Group 5 Pilot Study: A Study on the Utilization of Technology to Differentiate Instruction and Facilitate Student-Centered Learning

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GROUP 5 PILOT STUDY

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Introduction

School districts differ in the availability of technology provided to their educators. The integration of technology utilized varies as to whether it is applied to teacher-centered or student-centered instruction. An obstacle that Cuban (2003) identifies in his seminal writing is that the purchase of technology in schools is often unused. Educators are not aware of how to differentiate effectively with technology. Moreover, there is scant evidence that the vast majority of educators are using technology to differentiate instruction and foster student-centered learning environments. Student-centered learning environments with appropriate technology-infused tools are critical in helping students learn (Jonassen, 2012). The purpose of this pilot study is to investigate the extent to which educators use technology to differentiate instruction and facilitate student-centered learning.

Today's children and teachers have the opportunity to harness the integration of technology to help achieve deep, meaningful and differentiated learning opportunities to reach all types of learners as advances in technology continue in our world. School districts pride themselves on providing effective and high quality, diverse learning environments for their students. Student-centered learning is paramount in developing effective differentiated learning tasks for all students. Many school districts currently are focusing on integration of technology to facilitate this pedagogy. However, it is unclear if educators are aware of the potential benefits technology may offer to transition from a teacher-centered to a student-centered environment. Earlier studies found that "...teachers' enacted beliefs, particularly in terms of classroom

technology practices, often did not align with their espoused beliefs" (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012, p. 423).

In addition, it is unclear how teachers define student-centered technology in a learning environment and whether having similar definitions would help foster student-centered learning while differentiating instruction. A study of integration practices of award-winning technology-using teachers identified three different roles technology plays in their classrooms: reinforce skills and content, enrich the curriculum, and transform teaching and learning (Ertmer, et al., 2012, p. 430). The National Educational Technology Plan emphasizes the need for students to learn in a differentiated environment with student-centered use of technology to support curriculum goals. A prominent leader in the field of educational technology, Alan November (2009) promotes differentiated instruction with technology and collaborating as critical components in developing an environment to foster learning.

Literature Review

The use of technology to differentiate instruction depends on individual teacher characteristics and school contingent factors. Teacher's belief in constructivist philosophy often times lead to student-centered pedagogy. Curricular requirements, accessibility to technological resources and lack of technology knowledge are constraints for teachers to sway toward teacher-centered instruction (Friedrich & Hron, 2011, p. 275). Hains and Smith (2012) discuss the importance of creating a classroom environment where the learner is required to construct knowledge for themselves (Hains & Smith, 2012, p. 359). Global expansion demands for students to be able to collaborate, applying academic concepts in professional environments.

Constructivist philosophies adapted in classrooms by teachers and learners allow for learners to take ownership of their learning process.

Constraints beyond the teacher's control prevent them from adapting student-centered pedagogies. Lack of training and technological resources and the need for curricular changes are current struggles faced today by educators. Programs need to be evaluated and changed based on current student needs. Other teachers noted that the recent, strong focus on state assessments was a barrier to the adoption of pedagogies needed to differentiate using student-centered technologies (Ertmer, et al., 2014, p. 429).

Although external barriers to technology integration such as access and support have been greatly reduced, Ertmer et al. (2012) found that teachers were constrained by their own attitudes and beliefs in the delivery of student-centered activities in technology-aided differentiated instruction (DI). Teachers with constructivist beliefs supported student-centered curriculum in which students collaborate on authentic, multi-disciplinary tasks to create their own schema. But in many cases, increasing teachers' access to computers did not transform technology practices in the classroom unless accompanied by requisite training needed and a shift in teachers' pedagogical beliefs.

Student-centered learning supports the constructivist learning theory where the most meaningful learning takes place through personal experience, self-discovery and inquiry through trial and error. The infusion of technologies in the classroom supports the instructional strategy design for student-centered learning. This constructivist approach to learning encourages critical thinking, collaboration and students taking charge of their own learning (Saxena, 2013).

Teachers who use this approach in their classroom take on the role of a facilitator empowering

students to take a larger role in their own learning process. Bringing technology into the classroom does not necessarily create student-centered learning environments (Bharti, 2014). Teachers need to be trained on how to implement the technology into their classrooms to support student-centered learning environments. Students should be self-directed and ready to advocate for themselves. Teachers need to be ready to assess students, identify their strengths and provide appropriate tools to foster student's academic growth while meeting curriculum requirements (Moeller & Reitzes, 2011, p.17)

Advances in computer and educational technology have helped facilitate teachers in creating student-centered learning environments (Hannafin & Land, 1997, p.168). Students can use computer to research information on experiments or use interactive software to reinforce concepts taught. The creation of a personal connection while learning allows students to have a deeper understanding of content taught. Having access to technology resources address a larger range of student interests and enables them to construct personal meaning (Hanafin & Land, 1997, p.170). Projects constructed with online software and games that support creative thinking while addressing students' interests and the curriculum taught are all appropriate methods for facilitating student-centered learning environments.

Theoretical Framework

According to Creswell (2014) the research approach is that of mixed methods study with a pragmatic worldview in which the inquiry is based on data collection from both quantitative and qualitative research designs. In the case of this pilot study, a survey was developed to query a broad demographic (teachers of K-12 populations) as to how differentiation is accomplished through technology integration. Open-ended interviews were conducted with randomly selected

survey participants to probe for detailed information on practices of technology integration in differentiation. The question of whether technologies used were student-centered or teacher driven was included in the interview to test the validity of the research questions and provide information on teachers' perceptions of how they use technology in the classroom.

Research Questions

The purpose of this pilot study was to conduct a preliminary analysis of the use of technology in Differentiated Instruction (DI) and to further investigate whether the technology used in DI was considered by the teachers to be student-centered. Research questions were constructed as follows:

1. To what extent do teachers use technology to differentiate instruction?
2. Is any of the technology used to differentiate instruction considered student-centered use of technology to foster learning?

Methods

A qualitative analysis was designed by the four researchers using survey questions and personal interviews to obtain data on teachers' practices in using technology for differentiation. Some quantitative demographic data was also obtained as a result of the survey. An online spreadsheet was also created to capture data for analysis from the survey respondents. Sharing in the analysis of data was accomplished through the use of a collaborative Google document and participation in Google hangout sessions.

Participants: A convenience sample of teachers (n =17) was selected as survey participants from four schools; eight randomly selected participants from the survey were selected for interviews. Clustering was used in order to have all grade levels represented in the survey.

Procedures:

A Google survey (Appendix A) was administered and sent electronically to 17 selected participants. Researchers introduced the survey request with an electronic letter of explanation, guarantee of anonymity, and note of thanks. Participants were given seven days to complete the survey. During those seven days, two participants from each school were randomly selected for face-to-face interviews for a total of eight interviews. The interviews ranged from five minutes to ten minutes each. Researchers used identical interview questions (Appendix B).

Stratified-random sampling was completed as a proportion from each different pool was taken from each individual school district. The specific type of sampling was stratified random sampling, where two individuals were chosen from each of four different school districts where the interviews convened.

Instruments:

A Google survey was developed (see Appendix A) by the researchers to extract information from teachers about the use of technology in differentiated instruction as well as other demographic data. Google surveys provide an inexpensive and expedient way in which to query participants and analyze their responses. Surveys were delivered to the participants via e-mail and responses were collected anonymously through Google forms.

Personal interviews were conducted using a questionnaire developed by the researchers (Appendix B). Through the use of stratified-random sampling two participants were selected for interviews from each of the four school districts involved.

Evaluation and Assessment Methods

Conducting a pilot study allows the researcher to assure the feasibility of the actual study and determine if the instruments used for data collection are appropriate. The pilot study as a training ground for inexperienced researchers (Explorable, 2014) focuses on the importance of creating instruments that will collect measurable data from which patterns can be determined and predictions made. It allows researchers to establish validity of instruments used in the study and to make appropriate adjustments for the actual study (Creswell, 2014, p.161). A mixed-method approach was taken to obtain both qualitative and quantitative data from a survey and personal interviews. A Google survey link was emailed to all participants in each school with a brief statement asking these participants to complete the survey in the specific time frame mention.

The researchers chose a Google survey because it can efficiently collect data from multiple participants and translate the results into charts and spreadsheets for easy analysis. The survey was kept brief, consisting of only five questions, four of which were multiple-choice questions to keep the participants engaged and not take up much of their time. The survey was sent via email to keep results anonymous and make it easier for participants to respond.

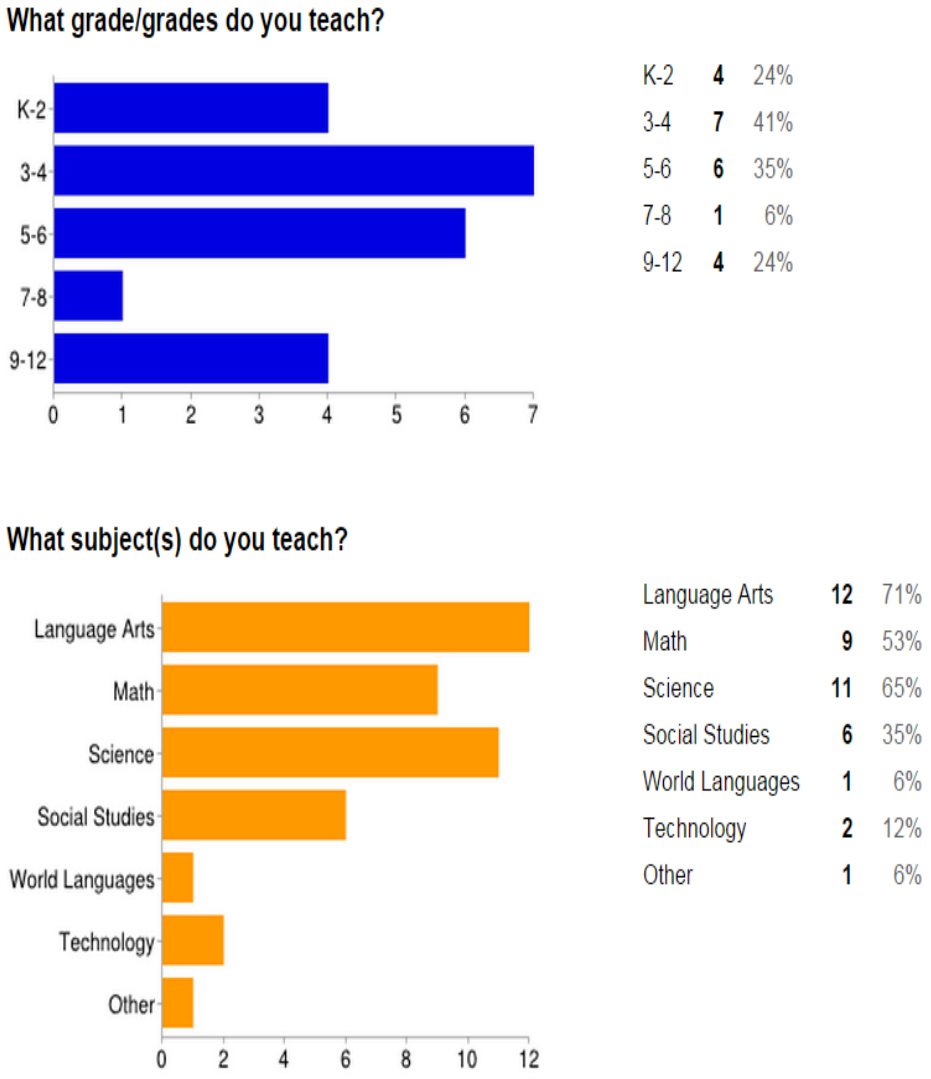
The survey questions addressed multiple scales of measurement. A nominal scale was used to identify grade level taught and an interval scale was used to determine years taught. A five point Likert-Scale was used to determine how useful technology was in implementing differentiated instruction. These measurements scales served to help the researchers to identify

experienced teachers from non-experienced teachers and what grade levels were taught. The quantitative information collected could be used to determine correlations between years' experience, numbers of courses taught in a given day and use of technology to differentiate instruction.

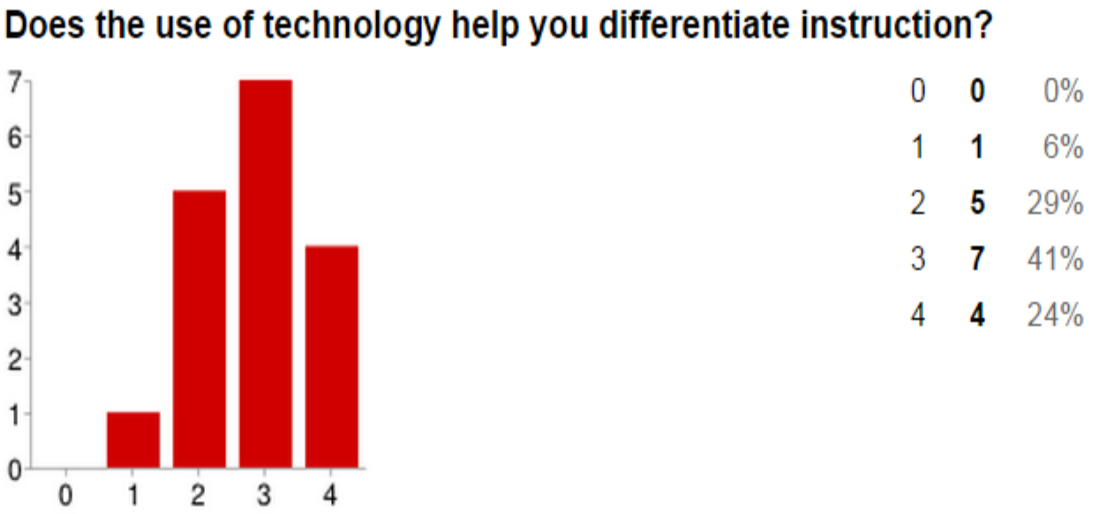
In order to increase the constructive validity (Creswell, 2014) of the pilot study the researchers conducted a brief interview with two participants from each school district involved focusing on the hypothetical construct that technology used for differentiation would be student-centered. The qualitative data collected from the personal interviews would help to support the finding from the survey conducted.

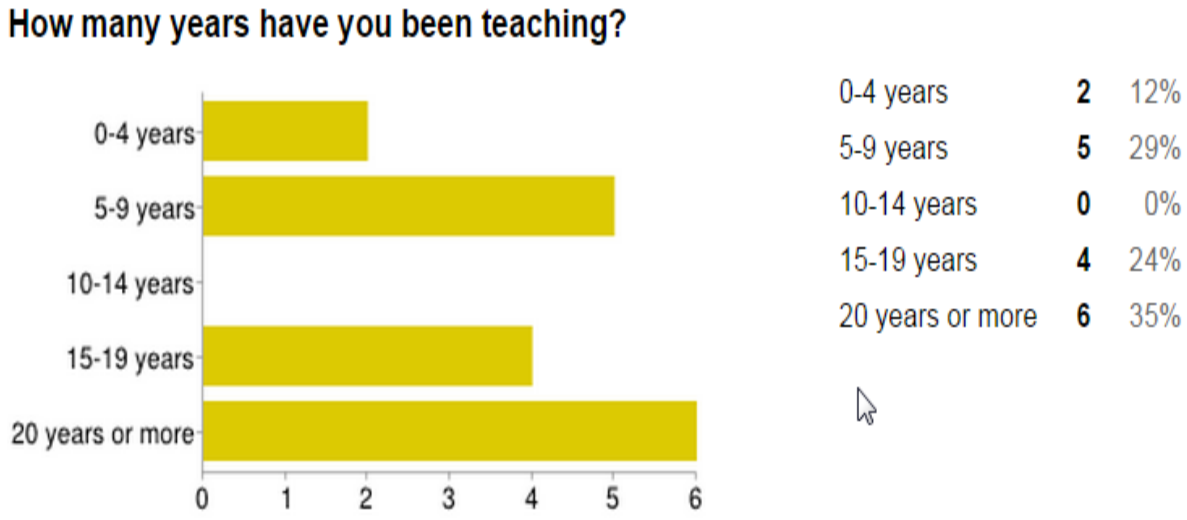
Results

The following results are given in raw data form. Figures 1.1, 1.2, 1.3 and 1.4 are graphical representations of data collected from the questions in the survey, generated from Google itself. Figure 1.5 is a copy of the list of technologies participants stated they used to differentiate instruction in their classrooms.



Figures 1.1 & 1.2- Graphical representations of nominal measurements identifying grades and subject taught.





Figures 1.3 & 1.4- Graphical representations of interval measurements describing the extent of which technology helps to differentiate instruction and number of years taught.

Text-Based Results from the Type of Technology used to Differentiate Instruct

What type of technology do you use to differentiate instruction?

Webspiration, google drive, google classroom, online labs, kurzweil
raz kids, docs, activboards,
My students use computers and iPads to play games in math. The games have different levels, so the children can play at their level. Some of my students have access to a phonics reading program on the computer. This program progresses at the children's pace according to ability level. We also use iPads for eBooks. These books allow the children to listen to the story if they are not able to read the words themselves. They can also look up unfamiliar words.
Audio/Visual aids Computers Calculators
*I put text books online and students can click and listen to the science lesson read aloud to them.(example our Science book) I also pick and choose activities and concept questions for all level learners by assigning different classwork and homework that is done online. * I use CoWriter a program that assists students in their writing. As they type it gives examples of the correct spelling of words they want to use and the student can then click what they believe is the correct word. * document camera- lets students show and explain their work visually
computers
moby max, edmodo assignments
computer Smartboard
I use word to type documents. I use excel to keep track of assessments.
smart board, websites (Ex. Super Teachers, Brain Pop, Informational test workbooks
Learning activities, games, online assessment and assignments (related to four skills of learning: reading, writing, listening and speaking), using an interactive board and some programs such as Edmodo, Quia and Voicethread (audio, text, pictures and video), etc
various websites, smartboard
smart board, internet
Cell phones, computers, tablets, online pograms
spelling city, voicethread, google docs
I'll use interactive overhead projector (i.e. Promeathean board) to accommodate auditory, visual, and hands-on learners. Also, I have used websites/programs like Khan Academy, Code Academy, and Robotc Curriculum Companion for the virtual worlds for students to complete self-pacing lessons. Additionally, I'll use PhET Simulations for certain physics labs. For my technology class (robotics studio), I have had my students work with the Arduino microcontroller

Figure 1.5- Represents responses from participants on all technologies used to differentiate instruction.

For data validation, according to Sincero (2012), the survey posed five questions. There were 17 respondents and each participant answered all the questions. No questions had to be eliminated due to lack of responses.

Comprehensive Discussion of Major Findings

In the survey only one of the five questions required an open-ended response. The purpose of this was to allow each individual to give the opportunity to provide in-depth information related to the type of technology they use to differentiate instruction with various technologies. The results showed varying degrees to which respondents interpret differentiated instruction with technology. Some patterns were identified when analyzing the findings from this question. The most prevalent theme was the use of the Internet, websites or online tools to help differentiate instruction. For the purposes of analysis, the terms websites, Internet, online and web-based were grouped together. These terms emerged at least once in more than half of the respondents' answers. This number increases when including some other cloud-based applications that users defined to differentiate instruction. For some of the responses, it was clear that students utilized web and cloud-based applications to interact with technology devices to benefit from differentiated instruction. Examples of cloud based applications that were written about from more than one respondent included Google Apps, Webspiration, Voicethread, and Edmodo. There were other cloud-based applications that were listed.

From other responses, it was unclear if the student or the teacher used the technology to help differentiate. One of the responses answered online assessments as technology used to

differentiate instruction, which is often used as a teacher-based instrument to help differentiate. The term computers came up in one-third of respondents, and other technology tools such as tablets and cell phones would have this number of student use of technology increase. The use of interactive whiteboards seemed to indicate that teachers and not students were the ones using it to differentiate instruction. Four respondents wrote about either Smartboards or interactive projectors in their responses. The term interactive projectors was meant to read as interactive whiteboards, which could also indicate misunderstanding of appropriate definitions of technology tools with some of the population that was surveyed.

It was interesting to note that only 3 of the 17 respondents indicated the term audio or visual as a method of differentiating instruction. These key words written by respondents indicate a specific level of awareness as to indicators in differentiating instruction without actually referring to a specific technological tool. Along the same lines, three teachers responded with assistive technology tools, such as Webspiration, Kurzweil and co-Writer, as methods to differentiate with individuals who have learning differences. Differentiation is a critical component when it comes to work with students who have specific reading and or writing disabilities. Interestingly, mobile devices were mentioned three times. This number appeared low compared with the preponderance of mobile devices in both students' and teachers' daily lives.

Participants from all grade levels, K -12, were represented in the pilot study as a result of cluster sampling. Teachers in all grade levels used technology to differentiate instruction as reported in the survey. Teachers were given choices, such as K-2, 3-4, 5-6, etc. Some teachers chose more than one box if they taught more than one grade levels. Several teachers choosing

multiple checkboxes in the survey made the group seem more representative of all grade levels. However, it would be inconclusive to say that every grade was taught, but better to indicate that most or all grades were covered in the survey.

The "Grade Taught" variable is limited in its value for correlation studies due to the fact that grade levels were grouped together rather than broken out. The question might have been reframed to determine "in which grade levels" teachers had used technology to differentiate instruction. Had this limitation not affected the measurement instrument it might have been possible to generalize the correlation between grade levels taught and the assistance that technology plays in differentiated instruction, as indicated on the scaled question.

A majority of the participants, 10 out of 17 surveyed, taught multiple subjects. Those who taught one subject had a higher rating in their use of technology to differentiate instruction. Only one of the participants who taught a single subject gave a rating of a 2 (Sometimes). One explanation for these results could be that it takes time to plan and differentiate instruction and teaching multiple subjects requires more planning. Integration of technology along with planning lessons across multiple subjects and grade level can be a daunting task. Overall Language Arts was the subject taught most often amongst the participants with results of 12 out of the 17 surveyed, followed by science taught by 8 out of 17 surveyed. The way the question was designed did not encourage participants to indicate if they taught special education, therefore there in no way to identify if special education teachers differentiate with the use of technology more often than general education teachers.

Research participants were educators from elementary, middle and high school levels. Years of teaching experience were 15 or more years for 59% of participants, while 41% had less

than 10 years. The sample data might be skewed toward habits of veteran teachers; however, an age correlation cannot be discussed as a significant variable, only as an assumption, as the survey does not identify age versus experience.

Limitations to the survey are:

- "Years of teaching" at the same grade, subject, or with the opportunity to use technology are not identified.
- Subjects previously taught by participants are not identified.
- Details of when more technology resources will become available are not provided.
- Definition of student-centered technology is very different or not known by participants.
- Non-tenured teachers could not be identified due to the structure and set-up of the survey questions.

Survey participants responded that they differentiate instruction. However, the use of technology to differentiate instruction is indicated by 65% of survey participants. The lack of clear understanding, or the definition of technology use to differentiate instruction not provided when completing the survey, could be the reason participants responded to this question. In addition, the survey is measured in a Likert Scale, with no constant interval distance or set value in between each answer.

Personal Interviews

Interview 1

Participant M does not differentiate instruction with the use of technology. The survey participant stated that the only technology used in the classroom was a projector and an

interactive whiteboard. The participant discussed that visual learners could be reached through the use of PowerPoint presentations, rich in text and pictures, as well as the use of videos integrated in the lesson. The participant understood the various ways in which technology could be utilized in the classroom for differentiation and described some applications; however, there are limitations within the school as to the type of resources available for use in the classroom.

Interview 2

Participant G discussed different technological resources utilized in the classroom. The participant repeatedly described how rubrics were used as a method to differentiate instruction. Examples of technological activities utilized by participant G are VoiceThread for education, PowerPoint, Quia, Wiki spaces and Edmodo. The follow-up question to describe how technology is used as student-centered method of instructional delivery was not understood by the participant.

The participant discussed how students are first identified by levels of content knowledge in order to differentiate instructional activities and assignments. However, the researcher had to repeat the question several times and probe for answers so that the participant could fully understand the question on how technology is utilized to differentiate student-centered instruction. The participant was not able to provide the researcher with a definition of student-centered technology. After thinking about the answer, the participant provided examples that can be interpreted as student-centered, such as creating a VoiceThread, games in Quia, creating a Prezi presentation, eduCanon and Edmodo.

Interview 3

Participant J differentiates her instruction in Daily 5 Language Arts and Math using iPads, computers, and adaptive learning programs that adjust instruction to abilities/skill levels of students engaged in the activity. Some of these programs included Lexia, RAZ kids, and Minute Readers. In math instruction, Participant J uses the same programs, websites, and apps with the class but adjusts the level based on prior benchmarking of student abilities.

This participant defined student-centered technology as using technology for learning in project-based activities that students select. The participant commented that based on the age of the students taught, the participant feels that more teacher-directed activities are needed with the exception of a project that the students select in Math using Educreations (limited duration).

Interview 4

Participant D provided a number of different examples of differentiation that is employed in instruction: students may chose current events articles from Newsela which are offered at the students' instructional reading level, choice of language activities from Reading A to Z within themes and reading levels, and student-centered writing activities using Co-writer and iPads. Intervention by Design is also used as a teacher-driven DI strategy.

Participant D found it hard to define student-centered technology but stated that the end result should be the ability of students to produce their own knowledge base. The participant felt that this could be accomplished using the iPads, however, with only 2 computers in the classroom, extensive student-centered tech activities are limited.

Interview 5

Participant E stated that instruction was not differentiated with the use of technology. The participant stated that if access to computers in the classroom were available, programs such

as Read 180 program would be used to differentiate instruction in class. This software program keeps the students on their own reading level and they learn at their own pace allowing for instruction to be differentiated. The participant's definition of student-centered learning is that learning occurs through a method where the teacher takes a step back and allows students to work together and at their own pace with the use of technology.

Interview 6

Participant F differentiates instruction with technology to reinforce and re-teach specific skills. The participant stated the use of computers or Ipad applications to review a lesson taught are used in the classroom. These resources are used as student-centered technology through reading lessons by allowing students to work on phonics skills while others are building sentences. The participant defined student-centered learning as using technology at an appropriate level of independence.

Interview 7

Participant G indicated that the instruction was differentiated when possible. The participant had difficulty answering the follow-up question related to how instruction was differentiated utilizing technology. After asking the question a second time, the participant was able to give a few examples. Renaissance Learning, a new program in the district, was one that the teacher differentiated with technology. This tool aligns different math and language arts objectives with students.

Per student-centered instruction, the definition was that the students teach themselves and learn from one another. For student-centered learning with technology, the participant had a difficult time providing a definition. The participant gave examples instead, including the use of

flipcharts. Although the participant also uses laptops and programs such as VoiceThread, these answers were not given until more careful questioning came about.

Interview 8

Participant H defined differentiated instruction as students coming up with ideas and questions. The participant discussed a variety of strategies that teachers could employ to help differentiate, including having students ask relevant questions and working together to problem-solve and complete tasks together.

The participant indicated the effective use of student-centered technology. The definition of student-centered technology given by the participant is that students are the ones using technology to complete tasks related to content areas. Some of the examples of differentiation with technology include Kurzweil, an assistive technology program that helps students learn how to take notes and is also a text-to-speech program. This is a use of differentiation of technology. Other programs cited for student-centered technology, but not necessarily differentiating instruction include the use of Google Spreadsheets, Docs and Earth. The participant gave a specific example of how students in the sixth grade work on a collaborative project related to earthquakes and spreadsheets. Each individual takes on different roles in the group. Other programs that specifically help to differentiate through the use of student-led technology include programs such as Webspiration, an electronic graphic organizer.

Student-centered technology was defined again as using technology as a tool to learn objectives. The participant does use interactive whiteboards, however, did not indicate that as something that falls within the scope of differentiated instruction through the use of student-centered technology.

Research limitations

There are many limitations to this pilot study. Participants in the survey were colleagues of the researchers and their selection by convenience sampling may be considered biased. The four different schools involved in the study could have considerable differences in the technology available. For example, it seemed that some schools had mobile devices available for student use, while it was unclear if others had them or not. This inability to accurately indicate if student-centered tools such as tablets and other mobile devices were available to students is a potential limitation of the study. The researchers could ask the technology personnel for an inventory of devices, interactive whiteboards, touch boards, computers and similar components to be identified in advance prior to surveying participants.

The reliability of the study could not be affirmed based on the first-time use of the measurement instruments. Discrepancies between survey and interview data on differentiation instruction yielded inconclusive results. The importance of specificity in the formation of research questions and limiting the number of variables to be analyzed was confirmed by this pilot study. The researchers discovered that another way to obtain reliable data that can be analyzed would be to narrow the study even further. In the future this can be done by focusing on a single subject and/or grade level over multiple schools. This would reduce many additional variables, thus making it easier to identify any significant positive correlations.

Conclusion and Top Recommendations

In conclusion, the survey instrument did not assist in answering the questions the researchers were trying to answer. Researchers assumed that participants had a clear understanding of the definition of technology used to differentiate instruction. However,

participants struggled to provide a definition of what and how they differentiated instruction with the use of technology. There were some participants who stated that they used technology to differentiate instruction, on the other hand, the survey did not ask if the technology was used in a student-centered or teacher directed manner. The interviews did not validate the result found in the survey pertaining to whether the participants differentiated instruction with the use of technology. Two participants indicated they did not differentiate instruction with the use of technology, however, the survey result show that all participants used technology-differentiated instruction to some degree.

The participants listed technologies used; yet, it is impossible to categorize some of the technologies identified as student-centered due to the risk of researcher bias. Perhaps asking the participants which technologies they felt facilitate student-centered learning would have yield better results. In the analysis of the electronic survey specific to the scaled question related to the use of technology to differentiate instruction, more teachers answered the choices of "Often" (7 respondents) or "Always" (4 respondents). This resulted in the average score of all seventeen respondents to fall right at the "Often" practice when using technology to differentiate instruction. This finding indicates a likelihood that many teachers are attempting to use technology to differentiate instruction.

Additionally, schools and educators must be able to understand appropriate technology to help differentiate. For example, the idea that the use of whiteboards when the teacher is leading the instruction does not necessarily constitutes a true implementation of differentiated instruction. While it can be an important tool, many times it is not used in districts to help differentiate but instead as an instrument that facilitates teacher-centered instruction. On the

other hand, an interactive touch-board where students can collaborate and learn with one another may offer more opportunities for differentiated, student-centered learning to occur.

A recommendation would also be for teachers to have a strong understanding of student-centered learning to help promote differentiated instruction. Ongoing professional development that supports differentiated instruction training could help with this. Specific examples with the use of technology must be a part of this training for teachers to understand how technology can be used, at times, to help differentiate instruction.

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Appendix A

Survey Questions- Group 5 NJCU

* Required

What grade/grades do you teach? *

Check all that apply.

- o ☐ K-2
- o ☐ 3-4
- o ☐ 5-6
- o ☐ 7-8
- o ☐ 9-12

What subject(s) do you teach? *

- o ☐ Language Arts
- o ☐ Math
- o ☐ Science
- o ☐ Social Studies
- o ☐ World Languages
- o ☐ Technology
- o ☐ Other: _____

Does the use of technology help you differentiate instruction? *

Key: 0- Never 1-Rarely 2-Sometimes 3-Often 4-Always

0 1 2 3 4

What type of technology do you use to differentiate instruction? *

Answer n/a if you do not use technology to differentiate instruction. Please specify all technologies that you use.

How many years have you been teaching? *

- 0-4 years
- 5-9 years
- 10-14 years
- 15-19 years
- 20 years or more

Appendix B

Interview Questions

Questions for participant:

1. How do you differentiate instruction with technology?
    a) If not: Do you have ideas for differentiating instruction with technology?
    b) If yes: Do you use student-centered technology to differentiate? Please explain.
2. What is your definition of student-centered technology?