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EDU 227

Capstone Project

Practical Experience

During this practical experience, I was able to discuss a lesson with my coworker, Ms. Freeman, that she feels can benefit from technological tools to help students reach understanding. She teaches Algebra 2 in a high school in Flushing, NY. Ms. Freeman shared a lesson on “Identifying Even and Odd functions.” During this lesson, students had a mini lesson on the algebraic method to figure out whether a function was even, odd, or neither. Plugging in $f(-x)$ and see if the result was the same as $f(x)$, which would mean it is even, or the equivalent to $-f(x)$, which would mean that it is odd. This is a rule that is Algebraic and Ms. Freeman feels that when she gave students practice problems, some of them were able to do it, but most of them still did not have a full understanding of why the rule worked, even after explaining their differences based on the graph. Ms. Freeman feels that this is one of the lessons that less than half of the class understood. Some challenges that I can identify in this lesson is that it is merely focusing on the algebraic method. The graphing way is presented to students, but they really don't get the chance to fully understand the concept behind the method. I truly believe that if we use Computational Thinking and Universal Design for Learning in this lesson, the outcome might be much more effective.

Recommendations

The use of Computational Thinking in the mathematics classroom is very important to me. I truly believe that if we design this lesson using decomposition, pattern recognition, abstraction, and algorithmic design, students will reach a better understanding of the concept and they might not even have to remember the rule that was presented in the mini lesson because students would be

able to come up with it themselves. One of the recommendations I have is to use “Teachable Machine,” links are in the attached lesson plan. I think this would be a great way to keep students time of task ([Triple E Framework](#)) at its best since Ms. Freeman has classes that are in the Computer Science Major. As stated, “Technology should enhance learning in a way that allows students to actively participate in the content creation, not just consume learning material,” in [EdTech](#). Additionally, to be able to support all students in the classroom(UDL), having students focusing on the visuals allows for the material to be accessible to all. This lesson is introduced by giving students three different graphs, to show functions that are odd, even, or neither. Students then discuss (or write in a post-it) in their groups the similarities and differences between all graphs, and what makes them that type of function. Students are then given 10 graphs that they need to sort (decomposition, pattern recognition). This would allow students to group graphs based on their observations, which is building their full understanding of the concept without using an algebraic rule.

In the next part, students use their groups of graphs to teach the machine to recognize functions that are even, odd, or neither. Here, students realize that they can create and use their own AI. Here is a [machine](#) I created, which is an example of what students can create and then use to sort the next 20 graphs. Digital Citizenship is present here because students are using technology that they are creating, collaborating with each other, and debugging and tinkering as needed. Students will be given 20 more graphs (CUTOOTS, from DELTAMATH) and then will sort them, this time, using their outputs from their teachable machine. Students will share their work in a Jamboard/ Lumio. This work can then be presented in a poster if student choose to or present it in front of the class. This would allow students to look at other groups’ work and provide

feedback and adjust as necessary. Multiple means of expression allow all students to engage in the lesson and show their understanding, as expressed in [Universal Design for Learning](#).

Feedback

When sharing my suggestions with Ms. Freeman, we discussed how helpful it is that there are laptop carts in each classroom. Assigning a laptop to each student is very important so that time is not lost when signing in. Therefore, the opening activity is something that Ms. Freeman liked a lot, because it builds in time for students to log in to the laptop. She really liked the first activity because she thinks that students would benefit from seeing different graphs and look for which ones go together. She was a little worried about some students that are not tech savvy. I suggested that when planning the groups she can pre-select one student that she knows is great with technology and they can support each other completing all the tasks. This allows all student to be engaged in the activity and allows for students to show digital citizenship and empathy to each other. I also suggested that she can show students how to use “teachable machine” in the front of the room and walk around to provide assistance. By using Teachable Machine, students will gain a visual understanding of even and odd functions and develop an intuition for how machine learning models can be trained to recognize patterns. We believe that this can help students to build confidence in the learning of mathematics. Overall, Ms. Freeman said that she really appreciates the resources that I provided, including the Triple E framework, and Universal Design for Learning, because it will help her to design instruction in a way that can help more students compared to traditional ways, without technology.