EDTECH Research

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Math/Kindergarten

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Instructional Objective:
Students will be able to analyze and evaluate by comparing numbers and identifying whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group while using new classroom technology as a learning tool.

Standards:
CCSS.Math.Content.K.CC.C.6: Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.

CCSS.Math.Content.K.CC.C.7: Compare two numbers between 1 and 10 presented as written numerals.

Pre-research objective:
To reach the instructional objective, students will be able to use new technology in creative ways to obtain the primary instructional objective.
In the kindergarten classroom, activities are divided into the following learning centers:

1. Math Center: Students will have objects such as Counting Bears, a scale, and playing cards to complete the learning objective of comparing objects for a greater or less than value.
2. Computer Center: Students will demonstrate their understanding of the objective by completing a computer based practice assessment. Use your knowledge to choose the best answer.
3. Science Center: Students work in pairs of two to measure sand and analyze whether the measurements are equal, less or greater than one another.

Research will aid in the confirmation and revision of these activities to reflect what new technology is being used and how it is used to obtain the instructional objective of this activity.

Post- research objective:
In the past, technology in the kindergarten classroom had been used primarily by the teacher. Desktop computers, audio recording and listening devices, as well as overhead projectors were past examples of these technologies. In today's classroom, students are the primary users of technology and the technology has changed.
Research concluded that students are using a number of technologies to obtain the instructional objective as well as obtainable State Standards. IPads, digital photography, online programs, personal computers, and QR codes are along those discussed in the researched conduct for this activity.

The following changes were made, after conducting research, to improve student's learning environment with the use of technology during learning centers for this activity.

In the kindergarten classroom, activities are divided into the following learning centers:

1. Math Center: Students will have objects such as Counting Bears, a scale, and playing cards to complete the learning objective of comparing objects for a greater or less than value. Students will be able to check self correct by checking their answering using precoded QR codes. An iPad will remain in the center for students to scan the QR codes and check their work.
2. Computer Center: Students will work in pairs to create an age appropriate activity, such as adding narrative to their photo's from the Science Center.
3. Small Group Center: Students will demonstrate their understanding of the objective by completing a practice assessment during small group with the teacher. Each student will have multiple turns at the SMARTboard to count and compare digital objects. The object is to use your knowledge to choose the best answer.
4. Science Center: Students work in pairs of two to measure sand and analyze whether the measurements are equal, less or greater than one another. Students will use digital photography to record and narrate their experience during the activity.

Annotated bibliography:

Ching, C. C., Wang, X. C., Shih, M., & Kedem, Y. (2006). Digital Photography and Journals in a Kindergarten-First-Grade Classroom: Toward Meaningful Technology Integration in Early Childhood Education. *Early Education and Development*, 17(3), 347-371. doi:10.1207/s15566935eed1703_3

The use of digital photography in the classroom has "out of the box thinkers" eager to explore new learning activities. In this article, students use digital photos to document daily activities and create a photo journal to log their experiences over a span of seven months time (November to May). Students assumed both the role of the photographer as well as the photographie, allowing each student to take part in all sides of the process. Findings were observed using a grounded theory approach. Students provided data through journaling, photos, and written as well as recorded narrative.

The research revealed that students who typically showed little interest in the computer area, now had an irresistible need to be near the computers. Students see photos in book form using iPhoto while the original researcher was completing his or her work on the computer. According to the text, the researchers were interested in not only the technology integration but the subjectivity of the students allowing students to explain their own perspectives on their classroom environment and seeing it through their eyes (Ching, Wang, Shih, & Kedem, p. 350). The new interest also opened a new social dialogue between students who previously did not speak to one another and/or did not previously show interest in these types of activities (p. 356).

Digital photography and journaling have proven to be useful in the kindergarten and first grade classrooms according to the research of this article. Although, the findings were easy to read and interpret, the article weighed heavily on the improvement of dialogue between students. Research results as well as examples were given to provide a clear understanding of the data collection, analysis and results. More examples of how digital photography and journaling would have been beneficial for the reader who plans on using the research to aid in his or her own classroom. Using digital photography to obtain the instructional objective would likely be a success according to the referenced article.

In the following classroom activity has improved due to the research results of this article: Students are presented with an amount of sand to measure. Students will complete the activity with digital photography by taking photos of their actions and results while providing a narrative for each photo sequence. The students will complete a book of their findings.

Lim, E. M. (2012). Patterns of kindergarten children's social interaction with peers in the computer area. *International Journal of Computer-Supported Collaborative Learning*, *7*(3), 399-421. doi: 10.1007/s11412-012-9152-1.

Students are increasingly in need of knowledge in computer training and skills. This article provides research based on a study conducted on student interaction in the computer area of a public kindergarten classroom. The results described an increase peer interaction in the computer

area which conflicts with the common belief that technology impedes ones ability to be social. Findings also support the fact that student cooperation improves when engaged in an age appropriate activity using the computers (Lim, 2012, p. 400).

The article provides a large amount of useful and interesting information that is thoroughly researched. An increase in peer interaction and discussion of an activity using computers is the goal. Due to the large shift in technology integration over the past 10 years, teachers have access to the knowledge of how to best create the environment that is most beneficial for his or her students.

Preston, C., & Mowbray, L. (2008). Use of SMART Boards for teaching, learning and assessment in kindergarten science. *Teaching Science: The Journal of the Australian Science Teachers Association.*, *54*(2), 50-53.

The explanation of a SMART board as an interactive whiteboard is explained as well as the SMART board as a whole. Cost, limitations, and beneficial purposes are provided as well as uses in the subject of science in the kindergarten classroom.

SMARTboards have a variety of uses in the classroom but were originally marketed for use in the business sector for meetings and boardroom presentations. According to the text a SMARTboard along with the projector is an estimated cost of 5,000.00 USD depending on the size and features of the board (Preston, 2008, p. 55). Limitations such as the cost and size of the SMARTboard are discussed as well as the children's behavior while using the board itself. Teachers explain that the SMARTboard can be a distraction and can cause classroom management issues if students do not get a turn using the board (p. 54).

Benefits of the SMARTboard are apparent in the article. Children of this generation are able to use the board with ease and with little assistance from their teachers. SMART boards also allow teachers the opportunities to gain evidence of understanding from the students quickly, showing the student's level of conceptual and skill development in the topic (p. 52). SMART boards used for science activities are also described in detail as an example of the benefits of SMARTboard use in the classroom.

The article provided a wide range of detail regarding SMARTBoard use in the classroom. More emphasis on the features of the SMARTboard to be used in the topic of science would have given the reader a better foundation to make plans themselves.

SMARTboard technologies could have a large impact on the teachers ability to quickly assess students by creating an interactive activity to check for understanding during whole or small

group sessions.

A new center will be formed to involve interactive mini lessons on the SMARTboard. Students will demonstrate their understanding of the objective by completing a practice assessment during small group with the teacher. Each student will have multiple turns at the SMARTboard to count and compare digital objects. The object is to use your knowledge to choose the best answer.

Lim, E. M. (2012). Patterns of kindergarten children's social interaction with peers in the computer area. *International Journal of Computer-Supported Collaborative Learning*, *7*(3), 399-421. doi: 10.1007/s11412-012-9152-1.

Robertson, Cory (2012). Scanning the Potential for Using QR Codes in the Classroom. *TechTrends*, 56 (2), 11-12. DOI: 10.1007/s11528-012-0558-4

The QR (Quick Response) has much potential and many identified uses in the classroom as a new classroom fad. The can be read from top to bottom and right to left so the diversity of the code is much greater than that of a common bar code (Robertson, 2012, p. 11). Teachers can easily create their own code by downloading a free application from their iSO or Android system. QR codes create a solution for small classrooms who do not have the space to display projects on the wall. Instead the work is saved on a website and the QR code is scanned to display the child's work (p. 12).
The article was well written and thoroughly researched with current findings. The writer is clearly enthusiastic about the use of QR codes in the classroom, which helps the reader get motivated. The possibilities for the use of QR codes in the classroom seem endless after reading this article.

Math Center: Students will have objects such as Counting Bears, a scale, and playing cards to complete the learning objective of comparing objects for a greater or less than value. Students will be able to check self correct by checking their answering using precoded QR codes. An iPad will remain in the center for students to scan the QR codes and check their work.

Lantz, M E (2010). The use of Clickers in the classroom: Teaching innovation or merely an amusing novelty? *Computers in human behavior*, 26 (4), 556 -557.

Student response systems include individual remote controls which can be used anonymously by students of all ages for informal and formal assessments. The article highlights that many teachers tend to use the "clickers" in the beginning or at the end of a lesson. Although use can be quite minimal pretesting and posttesting use with the response systems have showed a change in students test scores (Lantz, 2010, p. 556). Most "clickers," according to the text, can and should

be used throughout the lecture of a lesson to provide quick response in reflection and review of recently discussed content (p. 559).
Student feedback on whether they thought that the “clickers” were useful was provided. 74% of students responded that the response system was indeed helpful, whereas 14% of students disagreed, stating the “clickers” were not at all useful (p. 557).

Although the research was incomplete, due to lack of focus groups in age, the conclusion came across well discussed. The article is a wonderful resource to aid in the decision on whether or not to purchase the students response systems based on student and teacher responses. The overall usefulness is still unclear but it is apparent that the majority of students find using the “clickers useful.

Given the monetary resources for the response system are available, the system could provide a quick response analysis and prove to be useful in the kindergarten classroom. Due to short attention spans and lack of time during the school day, kindergarten could use the clickers in small or even whole group lessons. The response data collection would be helpful for the teachers once they made time to program their questions and answers.

References:

Ching, C. C., Wang, X. C., Shih, M., & Kedem, Y. (2006). Digital Photography and Journals in a Kindergarten-First-Grade Classroom: Toward Meaningful Technology Integration in Early Childhood Education. *Early Education and Development*, 17(3), 347-371. doi:10.1207/s15566935eed1703_3

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Robertson, Cory (2012). Scanning the Potential for Using QR Codes in the Classroom. *TechTrends*, 56 (2), 11-12. DOI: 10.1007/s11528-012-0558-4