STUDENT TECHNOLOGY

Agenda

1. The Good
   - Trends in Research
   - A Systematic Approach
   - Student Outcomes
2. The Bad
   - Student Achievement is Still Not Good Enough
   - Balancing Technology with Physical Health
3. The Ugly
   - Cyber Crime and Online Bullying Mitigated by Firewalls and Filtering/Monitoring Systems
   - Online Misbehavior Mitigated with Digital Citizenship

Pair and Share

Discuss the following with the person nearest you.

- What do you believe are the effects of educational technology on student learning outcomes?
- What is the best way to measure the effects we expect from using educational technology?

The Good –
Using technology improves student learning outcomes.

Trends in Research

There are many ways to look at research. I tend to trust meta-analysis the most since it has the most statistical validity. An example of this type of research: "Learning in One-to-One Laptop Environments: A Meta-Analysis and Research Synthesis"

by Binbin Zheng, Mark Warshauer, Chin-Hsi Lin, and Chi Chang

"Efforts by K-12 schools to give every student a laptop computer increased student achievement."

The research has stabilized over time

A Meta-Analysis of the Effects of Computer Technology on School Students' Mathematics Learning

by Li, Qing and Ma, Xin, Educational Psychology Review, **2010**

Summary: A meta-analysis of 85 independent effect sizes extracted from 46 primary studies involving a total of 36,793 learners indicated statistically significant positive effects of computer technology on mathematics achievement.

Effects of Technology on Students' Achievement: A Second Order Meta Analysis

by R. M. Tamim, Hamdan Bin Mohammed e-University, R. M. Bernard, E. Borokhovski, P. C. Abrami, & R. F. Schmid, Concordia University, Review of Educational Research, March **2011**

Summary: 574 individual effect-sizes (60,853 participants) were extracted from 13 meta-analyses. The weighted mean effect-size of 0.304 supported the findings of the second-order meta-analysis. The results consistently represent a medium strength effect-size, favoring the utilization of technology.

The Effectiveness of Education Technology for Enhancing Reading Achievement in K-12 Classrooms: A Meta-Analysis

by Slavin, Robert E. and Cheung, Alan C. K., Johns Hopkins University and University of York, May **2011**

www.bestevidence.org

Summary: 84 studies based on over 60,000 participants were analyzed. The findings suggest that education technology generally produced a positive effect in comparison to traditional methods. Innovative technology applications and integrated literacy interventions with the support of extensive professional development showed more promising evidence.

The research has stabilized over time

The potential of digital tools to enhance mathematics and science learning in secondary schools: A context-specific meta-analysis

by Delia Hillmayr, Lisa Ziernwald, Frank Reinhold, Sarah I. Hofer, Kristina M. Reiss, Computers and Education Journal, August **2020**

Summary: This meta-analysis investigated how the use of technology can enhance learning in secondary school mathematics and science. Overall, digital tool use had a positive effect on student learning outcomes (0.65). Use of intelligent tutoring systems or simulations such as dynamic mathematical tools were significantly more beneficial than hypermedia systems.

The effectiveness of technology-supported personalized learning in low- and middle-income countries: A meta-analysis

by Louis Major, Gill A. Francis, and Maria Tsapali, British Journal of Educational Technology, May **2021**

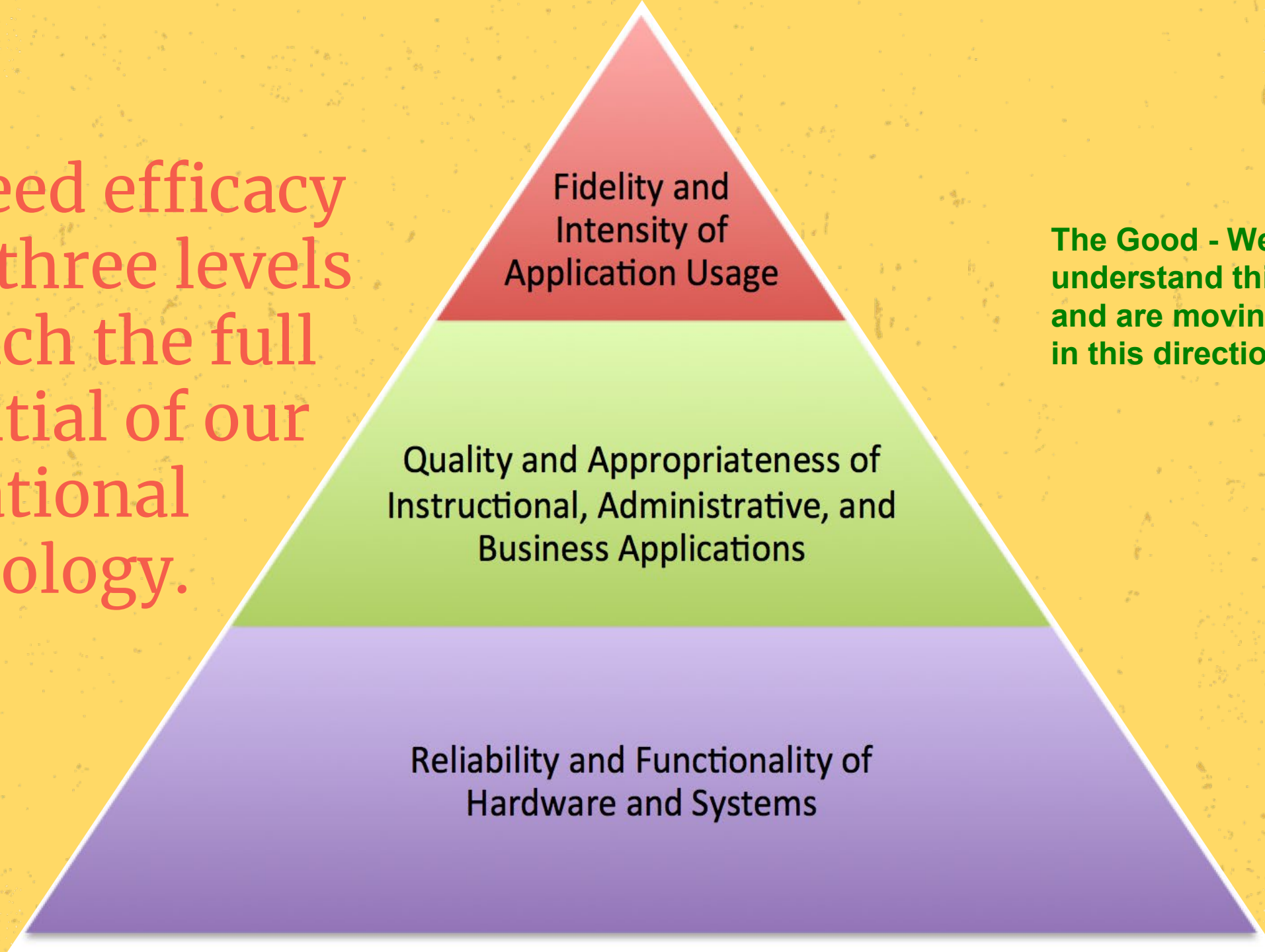
Summary: This meta-analysis examined the impact of students' use of technology that personalizes and adapts to learning level. Sixteen randomized controlled trials were identified in five countries. Studies involved 53,029 learners showed that technology-supported personalized learning had a statistically significant positive effect. More personalized approaches which adapt or adjust to learners' level led to significantly greater impact (effect size = 0.35)

Exploring the effects of digital technology on deep learning: a meta-analysis

by Xiu-Yi Wu, Shenzhen Institute of Information Technology, Education and Information Technologies 29(3):1-34, November **2023**

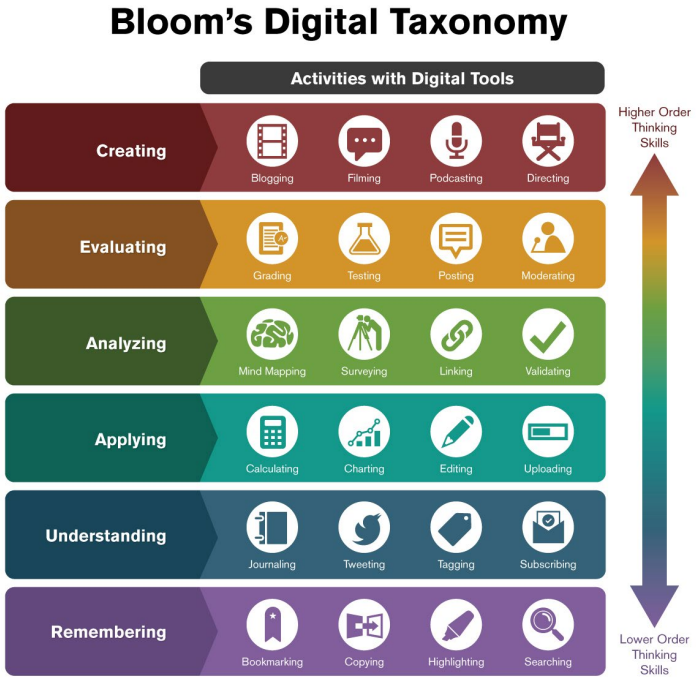
Summary: A meta-analysis of 60 high-quality, peer-reviewed empirical publications examined students' deep learning outcomes to assess the overall effectiveness of digital technology. The calculated effect size indicates a positive influence of digital technology on students' deep learning outcomes.

We need efficacy at all three levels to reach the full potential of our educational technology.

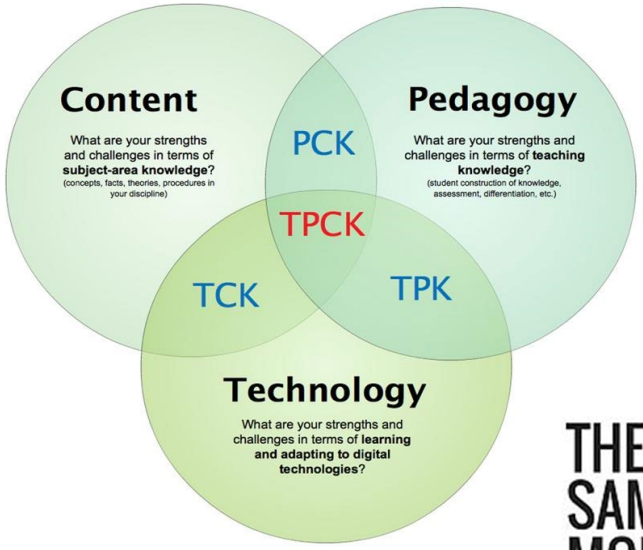


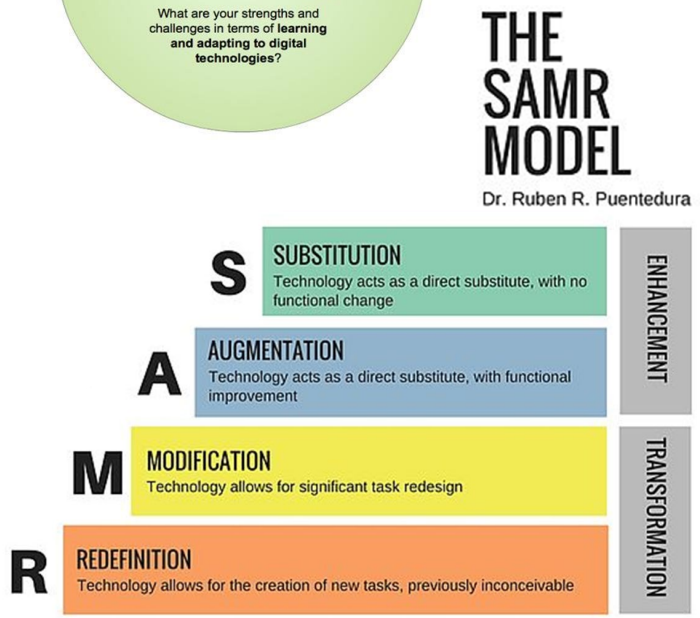
The Good - We understand this and are moving in this direction.

There are many types of maps, you just need one that gets you to your destination.

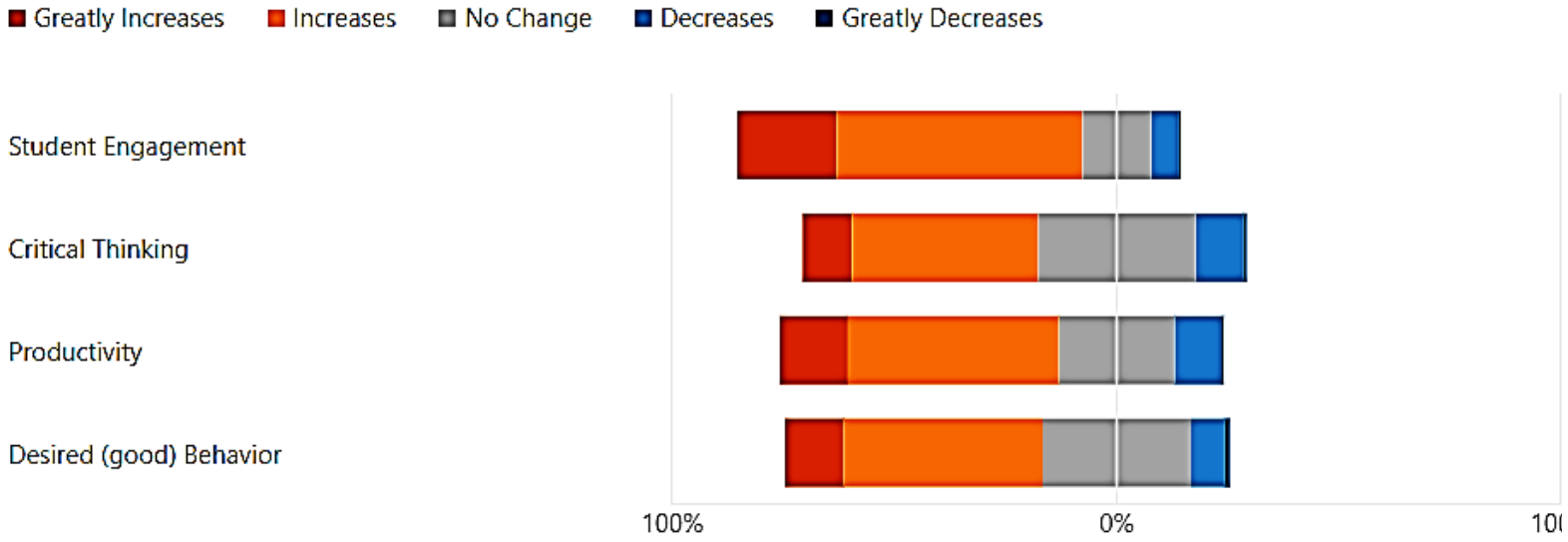


The Good - We are moving VCS toward the ISTE Standards for Students.





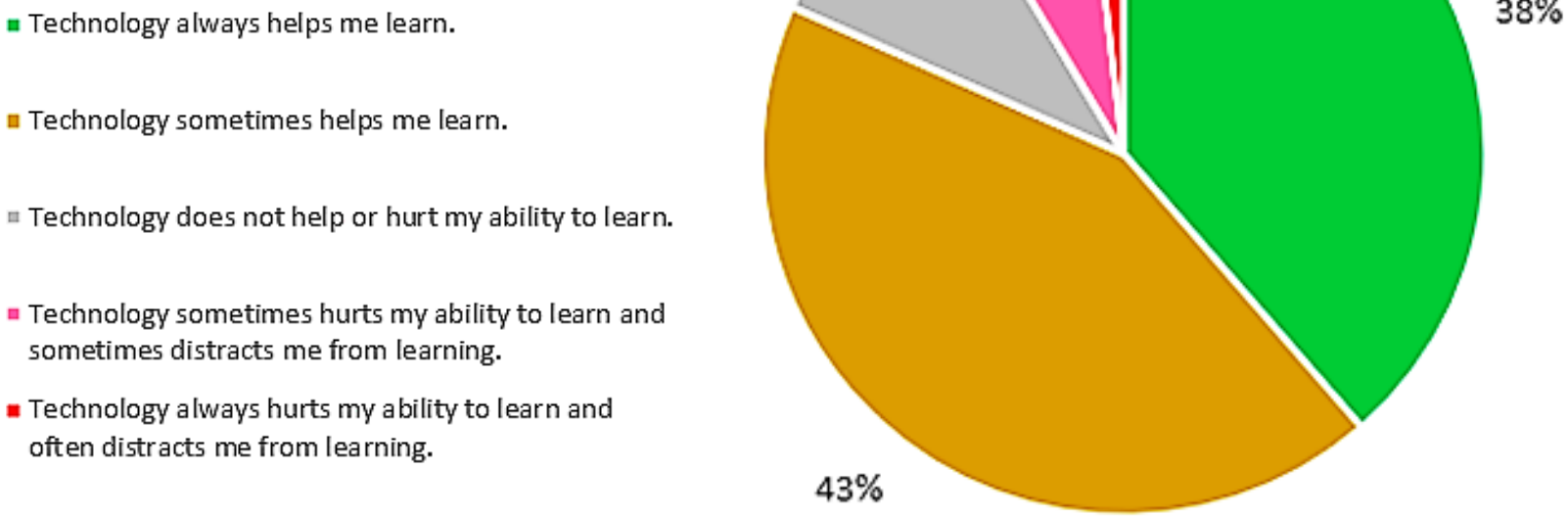
Educators: When students use technology during in-person learning, I observe...



The Good – Data on student use of technology for learning is trending in the right direction.

VCS Data

Secondary Students: Does technology help you learn?

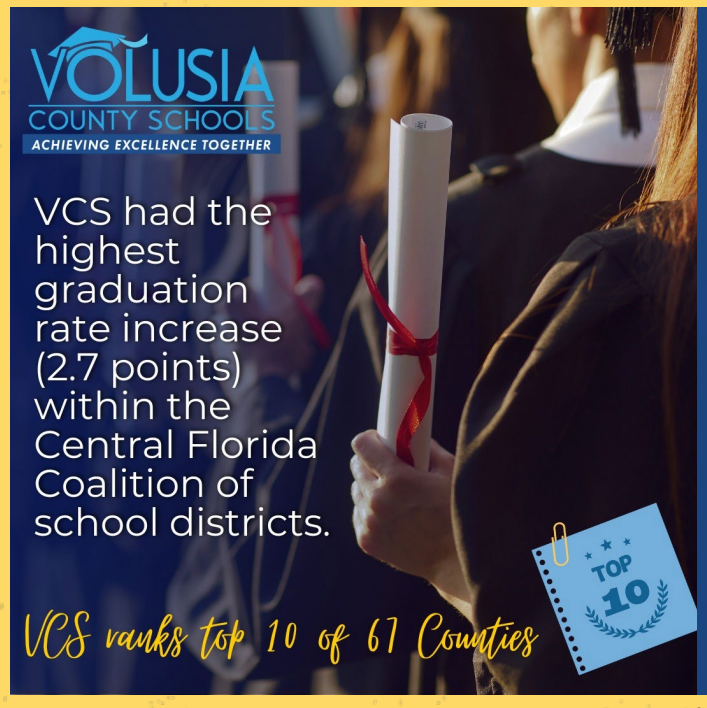


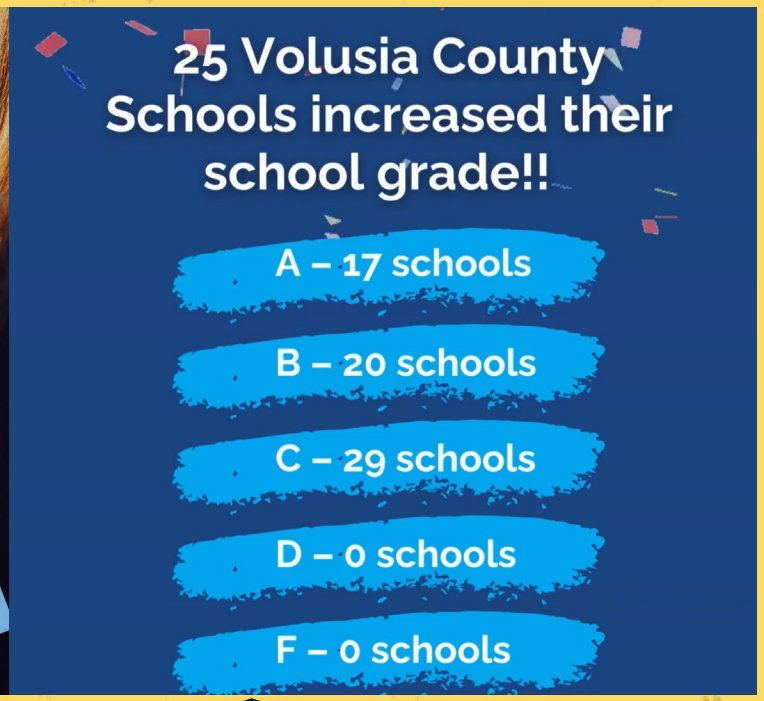
Think About

Think to yourself about these two questions:

- What outcomes does technology improve that standardized tests do not measure?
- Why are children more naturally adept at using technology compared to older generations?

Volusia County Schools has increased the use of educational technology over the last couple of years. Student outcomes have improved over the same period of time. Coincidence?





The Good – Outcomes are improving, and we still have room to grow.

US Students Have a lot of Work to Do

The Washington Post
Democracy Dies in Darkness

Math scores for U.S. students hit all-time low on international exam

Even so, U.S. students performed better relative to their peers than in past years

By Donna St. George

December 5, 2023 at 5:00 a.m. EST

Math scores for U.S. students plummeted to an all-time low on international exams that marked the first comparison of global achievement since the pandemic upended education, according to a new report that showed widespread decline among participating countries.

Data released Tuesday show a 13 point plunge in math for American 15-year-olds on exams known by the acronym PISA, for Program for International Student Assessment. The tests were given last year to 620,000 students in 81 countries around the globe.

The Bad – We've only scratched the surface of technology for math learning.

Balancing Physical Health

Children who are glued to screens tend to be less active, which can lead to health problems like obesity and sleep disorders. The blue light emitted by screens can also disrupt sleep patterns. The use of technology should be balanced with other activities, especially in the evening.

MEDICALNEWSTODAY

Benefits of outdoor play for children

Why it matters | Skills | Health benefits | Indoor vs. outdoor | Health equity | Tips | Summary

Outdoor play helps children learn skills, develop physical strength, and benefits mental well-being. Time outdoors can also provide an opportunity to make friends.

Outdoor play comes in many forms. It could involve spending time in a backyard, a local park, or more rural spaces, such as forests and national parks.

The Bad – Not all technology use is helpful. Students need a balance of human interaction and physical activity.

Cyber Crime

- **Phishing:** Phishing scams target students by sending emails or text messages that appear to be from a legitimate source, such as a bank, credit card company, or school.
- **Social Engineering:** Social engineering is a type of cybercrime that relies on tricking the victim into giving up their personal information or clicking on a malicious link. Social engineers will often use flattery, intimidation, or a sense of urgency to get the victim to do what they want.
- **Doxing:** Doxing is the act of publicly revealing private or identifying information about someone online, often with the intent to harm or humiliate them. Students can be targeted for doxing for a variety of reasons, such as revenge, bullying, or activism.
- **Malware:** Malware is software that is designed to harm a computer system. Students can be infected with malware by clicking on a malicious link, opening an infected attachment, or downloading a file from an untrusted source. Malware can steal personal information, damage files, or even take control of a computer system.

The Ugly – Cyber criminals pray on the naivety of children.

Balancing safety and access is tricky.

Cyberbullying Statistics

- About 37% of young people between the ages of 12 and 17 have been bullied online. 30% have had it happen more than once.
- 23% of students reported that they've said or done something mean or cruel to another person online. 27% reported that they've experienced the same from someone else.
- Girls are more likely than boys to be both victims and perpetrators of cyber bullying. 15% of teen girls have been the target of at least four different kinds of abusive online behaviors, compared with 6% of boys.

https ://www.dosomething.org/us/facts/11 -facts -about-cyber -bullying

Cyberbullying Statistics

The Ugly – Technical systems alone cannot solve these problems.

- Young people who experience cyberbullying are at a greater risk than those who don't for both self -harm and suicidal behaviors.
- 60% of young people have witnessed online bullying. Most do not intervene.
- Only 1 in 10 teen victims will inform a parent or trusted adult of their abuse.
- 4 out of 5 students (81%) say they would be more likely to intervene in instances of cyberbullying if they could do it anonymously.

https://www.dosomething.org/us/facts/11_-facts_-about-cyber_-bullying

What can we do to teach digital citizenship better?

How much have student misbehavior methods changed over time? Is the behavior the same, or just with different methods?

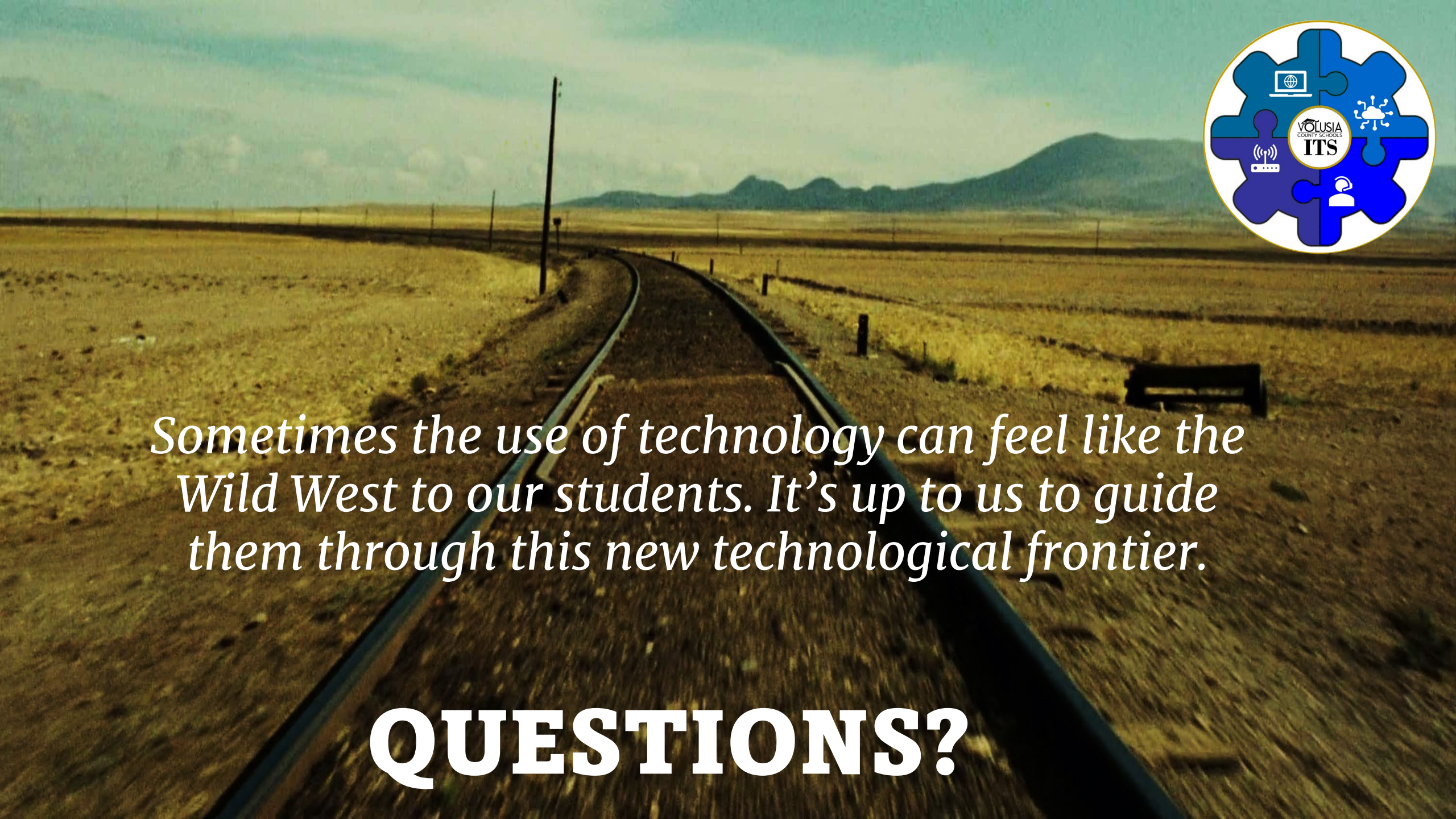
The Ugly – Misbehaviors persist over time, but with more powerful tools.

Think Fast and Win a Prize

Match the old school behaviors with the modern technology equivalents.

1. Passing notes in class	?
2. Making a mean face at someone	?
3. Doodling during class	?
4. Whispering rumors	?
5. Ostracizing someone	?

Be the first to text the question # above and your answer to 720-323-7791to win.



Sometimes the use of technology can feel like the Wild West to our students. It's up to us to guide them through this new technological frontier.

QUESTIONS?