

How Can We Ensure that All Students Have Quality Digital Learning Opportunities?

By Lila Armstrong

TMC 7 Theme: Ensuring the infusion of digital literacy skills and global competencies

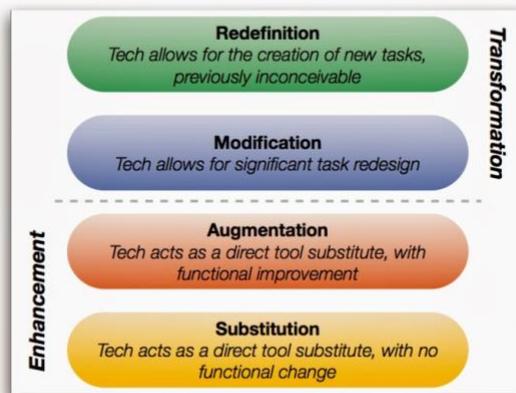
Purpose: Identify causes and solutions for the variable range of abilities and engagement in teachers which leads to inconsistent skill sets in students.

Introduction

Over the past ten years, much has been written about student use of technology in schools. From TPACK, (Koehler, 2012, September 24), to digital wellness, (Schrock, 2022, July 19), and school districts, there is clear messaging around the need for technology integration in all subject areas. However, there are gaps in student learning, teacher delivery methods, and healthy, ethical habits in students. How can we shrink the knowledge gap between district information and educational technology leaders, teacher-librarians, and classroom teachers so that all students are leaving high school with the array of digital skills and decision-making habits to support their post-secondary destinations?

In 2016, the SAMR model was introduced to educators by Dr. Ruben Puentedura (Puentedura, 2016). His system outlined a four-step model illustrating how to leverage technology use for enriched learning. Embraced by teacher-librarians, this model became an evaluation tool for those in the know. Many teachers have stayed in the “substitution zone”, simply because they think that they are integrating technology at an acceptable level. Others have highly tech-oriented classrooms. The rest are somewhere in between.

SAMR

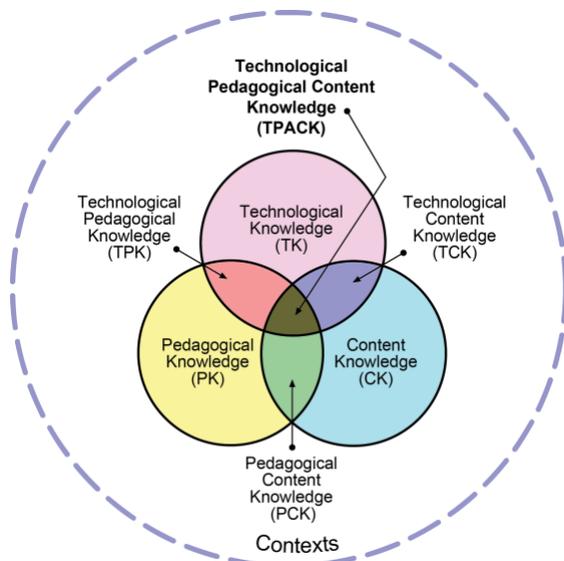


Dr. Ruben Puentedura

<http://www.hippasus.com/>

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TPACK is another important pedagogical tool that has not reached enough teachers. “At the heart of the TPACK framework, is the complex interplay of three primary forms of knowledge: Content (CK), Pedagogy (PK), and Technology (TK). The TPACK approach goes beyond seeing these three knowledge bases in isolation. The TPACK framework goes further by emphasizing the kinds of knowledge that lie at the intersections between three primary forms: Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPACK) (Koehler, 2012, September 24). As a planning tool for authentic learning and technology integration, this model focuses on the zone where all of this knowledge overlaps, using the expertise of teachers in all of these areas to create meaningful learning opportunities with technology.



Koehler, 2012, September 24

A deep understanding of this model creates experts out of teacher-librarians, but if it is not understood or implemented in classes, we quickly see a wide array of how technology is, or is not, being leveraged in classes. The knowledge gap can also create a mental division of labour in terms of who is “responsible” for teaching students a myriad of skills from general application to sophisticated creation, digital wellness, critical media literacy, media arts, accessibility tools, ethical use, and overall good habits. “It turns out that students do have digital skills, but not necessarily the digital literacy they need to do their schoolwork” (Tamez-Robledo, 2021).

If teachers choose not to engage with their teacher-librarian or other district technology experts, then students may leave that year with a very different skill set than those of a teacher who collaborates with skilled technology leaders and who engages in personal professional development to learn more about how to be a competent technology integrator. Furthermore, even skilled teacher-librarians find themselves questioning their efforts to reimagine a school culture. Teacher-librarian and collaboration expert Alanna King writes, “I thought I was making changes that were rippling throughout the school, but the shift plateaued. I had a few colleagues on board but not the majority. It was difficult to measure cultural shift. How did I know that all my hard work supporting transliteracy was making an impact, creating the changes in pedagogy that were most needed to prepare our students?” (King, 2020, p.5).

The goal of this paper is to identify causes and solutions for the variable range of abilities and engagement in teachers, which leads to inconsistent skill sets in students.

Our past and present

Back in 2014, Anita Brooks Kirkland, then President of the Ontario Library Association, wrote: “Despite online technology having been part of education for more than two decades, barriers persist in its meaningful integration into learning. As technology becomes increasingly mobile and social, the digital divide of access to hardware has morphed into a digital literacy divide. Our students may have facility with using technology, but mostly lack the ability to use technology in learning contexts, applying deeper skills of critical thinking, information literacy and communication” (Brooks Kirkland, 2014). How is it that almost 10 years later, her writing speaks to present day learning? Although access may be less of a barrier than it was then, the need for increased critical thinking skills, effective application and measurable outcomes looms large in our student populations today.

“In fact, research on information-problem solving shows that while students may have the ability to find information using digital technology, they have difficulties defining information problems, specifying proper search queries and evaluating the information they find. On the other hand, teachers are increasingly asking students to use ICT and the Internet to search for information and produce reports and presentations, but these activities are not always supervised or guided by them. As regards teachers, there is little knowledge about the competencies they should have to teach digital skills to students” (Claro, et al., 2018).

Educators now tasked with stemming the tides of decreasing literacy may be torn between technological expectations without understanding how to effectively teach it. To support teachers and students in this effort, many school districts have created ready to go resources, and most have educational technology leaders available to classroom teachers. Central Okanagan in B.C. has done such a task. “Knowledge, skills and dispositions” are the three components of the Learning Technology Department’s mission (Central Okanagan Public Schools, 2019). Their digital wellness priorities include practising mindfulness, exploring learning, thinking critically, connecting positively, and being safe, but the tips included are only “suggested practices.”

In SD71, Comox Valley, Learn71.ca has resources to connect to the ADST (Applied, Design, Skills and Technology) B.C. Curriculum, assistive technology, suggested technology skills by grade, integrating technology, general help and tips, along with the opportunity to book the district teacher for one-on-one visits (Comox Valley Schools, 2022a).

Integrating Technology

You are



Comox Valley Schools, 2022

In a recent survey of elementary teachers in a school district in B.C, (the school district asked to remain anonymous), there seem to be discrepancies in technology use and in-class application. The majority of teachers rated themselves as proficient users, but when asked what they might need to make technology a more integral part of their class (respondents selected as many choices as applied to them):

- 28% said knowledge of technology in general
- 42% said knowledge of incorporating technology in lesson
- 32% said more confidence using technology
- 26% said time in the classroom
- 41% said software that is connected to the curriculum
- 51% more access to technology
- 47% said more technical support
- 51% said they needed more opportunities to work with others.

This same district also has a district educational technology teacher available, rolled out laptops to all schools based on student populations, indicated that school teacher-librarians are the first point of contact for technology support, has a resource centre with ADST support kits (i.e. robotics, connected books, activities), the District Learning Commons website has tools to support teachers, and professional development opportunities within the district have been ongoing over the past 5 years. However, throughout this modernising period, this district did not use an in-service model, and with the current professional development structure in place, there is often no way to track how often, and which forms of PD teachers are engaging in for improvement. Other districts may have management systems that foster (or require) sharing to ensure that teachers are using their PD days as per their contracts.

According to the survey data, teachers use technology most often to communicate with families and increase personal productivity. Most shocking were the attitudes shown towards teacher-librarians. When asked to rank preferred ways of receiving technology support, not one respondent chose their teacher-librarian. Similarly, when asked who they look to for technology support in the school, 71% said a tech-savvy colleague, while only 12% said their teacher-librarian (district assigned school level technology leaders).

Teachers in this survey selected professional development sessions as their first choice in technology support and online video library as their second choice. Both Microsoft and the district offer an immense video library on demand by app, subject, and expertise level. If teacher-librarians are the key-holders for this knowledge in a school, and teachers are not seeking them out or choosing to work with them, then certainly this explains how the information held by teacher-librarian experts is not being integrated into the classrooms at the rate at which it could be. In *Leading Learning*, the Canadian school libraries standards of practice, (Canadian School Libraries, 2022), there are several themes that support the work of teacher-librarians in this domain. The standard “Advancing the Learning Community to Achieve School Goals” highlights the important interplay between principal, teacher-librarian and teachers to collaborate, co-plan and ensure that students have access to quality technology supported learning while ensuring that the LLC is building capacity for all users.

Themes		Growth Indicators				
		EXPLORING	EMERGING	EVOLVING	ESTABLISHED	LEADING INTO THE FUTURE
Principal Collaborative Role	Principals support or initiate LLC development to build a collaborative learning community. SEE IT IN ACTION	Principals ensure that all teachers have opportunity to work collaboratively. SEE IT IN ACTION	Principals encourage all teachers to work collaboratively with LLC staff to utilize programs, spaces, resources and technologies for learning. SEE IT IN ACTION	Principals are advocates and ambassadors for advancing the LLC. SEE IT IN ACTION		
Teacher-Librarian Collaborative Role	Teacher-librarian/LLC teacher works with LC leadership team to assess usage of LLC and alignment with school improvement goals. SEE IT IN ACTION	Teacher-librarian/LLC teacher develops short and long range plans for facilities and program growth with the LLC leadership team to facilitate school improvement goals. SEE IT IN ACTION	Teacher-librarian prepares and digitally shares reports/action research to document progress and aid in budget and staffing allocation and succession planning. SEE IT IN ACTION	Teacher-librarian leads collaborative site based research on the impact of the LLC. SEE IT IN ACTION		
Teacher Collaborative Role	Teachers advocate for the LLC to meet the literacy and information needs of all learners. SEE IT IN ACTION	Teachers co-plan learning experiences with teacher-librarian using LLC print and digital resources, spaces, technologies and teaching expertise to address differentiated learning. SEE IT IN ACTION	Teachers co-plan, teach and assess learning experiences with teacher-librarian using LLC learning environment to focus on learning to learn skills and strategies. SEE IT IN ACTION	Teachers co-plan with teacher-librarian for school-wide learner led approaches to inquiry. SEE IT IN ACTION		

Canadian School Libraries, 2022

The “Cultivating Effective Instructional Design to Co-plan, Teach and Assess Learning” standard, under the theme of “Technology for Learning”, illustrates the role of teacher-librarian in introducing new technology for learning and creating a supportive infrastructure, but also playing a fundamental role in continuing professional development of colleagues as the school builds on evidence-based best practice.



Evidence-Based Practice	Teacher-librarians/LLC teachers work with the LLC leadership team to review the LLC learning experiences and set goals for improvement. SEE IT IN ACTION	Teacher-librarians and teachers build and share their professional knowledge of approaches and environments to support inquiry learning and assess its effectiveness. SEE IT IN ACTION	Teacher-librarians initiate collaborative action research with teachers to build best practice strategies and approaches to learning in the LLC and assess its effectiveness. SEE IT IN ACTION	Teacher-librarians contribute their knowledge of best practice results in their LLC to the broader education community. SEE IT IN ACTION
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Canadian School Libraries, 2022

In many schools, the choice for the teacher to engage with the teacher-librarian and LLC, and to what degree, is still a choice. If there are options for professional development in the desired formats, but teachers are not attending, how does that speak to keeping our skills up to date? What is the evolving role of teacher-librarians?

What is the missing link?

Authors Beth Beschorner and Lindsay Woodward suggest that when teachers engage in long term planning that includes technology integration, while using short term planning structures to address student needs, teachers are more likely to stay the course (Beschorner & Woodward, 2019). Understanding our goals and curriculum outcomes before reaching for the devices creates opportunities for students to maximise their time and learn necessary skills and appropriate attitudes towards technology.

Teachers often cite lack of professional development in this area as one barrier to using technology. However, I would argue that we should be well beyond simple integration at this stage. Kathy Shrock suggests that, "In the beginning of the use of technology in the classroom, the phrase "integrate technology" was used. I always felt the phrase indicated sticking technology into an already full unit or lesson with little thought about what it could impact and how. I have been using the term "embed technology" and now use "infuse technology" instead. Infusing, to me, means the technology is seamlessly included and utilised. It indicates there should be purposeful thought put into the entire planning process" (Shrock, 2022).

Education is a constantly changing landscape, which makes for hard work, and requires constant self-improvement on the part of educators to stay up to date on best practices, and in this case, understanding educational technology. We cannot simply deny teaching critical skills to students because we feel that there are barriers in our way.

Educators have a professional responsibility to facilitate learning. There are caveats to this, of course. In B.C., it isn't until grade 6 that there are actual digital technologies required. The K-5 curriculum leans on design thinking and making skills and defines the word "technology" as a tool that extends human capability. So, teachers in elementary school are not required to teach digital literacy, citizenship, media literacy, etc. But many do internet research and play skills games or branch out into content creation without understanding creative commons or requiring students to cite their sources. Many districts have created scope and sequences for student skills (Comox Valley Schools, 2022b). Based on ISTE student standards, (International Society for Technology in Education (ISTE), 2022), these tools can be powerful references for teachers during planning.

This is an area where teacher-librarians could add value to classrooms. With our knowledge of TPACK, ISTE standards and the curriculum, we have ideas for how to make technology integration manageable and meaningful. With administration supported collaboration time to build long term plans together, we could start to bridge the knowledge gap in an action-oriented way. This strategy would not only empower teachers to implement plans but be "a catalyst for... teachers to try new technology in their literacy instruction and work to overcome well-known barriers" (Beschomer & Woodward, 2019).

The teacher-librarian/administration team needs to be strong to bring this structure to life. Many educators still do not really understand the skills and knowledge of the modern teacher-librarian. A re-awakening of long-term planning and how collaboration can work might be a necessary first step for some schools. For others, time to plan, with measurable outcomes (we all need to learn - and then practice - how to collaborate and leave with a plan!) would be a springboard to more effective weaving of subject content, digital tools and creative thinking.

We are at a point where barriers of the past are quickly being outnumbered by new nuances and themes, like critical media literacy. At no other point in education have students been so inundated by information, misinformation, advertising, and technology-driven recreation. "Teaching students to discern reliable information from inaccuracies or outright lies is too important to be left to individual discretion. In an information age, digital literacy should be the foundation to practically everything schools teach," (Wineburg & Zi, 2022). As educators and teacher-librarians, it is our job to share how important it is that digital literacy, digital citizenship, and media literacy are woven together like a braid. These three strands should not be taught in isolation - but connected to each other, and to authentic learning opportunities.

The gap between student and teacher habits continues to grow. Digital distraction is a constant battle in schools. If students continue to connect technology at elementary school to skill-practice gaming or consumption, or experience wider activities, but in the substitution zone, where “doing” a PowerPoint becomes synonymous with early cut and paste plagiarism, it becomes harder for teachers down the line to convince students that it’s a tool and harder to resist consumption at every stage. Harder also to reverse bad habits that have become ingrained. According to the American Association of School Libraries, “School librarians should engage in a continuous evaluation of the effectiveness of the school library program to meet the needs of patrons for access to ideas and information through the resources of the library” (ALA, 2022). We must be prepared to ask ourselves if our programs are indeed meeting the needs of our learners and how we can extend our capacity as a community.

According to Dr. Alison Butler in her ISTE conference presentation on critical media literacy, we must be asking ourselves “Why?” at every image, and at everything we see in the media (Butler, 2022, June 26-29). We need to be engaging in critical thinking and questioning in all subject areas. But once again, we loop the loop. “Students are often not capable of reading the difficult material they find on the internet, so being critical users has a new edge” (O’Brien, et al., 2020, January 30).

Making it stick

What approach would work best to make the leap from where we are at to where we need to be? Many schools already encourage teachers to connect with their teacher-librarian for technology planning. However, a more robust type of system, with thorough planning and development goals could have more concrete outcomes for students. Borrowing from The Royal College of Nursing in the United Kingdom, here are some of the outcomes that came from using the Hub and Spoke model in their education program: “Utilising a Hub & Spoke model enabled us to increase capacity, by linking underutilised small specialist (spoke) areas to wards traditionally used for long student placements (hub). By planning for each student allocated to the hub ward to spend time in the spoke area, we were able to increase the capacity without having too many learners in the hub area at the same time... It was important that we considered placements as not only within a physical space, but as associated guided learning” (Royal College of Nursing, 2019). While the context of this example comes from nursing, one can see how it could be easily adapted to the school unit.

Here is where the perspective is quite important. When I first proposed the adoption of a model like this, I imagined the library learning commons (LLC) and teacher-librarian to

be the hub, and the technology skills as the spokes. Carol Koechlin, co-chair of Canadian School Libraries, suggested that perhaps “the teacher-librarian/LLC is actually a spoke and the hub is probably the teacher/classroom if you follow the nursing model” (Koechlin, personal communication, 2022). Other spokes might be the school tech teacher, district workshops, expert colleagues, tutorials, professional reading etc. This spins back around to a fundamental choice in how the professional development and capacity building are defined.

Let’s first consider the teacher-librarian/LLC as the hub. Instead of offering “tech support,” the spokes would be fleshed out to include specific training and experience modules that are connected to student learning goals (ISTE or otherwise) and long-term curriculum planning, i.e., teachers learn how to teach the technology that they have planned with the teacher-librarian. As teachers become more proficient, the spokes can offer more extended opportunities. With regular planning between the teacher-librarian and grade teams, the hub (teacher-librarian /library) can identify areas that are weak, on track, or ready to extend. Students start to build skills that are age appropriate, effective, healthy, and taught explicitly, across all subject bands. Assessment of these skills and shorter screen time windows would also be included.

If the classroom teacher is the hub, then certainly the spokes would include the other technology experts within a district, colleagues, and leave more autonomy in the process. The teacher would have a pool of experts who could contribute to the required learning. The philosophy here is that there is sufficient infrastructure in place to keep the wheel spinning, but also that there is motivation for the purpose from the teacher.

While it certainly got me thinking about how I proposed the adoption of the hub and spoke model, I do believe that by beginning the capacity building and learning in-school, it would be more relevant to the day to day of the teacher. Perhaps there is a way to conceive of this model better with hexagonal thinking or as a few gears working together. Once a teacher has experienced success and honed skills with colleagues and their teacher-librarian, then they could extend by continuing their own reading, foster connections with experts within the district and their Personal Learning Plans (PLN).

One of the tools used by Beschorner and Woodward was setting up timetables to keep screen time on track. Table A shows early primary and table B is upper elementary/intermediate. Less is more in this sense. Extended sessions do not always equate to more work being done; in fact, the opposite is perhaps true. Including timing when considering technology integration would be another level of support for teachers to make screen time effective, meaningful, and manageable.

Table A

Week	No time	<10 minutes	10–30 minutes	30–60 minutes	>60 minutes
1	None	SMART Board: 1 day	iPads: 2 days Desktop computer: 2 days	None	None
3	None	SMART Board: 3 days	iPads: 2 days Desktop computer: 3 days SMART Board: 1 day	Desktop computer: 1 day	None
7	2 days	SMART Board: 1 day	iPads: 2 days SMART Board: 1 day	None	None
9	1 day	SMART Board: 1 day	iPads: 3 days SMART Board: 1 Day	None	None

Table B

Week	No time	<10 minutes	10–30 minutes	30–60 minutes	>60 minutes
1	2 days	None	Chromebooks: 2 days	None	None
3	None	Chromebooks: 1 day	Chromebooks: 3 days SMART Board: 2 days	Chromebooks: 1 day	None
7	None	None	None	Chromebooks: 5 days	None
9	None	Chromebooks: 1 day	Chromebooks: 1 day	Chromebooks: 2 days	None

Beschorner & Woodward, 2019

The Role of Professional Development (PD)

As research develops around professional development in teachers, we are now learning that for PD to be effective, it needs to have context, ongoing support, and immediate implementation opportunities. A collaborative team of teachers and a teacher librarian could effectively create an ongoing PD cycle that meets the specific needs of teachers. The following conditions “are critical to increasing teacher knowledge and skills and improving their practice, and which hold promise for increasing student achievement. These include (a) content focus, (b) active learning, (c) coherence, (d) duration and (e) collective participation” (O’Brien et al., 2020, January 30).

The components of effective PD from this model are defined as:

- Content focus: activities that focus on subject matter content, paired with increases in teacher knowledge and skills, and improvements in practice.

- Active learning: active as opposed to passive learning opportunities. These approaches allow teachers to practice new techniques and reflect on them, while using resources of experts, colleagues etc.
- Coherence: the extent to which teacher learning is consistent with teachers' knowledge and beliefs.
- Duration: PD activities should be of sufficient duration, considering both the learning phase and application/refinement/reflection
- Collective participation: Collaborative and collegial learning activities which may involve participation of teachers from the same school, providing opportunities for staff interaction and discourse (O'Brien et al., 2020, January 30).

On "The Cult of Pedagogy", a popular education podcast and blog, a help sheet "How to Plan Outstanding Tech Training for Your Teachers" was posted. (Gonzalez, J., 2016, March 20). Many of the tips are useful, but vague PD that isn't actionable for teachers is not going to help. "Make and take" PD certainly applies to some learning, but we need to stop "doing" tech and asking ourselves what our purpose is, and how we are adding value to our students' learning. Connecting long term teaching plans and PD provide an opportunity for teachers to strengthen their skills and to start a school-wide conversation about how to reach all students and provide opportunities for students to learn critical digital skills.

Thinking about how we weave assessment and evaluation into our planning before we use technology is a critical piece of making sure we are hitting the mark. Reflecting on our practice, as per the AASL guidelines, for example, keeps us thinking about constant improvement in our own practices, and in student learning outcomes. Evaluating our PD on an ongoing basis keeps us in touch with those we are supporting and helps us gather data on what practices are working, and those that need refinement.

Conclusion

If we imagine an in-school PD program using the Hub and Spoke model to grow the capacity of our educators and create systems to support collaborative planning between teachers and teacher-librarians, then not only do teachers have the technical skills to feel more confident, but they also have a plan to keep themselves accountable over the course of the school year with ongoing support within a school team. Students have consistent technology exposure, and learn how to apply their skills in context, too. They learn to approach technology as a tool and read with a critical lens. Teacher-librarians are able to engage their leadership and mentorship skills to close the knowledge gap and contribute to a school culture where lifelong learning isn't just a catchphrase. Everyone gets to build the farm and feel like they are valuable assets working towards student success.

YOUR DIGCIT/DIGLIT/MEDIA LIT TOOL LIST



TO IMPROVE STUDENTS' DIGITAL MEDIA LITERACY AND VERIFICATION SKILLS WITH LATERAL READING, AND LEARNING HOW TO EFFECTIVELY EVALUATE ONLINE SOURCES AND CLAIMS.
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A DOWNLOADABLE DIGITAL CITIZENSHIP FRAMEWORK TO GUIDE EDUCATORS FROM K-12. TOPICS INCLUDE: DIGITAL SAFETY, MEDIA AND INFORMATION LITERACY, DIGITAL WELLBEING AND SOCIAL RESPONSIBILITY.



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TOOLS FOR EDUCATORS AND "EVERYONE" THERE ARE MANY WAYS TO BECOME NEWS LITERATE.

LILA ARMSTRONG 2022

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Keep Thinking

How have you defined your personal role in creating an infrastructure that supports quality technology infusion?

In what ways could Administration at your level be engaged to leverage in-service time (e.g., at staff meetings or otherwise) to ensure more consistent PD? How can we evaluate its success?

What, if any, accountability features are part of your District/Provincial college?

How do we capture/support teachers who are new, returning from leave, from out of District/Province to implement scope and sequence goals, and alignment with District commitments/goals for tech learning?

What is your reaction to this quote? “The internet is how Gen Z becomes informed — and too often misinformed — about the world. Nearly 40% of this generation, young people born between the late 1990s and early 2000s, prefers using TikTok and Instagram as their search engines, according to recently released internal data from Google” (Wineburg & Nadav, 2022).

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