



Emerging Communicative Technologies for Math Leaders

(Including Representational)

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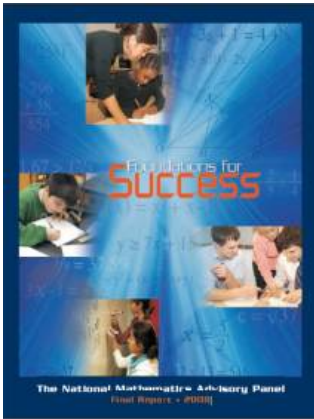
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EMS&TL 2010 Summer Institute, McDaniel College, June 4, 2010

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“[An **emerging technology** is] a body of knowledge or innovation *not yet widely adapted or fully actualized which holds educational implications.*”





A review of 11 studies that met the Panel's rigorous criteria (only one study less than 20 years old) found limited or no impact of calculators on calculation skills, problem solving, or conceptual development over periods of up to 1 year. This finding is limited to the effect of calculators as used in the 11 studies. Unfortunately, these studies cannot be used to judge the advantages or disadvantages of multiyear calculator use beginning in the early years because such long-term use has not been adequately investigated.

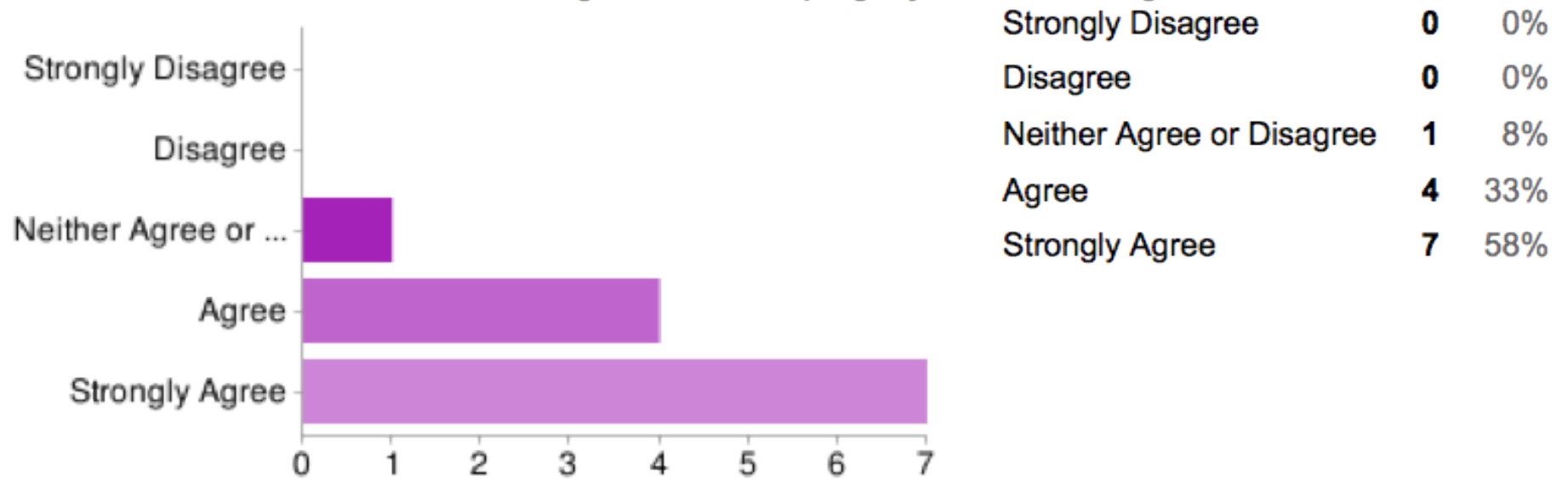
The Panel's survey of the nation's algebra teachers indicated that the use of calculators in prior grades was one of their concerns (National Mathematics Advisory Panel, 2008). The Panel cautions that to the degree that calculators impede the development of automaticity, fluency in computation will be adversely affected.

Research on instructional software has generally shown positive effects on students' achievement in mathematics as compared with instruction that does not incorporate such technologies. These studies show that technology-based drill and practice and tutorials can improve student performance in specific areas of mathematics. Other studies show that teaching computer programming to students can support the development of particular mathematical concepts, applications, and problem solving.

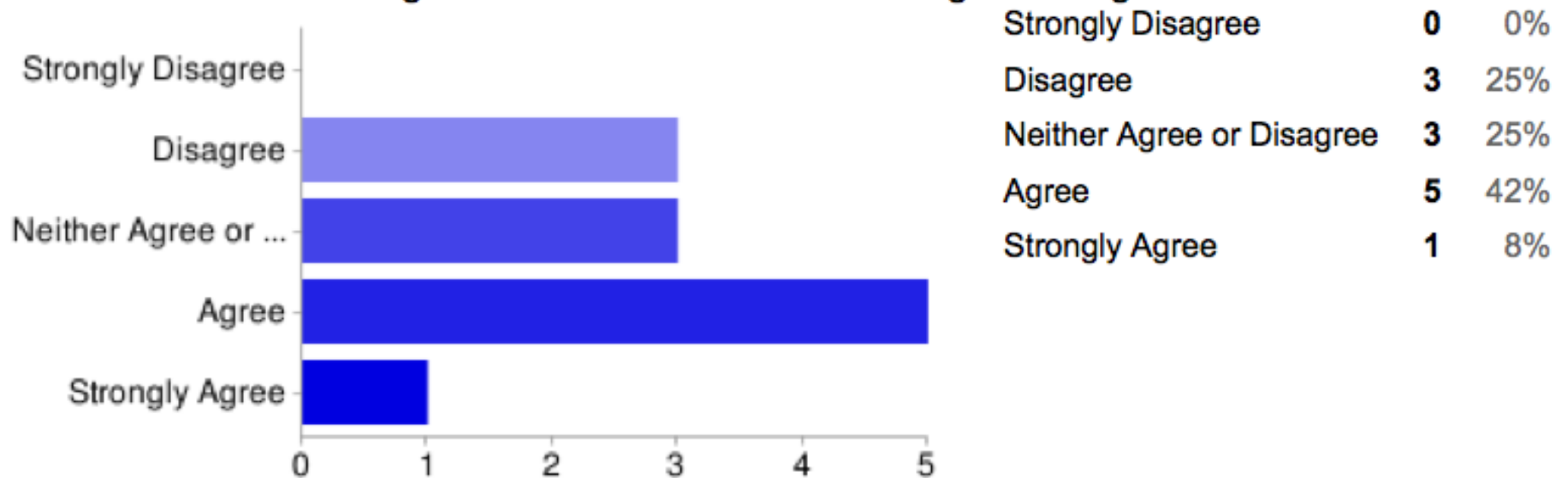
There are insufficient rigorous studies of other categories of software to make recommendations about their use. Problem-solving software may have potential, but more research is needed on this category of software, as well as on the effects of simulations, games, and Internet applications.

Mathematics versus Technological Content Knowledge

10. I have various sources and strategies for developing my understanding of mathematics.

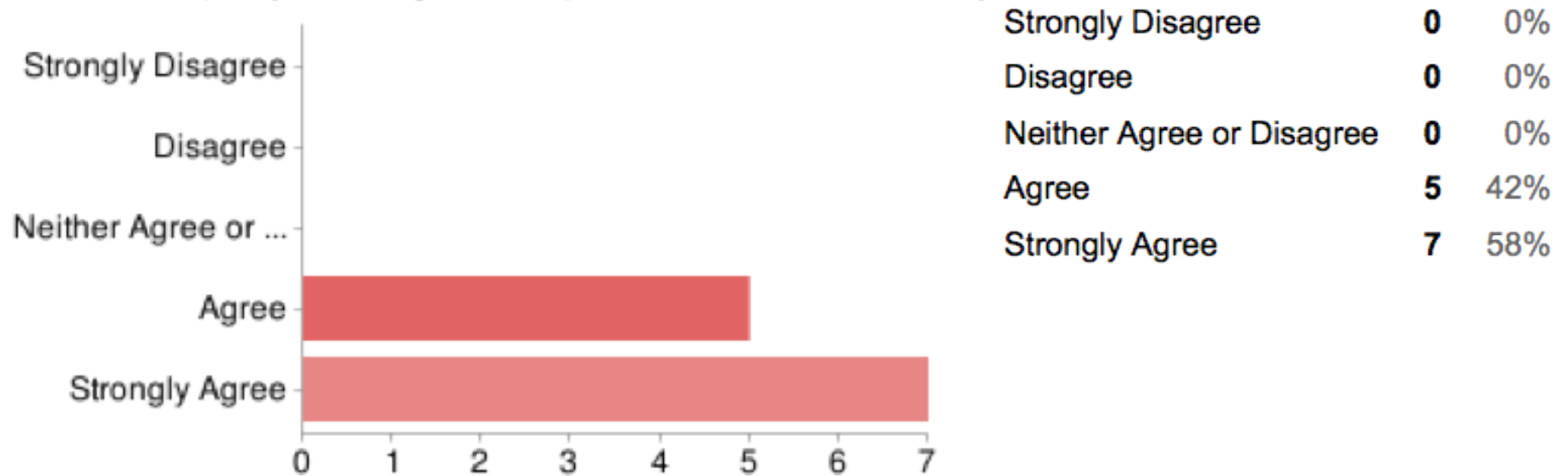


11. I know about technologies that I can use for understanding and doing mathematics.

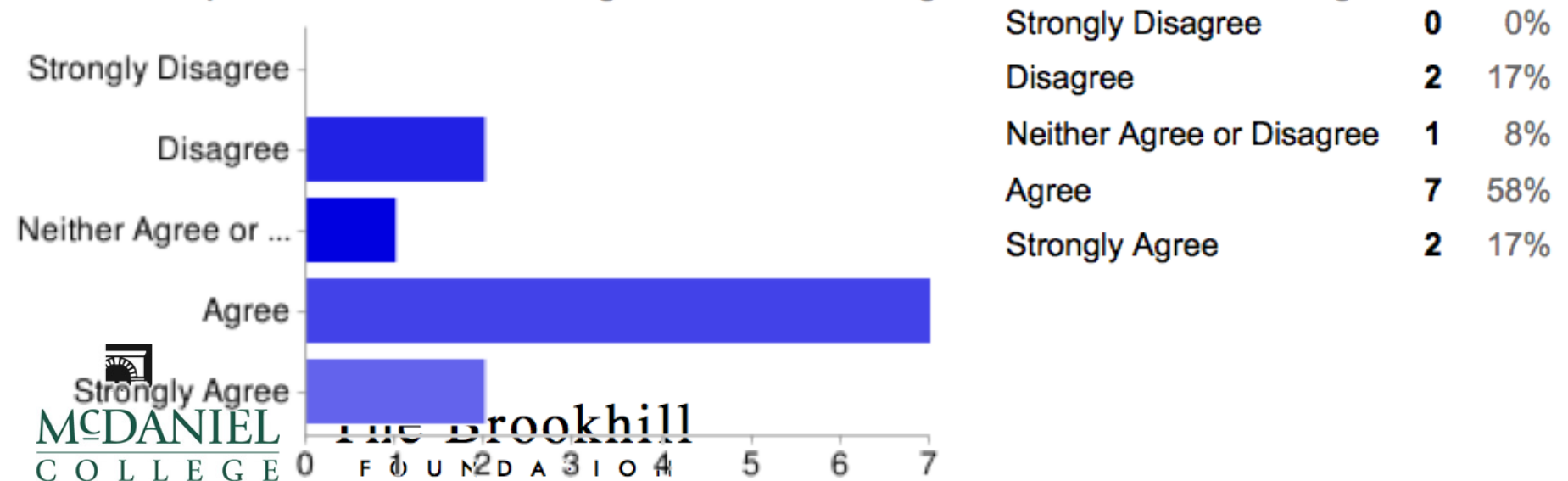


Pedagogical versus Technological Pedagogical Knowledge

13. I can adapt my teaching based-upon what students currently understand or do not understand.

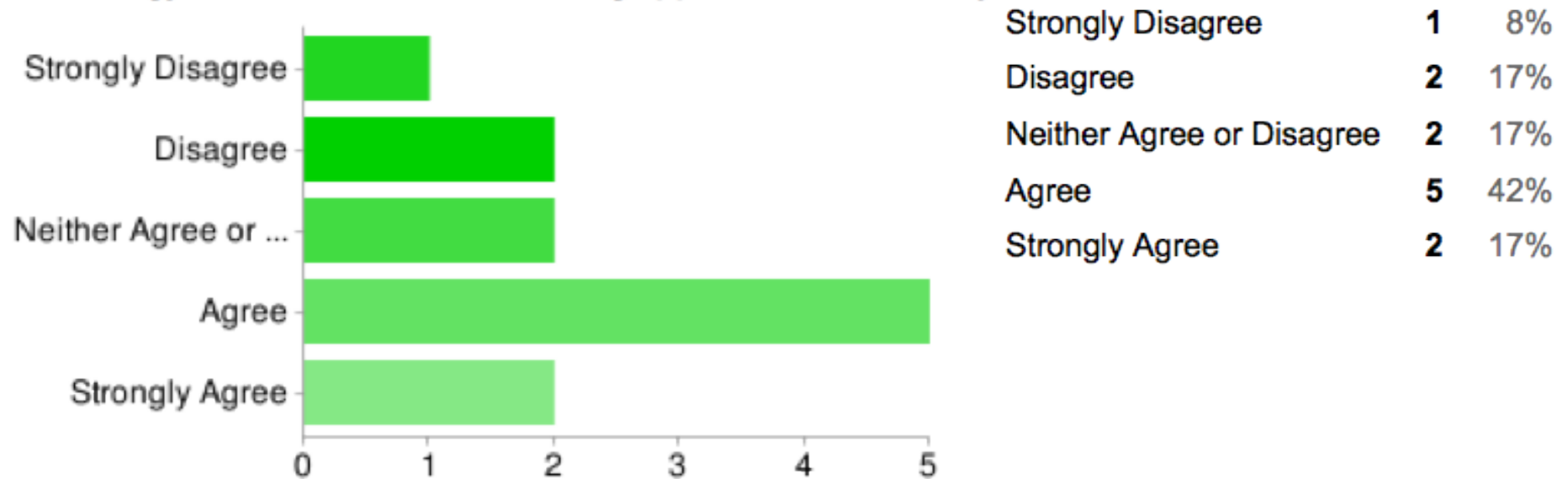


22. I can adapt the use of the technologies that I am learning about to different teaching activities.

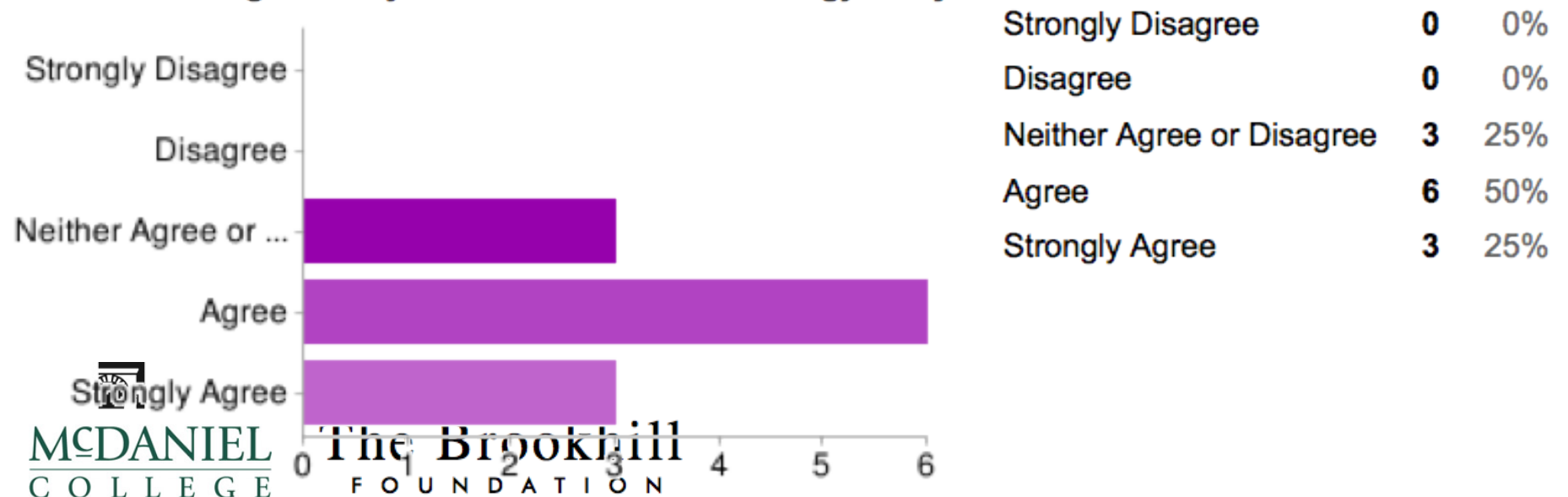


Technological Pedagogical Knowledge

20. My past teacher education program(s) have caused me to think more deeply about how technology could influence the teaching approaches I use in my classroom.

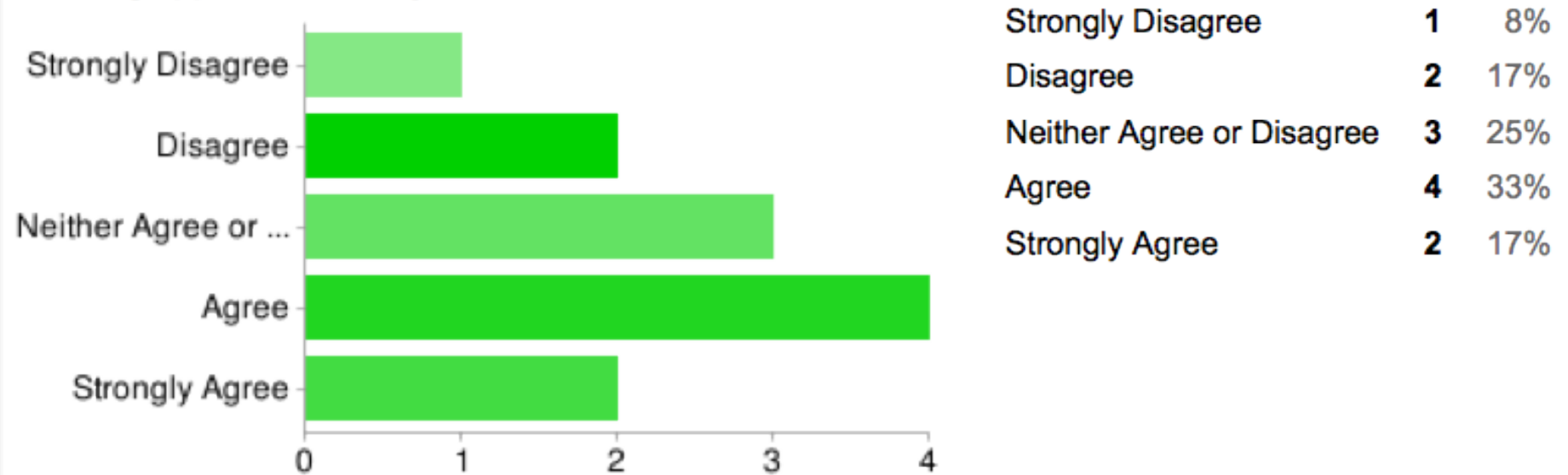


21. I am thinking critically about how to use technology in my classroom.

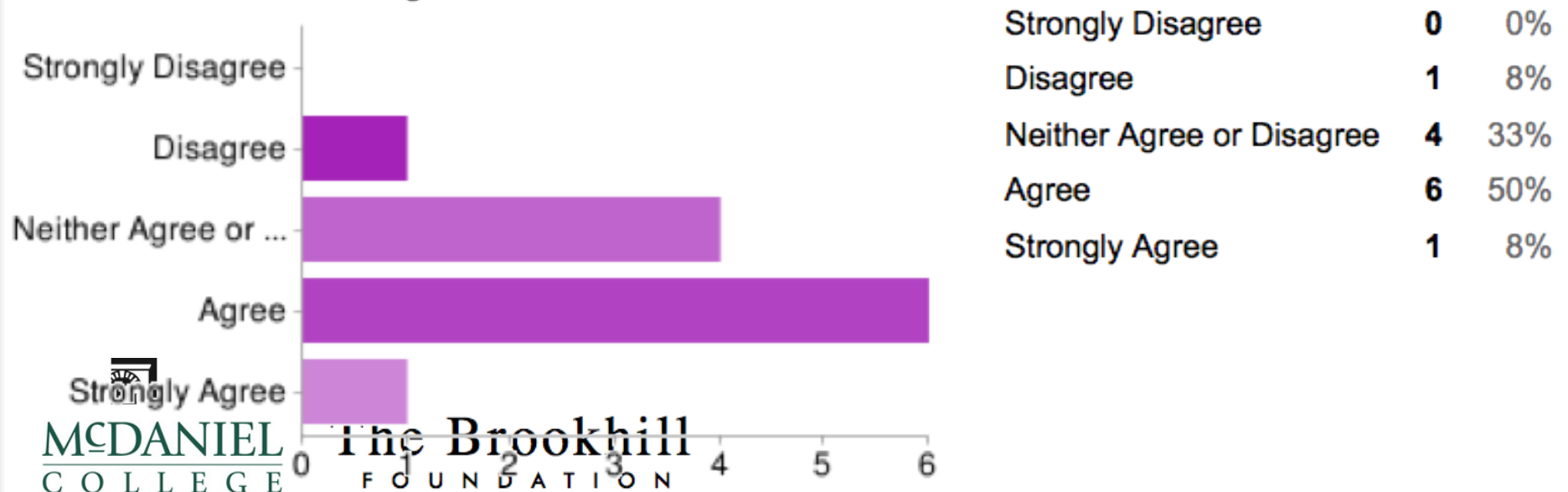


Technological Pedagogy and Content Knowledge

26. I can provide leadership in helping others to coordinate the use of content, technologies and teaching approaches at my school and/or district.



27. I can choose technologies that enhance the content for a lesson.



Linking Research and Practice

- What **knowledge and experiences** do prospective and practicing teachers need to know to help them incorporate technology in *doing, learning* and *teaching* math in **technology-enabled settings**?
- What are the **characteristics of a technology-enabled setting** that contribute to **students' learning of mathematics**?



Livescribe: The Pulse SmartPen



<http://www.livescribe.com/smartpen/videos.html>

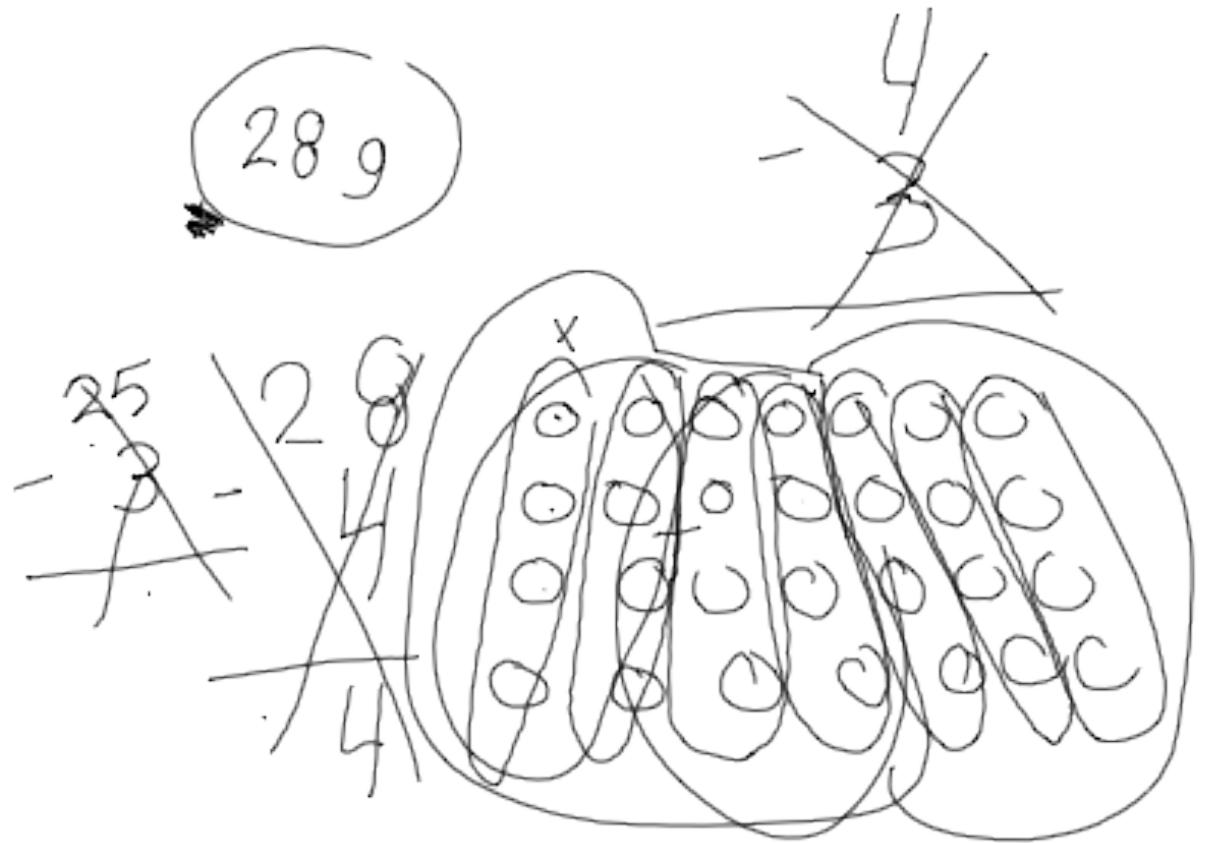


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What are some assumptions that you can make about this student's understanding from her representation?

Fran and Karen have 28 goldfish.
Fran has 4 more goldfish than Karen.
How many goldfish does each girl have?



Fran 16

Karen 12

Elena and her 3 friends ate 9 cookies.
How many cookies did each friend eat?

~~9~~ 18 16 17

Elena $\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$

~~18~~ $+ \frac{1}{3} + \frac{1}{3}$

$\frac{2}{3} + \frac{1}{3} + \frac{1}{3} = 1$

