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CEP 842
Professional Development Plan
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Participants:

This professional development program is designed for the lower elementary teachers in my school. We have early release days twice a month and this will occur during those times. All kindergarten through third grade general education teachers will meet during early release time on six days, for three hours each day. There are generally two teachers per grade level at the school, although second and third grade have a combo class instead of a second teacher.

The school is located in a suburban setting with a small town feel. Most of the students come from a low socioeconomic status and 59% of the students are on free and reduced lunch. The school is classified as Title I and has the highest free and reduced percentages in the district. For the past four years the school was receiving a Colorado Reading First Grant. Therefore, there have been many, many hours spent on reading professional development and math has just been an afterthought.

There is a small amount of technology available at the school. The school has one full computer lab as well as a portable laptop lab which teachers are able to check out. Other than that classrooms have one teacher computer, but no student computers. The district and building administration are highly supportive of teachers and seem to allot money to certain initiatives when they are needed, however it is a rather conservative district financially. Most professional development is done with one person being officially trained in a program and then returning to the school to train the rest of the staff. That is one reason why this professional development program is so important because it gives teachers knowledge of lots of different math programs and not just the one that the district deemed affordable.

Overall Goals:

- Teachers will gain a basic understanding of common learning disabilities and how those can be diminished through using UDL principles.
- Teachers will be introduced to several research-based mathematics supplemental curriculums. They will understand the focus of each program, how it works, and what students would benefit from the program.
- Teachers will apply strategies and programs they learned about in class to their students and classroom. Supplemental programs will be evaluated and considered in light of the current mathematics curriculum. Integration plans will be created at the end of this training.

Session 1: Overview of Learning Disabilities (3 hours)

Session Objectives:

- The teachers will be able to identify major characteristics of learning disabilities.
- The teachers will understand issues facing inclusion in the general education classroom.

- The teachers will communicate in grade-level teams to identify problems and issues that their mathematics students are facing.

Session Agenda:

The first segment of the class will begin with an overview of learning disabilities and educational concerns. It will begin with a video about learning disabilities from Teacher Tube (http://www.teachertube.com/viewVideo.php?video_id=43297&title=Learning_Disability). This is a short video that will serve as an introduction to the class. Then the instructor will present a PowerPoint outlining the major categories of learning disabilities and some general characteristics. This will be quite general and not math-focused.

(Total Time 1 hour)

The second segment of this session will be more interactive as the teachers complete an IRIS module by Vanderbilt University (<http://iris.peabody.vanderbilt.edu/agc/chaleycle.htm>). Teachers will work independently through the module, being sure to write answers to the assessment questions at the end. Following the work in the module (about 45 minutes) teachers will engage in a class discussion about their answers to the questions and what they have learned.

Guiding questions for the discussion are:

- Answering the module assessment questions
- What is one new thing that you learned from this module?
- What applications can you take from this module for your classroom?

(Total Time 1 hour, 15 minutes)

The final segment of this session will be work time for grade level teams. Teachers will gather in grade-level teams to discuss individual students and identify problems that students are facing in math. (Total Time 45 minutes)

Session Rationale:

The first session is an introduction to the class. Since the class is a collection of primary teachers from one school, their knowledge of special education and learning disabilities is quite varied. Some have just attended college, studying about learning disabilities in their classes and others completed their training years ago when knowledge and research was much different. This session is a way of setting up a common knowledge among teachers for the rest of the class. This is achieved by the PowerPoint and IRIS module used for instruction in the first two segments.

The discussion component of this session is quite important. Teachers are most successful when they are in communities where collaboration occurs. While collaboration is a major emphasis in this school, it tends to be focused on day-to-day tasks rather than the “big picture” of education. Specifically, the area of mathematics education as a discipline gets very little attention, as the focus of administrators is almost solely on reading. Giving teachers the chance to communicate and share opinions and ideas is a vital part of the success of this class. The goal is that by giving teachers common knowledge and experiences, they will be able to work together better as a mathematics instructional team.

Since discussion is important, the class will begin and end with work time in grade-level teams. Teachers receive a lot of training throughout the year with curriculum and programs, but usually it is a quick training with no time for discussion. Therefore since time is usually quite

limited for teachers, often the programs get left since there was never time to figure out how to incorporate the new ideas into the current program. One of my goals in this program is to achieve a lasting effect for teachers and students, which will be best achieved if teachers are given the time necessary to work on incorporating and integrating the new strategies into the current curriculum.

Session 2: UDL (3 hours)

Session Objectives:

- The teachers will know the basic concepts of UDL and how these ideas can be incorporated into the classroom.
- The teachers will identify major math specific disabilities and issues that our current students face.
- The teachers will apply what was learned about UDL and math specific disabilities to identify weaknesses and areas of growth needed in the current curriculum.

Session Agenda:

The first segment of this session will include an introduction to UDL. The instructor will introduce UDL briefly to teachers, explaining its' origin in architecture and the ways that it is applied. The instruction will be quite brief as discussion will be deeper as teachers learn more about the concept. Teachers will independently complete the IRIS module about UDL (<http://iris.peabody.vanderbilt.edu/udl/chalcycle.htm>). They will be able to work at their own pace through the unit, expecting that it will take about 45 minutes. Teachers will be instructed to write their answers to the assessment questions at the end of the module as these will be used later in discussions. Following completion of the module, teachers will be divided up into small groups and asked to discuss their answers to the assessment questions as well as any other responses to the UDL concept, about 20 minutes. When groups have finished their discussions, the instructor will recap general responses and comments which were observed during discussions, about 10 minutes. (Total Time 1 hour, 15 minutes)

The next segment of this session will be an introduction to math specific disabilities. Teachers will work through an interactive article by PBS on their website (<http://www.pbs.org/wgbh/misunderstoodminds/mathbasics.html>). This website is a basic introduction of specific problems that students have with various types of math skills. The interesting part of this website is that the teachers are able to try problems that are similar to the issues for math disabled students. That way teachers are able to experience the frustration and confusion that students feel with the concepts of multistep problems, basic facts, and visualization. Following the website activity, the teachers will have a whole group discussion about their observations after experiencing the frustration of students. The segment will end with a short video about famous people who have dyscalculia (http://www.teachertube.com/viewVideo.php?video_id=375&title=Dyscalculia__Famous_Dyscalculics). (Total Time 1 hour)

The next segment will be a chance for teachers to apply what they have learned so far about disabled students and UDL. The district math curriculum is Everyday Math. Since all

teachers are currently teaching, a review of the curriculum is not necessary. Also, due to the fact that different grade levels are represented, it would be difficult to address the curriculum specifically. Rather, the teachers will be asked to apply what they have learned about UDL to the Everyday Math curriculum. They will spend about 15 minutes brainstorming individually and then gather in grade level teams for a longer, more in-depth discussion. (Total Time 45 minutes)

Session Rationale:

The first segment of the second session is focused on instructing teachers about the foundational concepts of UDL (Universal Design for Learning). Since this is not a philosophy which began in education, many teachers do not know about UDL principles and how they apply to education. UDL can actually make teachers' jobs easier as they learn how to change their thinking to accommodate students with disabilities from the beginning of the lesson design process. Often special education students are not considered until after a lesson is created, as teachers consider how to change a lesson to accommodate those students' needs. However, by using UDL principles these considerations are used during the lesson design phase and there is not a need to make changes after the lesson for most inclusion students. This actually makes the teacher's job easier. In the first segment of this lesson, teachers will see how the UDL principles work and how it can alleviate work from their jobs.

The second segment is an introduction and discussion about math specific disabilities. This will incorporate concepts from the first lesson as the information about learning disabilities is more specifically connected to the discipline of mathematics. The structure of the segment is more open-ended on purpose, allowing teachers to peruse a website at their own pace. The loose structure is designed so that teachers will be able to find the information that they need and that is most pertinent to their students. Teachers will also have the chance to attempt math problems which simulate what students with disabilities feel when completing certain types of math problems. This is important for teachers to experience the affect side of mathematics disabilities to help them to understand the importance of changing instruction to meet the needs of these students.

The last segment in this session is a brainstorming and discussion session. As was already discussed in the previous section, an important aspect of this professional development class is the discussion and work time with both the new programs and curriculum. During this segment, teachers will incorporate the knowledge that has been gained about UDL and math disabilities with the current curriculum. They will be looking for inconsistencies and areas in the current curriculum where changes need to be made to best instruct students with math disabilities. This will help teachers to be analytical when learning about supplemental programs in the next three sessions to consider how they could actually be used to supplement areas of weakness in the current curriculum.

Session 3: Mathematical Calculations (Math Facts) (3 hours)

Session Objectives:

- The teachers will understand how the FASTT Math Fact Fluency program works and how it can be used to supplement traditional math curriculums.

- The teachers will understand how the TouchMath program works and how it can be used to supplement traditional math curriculums.
- The teacher will experience a TouchMath lesson as a student would.

Session Agenda:

In the first segment of this session, teachers will be introduced to the FASTT Math Fact Fluency Program which helps students to gain fluency and automaticity with Math Facts. Since this is a major area of struggle for many students with disabilities, this must be a major area of instructional focus. However, current math strategies employed in general curriculums do not seem to work well for learning disabled students. The instructor will use a slideshow to introduce the curriculum (60 minutes).

Following the instruction, teachers will explore the online website for the FASTT program. This website is very comprehensive and easy to navigate. Two sections of the website which teachers will explore are the program overview and a 5 minute oral presentation by the author about the research-based strategies in the program. Teachers also have the option of completing a 20 minute tutorial explaining the program. (30 minutes) (Total Time 1 hour, 30 minutes)

The second segment of this session is an overview of the TouchMath program which also helps primarily by providing a multi-sensory approach to learning number sense. The goal is helps students to learn math facts through simple counting methods. The instructor will use a slideshow to introduce the curriculum (45 minutes). Following the presentation, the teacher will present a simple lesson to the teachers illustrating how the TouchMath program would look in a classroom (20 minutes). Then the class will discuss the article “An Evaluation of the TouchMath Method for Teaching Addition to Students with Learning Disabilities in Mathematics” (25 minutes). Teachers will have been assigned this reading prior to class, so they will be ready to discuss the article in class. Guiding Questions for the Discussion are:

- How would you use this program in your classroom?
- Would it be a feasible program to integrate?
- What benefits do you see for the students?

(Total Time 1 hour, 30 minutes)

Session Rationale:

The third session of this professional development program is primarily an introduction to two supplemental programs which have been designed specifically to help struggling students in the area of mathematical calculations. Memorizing math facts is a huge area of weakness for special education students and one of the areas that teachers commonly try to instruct as an accommodation. However, for many of the math disabled students more drilling of math facts does not solve the problem and creates major frustrations for the students and teachers. This session provides alternatives to the drilling procedures often used to instruct math facts.

The first program introduced is the FASTT Math Fact Fluency program. This program is unique because it is a technology software program that is used to instruct students with disabilities. One of the helpful elements of this program is the structure that students can work on computers independently and a physical teacher instructing students is not necessary. This is a program that can be easily incorporated by simply having a classroom computer that students can get on during math time to get this supplemental instruction while the teacher is working

with the rest of the class. Also during this session, teachers will have time to get onto the program and try it out for themselves. This will build teacher buy-in into the program and its' ability to help their students

The second program introduced in this session is the TouchMath method for teaching math facts. This program works differently than the previous program because it is an alternative teaching method rather than just a remediation program for more math fact practice. It is extremely helpful for teaching students who do not seem to conceptually understand math calculations and have poor number sense. However, a drawback of the program is that it requires teacher instruction and therefore an extra teacher would be required to teach a small group of math disabled students. Following the presentation, the teacher will present a simple TouchMath lesson, giving teachers the visual of how the program works. This is an important step to get teachers practically involved in the curriculum rather than simply stuck in the facts. Finally, the teachers will analyze an article with research about using the TouchMath program to teach math disabled students. This will help them to be more knowledgeable and informed about the benefits of using this program in their classrooms.

Session 4: Language & Mathematical Structure (3 hours)

Session Objectives:

- The teachers will understand how the PALS Math program works and how it can be used to supplement traditional math curriculums.
- The teachers will experience a PALS Math lesson as a student would.
- The teachers will understand how the Stand Out Math program works and how it can be used to supplement traditional math curriculums.
- The teacher will experience a Stand Out Math lesson as a student would.

Session Agenda:

The first segment in this session will be focused on the PALS Math program. The segment will begin with a survey of which teachers have used peer-tutoring strategies in the past. There will be a short discussion of strengths/weaknesses of these types of strategies. Then the instructor will present a PowerPoint show explaining the basic structure of the PALS Math program and research supporting peer-assisted learning (40 minutes). Following the presentation, the instructor will introduce and play two videos from the PALS Math website (15 minutes). The first video will be a teacher instructing the program to a kindergarten class. The second video is two older students completing a PALS Math 2nd -6th grade lesson. While the students in the second video are far older than the K-3rd students represented in this professional development, it shows the style and format of a 2nd or 3rd grade PALS Math lesson. After the videos, the instructor will provide an abbreviated version of the pre-teaching required for a PALS Lesson. Then the teachers will try a PALS Math student lesson, being coaches and players (35 minutes). Teachers will be required to do either a K or 1st lesson and a 2nd or 3rd lesson. That will ensure that they see the scope of the program. (Total Time 1 hour, 30 minutes)

The second segment in this session will be focused on the Stand Out Math program. This is a math language program that helps students to understand math terminology at a young age. The instructor will introduce the program with a PowerPoint (50 minutes). Then the instructor

will do 2 lessons from the Stand Out Math curriculum (40 minutes). The instructor will do one K-1st game and one 2nd-3rd game. That way teachers are able to see how fun and interactive the program is along with the benefits for students. (Total Time 1 hour, 30 minutes)

Session Rationale:

The first segment of session four is an introduction to the PALS Math program and the strategy of peer tutoring. This is not a commonly used strategy in the primary grades because it is usually assumed that students cannot handle the independence and leadership. However, the PALS Math program provides the structure and instruction that students need to be able to appropriately peer tutor. The research in favor of this strategy is strong. During this training, teachers will be exposed to the elements of the program through a PowerPoint and then be able to watch the program in action from both a teaching side and a student side. This will allow the teachers to evaluate the effectiveness of the program for themselves and to be able to see that peer tutoring can work from a classroom management perspective. After the videos, teachers will be able to actually try the program as they engage in a peer tutoring lesson as a student would. The goal is that teachers are exposed to the peer tutoring concept and have confidence in the strategy as viable in a primary classroom.

The second segment of this session is about a somewhat unique math language program, called Stand Out Math. The philosophy of the program is that students need to begin learning math terminology long before they are expected to apply the concepts on standardized tests. Therefore students as young as kindergarten are learning the basic concepts of challenging language such as commutative property, volume, and vertices. Through the interactive partner work, fun songs, and engaging chants students learn these higher level concepts. During this second segment teachers will see the facts and research of the program through a PowerPoint and then have the opportunity to experience the lesson through 2 hands-on programs. The goal of this segment would be for teachers to see that with very little time, 20 minutes a week, they can make an impact on student learning and standardized test achievement through research-based, specific, direct instruction.

Session 5: Problem Solving (3 hours)

Session Objectives:

- The teachers will read an article about math problem solving strategies for students with disabilities.
- The teacher will discuss and discover ways to incorporate research-based math problem solving strategies into the current math curriculum.
- The teachers will understand how the Pirate Math program works and how it can be used to supplement traditional math curriculums.
- The teacher will experience a Pirate Math lesson as a student would.

Session Agenda:

This session will be focused on math problem solving strategies. Prior to this session, teachers will be asked to read the article, "Math Problem Solving For Primary Elementary Students with Disabilities"

(http://iris.peabody.vanderbilt.edu/resource_infoBrief/k8accesscenter_org_training_resources_documents_Math_Primary_Problem_Solving_pdf.html). Before discussing the article, teachers

will be asked to quickly brainstorm why they believe problem solving is such a problem for students and strategies that they use in their classroom to help alleviate the problem (15 minutes). Then, since the article will be most fresh in their minds, the session will begin with a quick summary of the article (10 minutes). Then teachers will be divided into small groups of 3-4 and asked to discuss specifics of the article. They will be asked to discuss the strategies and recommendations in light of the real students they teach. Some guiding questions include

- Is the research valid based on teacher's experience?
- Is this a feasible strategy to employ in the classroom?
- What are teacher's thoughts about integrating direct instruction in their classrooms?

After the small group discussion has come to a close, about 25-30 minutes, the instructor will ask for comments to the whole group. The whole group will discuss strategies and thoughts about integrating direct instruction techniques into the curriculum for about 30 minutes. (Total 1 hour, 15 minutes)

The second half of this session will be an introduction to the Pirate Math program for instructing students in problem solving strategies. The instructor will use a slideshow to overview the program (60 minutes) and then let the teachers experience the program first-hand. The instructor will teach a lesson to the teachers as a pretend class of students. Teachers will see all parts of the program and experience it as a student would. (30 minutes). Following the lesson, teachers will spend 15 minutes discussing thoughts and reactions to the lesson and program. Guiding Questions will include...

- How comfortable was this program as a student would feel?
- Does it seem to be a feasible intervention?
- What are ways that this could be integrated?

(Total 1 hour, 45 minutes)

Session Rationale:

This session focuses on problem solving which is a particular area of struggle for many math disabled students. There are many elements which can contribute to problem solving challenges. During the first segment, teachers will discuss an article by Marjorie Montague which outlines why students struggle with problem solving and effective strategies to help students. By using this article as a basis for the discussion, it should open up teachers to discuss and share strategies which they have found to be successful. Often teachers have strategies which they employ in their individual classrooms, but which are not shared with others. Many times, the teachers do not even realize that they are using a specific strategy and by allowing time for discussion, these techniques will naturally be shared. This session will encourage collaboration among teachers which will hopefully continue past the end of this professional development program.

The second segment of this program focuses on a specific program for teaching problem solving strategies titled, Pirate Math. This program is a short program which is defined and structured. One of the advantages is that the program is 16 weeks, has teacher scripts, and is easy to implement. However, the program is designed to be completed in a one-on-one setting which does require an extra teacher to instruct each struggling student. During this session, teachers will acquire a basic understanding of the program, learning the language and concepts of the program. Teachers will also experience a Pirate Math lesson as a student and then have

time to discuss reactions. The discussion time is a pivotal part of this program to engage teachers in effective collaboration strategies and to allow more ideas and strategies to surface.

Session 6: Learning Strategies & Application of Programs (3 hours)

Session Objectives:

- The teachers will read two articles discussing learning disabilities specifically in the math discipline.
- The teachers will be introduced to the use of mnemonic instruction to teach math and discuss ways to incorporate this strategy into their classroom.
- The teachers will review the math programs which have been highlighted in this professional development class.
- The teachers will work both in grade-level teams and cross grade-level teams to coordinate school-wide supplemental instruction to the current math curriculum in the areas of need of specific students.

Session Agenda:

Prior to the class, teachers will be asked to read two articles, “Learning Disabilities in Mathematics”

(http://iris.peabody.vanderbilt.edu/resource_infoBrief/ldonline_org_article_5947.html) and “Learning Strategies and Mathematics”

(http://iris.peabody.vanderbilt.edu/resource_infoBrief/k8accesscenter_org_training_resources_documents_LearningStrategiesMath_pdf.html). The first article is a short recap of mathematics disabilities as they relate to learning disabilities. This is a great review article to help bring the class together at the end. The second article discusses the need for and use of specific learning strategies. This is one last point that will be addressed in the class. The class will begin with a discussion of these two articles in light of what has been learned. Guiding questions for the discussion include:

- How does the use of specific learning strategies help students with mathematics disabilities?
- What learning strategies are already employed in our classrooms?
- What new learning strategies can be integrated?

(Total Time 30 minutes)

The next segment is again a discussion based on an article, but a slightly more advanced topic. The teachers will have read the article, “Using Mnemonic Instruction to Teach Math” (http://iris.peabody.vanderbilt.edu/resource_infoBrief/k8accesscenter_org_training_resources_documents_Mnemonicinstruction-math-4-20-05_pdf.html). One of the strategies mentioned in the previously discussed article about learning strategies was the use of mnemonic strategies. This article provides a much more in-depth look at mnemonic strategies and how they can be used. The class will engage in a whole group discussion about this article. Guiding questions for the discussion include:

- What mnemonics have you used in your classroom?
- How can the use of mnemonics help students?
- Did you learn any new mnemonics that can be used?

(Total Time 30 minutes)

The next segment of this session is to recap the programs which have been discussed. The instructor will do a quick five minute oral review of the highlights of each program discussing what the main focus and structure of each program. Materials will be available for teachers to peruse. (Total Time 30 minutes)

The final segment of this session will be a work session to wade through the programs and discuss how ideas can be integrated into the current curriculum and classrooms. This is an essential part to the class as it is the take away that will lead to change. Teachers will be asked to discuss thoughts with grade-level teams of ideas and programs that seem applicable to their students. Then they should use the current curriculum books and state-standards to help align a plan of how to provide help (60 minutes). After creating grade-level plans, each grade level will present their integration plan to the group and cross-grade level collaboration will occur (30 minutes). This will align the primary grades into a cohesive mathematical teaching unit. (Total Time 90 minutes)

Session Rationale:

This final session has four segments and serves to teach one more pivotal strategy for working with math disabled students along with reviewing major concepts from the professional development course. The session begins with a discussion of two final articles about math learning disabilities. The discussion will focus on specific learning strategies and how these are or can be employed in the classroom. By this point, collaboration should be working well and the teachers will be learning and teaching each other with their comments. After discussing the two articles about learning strategies, the teachers will discuss a third article which addresses the use of mnemonic strategies in the classroom. This is another learning strategy that can be used and discussion is vital to this segment. Many teachers develop mnemonic strategies on their own as a reaction to student's needs. Sharing these mnemonic strategies will benefit all of the teachers as they learn from each other.

The last two segments in this session are designed to review major concepts from the class. First, the instructor will do a quick review of the programs that have been discussed highlighting the major elements, strengths, and weaknesses. This will lead directly into a discussion and work time with grade-level teams. This work time is an important part of the class because this is where teachers can decide what strategies they want to use and how they will implement the strategies into their classrooms. That is why teachers will meet in both grade-level and cross grade-level teams to coordinate implementation. By the end of the work time, teachers should have an action plan about areas in the math curriculum which need supplemental instruction and how to fill in those gaps. Also, teachers will be comfortable with and engaged in productive collaboration techniques to continue discussions about productive math strategies after the class has ended.

Class Assessment:

The goal of this professional development class is to inform teachers about the needs of students with mathematics disabilities and programs that are available to help in various areas of mathematics. Therefore, I am not assessing whether teachers have memorized lists of information. Rather I want to see classrooms transformed as teachers realize that there are

programs to help which do not require lots of money or time. My goal is for this class to change the way that teachers teach.

It is hard to judge whether transformation is happening in teacher instruction. Therefore, I will use two assessments as my best attempt to be sure that I am meeting the needs of the teachers and in an attempt to get authentic responses which can lead to a more valuable class. I will give each teacher a survey both at the end of each session and at the end of the whole class. Authentic answers on these surveys will help me to guide instruction and be sure that class goals are being met.

The session survey is my formative assessment. There are only three simple questions on the survey, primarily asking what teachers found valuable, what they did not, and any areas that they would like to learn more about. As I review these surveys after each session, I will be able to change the program dependent on the teachers' needs. I see this as highly valuable because the best way to effect teacher change is to give them help in their areas of need. If my instruction is not matched to their needs, then the class will be much less successful.

The other assessment that I am going to employ is an end of class survey. This will be a formative assessment in that it might change future versions of this class, but it is also summative to learn what went well during this class. The questions on this survey are summative in nature and give information about what were the most valuable and least valuable parts of the class. The survey also addresses learning styles in asking what mode of instruction teachers like the best and whether the readings were valuable. One big area of concern on the end of class survey deals with whether assignments and information were worth the time. Time is a valuable commodity for teachers and one that is definitely worth considering when evaluating professional development.

Overall, I hope that my assessments help to guide the class by allowing me to make minor changes as time goes on with results from the session surveys and to evaluate the effectiveness of the class as a whole in the end of class survey. Teaching is a continual learning process whether we are teaching students or teachers.