6 fine if that's the policy decision you want to
7 make. Model 1A and Model 1 make that -- it's a
8 policy decision. We've decided that the only
9 thing that matters at the school in terms of
10 student growth is the teacher effects, and so
11 any school level effect that may exist is really
12 just the net effect, the aggregate effect of
13 having all good teachers.

14 So if you want this model, the policy
15 decision you want to make would basically be
16 saying that yes, it's true that more effective
17 teachers are clustered in some schools. So
18 what? They're still great teachers. These less
19 effective teachers are clustered in other
20 schools and, so what? They're just less
21 effective teachers. These models -- they're
22 telling you that there is correlation in teacher
23 effects within schools. Some schools have
24 higher student growth, some students have lower
25 average student growth. Your policy choice is

American Court Reporting
850.421.0058

1 whether to attribute it all to teachers, whether
2 to attribute none of it to teachers, or whether
3 to attribute part of it to teachers.

4 MS. GINN: Question. Then really does it
5 show that without putting the school in teacher
6 impact has allowed fluff?

7 DR. COHEN: That might be a technical term
8 there, right?

9 MS. GINN: You know what I'm saying.

10 DR. COHEN: I can't make the decision for
11 you. This is not a statistical decision.

12 MS. GINN: I'm just asking you, based on
13 what you have there because of the school
14 impact, we'll keep the difference, okay.

15 DR. COHEN: All I'm --

16 MS. GINN: We don't want to touch that,
17 fine. Here's my second question.

18 We keep using the school effect positively,
19 but the school effect can also be negative.

20 DR. COHEN: By definition the models are
21 estimated, half the schools are better than
22 average, half the schools are worse than
23 average. So it's positive or negative. It
24 really has to do with what you believe affects
25 -- if you believe that any common influence in a
American Court Reporting
850.421.0058

1 school is 100% student teachers and you're ready
2 to stand by that, choose one of these models or
3 use one of these models that has the school
4 effect back into the teacher effect.

5 MS. HALL: How are the schools being rated?
6 Is it the same thing as the teacher or is school
7 grades or how are we determining -- how are you
8 coming up with that graph?

9 DR. COHEN: Oh, the school effects are
10 estimated the same way. I am going to speak
11 loosely, this is not mathematically how it works
12 exactly, but it is this general idea. It gives
13 us a -- if I were to take these estimates that
14 are only teacher effects and find the average
15 effects within school, I would then subtract it
16 off the teacher effect, put it down here and
17 make it the school effect. So it's kind of --
18 if you leave school out of the model, it's kind
19 of the average teacher effect.

20 MR. MURPHY: If you don't remove the school
21 effect, you have teachers that may or may not be
22 earning that additional portion.

23 DR. COHEN: Yes, it's important that you
24 recognize that as a policy and substantive
25 decision. If nothing statistical models can

American Court Reporting
850.421.0058

1 tell you, it's not -- sure, Harold or I would be
 2 happy to tell you what the right answer is, but
 3 not statisticians and not giving you an answer.
 4 This really has to do with what you believe
 5 matters in an education system and how you think
 6 accountability ought to be distributed between
 7 leadership and the teachers.

8 DR. DORAN: This decision would be really
 9 easy. Jon's exactly right; this is a policy
 10 decision. Remember, we looked at precision
 11 before. Everything is policy decision, slash,
 12 statistical decision. But here if we did this
 13 and we said that schools didn't account for
 14 anything at all, your decision would be
 15 relatively easy. There's no need to account for
 16 the school effects because they don't account
 17 for any other variance and scores. But here we
 18 don't see that to be the case. We see that
 19 schools seem to have differences between them
 20 and that that seems to affect the differences in
 21 the teacher effects, right? So there is
 22 something that matters systematically between
 23 schools.

24 Yes?

25 MS. FEILD: Let me make sure I understand.
 American Court Reporting
 850.421.0058

1 That's a classification rule and now how those
 2 effects relate to the other grades, I have no
 3 idea and I don't want to speculate on it.
 4 Whether it's plausible that they could look good
 5 under one model and not look good under another
 6 maybe, but there's no basis for me to make that
 7 decision. That's pure speculation.

8 But the issue about classification is
 9 something we'll talk about later today; and that
 10 is do we have to use the average? No, you can
 11 use above the average to create more stringency
 12 and go up by five, one, you know, you can be one
 13 standard error above that, you can be two
 14 standard errors, one-and-a-half standard errors.
 15 We can come up with different classification
 16 rules and we're going to show you the
 17 consequences of what happens when you choose the
 18 classification rules at the end of the day.

19 MS. FEILD: I think you misinterpret --

20 DR. DORAN: But how we score grades,
 21 there's no way to --

22 MS. FEILD: I understand. I think the
 23 misinterpretation is when we talk about a school
 24 effect, at least in the original conversation
 25 before lunch, I was thinking we were looking at
 American Court Reporting
 850.421.0058

1 The school effects here is really the same as
 2 the teacher, but it's kind of aggregated for the
 3 school?

4 DR. DORAN: All kids, yes.

5 MS. FEILD: So what happens is, and I think
 6 someone may have asked this question, you may
 7 have a school who was rated under our
 8 accountability system as an 'A' school, right,
 9 based on points? And it could have been
 10 proficiency, gains, whatever it happens to be.
 11 Now you have this model where the teachers
 12 performed okay but not great, but based on the
 13 nature of the statistical model where half are
 14 going to be below the average and the other
 15 half, this school who is an 'A' may have every
 16 teacher get a negative school effect on their
 17 individual evaluation; is that correct?

18 DR. DORAN: No, it depends. We're going to
 19 get to the end of the day -- now, if we use the
 20 average as a classification rule, you say --
 21 classification is something that we're going to
 22 talk about at the end of the day today. Suppose
 23 we say that any teacher above the average if
 24 it's called a high value-added, any teacher with
 25 a below-the-average is a low value-added.

American Court Reporting
 850.421.0058

1 other variables that had to do with schools
 2 separate from value-added, school grades,
 3 accountability, but in --

4 DR. DORAN: No.

5 MS. FEILD: But in essence we're talking
 6 about the same thing. Okay. I just want to
 7 make that clear.

8 DR. DORAN: That's a good clarification,
 9 all right. So essentially, another way to think
 10 about this it that we've got -- this is all
 11 value-added, all the same metric, and this is
 12 everything that we're looking at. So
 13 essentially we're going to have some expectation
 14 and now I've got -- I'm just drawing -- it's too
 15 low. I'm a school who on average beat the
 16 expectation and now I'm going to have teachers
 17 in that school, some below the school average
 18 and some above that average by some amount.
 19 It's all based on the same data, even the same
 20 model. We don't have other variables like
 21 school grades and so forth.

22 Now what's interesting here is that we see
 23 a couple of things, schools appear to account
 24 for some non-trivial proportion of the total,
 25 variation in scores. Non-trivial is not

American Court Reporting
 850.421.0058

1 determined statistically. We've just shown you
 2 the graphs and just based on the visual displays
 3 it seems to be a large proportion of the total
 4 variance of scores. Teachers are less different
 5 from each other when including school effects.
 6 What does that mean?

7 When we don't include the school effect, we
 8 have this much variability between teachers.
 9 There's a lot of variability. Teachers are very
 10 different from each other, but when you include
 11 the school effects part of what made that
 12 teacher look really, really good before gets
 13 soaked up by the school effect; or part of what
 14 made that teacher look really, really, really
 15 low value-added before gets soaked up by the
 16 school effect. The teachers appear to be less
 17 different from each other under that model.
 18 Yes?

19 MS. FRAKES: So when the school effect is
 20 smaller, the teacher effect could be greater.
 21 So when you're talking about --

22 DR. DORAN: It would be greater by
 23 definition, so as this gets smaller this will
 24 get bigger.

25 MS. FRAKES: So when you're talking about
 American Court Reporting
 850.421.0058

1 moving your best teachers into your lowest
 2 performing schools, I mean, when you're taking
 3 into account as a school this is the school
 4 effect that the students are not performing, and
 5 then that teacher goes there and she does what
 6 she does so well; that's really going to show as
 7 opposed to that school effect, correct?

8 DR. DORAN: That's correct. The teacher
 9 would appear to be very high performing within
 10 that school.

11 MS. FRAKES: Within that school because the
 12 school effect is lower. I mean, it can work
 13 both ways.

14 DR. DORAN: Correct, if you've got a bad
 15 teacher going into a good school that teacher
 16 would have a lower value-added effect within
 17 that school than they would in some other
 18 situation potentially.

19 MR. LeTELLIER: So could this have an
 20 unintended consequence of a performing arts
 21 school, which typically we have data that shows
 22 that those are higher performing schools, or
 23 some sort of a magnet school where, you know, an
 24 IB school or something where the kids are very
 25 well performing. Will that make it harder for a

American Court Reporting
 850.421.0058

1 good teacher to have a good value-added model
 2 score because those kids are already performing
 3 so high, the school is performing so high, the
 4 teacher goes in and the kids are doing well.

5 DR. DORAN: In some respects, yes. In some
 6 respects that is almost what you would expect.

7 If those kids are doing well because of things
 8 the school is doing then you want to
 9 differentiate that from the teacher effects,
 10 right? But if you ignore the school effects in
 11 that particular case then everything that's
 12 happening systematically in that school gets
 13 pushed into the teacher effect, and those
 14 teachers may appear to be high value-added, not
 15 necessarily because of what they're doing but
 16 because of other initiatives in that school.
 17 But now you account for the other things
 18 happening in that school, and the teacher
 19 effects could -- in fact, they will be smaller
 20 as we see here. The teacher now has to
 21 demonstrate that they're doing things above and
 22 beyond what's normally happening in that school
 23 to have a higher value-added effect relative to
 24 other teachers in that same school.

25 MS. BROWN: I think what is discomfort and
 American Court Reporting
 850.421.0058

1 where some people are settled is how then when
 2 you look at the full distribution is there still
 3 equal opportunity to achieve a, quote, if 50 is
 4 high -- just pick a number, doesn't matter --
 5 can you -- do you have equal opportunity to
 6 achieve a value-added score of 50 at a school
 7 with a more positive school effect as you would
 8 at a school with a more negative school effect
 9 because if you are the same teacher in both
 10 locations, implicitly you should have the equal
 11 opportunity to achieve the same score.

12 DR. DORAN: Like if you're a good teacher
 13 -- let me just pull away from the number 50 for
 14 just a moment. If you're a good teacher and
 15 you're doing things above and beyond what other
 16 teachers in your school are doing, whether
 17 you're in a good school or bad school, you have
 18 equal opportunity to appear as a high
 19 value-added teacher in either instance.
 20 Remember, what you have to do here is those
 21 teachers have to do more than what other
 22 teachers are typically doing in that same
 23 school.

24 MS. BROWN: I understand.

25 DR. DORAN: So that gives them -- so long
 American Court Reporting
 850.421.0058

1 as they're doing those things, they have equal
2 opportunity.

3 DR. COHEN: Can I break in here?

4 DR. DORAN: Yes.

5 DR. COHEN: It's a little more complicated
6 than an extra decision that you have to make.
7 I'll put a little example up here. Let's say
8 we're going to talk about one school. That
9 school has four teachers, and the math is not
10 exactly -- this math does not come out exactly
11 the same, but it comes out really close in this
12 illustration.

13 So the school effect, estimated according
14 to let's say Model 3A -- school effect is 10,
15 teacher effect is 20 minus 20, 10 and minus 10;
16 so they're equal. They have an average of zero
17 around the school mean. If we were to ignore
18 the school effect and just estimate it for the
19 teachers and say everything is attributable to
20 the teacher, those scores under Model 1A would
21 be 30 minus 10, 20, and 0, right. So this is
22 attributing all effects to the teacher, so we
23 just assume that any school effects are just the
24 result of an aggregate teacher effect.

25 If we take 20 minus 20, 10 and minus 10,
American Court Reporting
850.421.0058

1 teachers potentially within the district or
2 within wherever have lower scores when compared
3 to each other?

4 DR. COHEN: You're unwinding it. You're
5 making an assumption about what you're going to
6 do with the school effect. If you ignore the
7 school effect, you wind up with this. If you
8 have Model 1 or 1A, you wind up attributing
9 anything that might be the school effect to
10 this.

11 MS. BROWN: I understand that.

12 DR. COHEN: Right, and that's the situation
13 in which if there really is an independent
14 effect of the school that is not due to the
15 teachers, then the schools happening to be in
16 the better schools will be advantaged and the
17 teachers who happen to be in the worst schools
18 will be disadvantaged.

19 MS. BROWN: Correct.

20 DR. COHEN: One might argue, and I'm not
21 making this argument necessarily, but just to
22 point out, somebody might say, yeah, the
23 principal matters but he does all of his work --
24 he matters through the teachers who are
25 interacting with the kids day to day. So the
American Court Reporting
850.421.0058

1 that's attributing 100% of the school effect, of
2 whatever is common in the school to the school.
3 So great principal or a bad principal, it's all
4 on the principals. But what we did down here is
5 we say, well, we decide we're going to split
6 this half and half. We're going to say half of
7 it is due to the fact of the school and half of
8 it is due to the teachers themselves. Well,
9 then we wind up 20 minus 15, 15 and minus 5.

10 The thing is if we estimate it with the
11 school effect, this decision is explicit. Do I
12 add these things together and get that? Do I
13 partition it partially and do that or do I
14 attribute it 100% to the school?

15 MS. BROWN: However, if you look at that
16 differently and you use your same numbers, I
17 think the question around the table is if school
18 A has a school effect of 10 and school B has a
19 school effect of 5 yet the same teacher effect
20 of 20 in each of those schools -- or maybe I'm
21 backwards, but the point is that is if we went
22 that way, is it possible that in the long run
23 teachers at the school effect 10 have the
24 potential to have the higher scores? And if
25 there was a lower school effect, would those

American Court Reporting
850.421.0058

1 principal's influence is through teachers.
2 Therefore, it really is a teacher effect.
3 Someone could argue that this is average teacher
4 effect and that's how you should do it.

5 The point being that there is a policy
6 decision to be made. The data won't give you
7 any information to help you make this policy
8 decision; it's how much of what's common within
9 school gets attributed to teachers and how much
10 gets attributed elsewhere.

11 DR. DORAN: Let me try one other angle.
12 Suppose you have two schools -- let me try this
13 another way. We're going to try this.

14 MR. MURPHY: Teachers are being compared in
15 the same school, not across the district, so
16 it's all relative at the school level, not at
17 the district level.

18 DR. DORAN: That's correct.

19 DR. COHEN: But only if you attribute it --
20 you can add the school or a portion of the
21 school effect back in once you have the estimate
22 added in, then you can attribute it however you
23 like. So it doesn't have to be relevant.
24 That's the policy decision.

25 DR. DORAN: Here's another thing. I think
American Court Reporting
850.421.0058

1 this is part of what you're getting at. Suppose
 2 I had two schools or two teachers and suppose
 3 some teacher had a -- suppose at the school A
 4 it's typical for the students to score 20 points
 5 above the state average. Let's just use that
 6 term, it's typical for kids in school A to score
 7 20 points above the average. Now suppose that
 8 that teacher, a teacher within that school has
 9 kids who only score 20 points above the average.
 10 That teacher didn't do anything above and beyond
 11 what's typical for students in that school,
 12 right?

13 Now let's take another situation, another
 14 teacher, who's in a different school. In that
 15 school, let's just say it's typical for teachers
 16 to score 10 points below the average. That's
 17 typical for that school. But that teacher, a
 18 teacher in that school scores 20 points above
 19 the average, the same as the other teacher,
 20 okay, in the different school. That teacher
 21 would appear to have a higher value added
 22 because that teacher is doing something that's
 23 very different than what's typical in that
 24 school. Do you see? So while two teachers did
 25 the same thing, this teacher over here is doing

American Court Reporting
 850.421.0058

1 what's typically expected or typically observed
 2 for kids in that school. There's nothing
 3 exceptional happening there, whereas this other
 4 teacher went away above and beyond what's
 5 typically observed for kids in that class.

6 Now while two teachers have the same --
 7 both have kids that performed at the same level
 8 given that they're in different schools this
 9 teacher did what's normally observed -- or did
 10 what's normally observed in the school, so it's
 11 not regarded as being high value-added because
 12 that's what's typical for that school. In that
 13 instance you could have teachers who do the same
 14 thing with their kids, but this teacher over
 15 here is doing something that -- that's what you
 16 observe with any other kid in school. So what
 17 makes that teacher particularly high value-added
 18 when the school effect is included? When the
 19 school effect is not included, both of those
 20 teachers would appear to be exactly the same.
 21 They both beat the average by 20, right? But
 22 unless you know something more about the context
 23 of the school that they're in, well, this goes
 24 to -- that's what you typically observe because
 25 there's other things that the school does to get

American Court Reporting
 850.421.0058

1 the kids there.

2 MR. MOREHOUSE: What happens to the
 3 students who perform below the average?

4 DR. DORAN: Again, a teacher has a group of
 5 kids who perform below the average of the
 6 school?

7 MR. MOREHOUSE: Yes.

8 DR. DORAN: They would not appear to be
 9 high value-added relative to that school. They
 10 don't do -- that's what we regard as a low
 11 value-added effect because --

12 MS. BROWN: But don't confuse that with a
 13 teacher that has a group of level 1 students.
 14 Those are two different things.

15 DR. DORAN: That's exactly right.

16 MS. BROWN: Because you can have all
 17 students that score at level 4 and they all
 18 don't gain, and you would be considered
 19 (inaudible). But just because you have maybe
 20 lower performing students coming in, that
 21 wouldn't necessarily be the case.

22 DR. DORAN: Right, right, because of
 23 intake. The kids you intake are not to be
 24 confused with the potential for a value-added
 25 effect to be higher.

American Court Reporting
 850.421.0058

1 MS. KEARSCHNER: I want to go back to
 2 something Jon said earlier about a high
 3 achieving or IB school, for example, where if
 4 the school effect -- this is a high performing
 5 school and you have all level 5 students. How
 6 are you going to show gains, student growth in
 7 those situations?

8 DR. DORAN: Well, remember, even if they
 9 come in really high, if we go back to the
 10 scatter plot that Jon showed you earlier today,
 11 the level 5 kids are the ones that are up here.
 12 This is the prior score, this is the current
 13 score, let's just say, right? We have that
 14 scatter plot that would look like this, but even
 15 those kids who are very high performing. Even
 16 when they come in, it's very high performing.
 17 They have an expectation and there are still
 18 students who beat that expectation. That is how
 19 we determine growth for those kids.

20 MS. KEARSCHNER: But with the school effect
 21 measured, I'm trying to -- I'm still not
 22 grasping the school effect in those outlined
 23 situations where you have, say, a school that's
 24 all ESE population versus a school that's all
 25 gifted or IB or something along those lines.

American Court Reporting
 850.421.0058

1 But in those situations does that school effect
2 narrow? I'm trying to understand when you get
3 to that end are you bumping up against something
4 where it has less effect?

5 DR. COHEN: Point of diminishing returns.

6 But that's my point; you get to a ceiling.

7 MS. KEARSCHNER: A ceiling.

8 MR. MURPHY: There might be a smaller range
9 of difference between a group of teachers, but
10 the percentages we would use would still point
11 out the teachers that were high performers or
12 the ones with the bigger value add. The range
13 is going to be smaller is what you're saying,
14 right, because of the school --

15 DR. DORAN: I see where you're going.
16 There are some potential ceiling effects. One
17 of the graphs that Jon was showing earlier there
18 is the highest obtainable scale score and
19 there's the lowest obtainable scale score.
20 There are some kids who score so high that their
21 score gets truncated to the top; they just can't
22 score any higher. How large are the ceiling
23 effects when we went through this; do you
24 remember?

25 DR. COHEN: I don't remember and the
American Court Reporting
850.421.0058

1 effect.

2 MS. KEARSCHNER: That's my question really.
3 That's what I think I was trying to get at. Is
4 there -- could there be any correlation with the
5 school effect in those kinds of populations?

6 DR. DORAN: Let's take an example and
7 answer the question. Could there be? Suppose
8 we have a very high performing school and
9 suppose we have a school where there are a lot
10 of students who come in with very high scores in
11 the intake, right? Let's just say all of the
12 kids are clustered in this particular area.
13 Now, can that school still show a positive
14 effect? Well, one of the things that we saw was
15 there is pretty significant scatter around that
16 expectation line even at the high end of the
17 score distribution, right? It resulted that
18 there was virtually no scatter around that
19 point, we would observe that students for
20 whatever reason weren't deviating much from the
21 conditional expectations of the high or low end
22 of the distribution. It's plausible that being
23 at the end of the extremes, very low end of the
24 distribution, could limit your ability to be
25 classified as low value-added, or being at the
American Court Reporting
850.421.0058

1 ceiling effects could actually be more subtle
2 because your measurement error gets bigger at
3 the ends of the scale. So there are ceiling
4 effects. There is a small negative correlation
5 -- we'll show you this later -- between the
6 expected scores and -- yeah, we did it by -- but
7 a small negative correlation between the
8 expected growth and the starting point, right?

9 DR. DORAN: Yeah.

10 DR. COHEN: Higher scoring kids have a
11 lower expectation of growth; lower scoring kids
12 have a higher expectation of growth. The model
13 with two lags mitigate that a little bit, you
14 know, with two years of prior achievement, but
15 it's still there. It doesn't go away. We're
16 going to get into that as we start to do this.

17 DR. DORAN: It's a good question because,
18 yes, there are ceiling effects and floor
19 effects? They exist. How large are they?

20 We'll show you some of the things that suggest
21 there may be some issues, but that will be true
22 with any particular measurement.

23 DR. COHEN: Actually, could we -- it's an
24 important point and a good point, but it's not
25 directly related to the school effect/no school

American Court Reporting
850.421.0058

1 very high end of the distribution if you have a
2 cluster of kids who could be there, it's
3 plausible. The degree to which it happens, I
4 just don't know because we don't subset the
5 schools when that happens and see if there is a
6 particular consequence. But to the degree that
7 would play out in the real world, I'm not sure
8 is a huge concern.

9 DR. COHEN: This really is a big and
10 important issue in the accountability system.
11 You need to think about it. Unfortunately, it's
12 not a technical statistical issue. If it was,
13 you could ask Harold what the right answer was
14 and he'd tell you. But statistically when you
15 estimate the school effect, and again I'm
16 speaking loosely but it's pretty much true; when
17 you estimate the school effect the teacher
18 effects are going to have the average of zero in
19 each school. So that means that all schools
20 would have some positive teacher effects, some
21 negative teacher effects. The school effect
22 will be either positive or negative. It's
23 around that school.

24 Unless you believe that teachers are
25 distributed evenly across schools, every school

American Court Reporting
850.421.0058

1 has an equal mix of better and worse teachers,
 2 high value-added and low value-added teachers,
 3 you probably wouldn't want to attribute
 4 everything common in the school to something
 5 other than the average teacher effect, right?
 6 So on the one hand you want some of that to
 7 count for the teachers because you don't believe
 8 that teachers are equally distributed across all
 9 schools.

10 On the other hand, to attribute it all to
 11 the teacher, you may want to do that. To
 12 attribute 100% to the teacher, then you would
 13 say things like school leadership doesn't
 14 matter. If you've got great teachers in your
 15 school or you say a principal has this effect on
 16 student learning through his effect on the
 17 teachers; he or she makes the teachers effective
 18 teachers, and that's effective school
 19 leadership. So it's really a policy decision.

20 You can estimate the model with the school
 21 effects and then add the school effects and
 22 teacher effects together like I did on the board
 23 here and wind up with something very much like
 24 this. In that case, you'd be making the
 25 decision that I'm going to attribute everything

American Court Reporting
 850.421.0058

1 common in the school to the average of the
 2 teacher-effects, and that's fine. If that's how
 3 you believe it works and that's how you want to
 4 attribute it, that's fine. That's how you do
 5 it. If you agree now that you want to do that,
 6 you're probably better off with one of these
 7 models because that's done automatically and you
 8 don't even have to mess with it. But if you
 9 think that whatever is common in the school
 10 should be shifted and shared a little bit
 11 between school leadership or whoever and
 12 teachers at the school.

13 You estimate one of these models, but you
 14 think real hard about whether you just take this
 15 teacher effect or whether you add in all or part
 16 of the school effect for each teacher as well.

17 MS. FEILD: Is the school effect affected
 18 by the differentiation that we had earlier on
 19 the growth where a child who's sitting in two
 20 reading courses has a higher expectation for
 21 growth than one who is not? And the question
 22 would be on a low performing school where let's
 23 say 90% of the kids are being double-dipped
 24 versus not, is that going to negatively affect
 25 the school effect because there's a higher

American Court Reporting
 850.421.0058

1 growth expectation?

2 DR. COHEN: I understand the logic behind
 3 that. The growth expectation doesn't go up very
 4 much with additional courses and that's good to
 5 know. We didn't look at that for the schools.
 6 We did look at it for teachers, and teachers of
 7 lower performing students are somewhat more
 8 likely to have higher value-added scores.

9 MR. MOREHOUSE: But what if the school has
 10 a tracking system where some students are
 11 tracked in the regular courses, some are into
 12 honors courses, some are into gifted classes.
 13 Does this model take into consideration those
 14 differences?

15 DR. COHEN: At the margins I think it does.
 16 The teachers teaching the -- typically on
 17 average we found that even with the best of our
 18 models the teachers teaching the lowest
 19 performing students have slightly higher average
 20 value-added scores than the teachers teaching
 21 higher performing students. So a teacher who
 22 got the lower tract track courses would be at a
 23 bit of an advantage. Maybe we want that. Maybe
 24 that will attract the smartest teachers then
 25 because part of what happens with the scale,

American Court Reporting
 850.421.0058

1 maybe a different effect. Gina?

2 MS. TOVINE: You've kind of already
 3 answered that, but one of the things I was going
 4 to ask, since you've run the data for every one
 5 of those models and you have all that
 6 information, is it possible for us to see at
 7 some point like the simulation, like see teacher
 8 A and teacher B and how it would actually pan
 9 out for that individual teacher for each one of
 10 these. But you just kind of indicated how that
 11 would actually be translated over to the
 12 value-added model.

13 DR. DORAN: We had a slide that I think we
 14 took out and perhaps we can recreate the slide
 15 and put it back in. I think the question you're
 16 asking is, are there -- when you have the school
 17 effects and the teacher effects, do thinks
 18 change for the teachers' classification
 19 relatively large? The answer is no. One of the
 20 plots that I had previously was it showed the
 21 relationship between teachers under every single
 22 one of the models, and what you see is virtually
 23 a perfect correlation between teacher effects
 24 and models 1 and any of the models 3. What that
 25 suggests is that however teachers are classified

American Court Reporting
 850.421.0058

1 under this particular model, the teacher only
2 model, they remain similarly classified under
3 this one.

4 If they have high value-added effects under
5 one model, they would also have high value-added
6 effects under the other model. We could
7 recreate that and show that to you so you could
8 see there's virtually a very strong linear
9 relationship between the two.

10 One of the things that might have been a
11 concern is what if the correlation was zero or
12 even negative? Would it contain the teacher
13 effect under this model and look at its
14 relationship to the teacher effects under this
15 model, and suppose the correlation became
16 negative or zero, meaning they flip-flopped or
17 there's no relationship? That doesn't happen.
18 We know and we can show you that the correlation
19 between the teacher effects under all of these
20 models is very close to one.

21 Yes?

22 MS. BROWN: I just want to throw something
23 out for thought, politically correct or not.

24 But sometimes -- you know, we started our last
25 discussion when we were here face to face

American Court Reporting
850.421.0058

1 stakeholder committee involved in this process
2 because what Harold is expressing now is
3 opinion. He believes this to be -- he believes
4 this to be true, the -- but the stakeholder
5 committee here because it's your beliefs about
6 whether those things are affecting the teacher
7 effect. It's your beliefs about those things
8 that should be driving the day and driving the
9 decision.

10 On the other side, if you take the school
11 effect and attribute it entirely to the school
12 then the average teacher effect within each
13 school is going to be approximately average,
14 right? So there is a whole continuum of choices
15 you could make. That choice depends on what you
16 can believe; you're the stakeholder. You guys
17 represent the folks who are going to be affected
18 by this, whose children are going to be affected
19 by this, whose staff are going to be affected by
20 this. You need to figure out what you believe
21 affects student learning in the school.

22 MS. FEILD: But speaking from the political
23 perspective, if you're selling this model to
24 teachers and you're saying to teachers that it's
25 not just the math or reading teacher that

American Court Reporting
850.421.0058

1 talking about wishing we could incorporate
2 things that we don't measure, like parent
3 involvement, homework completion, things like
4 that that we have no data for. When we look at
5 something like a school effect, even though the
6 residuals are calculated based on what's in the
7 model, we're still getting an aggregate of that
8 school. So in some ways we're getting the
9 hidden variable of that which we wanted to
10 measure but we can't and we might want to think
11 about that.

12 DR. DORAN: We're going to hire you because
13 that's exactly the right way to phrase it.

14 MS. BROWN: Thank you.

15 DR. DORAN: There are things that are
16 unknown in --

17 MS. BROWN: I have a very nice fee.

18 DR. DORAN: That's exactly why. There are
19 things in that school, parents who do extra
20 thinks for their kids or who don't do as much
21 for their kids, or certain policies or practices
22 or neighborhood effects, or peer effects or
23 something --

24 DR. COHEN: There may be, but then this is
25 really -- there's a reason that there's a

American Court Reporting
850.421.0058

1 counts, but everything else that everybody else
2 is doing is contributing to the achievement of
3 the student, then I think you have a better
4 chance of having a school-wide attempt to work
5 as a team opposed to -- I mean, it's a
6 perception.

7 DR. COHEN: A lot of companies decide that
8 they'll compensate their executives partly on
9 overall company performance and partly on the
10 performance of their unit; so if you estimate
11 school effects and your compensation system is
12 compensating teachers partly on overall school
13 performance and partly on their -- ability --
14 that's allowed under the current legislation
15 then yes, you've estimated the school effects
16 and you've made some decisions on the back end
17 and then --

18 MS. FEILD: Wouldn't you say that when we
19 continue to add additional assets to this model,
20 when we add a APIBAICE (ph), all of that, then
21 by having that school effect it allows you to
22 combine all these pieces, and so the effect of
23 all of these different assessments could
24 contribute to a student's or teacher's
25 performance. Is that going to happen you think?

American Court Reporting
850.421.0058

1 No.

2 DR. COHEN: I don't know enough about all
3 the things that are going on.

4 MS. KEARSCHNER: It's actually required by
5 law that there's pieces from parents, from
6 students. There's all these other things that
7 have to go into the evaluation. That might be
8 the other 50%, but it could certainly be
9 incorporated as part of this school effect. I
10 mean, that's another --

11 MS. FEILD: I was thinking when we add
12 staying to the achievement side we eventually
13 should be looking at models for, let's say,
14 advance placement scores or international
15 baccalaureate, so if those get tied into an
16 overall school effect then again you're sort of
17 tying in all of the achievement results.

18 MS. BROWN: Technically, if you tie all
19 those different assessments together at a school
20 level then it's all going to play into the
21 school effects.

22 MS. FEILD: The teacher may be teaching
23 English in 10th grade, AP English in 10th grade,
24 and that student is taking the FCAT 10th grade
25 reading test and the AP English test, right?

American Court Reporting
850.421.0058

1 And in theory at some point I would assume at
2 some point that teacher may be measured on both
3 those assessments, both the FCAT and the
4 advanced placement, and eventually there will be
5 more than that.

6 DR. DORAN: I think this is an interesting
7 conversation. Now, remember, the teacher
8 effects here are essentially the unobserved
9 thing that is happening after we control for all
10 the stuff that we think is true, you know, the
11 difference between kids, there's some deviation
12 from the expectation, and there's a question
13 mark about why that happens. In the model we
14 assume that's because of the teacher and the
15 school effects is kind of the same thing.
16 There's un-observed random variations that
17 happen at the school level that may be due to
18 other things, and that gets called a school
19 effect, and then teachers have to deviate from
20 that in order to have high or low value-added.
21 Yes?

22 MR. TOMEI: You talked about the
23 consistency of the models when looked at from
24 individual teacher outcomes, and that's using
25 the data you created so you know that you're

American Court Reporting
850.421.0058

1 dealing, I assume, or is that dealing with --

2 DR. DORAN: Real world data.

3 MR. TOMEI: Okay. Here's my question.

4 There's been a fair amount of research done
5 historically looking at different types of
6 student growth models, including value-added
7 models. The work that was done previously in
8 Florida among the things that were done was they
9 looked at how those models categorized teachers
10 into quartiles, which is interesting because
11 that's essentially what we're going to do under
12 the legislation now; and then they looked at the
13 stability of teacher ratings over a number of
14 years and found way more variance than what you
15 would logically expect to occur. At any point
16 in time, are we going to know how these models
17 evaluate real teachers from year to year over
18 time and the consistency there because I think
19 that's another important attribute that we need
20 to consider.

21 DR. DORAN: I think Jon and I were the
22 first people to write a paper on this about
23 eight or seven years ago on the volatility of
24 teacher effects that we observe over the time,
25 and the paper we called it *From Saint to Sinner*

American Court Reporting
850.421.0058

1 *Pattern*, we saw teachers that were sort of
2 bouncing around. That's a well known effect
3 observed in value-added models. When you
4 estimate teacher effects on a limited subset of
5 data, you're going to get an estimate and if you
6 estimate it again the following year you're
7 going to get a different estimate. There are
8 some teachers that will switch from low
9 quartiles to high quartiles, and part of our
10 classification that we're going to talk about
11 today in terms of how you take multiple teacher
12 effects and possibly use them, it may be --
13 we'll show you -- when you use one teacher
14 effect the probability of being missed by
15 (inaudible) is very big because we don't know.
16 There are swings.

17 By the term, mis-classified, what I mean is
18 if you're classified as a high value-added, the
19 probability that you're really low value-added
20 could be very high. But as we add additional
21 years of data, the probability of that
22 misclassification goes down. We're going to
23 actually show you data that shows exactly that
24 in terms of what we would anticipate, and that
25 is something that you should look at as you

American Court Reporting
850.421.0058

1 collect more data. We would expect more stable
2 estimates as you use more data.

3 * * * * *

4 (Whereupon, this concludes Day 1, Volume 1.
5 Volume 2 continues without interruption.)

6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

American Court Reporting
850.421.0058

<p>146:19, 147:6</p> <p>Analysis [1] - 1:17</p> <p>analyze [2] - 10:13, 13:7</p> <p>angle [1] - 177:11</p> <p>ANN [1] - 1:20</p> <p>Anna [3] - 4:20, 72:11, 121:25</p> <p>anomalous [1] - 103:8</p> <p>anomaly [4] - 80:16, 81:18, 81:21, 145:11</p> <p>answer [13] - 10:22, 87:22, 99:11, 109:9, 138:4, 148:25, 151:6, 151:9, 166:2, 166:3, 184:7, 185:13, 189:19</p> <p>answered [3] - 72:11, 85:15, 189:3</p> <p>answers [2] - 36:4, 96:11</p> <p>anticipate [1] - 197:24</p> <p>anticipation [1] - 86:13</p> <p>AP [2] - 194:23, 194:25</p> <p>APIBAICE [1] - 193:20</p> <p>apologize [2] - 87:13, 87:15</p> <p>appear [24] - 12:3, 103:15, 130:25, 150:5, 151:18, 152:6, 152:12, 152:23, 153:20, 153:22, 161:9, 161:11, 161:12, 161:16, 161:20, 162:1, 169:23, 170:16, 171:9, 172:14, 173:18, 178:21, 179:20, 180:8</p> <p>applicable [1] - 41:4</p> <p>applied [2] - 85:1, 85:9</p> <p>applies [1] - 158:12</p> <p>apply [3] - 82:22, 115:7, 148:7</p> <p>appreciate [3] - 2:23, 5:10, 8:5</p> <p>appropriate [3] - 63:12, 66:15, 85:22</p> <p>approves [1] - 81:13</p> <p>April [3] - 11:23, 38:18, 49:10</p> <p>area [4] - 133:20, 134:15, 138:10, 184:12</p> <p>areas [5] - 28:11, 36:19, 83:6, 119:14, 138:12</p> <p>argue [2] - 176:20, 177:3</p> <p>argument [2] - 156:13, 176:21</p> <p>articulate [1] - 65:3</p> <p>arts [6] - 48:8, 48:20, 65:15, 65:24, 66:3, 171:20</p> <p>aspects [1] - 127:6</p> <p>assessed [1] - 139:13</p> <p>assessment [4] - 4:21, 5:2, 85:2</p> <p>assessments [3] - 193:23, 194:19, 195:3</p> <p>assets [1] - 193:19</p> <p>assigned [2] - 55:8, 55:9</p> <p>assignment [2] - 80:13, 118:24</p> <p>assist [1] - 52:8</p> <p>assistance [2] - 80:1, 81:24</p> <p>assistant [2] - 4:9, 4:16</p> <p>associate [1] - 4:12</p> <p>associated [4] - 33:25, 34:8, 55:22, 87:7</p> <p>assume [5] - 156:1, 174:23, 195:1, 195:14, 196:1</p> <p>assumes [1] - 14:25</p> <p>assuming [1] - 79:5</p> <p>Assuming [1] - 54:19</p> <p>assumption [7] - 50:21, 53:11, 53:13, 70:11, 70:13, 142:13, 176:5</p> <p>assumptions [2] - 96:9, 147:5</p> <p>assured [1] - 100:18</p> <p>assuring [2] - 78:22, 79:4</p> <p>attempt [3] - 28:10, 71:24, 193:4</p> <p>attempting [1] - 143:13</p> <p>Attendance [1] - 108:12</p> <p>attendance [26] - 11:21, 19:16, 24:9, 24:12, 26:9, 30:14, 30:21, 39:17, 42:21, 42:23, 42:25, 43:2, 43:12, 48:25, 49:17, 49:18, 63:11, 63:14, 63:25, 65:1, 106:14, 107:14, 108:10, 108:22, 120:8</p> <p>attention [4] - 8:5, 51:7, 79:15, 79:17</p> <p>attract [1] - 188:24</p>	<p>attributable [2] - 60:20, 174:19</p> <p>attribute [16] - 68:22, 151:6, 151:10, 164:1, 164:2, 164:3, 175:14, 177:19, 177:22, 186:3, 186:10, 186:12, 186:25, 187:4, 192:11, 196:19</p> <p>attributed [8] - 54:25, 68:18, 69:4, 101:18, 151:14, 163:5, 177:9, 177:10</p> <p>attributes [1] - 138:1</p> <p>attributing [3] - 174:22, 175:1, 176:8</p> <p>attribution [9] - 58:8, 60:8, 61:13, 68:12, 69:12, 71:25, 72:6, 73:14, 84:14</p> <p>attributions [1] - 57:7</p> <p>audible [1] - 82:10</p> <p>audience [2] - 2:12, 2:14</p> <p>autism [1] - 135:9</p> <p>automatically [1] - 187:7</p> <p>availability [1] - 50:20</p> <p>available [7] - 51:5, 63:19, 64:5, 70:22, 124:6, 124:16, 124:17</p> <p>average [75] - 18:2, 18:3, 60:21, 60:24, 61:7, 90:15, 100:13, 106:9, 117:2, 117:13, 117:15, 118:2, 118:11, 119:17, 120:22, 120:25, 127:14, 138:22, 140:19, 143:3, 143:9, 143:14, 144:1, 144:3, 144:5, 145:3, 155:21, 156:8, 156:11, 156:16, 157:1, 157:6, 157:17, 158:21, 158:25, 159:1, 159:9, 159:13, 159:19, 160:4, 160:7, 161:2, 163:25, 164:22, 164:23, 165:14, 165:19, 167:14, 167:20, 167:23, 167:25, 168:10, 168:11, 169:15, 169:17, 169:18, 174:16, 177:3, 178:5, 178:7, 178:9, 178:16, 178:19, 179:21, 180:3, 180:5, 185:18, 186:5, 187:1, 188:17, 188:19, 192:12, 192:13</p> <p>aware [2] - 56:3, 84:22</p> <p>axis [6] - 17:3, 17:4, 138:22, 139:21, 139:23</p> <p>AYP [1] - 51:12</p>	<p>behaved [1] - 94:22</p> <p>behaves [4] - 105:8, 111:20, 112:15, 112:16</p> <p>behaving [3] - 103:9, 103:14, 109:13</p> <p>behavior [4] - 95:2, 95:8, 104:15, 104:21</p> <p>behaviors [1] - 120:11</p> <p>behind [5] - 48:12, 134:24, 145:5, 145:14, 188:2</p> <p>beliefs [2] - 192:5, 192:7</p> <p>believes [2] - 192:3</p> <p>bell [2] - 127:8, 127:9</p> <p>below [9] - 30:24, 90:23, 156:24, 167:14, 167:25, 169:17, 178:16, 180:3, 180:5</p> <p>below-the-average [1] - 167:25</p> <p>bends [1] - 146:15</p> <p>benefit [3] - 6:14, 62:10, 77:4</p> <p>bent [1] - 78:8</p> <p>best [15] - 17:9, 18:5, 51:4, 63:21, 64:5, 76:15, 77:12, 85:14, 134:4, 134:9, 147:12, 147:21, 148:6, 171:1, 188:17</p> <p>better [20] - 22:12, 22:19, 28:8, 34:10, 83:24, 88:22, 99:4, 99:5, 113:6, 122:14, 146:17, 161:3, 162:17, 164:21, 176:16, 186:1, 187:6, 193:3</p> <p>between [44] - 15:19, 18:25, 22:14, 22:16, 22:18, 24:23, 25:7, 37:4, 43:24, 44:15, 44:25, 45:25, 58:4, 59:15, 72:4, 74:8, 97:20, 103:23, 109:19, 110:7, 110:16, 111:3, 114:15, 121:2, 146:3, 148:23, 151:1, 154:20, 157:4, 161:14, 166:6, 166:19, 166:22, 170:8, 182:9, 183:5, 183:7, 187:11, 189:21, 189:23, 190:9, 190:19, 195:11</p> <p>beyond [5] - 28:6, 172:22, 173:15, 178:10, 179:4</p> <p>bias [4] - 39:7, 96:25, 97:1, 97:2</p> <p>biased [1] - 32:17</p> <p>big [36] - 6:14, 25:5, 55:19, 74:14, 93:23, 93:25, 101:24, 103:22, 106:5, 110:19, 114:21, 115:1, 115:2, 115:14, 118:10, 125:21, 127:24, 130:25, 131:1, 131:3, 139:15, 150:3, 152:7, 152:12, 152:19, 152:23, 153:10, 153:13, 153:20, 154:4, 154:7, 154:10, 161:13, 185:9, 197:15</p> <p>bigger [9] - 37:11, 100:15, 111:2, 111:6, 126:11, 130:14, 170:24, 182:12, 183:2</p> <p>biggest [2] - 110:11, 110:12</p> <p>Bill [2] - 11:18, 39:17</p> <p>bit [34] - 5:13, 16:22, 21:5, 28:22, 48:19, 51:17, 57:22, 58:14, 89:23, 91:8, 96:4, 101:15, 103:1, 103:16, 104:3, 107:8, 107:13, 114:14, 116:22, 121:4, 125:4, 134:21, 135:7, 135:12, 136:5, 136:9, 136:11, 156:7, 158:5, 159:19, 160:16, 183:13, 187:10, 188:23</p> <p>black [9] - 116:17, 116:24, 117:3, 117:17, 118:1, 118:4, 118:13, 119:10, 119:15</p> <p>blip [1] - 106:19</p> <p>block [3] - 64:10, 64:11, 70:3</p> <p>blue [1] - 17:5</p> <p>board [3] - 3:12, 3:25, 186:22</p> <p>Board [4] - 8:4, 48:16, 86:4, 86:9</p> <p>boiled [1] - 16:22</p> <p>books [2] - 16:24, 16:25</p> <p>bottom [1] - 101:14</p> <p>bouncing [1] - 197:2</p> <p>bound [1] - 122:1</p> <p>BOURN [2] - 3:8, 138:19</p> <p>Bourn [1] - 3:8</p> <p>box [6] - 116:12, 117:24, 118:10, 118:14, 119:3, 119:8</p>	<p>brainstorming [1] - 39:18</p> <p>break [4] - 2:17, 88:25, 155:1, 174:3</p> <p>breaking [1] - 101:9</p> <p>Brevard [1] - 5:8</p> <p>brick [1] - 89:14</p> <p>bricks [2] - 89:13, 89:16</p> <p>brief [1] - 11:6</p> <p>briefly [2] - 92:8, 96:18</p> <p>bring [3] - 8:7, 11:3, 13:8</p> <p>bringing [3] - 63:22, 67:1, 120:4</p> <p>brings [1] - 129:6</p> <p>broad [1] - 59:21</p> <p>brought [1] - 109:2</p> <p>Broward [2] - 3:14, 5:5</p> <p>BROWN [35] - 4:20, 32:19, 34:25, 35:6, 70:16, 70:24, 71:14, 71:17, 71:21, 73:6, 80:5, 100:22, 101:5, 112:1, 113:2, 140:1, 142:23, 143:21, 144:10, 144:15, 144:23, 145:1, 145:9, 145:19, 172:25, 173:24, 175:15, 176:11, 176:19, 180:12, 180:16, 190:22, 191:14, 191:17, 194:18</p> <p>Brown [1] - 4:20</p> <p>build [1] - 67:20</p> <p>Building [1] - 1:8</p> <p>built [1] - 10:12</p> <p>bumping [1] - 182:3</p> <p>bunch [3] - 62:8, 130:13, 134:8</p> <p>business [18] - 3:25, 7:16, 8:17, 9:9, 11:16, 12:13, 21:6, 22:25, 64:22, 65:7, 65:10, 76:1, 76:4, 80:10, 80:14, 84:10, 84:16, 147:15</p>
C			
			<p>calculate [1] - 61:7</p> <p>calculated [3] - 44:23, 59:20, 191:6</p> <p>calculation [3] - 44:4, 63:3, 143:7</p> <p>calculations [1] - 79:19</p> <p>CAMPUTARO [1] - 4:6</p> <p>Computaro [1] - 4:6</p> <p>cannot [3] - 32:12, 86:12, 94:11</p> <p>capacity [1] - 50:22</p> <p>capture [12] - 43:9, 49:7, 49:13, 52:5, 62:2, 62:3, 63:23, 65:6, 78:15, 99:24, 126:14, 147:22</p> <p>captured [1] - 46:14</p> <p>capturing [4] - 49:16, 63:13, 73:9, 78:11</p> <p>care [11] - 28:5, 36:1, 36:7, 78:1, 88:19, 104:7, 113:19, 115:22, 131:16, 131:17, 148:18</p> <p>careful [1] - 89:13</p> <p>case [11] - 8:21, 60:13, 62:11, 72:21, 142:25, 144:8, 154:8, 166:18, 172:11, 180:21, 186:24</p> <p>cases [2] - 78:24, 80:11</p> <p>catch [2] - 30:10, 31:1</p> <p>categories [6] - 16:8, 36:11, 41:8, 90:7, 121:22, 121:23</p> <p>categorization [1] - 92:23</p> <p>categorized [1] - 196:9</p> <p>category [4] - 15:15, 15:17, 16:12, 141:8</p> <p>Cathy [1] - 83:14</p> <p>causes [3] - 21:24, 22:3, 104:14</p> <p>causing [2] - 22:6, 22:7</p> <p>ceiling [7] - 182:6, 182:7, 182:16, 182:22, 183:1, 183:3, 183:18</p> <p>cell [1] - 70:18</p> <p>center [4] - 98:5, 116:17, 136:12, 139:16</p> <p>Center [2] - 3:22, 4:5</p> <p>centered [2] - 101:10, 136:15</p> <p>Central [1] - 1:7</p>

<p>estimating [12] - 14:10, 14:14, 14:21, 15:23, 16:2, 21:19, 22:22, 29:14, 37:7, 38:2, 130:15, 130:16</p> <p>estimation [2] - 21:22, 22:4</p> <p>estimations [1] - 47:1</p> <p>estimators [1] - 95:16</p> <p>et [1] - 80:23</p> <p>etched [1] - 86:12</p> <p>European [1] - 54:8</p> <p>evaluate [22] - 9:7, 9:21, 28:7, 28:14, 29:3, 41:11, 74:1, 74:3, 74:4, 74:10, 75:19, 87:23, 88:9, 90:6, 94:5, 104:5, 105:1, 112:14, 131:15, 131:22, 147:16, 196:17</p> <p>evaluated [7] - 12:7, 28:3, 40:7, 40:19, 41:9, 66:14, 71:18</p> <p>evaluating [1] - 122:6</p> <p>evaluation [18] - 9:24, 11:17, 11:22, 26:19, 39:24, 40:6, 50:8, 62:19, 66:11, 66:16, 66:21, 67:1, 82:14, 82:16, 82:22, 120:6, 167:17, 194:7</p> <p>evaluations [1] - 43:7</p> <p>evenly [2] - 136:8, 185:25</p> <p>event [1] - 74:23</p> <p>eventually [4] - 82:18, 83:18, 194:12, 195:4</p> <p>everywhere [1] - 64:13</p> <p>evidence [2] - 36:5, 113:16</p> <p>Evidence [1] - 151:3</p> <p>evolving [1] - 86:14</p> <p>exact [7] - 21:14, 21:15, 21:19, 22:1, 92:25, 103:21, 105:19</p> <p>exactly [25] - 9:2, 21:8, 21:25, 37:13, 47:17, 84:23, 88:5, 88:13, 92:21, 93:2, 106:10, 123:7, 127:23, 138:11, 142:11, 145:25, 165:12, 166:9, 174:10, 179:20, 180:15, 191:13, 191:18, 197:23</p> <p>examined [1] - 94:24</p> <p>example [17] - 17:7, 26:6, 26:25, 27:6, 35:8, 49:23, 80:12, 84:11, 92:20, 103:12, 108:13, 114:9, 129:10, 160:11, 174:7, 181:3, 184:6</p> <p>exceed [1] - 18:18</p> <p>exceeding [2] - 18:22, 76:6</p> <p>Excellent [1] - 30:16</p> <p>excellent [1] - 62:17</p> <p>except [1] - 19:25</p> <p>exception [1] - 32:8</p> <p>exceptional [2] - 33:3, 179:3</p> <p>exceptionalities [4] - 41:10, 41:14, 42:2, 42:4</p> <p>exceptionality [3] - 40:25, 41:12, 41:18</p> <p>exciting [2] - 13:5, 13:9</p> <p>exclaim [1] - 132:18</p> <p>exclude [1] - 151:17</p> <p>excluded [1] - 148:13</p> <p>Executive [1] - 1:18</p> <p>executives [1] - 193:8</p> <p>exist [3] - 41:19, 163:11, 183:19</p> <p>exit [1] - 44:15</p> <p>expand [1] - 96:12</p> <p>expect [14] - 14:22, 15:9, 17:18, 65:4, 100:7, 100:8, 110:8, 134:5, 136:20, 143:8, 159:6, 172:6, 196:15, 198:1</p> <p>expectation [58] - 15:6, 17:20, 57:15, 57:17, 57:22, 58:6, 58:10, 58:14, 58:19, 58:23, 59:1, 59:2, 59:4, 68:7, 68:15, 90:11, 90:16, 90:18, 90:22, 90:24, 91:1, 91:5, 91:15, 92:11, 92:13, 92:17, 108:20, 138:24, 155:18, 155:20, 155:25, 156:2, 156:3, 156:4, 156:6, 156:14, 156:15, 156:24, 157:13, 157:24, 158:11, 158:17, 159:6, 159:9, 160:22, 160:24, 169:13,</p>	<p>169:16, 181:17, 181:18, 183:11, 183:12, 184:16, 187:20, 188:1, 188:3, 195:12</p> <p>expectations [21] - 15:16, 15:18, 16:18, 39:9, 51:23, 57:6, 57:12, 57:23, 58:1, 67:25, 68:11, 68:17, 92:16, 93:5, 93:10, 93:12, 101:20, 160:17, 161:1, 184:21</p> <p>expected [29] - 15:3, 37:8, 37:9, 67:21, 91:17, 91:18, 91:19, 91:25, 92:3, 92:9, 96:16, 108:18, 136:18, 137:2, 139:22, 140:12, 141:10, 142:10, 146:4, 156:22, 157:5, 157:18, 157:22, 158:22, 161:3, 179:1, 183:6, 183:8</p> <p>Expected [2] - 15:10, 91:14</p> <p>expecting [5] - 18:23, 133:19, 133:21, 138:14, 138:17</p> <p>expects [1] - 16:13</p> <p>experience [1] - 80:8</p> <p>experienced [1] - 74:23</p> <p>expertise [2] - 8:6, 10:23</p> <p>experts [1] - 6:3</p> <p>explain [4] - 20:20, 24:15, 102:10, 131:25</p> <p>explained [2] - 40:4, 103:20</p> <p>explicit [1] - 175:11</p> <p>explore [3] - 153:16, 153:24, 154:18</p> <p>express [1] - 131:20</p> <p>expressing [2] - 147:21, 192:2</p> <p>extensive [3] - 96:1, 96:7, 96:14</p> <p>extent [1] - 76:14</p> <p>extra [6] - 67:20, 92:12, 125:9, 125:11, 174:6, 191:19</p> <p>extreme [1] - 147:14</p> <p>extremely [4] - 73:17, 75:2, 89:20, 103:8</p> <p>extremes [1] - 184:23</p> <p>eyeballing [1] - 130:2</p>	<p>46:16, 47:16, 47:24, 49:19, 52:11, 52:23, 53:1, 53:17, 53:20, 53:25, 54:13, 54:19, 54:22, 55:4, 59:5, 67:5, 67:17, 68:2, 71:4, 72:21, 84:18, 85:10, 122:12, 122:23, 123:3, 123:14, 123:22, 124:19, 126:5, 126:19, 126:21, 128:23, 166:25, 167:5, 168:19, 168:22, 169:5, 187:17, 192:22, 193:18, 194:11, 194:22</p> <p>Feild [1] - 4:14</p> <p>fell [3] - 99:13, 99:15, 156:23</p> <p>few [6] - 9:17, 30:1, 57:7, 88:12, 102:21, 125:21</p> <p>fewer [1] - 42:10</p> <p>field [1] - 39:4</p> <p>fifth [1] - 109:20</p> <p>fifty [5] - 60:19, 60:22, 60:23, 72:5, 130:7</p> <p>figure [4] - 68:22, 68:23, 77:20, 192:20</p> <p>files [1] - 109:3</p> <p>final [4] - 7:15, 9:18, 9:22, 10:9</p> <p>finalized [1] - 12:19</p> <p>Finally [1] - 29:24</p> <p>findings [2] - 12:23, 110:20</p> <p>fine [7] - 5:19, 59:14, 141:4, 163:6, 164:17, 187:2, 187:4</p> <p>finish [3] - 8:18, 148:16, 151:24</p> <p>finished [1] - 9:4</p> <p>first [26] - 6:1, 7:16, 7:20, 9:3, 10:18, 11:10, 15:14, 19:8, 19:22, 29:19, 45:5, 59:23, 68:16, 71:11, 71:16, 73:1, 81:13, 81:16, 91:24, 102:2, 113:25, 121:3, 123:15, 135:4, 142:18, 196:22</p> <p>First [3] - 39:15, 46:17, 73:19</p> <p>fit [13] - 16:4, 17:10, 89:16, 134:7, 134:9, 135:21, 136:14, 137:16, 146:6, 146:12, 146:17, 148:2, 148:12</p> <p>fits [4] - 89:14, 113:6, 134:4, 148:2</p> <p>fitted [2] - 146:8</p> <p>fitting [3] - 17:9, 18:5, 138:6</p> <p>five [7] - 43:5, 55:20, 99:17, 110:3, 129:17, 148:15, 168:12</p> <p>fix [1] - 81:4</p> <p>fixed [17] - 11:13, 20:15, 20:18, 20:23, 21:4, 21:16, 22:10, 23:11, 37:4, 37:5, 37:19, 37:23, 129:14, 129:19, 129:22, 133:25, 148:10</p> <p>flag [3] - 135:2, 148:14</p> <p>flip [2] - 107:3, 190:16</p> <p>flip-flop [1] - 107:3</p> <p>flip-flopped [1] - 190:16</p> <p>floor [1] - 183:18</p> <p>floor [1] - 107:3</p> <p>flopped [1] - 190:16</p> <p>FLORIDA [1] - 1:1</p> <p>Florida [11] - 1:7, 1:9, 3:10, 3:16, 4:1, 5:7, 44:19, 75:25, 81:15, 95:22, 196:8</p> <p>FLORIDA'S [1] - 1:4</p> <p>fluff [1] - 164:6</p> <p>focus [1] - 65:24</p> <p>focusing [2] - 66:4, 129:24</p> <p>FOERSTER [1] - 4:12</p> <p>Foerster [1] - 4:12</p> <p>fold [1] - 87:2</p> <p>folders [1] - 25:18</p> <p>folks [6] - 2:19, 5:16, 9:25, 68:19, 82:20, 192:17</p> <p>follow [2] - 18:20, 133:6</p> <p>followed [1] - 17:3</p> <p>following [12] - 2:2, 10:11, 24:13, 44:16, 79:4, 80:3, 99:18, 99:19, 109:23, 113:12, 134:14, 197:6</p> <p>FOR [1] - 1:2</p>	<p>forced [2] - 113:2, 143:5</p> <p>forces [1] - 133:25</p> <p>forget [1] - 21:8</p> <p>forgot [1] - 121:19</p> <p>forgotten [1] - 28:2</p> <p>form [4] - 82:18, 82:20, 92:11, 92:13</p> <p>formalized [1] - 78:14</p> <p>formed [2] - 91:11, 92:4</p> <p>formula [1] - 99:7</p> <p>formulas [1] - 99:9</p> <p>forth [8] - 26:2, 27:14, 56:14, 90:14, 92:19, 92:24, 105:3, 169:21</p> <p>forward [8] - 7:2, 86:5, 86:10, 90:3, 100:17, 102:9, 121:17, 127:4</p> <p>Foundation [1] - 56:12</p> <p>Four [2] - 41:11, 85:24</p> <p>four [18] - 29:5, 31:3, 31:5, 31:9, 36:3, 42:18, 75:15, 83:9, 83:12, 94:8, 94:9, 95:1, 103:9, 110:2, 113:12, 129:16, 174:9</p> <p>fourth [6] - 55:18, 72:4, 109:19, 123:3, 123:7, 129:3</p> <p>Fox [1] - 147:25</p> <p>fraction [1] - 151:11</p> <p>FRAKES [9] - 4:10, 65:13, 65:20, 132:2, 132:5, 132:15, 170:19, 170:25, 171:11</p> <p>Frakes [1] - 4:10</p> <p>framework [3] - 39:13, 40:5, 40:10</p> <p>framing [1] - 5:23</p> <p>front [1] - 87:14</p> <p>FTE's [3] - 46:22, 52:16, 52:17</p> <p>fulfill [1] - 10:21</p> <p>full [9] - 47:5, 47:7, 63:11, 69:6, 69:19, 69:22, 70:15, 71:10, 173:2</p> <p>fully [7] - 20:20, 58:12, 58:24, 59:1, 67:2, 89:25, 141:12</p> <p>function [2] - 97:25, 161:17</p> <p>fundamental [2] - 56:18, 57:11</p> <p>funky [1] - 145:13</p> <p>future [1] - 86:5</p>
F			
<p>face [6] - 10:19, 11:11, 190:25</p> <p>face-to-face [2] - 10:19, 11:11</p> <p>faces [3] - 27:4, 27:21, 33:10</p> <p>facilitate [3] - 26:17, 66:9, 131:19</p> <p>facilitates [1] - 27:16</p> <p>facilitating [1] - 94:15</p> <p>fact [14] - 10:24, 21:20, 22:8, 23:4, 37:7, 54:22, 55:1, 93:15, 111:13, 134:18, 135:6, 145:2, 172:19, 175:7</p> <p>factors [2] - 129:6, 129:15</p> <p>fail [1] - 73:1</p> <p>fair [4] - 62:20, 75:18, 78:14, 196:4</p> <p>fairly [2] - 46:11, 141:14</p> <p>fairy [1] - 97:6</p> <p>fall [6] - 73:5, 83:3, 84:25, 99:2, 100:1, 136:2</p> <p>falling [2] - 128:4, 128:5</p> <p>falls [2] - 136:21, 143:9</p> <p>familiar [1] - 114:9</p> <p>famous [1] - 147:24</p> <p>fancy [1] - 34:23</p> <p>fantastic [3] - 66:5, 67:1, 81:10</p> <p>far [4] - 8:23, 11:3, 90:2, 159:24</p> <p>fare [2] - 158:16, 159:8</p> <p>favor [1] - 151:3</p> <p>FCAT [19] - 6:17, 66:17, 66:25, 67:8, 71:21, 72:13, 72:14, 72:16, 72:20, 73:13, 73:22, 83:14, 84:18, 85:12, 85:18, 95:21, 194:24, 195:3</p> <p>feasible [1] - 145:20</p> <p>February [2] - 46:4, 63:1</p> <p>fee [1] - 191:17</p> <p>feedback [1] - 66:1</p> <p>FEILD [47] - 4:14, 30:13, 31:12, 32:5, 32:10,</p>	G		
		<p>gain [1] - 180:18</p> <p>gains [2] - 167:10, 181:6</p> <p>game [4] - 40:22, 77:2, 77:7, 78:3</p> <p>gap [4] - 111:2, 111:6, 111:11, 131:4</p> <p>Gates [1] - 56:12</p> <p>Gathering [1] - 69:7</p> <p>general [8] - 17:15, 23:20, 31:12, 71:4, 107:21, 139:13, 142:5, 165:12</p> <p>generalize [1] - 155:14</p> <p>generally [1] - 137:7</p> <p>Generally [1] - 46:21</p> <p>generate [5] - 47:4, 81:14, 97:14, 124:1</p> <p>generated [1] - 59:11</p> <p>generating [1] - 99:10</p> <p>genres [2] - 14:17</p> <p>George [1] - 147:25</p> <p>Gifted [2] - 32:22, 41:22</p> <p>gifted [18] - 12:1, 32:20, 32:21, 32:25, 33:2, 35:1, 36:10, 41:7, 41:24, 41:25, 67:10, 90:13, 92:19, 92:23, 93:3, 181:25, 188:12</p> <p>Gina [6] - 4:16, 67:6, 67:13, 68:9, 83:8, 189:1</p> <p>Gina's [1] - 67:22</p> <p>GINN [5] - 140:24, 164:4, 164:9, 164:12, 164:16</p> <p>Gisela [6] - 4:14, 58:20, 59:1, 67:4, 87:17, 92:20</p>	

65:20, 67:5, 67:15, 67:17, 68:2, 70:16, 70:24, 71:4, 71:14, 71:17, 71:21, 72:9, 72:21, 73:6, 78:6, 80:5, 81:25, 82:25, 84:18, 85:10, 87:13, 88:1, 88:23, 88:24, 100:22, 101:5, 109:14, 110:1, 110:24, 111:25, 112:1, 113:2, 122:12, 122:23, 123:3, 123:14, 123:22, 124:19, 126:5, 126:19, 126:21, 128:23, 132:2, 132:5, 132:15, 138:19, 140:1, 140:24, 142:23, 143:21, 144:10, 144:15, 144:23, 145:1, 145:9, 145:19, 154:24, 160:3, 164:4, 164:9, 164:12, 164:16, 165:5, 166:25, 167:5, 168:19, 168:22, 169:5, 170:19, 170:25, 171:11, 172:25, 173:24, 175:15, 176:11, 176:19, 180:12, 180:16, 181:1, 181:20, 182:7, 184:2, 187:17, 189:2, 190:22, 191:14, 191:17, 192:22, 193:18, 194:4, 194:11, 194:18, 194:22
multiple [18] - 15:25, 21:10, 21:11, 24:22, 28:11, 42:24, 49:1, 55:12, 55:17, 55:21, 57:17, 57:18, 68:1, 73:12, 74:1, 126:24, 140:1, 197:11
multiplied [1] - 60:24
multiplying [1] - 60:22
MURPHY [4] - 5:6, 165:20, 177:14, 182:8
Murphy [1] - 5:6
music [1] - 3:18
must [2] - 86:2, 151:5

N

name [2] - 3:5, 147:25
names [1] - 34:23
narrative [1] - 25:17
narrow [3] - 94:15, 101:2, 182:2
narrowed [1] - 11:11
nature [1] - 167:13
near [2] - 21:24, 38:1
necessarily [10] - 16:10, 34:15, 84:12, 110:8, 111:14, 152:7, 154:9, 172:15, 176:21, 180:21
need [25] - 5:13, 7:14, 20:17, 33:18, 52:7, 65:13, 69:10, 74:24, 76:11, 76:17, 79:15, 80:9, 81:23, 94:8, 94:23, 111:21, 112:10, 123:9, 133:14, 146:12, 151:6, 166:15, 185:11, 192:20, 196:19
needed [2] - 82:14, 154:9
needs [2] - 28:16, 66:14
NEFEC [1] - 56:6
negative [16] - 130:6, 156:25, 157:19, 157:20, 158:1, 162:9, 164:19, 164:23, 167:16, 173:8, 183:4, 183:7, 185:21, 185:22, 190:12, 190:16
negatively [1] - 187:24
neighborhood [1] - 191:22
net [1] - 163:12
never [7] - 110:22, 123:4, 129:3, 129:4, 129:16, 147:11, 147:22
new [7] - 38:12, 52:2, 84:25, 85:12, 85:13, 85:14, 85:18
Next [1] - 131:13
next [35] - 2:6, 5:25, 7:1, 7:25, 8:25, 9:12, 9:17, 10:1, 10:11, 15:10, 19:4, 19:7, 25:24, 29:17, 38:9, 56:13, 66:23, 73:3, 83:21, 102:7, 104:16, 110:12, 116:10, 131:14, 131:24, 133:4, 133:18, 136:20, 136:21, 139:10, 139:14, 141:7, 141:25, 153:15, 153:17
nice [3] - 28:17, 137:24, 191:17
Nicole [2] - 5:4, 64:6
nine [1] - 110:2

ninth [1] - 109:21
nobody's [1] - 84:3
Non [1] - 169:25
non [2] - 142:15, 169:24
non-parametric [1] - 142:15
non-trivial [1] - 169:24
Non-trivial [1] - 169:25
none [4] - 14:4, 30:1, 151:10, 164:2
norm [3] - 75:5, 106:16, 108:4
normal [2] - 98:11, 99:16
normally [4] - 146:7, 172:22, 179:9, 179:10
Northeast [1] - 3:9
note [2] - 24:10, 38:11
Note [1] - 152:15
notes [4] - 8:21, 26:18, 34:20, 121:9
Notes [1] - 33:9
nothing [4] - 60:10, 123:19, 165:25, 179:2
notice [2] - 120:10, 137:17
NOYA [2] - 4:8, 81:25
Noya [1] - 4:8
nuances [1] - 37:21
number [52] - 13:6, 18:8, 20:24, 22:2, 24:5, 25:5, 28:10, 31:7, 42:22, 42:25, 43:1, 43:3, 43:15, 43:16, 44:5, 45:16, 45:19, 46:7, 46:8, 47:2, 50:6, 57:4, 57:20, 58:7, 59:24, 61:2, 63:24, 70:7, 87:18, 87:19, 96:14, 98:6, 99:12, 99:14, 101:11, 105:20, 115:9, 115:10, 129:9, 129:10, 129:13, 133:8, 133:21, 138:5, 138:15, 139:9, 152:7, 173:4, 173:13, 196:13
numbering [1] - 93:13
numbers [10] - 34:16, 37:12, 37:14, 80:22, 100:7, 105:19, 110:8, 142:2, 143:23, 175:16

O

objective [1] - 35:9
observation [5] - 73:17, 118:22, 119:6, 119:19, 120:19
observations [2] - 119:3, 154:19
observe [8] - 99:6, 111:8, 113:23, 118:15, 179:16, 179:24, 184:19, 196:24
observed [14] - 18:12, 18:13, 18:17, 18:24, 91:3, 91:6, 146:4, 160:19, 179:1, 179:5, 179:9, 179:10, 195:16, 197:3
obtainable [3] - 77:11, 182:18, 182:19
obvious [1] - 112:4
obviously [2] - 108:2, 139:17
occupational [1] - 41:2
occur [1] - 196:15
occurred [1] - 2:3
occurrence [1] - 69:24
October [2] - 46:3, 57:3
OF [3] - 1:1, 1:1, 1:16
offer [1] - 49:22
offered [3] - 45:16, 45:17, 45:18
offering [1] - 50:1
offhand [1] - 139:10
often [2] - 136:13, 142:20
old [3] - 84:19, 84:23, 85:11
once [3] - 71:22, 111:3, 177:21
Once [1] - 82:25
one [150] - 3:1, 8:11, 12:16, 13:2, 15:2, 16:5, 16:7, 16:10, 16:11, 18:6, 19:11, 19:12, 19:13, 20:6, 20:7, 21:13, 21:18, 21:20, 22:2, 24:6, 25:12, 25:13, 26:7, 26:14, 29:20, 29:21, 30:9, 30:22, 30:25, 38:12, 42:18, 44:7, 44:10, 46:12, 49:9, 49:11, 50:18, 55:10, 56:6, 56:7, 57:1, 58:10, 58:11, 58:21, 59:18, 59:23, 60:25,

61:4, 61:6, 61:7, 65:16, 65:19, 69:2, 70:9, 70:12, 71:23, 72:4, 73:13, 73:23, 74:13, 74:22, 79:2, 80:25, 81:21, 82:3, 86:19, 88:19, 93:1, 93:6, 95:18, 100:10, 102:12, 106:22, 106:24, 107:4, 108:3, 108:19, 109:10, 109:18, 112:6, 112:7, 112:8, 112:14, 113:2, 113:6, 117:12, 119:12, 119:16, 119:17, 119:18, 119:22, 120:21, 121:8, 121:15, 124:8, 124:10, 124:11, 124:17, 124:20, 125:2, 125:13, 126:10, 127:2, 127:13, 128:6, 128:8, 130:20, 131:23, 131:24, 133:17, 134:1, 134:15, 135:3, 135:10, 138:14, 141:3, 143:17, 143:18, 145:18, 148:3, 148:25, 152:4, 153:24, 157:7, 157:19, 165:2, 165:3, 168:5, 168:12, 168:14, 174:8, 177:11, 184:14, 186:6, 187:6, 187:13, 187:21, 189:3, 189:4, 189:9, 189:22, 190:3, 190:5, 190:20, 197:13
One [16] - 6:8, 8:17, 10:16, 14:6, 26:23, 29:6, 68:19, 68:21, 90:10, 95:16, 108:25, 127:7, 176:20, 182:16, 189:19, 190:10
one-and-a-half [1] - 168:14
one-term [1] - 69:2
ones [12] - 2:21, 50:17, 62:21, 66:24, 97:13, 117:11, 122:14, 122:18, 126:17, 132:10, 181:11, 182:12
ongoing [1] - 87:4
online [2] - 5:16, 83:18
open [2] - 2:18, 56:16
operated [1] - 39:13
operating [2] - 40:5, 55:25
operation [2] - 13:17, 36:24
operational [2] - 56:5, 90:4
opinion [4] - 13:12, 13:13, 27:22, 192:3
opinions [3] - 28:8, 120:4, 131:18
opportunities [1] - 9:15
opportunity [9] - 13:7, 51:13, 51:20, 81:17, 173:3, 173:5, 173:11, 173:18, 174:2
opposed [5] - 49:17, 60:5, 104:13, 171:7, 193:5
option [1] - 71:23
options [1] - 86:22
or" [1] - 52:24
order [11] - 2:1, 7:16, 32:1, 43:20, 47:3, 52:9, 81:7, 81:20, 127:10, 127:13, 195:20
ordering [1] - 127:5
organization [1] - 28:22
organized [1] - 34:17
organizer [1] - 34:14
original [1] - 168:24
Orlando [1] - 1:9
orthopedically [1] - 41:6
Osceola [1] - 56:7
ought [3] - 99:17, 99:18, 166:6
outcome [3] - 48:25, 74:19, 142:3
outcomes [2] - 49:11, 195:24
outer [1] - 139:18
outliers [2] - 128:16, 147:14
outlined [1] - 181:22
outlines [1] - 117:10
outside [4] - 89:10, 100:1, 149:21, 153:1
Over-speaking [3] - 69:15, 141:13, 144:22
overall [4] - 76:10, 193:9, 193:12, 194:16
oversight [2] - 80:19, 80:24
overview [2] - 104:9, 105:4
overwhelm [1] - 66:8
overwhelmed [1] - 121:19
own [7] - 6:10, 27:1, 27:11, 27:22, 41:22, 80:21, 131:18

owner [1] - 3:25
P
P-12 [1] - 46:10
packet [2] - 5:21, 48:8
page [4] - 30:12, 121:15, 125:22, 133:15
paid [1] - 51:8
pairs [1] - 29:3
Pam [2] - 4:18, 121:25
pan [1] - 189:8
PANEL [5] - 69:15, 76:23, 84:20, 141:13, 144:22
panicking [1] - 82:8
paper [2] - 196:22, 196:25
par [1] - 51:19
parallel [5] - 110:12, 135:6, 135:12, 135:15
parametric [1] - 142:15
paramount [1] - 79:18
Pardon [1] - 112:20
parent [1] - 191:2
parents [5] - 4:2, 67:13, 77:25, 191:19, 194:5
parsimony [3] - 34:6, 87:24, 88:14
Parsimony [1] - 87:24
parsing [1] - 55:14
Part [1] - 161:7
part [29] - 11:5, 15:12, 70:24, 72:21, 76:10, 81:7, 82:13, 84:23, 86:3, 86:8, 87:4, 87:10, 89:3, 104:5, 112:23, 149:20, 150:13, 151:10, 154:2, 158:8, 158:9, 164:3, 170:11, 170:13, 178:1, 187:15, 188:25, 194:9, 197:9
partial [1] - 72:6
partially [1] - 175:13
participating [1] - 3:3
participation [1] - 2:24
particular [46] - 14:2, 16:19, 23:6, 27:7, 31:9, 43:4, 43:17, 45:24, 46:6, 47:1, 47:15, 48:23, 50:7, 53:16, 55:10, 59:12, 63:25, 64:18, 78:20, 79:13, 79:16, 95:5, 102:10, 102:12, 102:14, 103:10, 103:12, 106:8, 106:22, 109:11, 111:7, 111:9, 111:16, 111:17, 120:13, 120:23, 131:6, 139:21, 146:6, 150:12, 153:2, 172:11, 183:22, 184:12, 185:6, 190:1
particularly [3] - 62:14, 62:15, 179:17
Particularly [1] - 69:13
particulars [1] - 78:25
partition [2] - 150:19, 175:13
partitioned [1] - 21:11
partly [6] - 72:11, 150:16, 193:8, 193:9, 193:12, 193:13
partner [1] - 56:6
partners [2] - 10:17, 56:16
parts [1] - 139:18
pass [2] - 36:24, 73:1
past [5] - 55:6, 56:23, 73:21, 77:14, 141:19
path [1] - 14:19
Pattern [1] - 197:1
pattern [5] - 14:23, 105:10, 110:16, 137:24, 153:18
patterns [3] - 112:5, 146:7, 146:23
pay [1] - 79:16
paying [1] - 79:15
PD [1] - 79:25
peer [1] - 191:22
pen [1] - 97:19
People [1] - 69:2
people [16] - 13:17, 37:18, 37:22, 37:24, 75:19, 77:2, 77:16, 77:23, 78:10, 84:1,

rare [1] - 72:15
rated [2] - 165:5, 167:7
rates [1] - 107:14
rather [2] - 69:23, 77:19
rating [3] - 9:25, 114:10, 114:11
ratings [1] - 196:13
rationale [1] - 20:10
rationales [1] - 39:5
reach [1] - 76:8
reached [1] - 42:17
reaching [1] - 76:5
reactions [1] - 118:16
reacts [1] - 112:8
read [2] - 6:9, 100:4
readily [1] - 18:19
reading [58] - 47:18, 47:22, 47:25, 48:3, 48:7, 48:13, 48:14, 48:17, 54:2, 54:4, 54:5, 54:9, 54:10, 54:16, 54:17, 55:9, 55:16, 57:14, 57:16, 57:17, 57:25, 58:2, 58:3, 58:5, 58:20, 58:21, 59:8, 61:6, 65:15, 65:22, 65:23, 66:17, 66:20, 67:8, 67:12, 67:14, 67:20, 68:4, 71:6, 102:6, 104:22, 109:17, 110:16, 112:15, 112:25, 113:6, 113:8, 119:7, 119:9, 121:21, 122:7, 152:22, 152:23, 187:20, 192:25, 194:25
ready [7] - 14:3, 27:17, 104:5, 105:1, 151:22, 151:23, 165:1
Real [2] - 133:11, 196:2
real [18] - 13:23, 23:4, 95:12, 95:20, 95:24, 97:4, 99:11, 120:18, 141:6, 141:10, 141:20, 141:24, 148:5, 148:7, 150:3, 185:7, 187:14, 196:17
reality [1] - 145:9
realize [1] - 83:8
really [57] - 7:16, 8:4, 13:1, 13:5, 13:6, 16:1, 23:13, 23:14, 42:15, 55:2, 72:25, 74:14, 77:22, 82:19, 83:15, 89:8, 93:19, 98:8, 98:18, 104:6, 105:13, 115:13, 126:8, 127:6, 128:2, 134:16, 136:15, 143:17, 150:9, 152:6, 152:12, 153:9, 154:3, 154:4, 154:7, 156:18, 163:11, 164:4, 164:24, 166:4, 166:8, 167:1, 170:12, 170:14, 171:6, 174:11, 176:13, 177:2, 181:9, 184:2, 185:9, 186:19, 191:25, 197:19
reason [16] - 22:24, 32:17, 37:16, 38:19, 67:12, 71:22, 75:5, 90:1, 123:7, 127:18, 128:14, 132:25, 150:14, 161:7, 184:20, 191:25
reasonable [6] - 23:2, 28:12, 62:25, 94:14, 146:24, 148:8
reasons [1] - 73:19
receive [2] - 6:23, 7:6
received [2] - 47:8, 91:5
receiving [3] - 42:8, 42:11, 42:17
recent [2] - 91:24, 124:18
recess [2] - 89:2, 155:2
recognize [2] - 16:17, 165:24
recognized [1] - 67:2
recognizes [1] - 66:13
recommend [2] - 69:8, 87:17
recommendation [6] - 10:8, 10:20, 26:16, 63:7, 83:7, 123:20
recommendations [1] - 6:15, 7:12, 7:13, 7:22, 12:19, 41:1, 63:15, 64:2, 65:10, 66:10, 67:23
record [4] - 44:7, 53:8, 53:9, 147:9
recorded [1] - 29:18
recording [1] - 155:1
records [3] - 44:9, 44:13, 53:7

recovery [3] - 72:22, 72:24, 73:2
recovery-ing [1] - 73:2
recreate [2] - 189:14, 190:7
red [8] - 16:6, 16:13, 17:24, 18:9, 130:19, 134:23, 134:24, 138:18
reduce [1] - 38:20
reduction [2] - 148:5, 148:6
Refer [1] - 116:15
refer [2] - 25:20, 133:7
referenced [1] - 75:6
referred [1] - 90:25
Referring [1] - 49:19
refers [1] - 101:15
refine [1] - 86:9
refined [1] - 52:7
refinement [1] - 85:3
refinements [1] - 86:7
reflect [3] - 9:15, 34:17, 99:24
reflected [1] - 52:10
refresh [2] - 34:21, 38:16
refresher [1] - 39:10
regard [3] - 34:2, 113:6, 180:10
regarded [1] - 179:11
regarding [1] - 82:15
regardless [2] - 57:18, 122:16
Regardless [1] - 32:5
regards [3] - 112:19, 112:21, 112:22
regression [11] - 20:2, 20:7, 90:18, 133:12, 140:2, 140:3, 145:12, 155:16, 156:3, 160:10
regroup [1] - 88:25
regular [1] - 188:11
reiterate [2] - 12:4, 79:7
relate [1] - 168:2
related [2] - 36:9, 183:25
relationship [10] - 8:12, 17:8, 22:14, 103:24, 107:1, 153:3, 189:21, 190:9, 190:14, 190:17
relative [17] - 16:14, 110:9, 111:22, 118:6, 120:13, 130:7, 152:17, 156:18, 157:2, 158:16, 158:24, 159:1, 159:3, 159:9, 172:23, 177:16, 180:9
relatively [6] - 89:6, 116:8, 152:19, 155:11, 166:15, 189:19
relevant [1] - 177:23
reliability [1] - 89:18
rely [1] - 23:3
remain [1] - 190:2
remaining [1] - 7:21
remains [1] - 111:24
remedial [2] - 48:17
Remember [10] - 9:11, 11:1, 32:12, 88:16, 90:19, 130:19, 148:25, 156:3, 166:10, 173:20
remember [19] - 8:9, 32:6, 48:24, 48:25, 76:21, 102:20, 116:16, 119:12, 122:9, 132:12, 135:10, 135:13, 135:24, 139:8, 139:9, 181:8, 182:24, 182:25, 195:7
remind [6] - 2:17, 7:10, 8:24, 21:9, 36:12, 60:6
Reminder [1] - 39:13
reminder [6] - 10:16, 11:7, 19:19, 39:10, 41:2, 43:4
reminding [2] - 8:20, 10:7
remove [10] - 21:18, 21:20, 22:9, 23:6, 28:18, 30:22, 30:25, 37:25, 119:24, 165:20
removed [1] - 53:9
repeating [2] - 69:21, 69:23
report [6] - 56:21, 70:18, 79:1, 79:2, 96:19, 100:3

reported [2] - 46:14, 126:12
reporting [4] - 9:20, 52:3, 78:22, 80:2
represent [2] - 3:6, 192:17
representing [1] - 4:2
represents [1] - 117:3
reps [1] - 46:10
request [2] - 10:21, 50:2
requests [1] - 6:18
require [2] - 63:11, 111:19
required [3] - 66:25, 95:2, 194:4
requires [2] - 56:3, 123:12
requiring [1] - 48:14
RESEARCH [1] - 1:2
research [2] - 36:18, 196:4
Research [3] - 1:17, 1:19, 6:12
residual [6] - 90:25, 91:7, 144:18, 146:2, 146:3, 156:7
residuals [15] - 91:10, 137:23, 146:6, 146:9, 146:11, 146:20, 156:11, 156:17, 156:25, 157:4, 158:6, 159:20, 159:23, 161:1, 191:6
respect [2] - 47:5, 81:5
respects [3] - 157:14, 172:5, 172:6
responsibility [5] - 10:9, 33:8, 66:23, 81:14, 85:5
responsible [2] - 149:14, 151:16
rest [1] - 100:18
rests [1] - 89:19
result [3] - 75:21, 85:3, 174:24
resulted [1] - 184:17
results [28] - 6:18, 6:24, 9:7, 9:20, 11:8, 12:9, 12:10, 12:18, 12:23, 13:21, 20:12, 21:4, 22:8, 23:5, 27:10, 33:19, 34:11, 40:9, 40:11, 50:12, 51:14, 68:16, 82:25, 94:20, 95:22, 100:6, 113:10, 120:6, 194:17
retained [6] - 31:18, 31:20, 31:22, 31:23, 32:10, 32:16
returns [1] - 182:5
reverse [1] - 77:8
review [4] - 51:13, 79:16, 81:19, 83:16
reviewed [1] - 14:16
revise [2] - 63:16, 132:24
revised [1] - 66:14
revising [1] - 51:25
revisit [4] - 85:20, 104:17, 133:13, 133:15
revisiting [1] - 60:11
right-hand [1] - 48:12
risk [1] - 75:14
roadmap [1] - 101:14
ROBERTS [1] - 5:13
role [5] - 10:17, 10:20, 10:21, 87:10, 147:1
roll [1] - 97:21
Ronda [2] - 3:7, 3:8
room [4] - 2:13, 2:14, 3:4, 77:24
roster [3] - 56:3, 56:8, 56:17
round [1] - 147:10
row [3] - 30:19, 30:22, 30:24
rows [2] - 27:19, 121:4
rule [12] - 10:19, 21:6, 21:7, 23:1, 57:9, 64:22, 65:7, 77:15, 80:14, 86:9, 167:20, 168:1
rules [14] - 8:17, 9:9, 11:17, 12:14, 65:3, 65:10, 80:10, 84:11, 84:16, 86:4, 86:23, 89:24, 168:16, 168:18
run [5] - 9:8, 83:1, 110:18, 175:22, 189:4
runs [2] - 6:24, 55:8
rush [1] - 82:7

S

sad [1] - 27:21
safe [1] - 84:15
Saint [1] - 196:25
sake [1] - 156:13
Sam [6] - 4:12, 26:16, 27:15, 28:1, 155:23, 156:5
Sam's [1] - 131:18
sample [4] - 100:14, 105:16, 105:25, 140:16
Sandi [1] - 3:21
saturated [1] - 148:4
saturates [1] - 16:1
save [1] - 78:15
saw [7] - 10:18, 21:3, 94:21, 111:15, 138:2, 184:14, 197:1
scale [31] - 27:3, 27:12, 84:19, 84:23, 85:8, 97:24, 108:18, 116:21, 116:23, 117:8, 117:12, 119:12, 119:14, 126:1, 126:3, 128:14, 131:1, 131:2, 140:4, 140:10, 140:15, 140:18, 140:20, 145:11, 152:2, 182:18, 182:19, 183:3, 188:25
scaled [1] - 85:7
scales [3] - 9:24, 110:6
scatter [12] - 90:17, 136:6, 136:7, 144:13, 144:15, 145:4, 145:16, 146:1, 181:10, 181:14, 184:15, 184:18
scattered [1] - 143:11
scenario [1] - 141:25
scheduled [2] - 71:6, 80:23
schedules [1] - 70:4
scheduling [4] - 55:5, 64:10, 64:11, 70:17
school [289] - 3:11, 3:22, 12:2, 23:17, 23:21, 26:8, 26:11, 26:12, 27:13, 28:25, 29:2, 29:13, 29:14, 29:15, 31:6, 32:7, 34:4, 34:5, 42:23, 44:6, 44:11, 44:14, 44:16, 44:17, 44:20, 45:15, 45:20, 46:6, 47:14, 50:6, 51:11, 51:12, 53:22, 54:4, 54:14, 54:19, 54:22, 55:11, 55:13, 55:21, 57:1, 59:16, 59:17, 59:23, 60:1, 64:1, 64:9, 64:19, 69:21, 70:7, 72:14, 73:10, 74:3, 102:23, 102:25, 104:4, 104:7, 104:10, 104:13, 105:11, 108:23, 119:5, 133:4, 149:1, 149:5, 149:11, 149:18, 149:19, 149:22, 150:1, 150:2, 150:3, 150:8, 150:10, 150:12, 150:15, 150:22, 150:24, 151:5, 151:8, 151:12, 151:14, 151:15, 151:17, 152:15, 152:18, 152:19, 152:22, 152:24, 153:11, 153:21, 154:2, 154:3, 154:6, 154:8, 154:10, 154:13, 154:21, 155:4, 155:8, 155:9, 155:12, 155:15, 158:12, 158:14, 158:17, 158:21, 158:23, 158:24, 159:2, 159:4, 159:5, 159:7, 159:8, 159:10, 159:13, 159:21, 159:24, 159:25, 160:2, 161:6, 161:15, 161:18, 161:19, 161:24, 162:9, 163:1, 163:2, 163:4, 163:9, 163:11, 164:5, 164:13, 164:18, 164:19, 165:1, 165:3, 165:6, 165:9, 165:15, 165:17, 165:18, 165:20, 166:16, 167:1, 167:3, 167:7, 167:8, 167:15, 167:16, 168:23, 169:2, 169:15, 169:17, 169:21, 170:5, 170:7, 170:11, 170:13, 170:16, 170:19, 171:3, 171:7, 171:10, 171:11, 171:12, 171:15, 171:17, 171:21, 171:23, 171:24, 172:3, 172:8, 172:10, 172:12, 172:16, 172:18, 172:22, 172:24, 173:6, 173:7, 173:8, 173:16, 173:17, 173:23, 174:8, 174:9, 174:13, 174:14, 174:17, 174:18, 174:23, 175:1, 175:2, 175:7, 175:11, 175:14, 175:17, 175:18, 175:19, 175:23, 175:25,

176:6, 176:7, 176:9, 176:14, 177:9, 177:15, 177:16, 177:20, 177:21, 178:3, 178:6, 178:8, 178:11, 178:14, 178:15, 178:17, 178:18, 178:20, 178:24, 179:2, 179:10, 179:12, 179:16, 179:18, 179:19, 179:23, 179:25, 180:6, 180:9, 181:3, 181:4, 181:5, 181:20, 181:22, 181:23, 181:24, 182:1, 182:14, 183:25, 184:5, 184:8, 184:9, 184:13, 185:15, 185:17, 185:19, 185:21, 185:23, 185:25, 186:4, 186:13, 186:15, 186:18, 186:20, 186:21, 187:1, 187:9, 187:11, 187:12, 187:16, 187:17, 187:22, 187:25, 188:9, 189:16, 191:5, 191:8, 191:19, 192:10, 192:11, 192:13, 192:21, 193:4, 193:11, 193:12, 193:15, 193:21, 194:9, 194:16, 194:19, 194:21, 195:15, 195:17, 195:18	41:20, 46:11, 52:15, 61:25, 64:4, 71:5, 72:5, 72:17, 73:6, 75:21, 80:8, 81:21, 82:7, 83:4, 95:1, 100:5, 100:6, 103:2, 103:5, 103:7, 103:16, 103:17, 103:22, 104:11, 104:16, 105:5, 105:6, 105:10, 106:10, 109:17, 109:25, 111:11, 112:15, 112:23, 114:13, 115:20, 116:19, 116:24, 116:25, 117:4, 117:9, 117:18, 117:25, 118:9, 119:16, 120:9, 120:10, 120:12, 121:3, 121:5, 125:23, 128:15, 128:17, 130:1, 130:12, 131:6, 136:6, 136:8, 136:9, 136:13, 136:17, 137:3, 137:19, 137:20, 137:23, 138:4, 140:18, 142:1, 142:2, 142:4, 142:18, 142:23, 143:2, 144:8, 144:10, 144:12, 144:13, 144:17, 144:18, 144:20, 145:20, 146:1, 146:16, 146:21, 146:22, 147:1, 147:8, 152:4, 152:5, 152:10, 153:18, 159:16, 159:23, 160:7, 161:9, 161:25, 166:18, 169:22, 172:20, 178:24, 182:15, 185:5, 189:6, 189:7, 189:22, 190:8	short [1] - 89:2 shoulder [1] - 97:7 show [47] - 12:13, 15:7, 26:20, 33:17, 33:18, 33:19, 33:21, 34:4, 34:11, 35:17, 48:2, 73:12, 91:16, 92:5, 94:14, 94:20, 95:3, 95:9, 100:6, 102:2, 102:4, 102:8, 106:19, 113:22, 115:20, 130:13, 130:17, 141:14, 143:14, 144:7, 145:24, 146:21, 147:6, 151:23, 162:18, 162:19, 164:5, 168:16, 171:6, 181:6, 183:5, 183:20, 184:13, 190:7, 190:18, 197:13, 197:23 showed [5] - 47:8, 104:20, 133:15, 181:10, 189:20 showing [6] - 99:20, 104:20, 116:11, 120:5, 142:8, 182:17 shown [3] - 37:25, 146:10, 170:1 shows [11] - 47:13, 48:9, 102:3, 111:10, 111:12, 117:21, 130:21, 133:16, 162:25, 171:21, 197:23 sick [2] - 13:1, 13:2 side [5] - 28:19, 48:13, 99:16, 192:10, 194:12 sides [1] - 6:3 significant [5] - 40:12, 58:5, 109:18, 109:24, 184:15 signing [1] - 51:10 similar [22] - 15:6, 15:15, 15:17, 24:16, 25:1, 62:22, 90:15, 90:21, 93:9, 93:10, 95:8, 104:15, 104:17, 104:23, 118:20, 120:8, 131:4, 137:1, 141:22, 153:18 similarly [7] - 103:4, 103:14, 104:12, 105:14, 112:17, 120:8, 190:2 simple [16] - 10:6, 16:6, 17:24, 19:1, 65:3, 77:5, 88:24, 103:18, 113:20, 117:14, 129:24, 130:20, 132:8, 132:24, 133:24, 138:17 simpler [1] - 88:22 simplistic [1] - 48:19 simply [2] - 94:11, 141:15 simulated [1] - 96:8 Simulated [1] - 96:8 simulation [1] - 189:7 simulations [2] - 43:8, 96:15 simultaneously [1] - 29:14 single [6] - 104:25, 137:12, 147:19, 148:3, 156:12, 189:21 sink [1] - 30:1 Sinner [1] - 196:25 sitting [6] - 11:9, 52:13, 67:6, 67:12, 67:22, 187:19 situation [6] - 73:7, 80:15, 81:3, 171:18, 176:12, 178:13 situations [5] - 35:2, 100:10, 181:7, 181:23, 182:1 six [5] - 11:9, 13:5, 22:21, 110:3, 110:25, 111:10 sixth [2] - 109:19, 109:20 size [14] - 12:1, 24:13, 43:13, 43:17, 45:23, 46:9, 46:24, 74:7, 74:8, 100:15, 101:17, 102:19, 110:14, 130:8 sizes [1] - 43:14 skills [2] - 59:23, 65:23 skip [2] - 57:8, 93:18 skirt [1] - 77:3 slash [2] - 122:3, 166:11 slide [19] - 19:4, 19:19, 24:19, 30:5, 32:21, 32:23, 37:2, 101:14, 102:7, 102:10, 102:11, 102:14, 104:16, 104:19, 104:20, 131:13, 189:13, 189:14 slides [15] - 8:10, 8:18, 25:11, 26:1, 36:15, 50:18, 57:7, 89:7, 91:16, 105:13, 116:10,	127:4, 130:13, 151:24, 161:5 slightly [2] - 117:5, 188:19 slope [9] - 16:7, 16:9, 18:5, 18:6, 133:16, 133:25, 134:3, 134:13, 139:17 small [17] - 25:2, 43:24, 114:16, 115:3, 115:6, 115:13, 115:14, 116:8, 116:25, 118:11, 121:1, 154:3, 154:4, 154:5, 183:4, 183:7 smaller [24] - 98:23, 115:19, 117:1, 117:4, 117:5, 118:2, 118:6, 118:9, 118:14, 119:16, 119:17, 121:1, 126:17, 128:1, 140:17, 152:16, 152:18, 153:24, 162:5, 170:20, 170:23, 172:19, 182:8, 182:13 smallest [5] - 111:17, 119:21, 120:21, 127:14, 127:15 smartest [1] - 188:24 smiley [1] - 33:10 smoothing [1] - 146:13 snack [1] - 89:12 soaked [2] - 170:13, 170:15 social [1] - 54:3 software [2] - 95:25, 96:5 someone [2] - 131:24, 167:6 Someone [1] - 177:3 Sometimes [1] - 15:20 sometimes [4] - 70:25, 72:25, 91:3, 190:24 somewhat [2] - 163:1, 188:7 somewhere [4] - 44:18, 114:15, 149:23 soon [5] - 65:5, 79:7, 89:6, 96:13, 154:18 Sorry [1] - 95:10 sorry [1] - 31:1 sort [13] - 8:11, 46:16, 64:23, 83:6, 97:24, 106:4, 113:20, 131:4, 135:19, 171:23, 194:16, 197:1 sorts [2] - 8:22, 135:19 sound [1] - 5:11 sounds [1] - 99:4 speaking [7] - 2:22, 69:15, 84:20, 141:13, 144:22, 185:16, 192:22 special [4] - 3:9, 90:13, 92:19, 92:23 specific [6] - 11:19, 34:21, 46:5, 57:9, 77:19, 133:21 specifically [3] - 12:15, 48:9, 52:6 specifications [1] - 132:22 specifics [1] - 93:25 spectrum [1] - 135:9 speculate [1] - 168:3 speculation [1] - 168:7 speech [1] - 4:17 spelling [1] - 55:15 spend [2] - 8:19, 94:6 spent [2] - 21:5, 44:18 split [1] - 175:5 spool [1] - 148:17 spots [1] - 119:3 spread [8] - 25:6, 118:9, 118:19, 119:18, 138:16, 139:15, 161:13 spring [1] - 85:1 square [1] - 103:13 St [2] - 4:8, 4:19 stab [1] - 138:19 stability [1] - 196:13 stable [4] - 45:24, 46:12, 74:8, 198:1 Stacey [2] - 4:10, 132:1 stack [1] - 26:21 staff [1] - 192:19 stakeholder [3] - 192:1, 192:4, 192:16 stakes [2] - 56:22, 147:18 stand [1] - 165:2 Standard [1] - 116:8 standard [7] - 85:13, 95:18, 96:3, 98:14,
---	---	--	---

<p>vast ^[1] - 77:6 verification ^[3] - 56:4, 56:9, 56:17 versa ^[2] - 73:4, 150:11 Versus ^[1] - 106:11 versus ^[15] - 29:7, 29:8, 31:4, 31:5, 31:7, 35:15, 41:21, 47:5, 109:20, 110:2, 136:1, 141:2, 141:10, 181:24, 187:24 viable ^[1] - 94:11 vice ^[2] - 73:4, 150:11 Vice ^[1] - 1:18 Vice-President ^[1] - 1:18 virtual ^[1] - 111:14 Virtual ^[1] - 5:7 virtually ^[7] - 34:1, 35:11, 107:9, 111:8, 184:18, 189:22, 190:8 Virtually ^[1] - 35:10 visibly ^[1] - 142:4 visual ^[2] - 15:20, 170:2 voice ^[1] - 5:18 volatility ^[1] - 196:23 Volume ^[3] - 1:13, 198:4, 198:5</p>	<p>words ^[6] - 31:15, 42:16, 106:13, 107:25, 112:9, 123:3 works ^[4] - 120:5, 133:2, 165:11, 187:3 word ^[16] - 23:5, 28:9, 95:20, 95:24, 97:4, 141:20, 145:24, 147:4, 147:10, 147:22, 148:5, 148:7, 149:7, 158:2, 185:7, 196:2 worried ^[1] - 78:9 worse ^[2] - 164:22, 186:1 worst ^[1] - 176:17 worth ^[1] - 147:19 wound ^[3] - 99:20, 137:16, 137:23 wow ^[1] - 132:21 write ^[3] - 30:20, 132:22, 196:22 writing ^[5] - 55:16, 65:21, 65:25, 66:4, 80:8 wrote ^[1] - 107:20</p>
W	Y
<p>wait ^[1] - 85:18 walk ^[1] - 11:1 walked ^[1] - 89:10 wall ^[1] - 80:9 wants ^[4] - 100:4, 130:10, 131:24, 142:16 watched ^[1] - 66:2 watching ^[4] - 2:12, 5:16, 7:11, 9:1 ways ^[9] - 10:14, 15:25, 37:6, 49:12, 97:10, 103:7, 147:21, 171:13, 191:8 wayside ^[1] - 75:17 web ^[3] - 2:13, 16:24 webcast ^[1] - 2:18 webinar ^[3] - 11:23, 38:19, 66:2 week ^[3] - 46:3, 83:19 weeks ^[4] - 11:9, 13:5, 22:21, 46:5 weighing ^[1] - 77:13 weight ^[2] - 106:16, 131:21 weighted ^[1] - 60:21 Weirsdale ^[1] - 3:19 welcome ^[3] - 2:6, 2:11, 2:12 WESTPHAL ^[5] - 4:3, 109:14, 110:1, 110:24, 111:25 Westphal ^[1] - 4:3 whereas ^[3] - 16:8, 128:9, 179:3 whichever ^[1] - 46:4 whisker ^[3] - 116:12, 117:24, 119:9 whisper ^[1] - 97:7 who'll ^[1] - 59:8 whole ^[7] - 49:4, 49:5, 70:11, 106:12, 108:21, 134:8, 192:14 wide ^[2] - 127:24, 193:4 wider ^[1] - 101:4 width ^[1] - 127:11 wind ^[7] - 23:10, 128:10, 128:11, 175:9, 176:7, 176:8, 186:23 window ^[1] - 75:6 wise ^[3] - 40:15, 111:2, 112:5 wish ^[1] - 122:10 wishing ^[1] - 191:1 wobble ^[1] - 133:23 wobbles ^[2] - 134:4, 134:5 wondering ^[1] - 112:24 WOODHOUSE ^[1] - 4:23 Woodhouse ^[1] - 4:24 WOODHOUSE-YOUNG ^[1] - 4:23 Woodhouse-Young ^[1] - 4:24 word ^[3] - 76:21, 82:11, 92:12</p>	<p>Y-axis ^[1] - 138:22 year ^[67] - 8:11, 10:1, 10:11, 10:12, 15:10, 17:4, 19:11, 19:12, 31:7, 42:11, 44:12, 47:5, 47:7, 52:14, 53:12, 53:21, 56:13, 59:17, 62:5, 62:12, 62:22, 63:11, 64:18, 69:2, 69:6, 69:7, 69:19, 69:22, 70:11, 70:15, 70:21, 71:10, 71:22, 72:8, 72:16, 73:3, 74:12, 83:9, 83:12, 84:19, 85:24, 86:20, 94:9, 122:13, 125:2, 133:18, 136:19, 136:20, 139:11, 139:14, 141:7, 141:9, 141:23, 141:25, 142:1, 142:11, 142:18, 142:19, 145:10, 196:17, 197:6 year's ^[2] - 20:4, 147:19 year-long ^[1] - 72:16 years ^[30] - 7:21, 7:25, 15:10, 20:1, 20:5, 23:18, 25:12, 29:17, 31:15, 31:24, 32:3, 42:10, 42:17, 55:20, 77:23, 82:3, 83:21, 85:19, 86:7, 94:9, 124:21, 126:21, 126:24, 129:1, 135:4, 183:14, 196:14, 196:23, 197:21 yield ^[3] - 95:17, 101:20, 129:7 yielded ^[1] - 122:24 yielding ^[1] - 21:4 yields ^[1] - 115:18 YOUNG ^[2] - 4:23, 48:24 Young ^[1] - 4:24 yourselves ^[1] - 3:1</p>
	Z
	<p>zero ^[6] - 22:15, 44:8, 174:16, 185:18, 190:11, 190:16</p>
	-
	<p>-1 ^[1] - 22:12</p>