The Learning Accelerator

Driving Quality in Remote Learning:

A framework for research-informed remote experiences for K-12 learners

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Created by The Learning Accelerator

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Quality Remote Learning Experiences: A Research-Informed Brief

The COVID-19 pandemic has dramatically shifted the landscape of American K-12 learning. Between March and April 2020, nearly every public school was forced to close, shifting quickly to remote[1] learning. As educators begin the 2020-2021 school year, the prospect of continuing remote full-time or hybrid (that is, part-online, part in-person) remains likely for many communities. Improving our approaches to teaching and learning in these environments, therefore, is a critical lever for ensuring our schools are able to drive equitable outcomes for every child in the country.

- **What can we learn from research about if and how remote learning experiences are an effective means for student learning?**
- **How might teachers think about the design of their remote instruction in a research-informed way?**

The Learning Accelerator (TLA), a national nonprofit, completed a review of the academic and professional literature to help begin to answer these questions.

This document summarizes key findings and lays out a research-informed framework for implementing and improving remote learning for K-12 students.

Note: This document is aimed at exploring strategies teachers can enact with students; equally important are the school and system-level conditions (processes, structures, supports) leaders must put in place to ensure greater equity and access around the design of teaching and learning. Examination of the system-level conditions for success is outside the scope of this brief, but you can explore more about conditions for success and scale conditions for success and scale here. In addition, this review is offered alongside other practice guidance for implementing remote learning.

Finally, given the pace of field learning, this document should be considered "living;" as the evidence base grows and evolves, our team will update it.

[1] For the purposes of this review, we are using the term "remote learning" to broadly describe forms of instructional interaction where students and teachers are working together online and/or in a non-co-located way, adopting the following definition from Schlosser & Simonson (2002): "Institution-based, formal education where the learning group is separated, and where interactive telecommunications systems are used to connect learners, resources, and instructors."

Contents of This Brief

In the pages that follow, you'll find an overview of the findings, first in summary and then more deeply in three main areas. We've included a simple reflection tool to support educators and teams in their work.

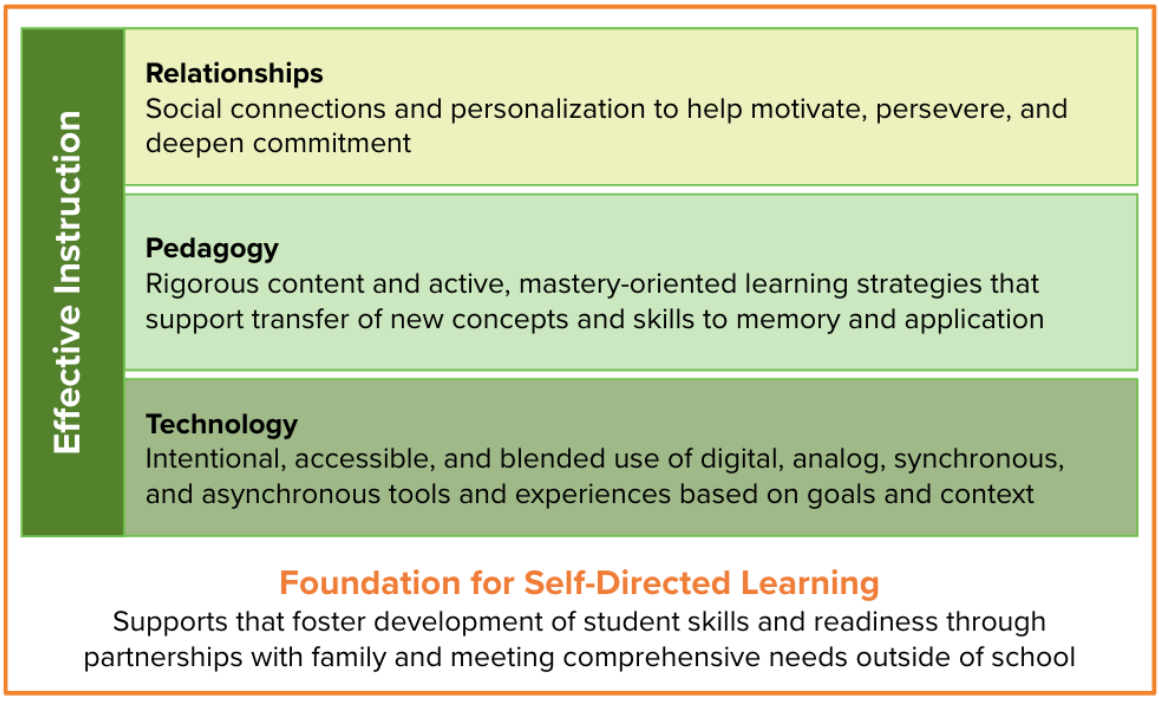
Summary: Framing the Factors that Help Drive Quality in K-12 Remote Instruction

High-quality remote learning builds upon the features of effective in-person instruction. However, it also meaningfully addresses, mitigates, and/or leverages the unique challenges and benefits created by technology and out-of-school learning to deeply engage and meet the needs of students[2]. In TLA's review of the research, as well as our work alongside schools navigating the shift, the team has identified **two specific factors that teachers can think about as drivers of quality as they implement and improve remote approaches:**

- **Foundation for Self-Directed Learning** that fosters students' engagement outside of school
- **Effective Instruction** that facilitates powerful and motivating learning interactions and engagement between student, teacher, and content (i.e., the instructional core[3])

The framework illustrated below is not intended to be exhaustive; rather, we hope it offers a way to organize, plan for, and assess the design of experiences for learners.

Key Factors that Help Drive Remote Learning Quality



Specific features of each quality driver are described in greater detail in the sections that follow. Finally, it's important to note that while this framework shows them as separate, many of the drivers are interrelated and, in fact, amplify each other. (For example, personal, individualized feedback can help establish feelings of "social presence," and therefore connectedness, in online settings[4].)

[2] Bonk & Cummings, 1998
[3] Elmore, 2004
[4] Dunlap & Lowenthal, 2014

A Note on Diversity, Equity, and Inclusion In the Design of Remote Experiences

"Design of web-based instruction is not culturally neutral, but instead is based on the particular epistemologies, learning theories and goal orientations of the designers themselves."
(McGloughlin and Oliver[5])

Learners from different backgrounds and demographics experience instruction differently based on their comfort with and cultural proximity to the assumptions and expectations of learning designers (e.g., teachers). For example, students exhibit cultural differences in participation approaches in online discussions[6], suggesting a need for active modeling and expectation setting. In addition, how students are motivated to engage with and persevere during learning experiences has been found to differ across students based on culture, gender, and age[7].

Given this, educators and tool/resource creators must actively interrogate how experiences will be interpreted by students coming from multiple cultural backgrounds and contexts — incorporating factors such as assumed familiarity with modality and background materials, desired relationships with peers, caretakers, and instructors, and motivational and assessment approaches. Teachers must think holistically about how design choices will affect students' experiences and proactively address issues through a variety of strategies, such as:

- supporting differences in communication styles through offering opportunities to participate and contribute via multiple modalities;
- offering many channels for communication;
- encouraging students to actively make connections between content and their own lived cultural and community context, inviting them to bring ideas, resources, and examples;
- encouraging peer-to-peer engagement (in a supported and clearly normed way) and explicitly offering opportunities for cross-cultural understanding and inquiry;
- offering choice through multiple modes of delivery and assessment; and,
- providing maximum clarity and transparency on tasks and expectations.[8]

We've included specific questions that can support reflection on diversity, equity, and inclusion issues through the remainder of this guide.

[5] McGloughlin & Oliver, 2000, p58
[6] Yang, Olesova, & Richardson, 2010
[7] Lim and Kim, 2003; Lim, 2004
[8] McGloughlin & Oliver, 2000; Yang, Olesova, & Richardson, 2010; Parrish & Linder-VanBerschot, 2010; Yang et al, 2014

Background on Remote Learning: Can Remote Learning Work?

Before jumping into questions of remote learning design, it is useful to briefly consider the existing body of research that tackles whether or not online remote learning can be effective. What's our "warrant" for remote learning and how might it differ from more traditional, in-person teaching and learning?

Overall the research suggests that "good" learning at any age or stage[9] is simply good learning across any modality, assuming that the design for online approaches acknowledges and capitalizes on differences experienced by learners in online environments[10]. Put another way by Clark in 1983[11], "...media are mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in our nutrition."

It is important to caveat any review of the remote learning research by noting that the majority of studies of online and virtual learning have focused on older learners (e.g., higher-education, professional learning). This is not to say there are not published and peer-reviewed K-12 studies to draw from, but there is more work to be done by the research community to help practitioners more deeply understand how K-12 students experience online, remote learning as well as to understand the efficacy of certain practices across different ages and content areas.

Key Section Highlights

- Learning through an online platform can likely be as effective as any other high-quality learning experience, assuming designers and instructors are following evidence-informed principles in their design and ongoing facilitation (either human or technologically mediated).
- It is important that educators do not simply reproduce in-person learning online (either as a standalone remote experience or via having some remote students join into synchronous classes); such approaches combine the "worst of both worlds" and have been shown to underperform traditional face-to-face as well as online learning.
- Incorporating some face-to-face elements in "blended" formats (for example, through hybrid learning models) should be considered if possible and these models tend to outperform both standalone online and offline learning.

Key findings from the research base include:

- **While effect sizes vary, multiple studies find no significant, consistent difference in outcomes between online versus face-to-face learning environments.** The most comprehensive review of studies of online and blended learning efficacy to date have found that learners in fully online or partially online environments tend to perform better than those in face-to-face ones[12]. Meta-analysis of research studies comparing the efficacy of remote and hands-on labs shows little or no systematic differences in learning outcomes between the two types of experiences[13]. Students sometimes express greater satisfaction with

[9] Bransford et al, 2004
[10] Cavanaugh et al., 2004
[11] Clark, 1983, p 445
[12] Means et al 2009
[13] Ma & Nickerson, 2006; Triona & Klahr, 2003

in-person approaches, but these differences do not translate to higher learning gains[14]. In fact, in some cases online high-school and older learners have shown higher long-term retention as well as better outcomes for certain types of knowledge building[15].

- **Online-only and asynchronous formats can offer specific advantages but also pose unique (but not insurmountable) design challenges.** The potential design and experiential advantages online approaches can provide include accessibility for learners (access, flexibility, convenience), personalization, intervention through credit recovery and accelerated learning, and standardization (typically difficult when seeking to scale face-to-face experiences across multiple instructors)[16]. Online environments can offer ways to reduce risk and bias in participation by downplaying individual differences in physical appearance (e.g., gender, age, race, or disability) that may affect others' responses to them and also offer greater inclusion for learners with special needs (either cognitive — wherein they can offer supports not present in a traditional, in-person format — or accessibility)[17].
- **To realize potential advantages, learning designers must understand and address meaningful differences between in-person and online settings**. Simply replicating traditional offline approaches (e.g., synchronous, one-way instruction from teacher, such as lecture) tends to result in worse performance in online environments, particularly if only some students are learning online[18]. Initiating and sustaining engagement can take on new levels of challenge. In addition to differences in learner satisfaction, likely related to sense of connection to others[19], there are differences in engagement, relationships, and collaboration, which can be weaker than in blended or offline communities[20]. Finally, because online learning requires more independent work, students will likely need more support to trigger active engagement, reflection, self-monitoring, and self-regulation. (For example, one study found successful online-only students use more self-regulation strategies than those in blended learning approaches, even though they achieve similar levels of performance.) [21]
- **The exception to the overall positive findings on online learning is student performance in online-only charter schools; in these cases it has been found that students are not learning at the same rate as peers in in-person settings** (traditional district or charter)[22]. Researchers studying these schools posit that the highly independent, under-networked and under-connected nature of the learning experience in these schools is a contributing factor, noting "learners still need the presence of teachers, mentors, or peers to help them through the learning process.[23]"
    - To quote a highly-cited 2017 study of online schools in Ohio[24], "In the history of educational technology research, it is well established that technology as a delivery mechanism (e.g., whether something is online or face-to-face) has no direct impact on student learning outcomes (Bernard et al., 2004; Clark, 1983; Fishman et al., 2013). **What really matters is understanding how the introduction of technology impacts who chooses to participate in particular learning environments and what they experience that result in learning outcomes.** As researchers strive

[14] Olivet, 2017
[15] Olivet, 2017; Sitzmann et al, 2006
[16] Mrazek et al, 2018; Mills, 2003; Tunison & Noonan, 2001
[17] Elias, 2010
[18] Bernard et al., 2004, Means et al, 2009
[19] Olivet, 2017
[20] Hart, 2012; Tunison & Noonan, 2001
[21] Means et al, 2009; Broadbent, 2017
[22] Ahn, 2016; CREDO, 2015; Ahn, 2017
[23] Ahn, 2017
[24] Anh, 2017, p 55

to understand how online learning could be employed to improve student outcomes, there is a great need for research to contextualize findings and better articulate how online education is implemented in various ways, how policies shape what types of learners experience online learning, and importantly how online learning may likely have differential effects for students who have diverse academic needs and histories."

- **Blended implementation formats have shown advantages over purely online or face-to-face approaches**[25]**,** likely because when designed well they maximize benefits while minimizing downsides of any one modality[26]**,** allowing the optimal use of resources[27]. For example, by offering opportunities for authentic, in-person interaction, blended approaches can help solve for the lower levels of learner satisfaction experienced in online-only environments (for example, a randomized control study of undergraduate students found video assignments along with in-class work problems significantly improved engagement and satisfaction as well as overall course outcomes[28]). In some cases, online programs have also been used effectively in a blended format to offer students access to certified teachers in certain subjects. For example, a Louisiana program paired online certified math teachers with a non-certified in-person instructor to allow students to take Algebra 1 online; post-test results indicated no significant difference between students in this program versus those in a traditional course[29].

  Using online tools and activities within face-to-face/in-person sessions is a helpful way to ensure participants have the opportunity to increase their comfort and skill before working independently online. In addition, offering in-person blended opportunities in addition to online learning can enhance feelings of community and inclusion[30]. (Although note, this is not true for every learner — for example, requiring synchronous learning sessions without proper support can be less inclusive for cognitively atypical learners[31].) Given this, it seems blended/hybrid approaches that leverage the respective benefits of in-person and online approaches should be considered whenever possible.

[25] Means et al, 2009; Liu et al, 2016
[26] Glazer, 2012; Reich, 2015; Stockwell et al, 2015
[27] Kauer, 2013; Holden & Westfall, 2006
[28] Stockwell et al, 2015
[29] O'Dwyer, Carey, & Kleiman, 2007
[30] Rodrigo & Nyugen, 2013
[31] Elias, 2010

Setting the Foundation: Quality Factors That Improve Self-Directed Learning At Home

The base of the remote learning quality framework is focused on building a solid foundation for learning outside of the classroom. A student's ability to engage in any remote instructional experience, no matter how well designed, is affected by their resources, learning environment, and state of wellbeing. Educators should consider how to set students up for success as independent learners at home, engaging families and caregivers as partners. In addition, given unique stressors and disruptions associated with COVID-19, educators must acknowledge and take action to support children holistically in areas beyond academics in order to drive achievement.

Key Section Highlights:

- While "good learning is good learning," educators must think beyond just the design and delivery of remote instruction as they launch. Specifically, learning at home requires students to self-direct considerably more than in an in-person environment. Teachers should provide explicit directions and support for independent learning as well as engage parents and guardians as partners in the process.
- Learning occurs across different domains of development; experiences in one area (such as social and emotional development or mental wellbeing) affect learning in others (such as academics).
- In light of the SY19-20 rapid shut-down, lack of access to school (and the related social, emotional, and service connections it critically provides for needs beyond academics), and the ongoing COVID-19 pandemic, educators must consider how to remotely offer trauma-informed, whole child development instruction and supports to students.

The research suggests:

- **Educators must establish explicit expectations and support for independent learning.** Learning online is independently directed[32]; even in a full synchronous setting, students must exert effort to attend and engage. Online environments offer students many opportunities to make choices — from setting up learning-activity arrangements to deciding how to undertake learning activities in terms of media type, pace, depth, and coverage of the content, and time[33].

  Given this, **students' readiness to exert control and self-direct is a critical factor**[34]. In fact, in one study, researchers found the four factors that correlated with passing a course were a student's: ability to approach tasks in an organized and self-directed way; access and skill with technology; taking responsibility and initiative; and, belief in oneself and ability to achieve. The only personal characteristic associated was whether or not a student had a job outside the home.[35]

  Teachers can support students by helping them understand how to effectively direct their own learning (defined by Knowles (1975) as a process in which individuals take the initiative in understanding their learning needs, establishing learning goals, identifying human and material resources for learning,

[32] Johnson & Galy, 2013; Shyu & Brown, 1992; Stansfield, McLellan, & Connolly, 2004
[33] Stansfield, McLellan, & Connolly, 2004
[34] Hung et al 2010
[35] Roblyer and Marshall, 2003

choosing and implementing appropriate learning strategies, and evaluating learning outcomes).

  - Hung et al (2010) suggest **concrete strategies to do this include**: **improving clarity** of course objectives, expectations, and structures; **helping students establish routines** for time- and information-management; **provide pre-assessments** to help students understand existing levels of mastery and set goals; and, **help students build processes for peer engagement and help-seeking**.
  - Educators should also be aware that the **ability to self-regulate doesn't translate universally across subjects or modalities**; beliefs and strategies may be domain specific[36], so teachers may need to help students apply mindsets and skills to different experiences and content areas.
  - In addition, a student's sense of "communication self-efficacy" (that is, the ability to effectively communicate and be understood) is a key skill needed for online learning. **Explicitly helping students identify and improve communication across modalities through providing strategies and expectations, modeling, and coaching can be helpful**. Teachers should also provide ongoing encouragement to students to participate more extensively in the discussions and peer communications, express their thoughts, and reach out for assistance.[37]

- **Educators should consider how they might activate students' personal networks (e.g. parents, caregivers, others at home) to support learning at home.** There's significant evidence that effective parental/caregiver engagement is associated with higher academic outcomes[38], and that students' ability to participate effectively, behaviorally, and cognitively in learning is supported by their personal and "course" (e.g., class, school) communities[39]. The rapid shift to remote learning during the COVID-19 pandemic (and related isolation during quarantine and social distancing) shone a spotlight on families' critical facilitation of at-home learning, but research conducted prior to the pandemic indicate that online learning has always required parents and caregivers to play an increased instructional role to support their children's learning[40]. Further, in the context of online learning, a lack of connection between families and school may exacerbate a sense of disconnection and prevent effective interactions[41].

  Educators can therefore increase the likelihood that students will be successful as remote learners by **bringing parents and caregivers in as collaborators in learning**.

  - How to do this might not be obvious to parents, who may underestimate their ability to help motivate learning[42]; teachers can help them understand how to support instruction. For example, if teachers are able to help highlight accomplishments (e.g., improvements, key milestones, effective engagement) explicitly, parents can help by giving positive reinforcement after learning activities[43].
  - Having an explicit plan for engaging families proactively, providing practical strategies for family action, engaging in personalized, consistent communication, and offering structured support can

[36] Boekaerts, 1997
[37] Hung et al 2010
[38] Education Endowment Foundation, 2018
[39] Borup et al, 2020
[40] Borup, Graham, Davies, 2013; Liu et al., 2010
[41] Chen et al 2019
[42] Borup et al 2014
[43] Hoover-Dempsey & Sandler, 1995, 2005; Liu et al., 2010

all be effective strategies for engaging with parents as partners[44].

- **Remote learning approaches must acknowledge and support the "whole child."** Conditions vary for learning across homes, and students bring heterogenous needs across developmental domains. Further, the COVID-19 pandemic and rapid closure of schools has contributed to individual and collective levels of trauma, which in turn has likely affected student physical, mental, emotional, or social wellbeing[45]. These stressors can significantly impact skills foundational to readiness for academic learning[46].

  As schools seek to improve remote learning approaches, educators must consider how they can respond to trauma as well as support comprehensive development of the whole child. Educators should:

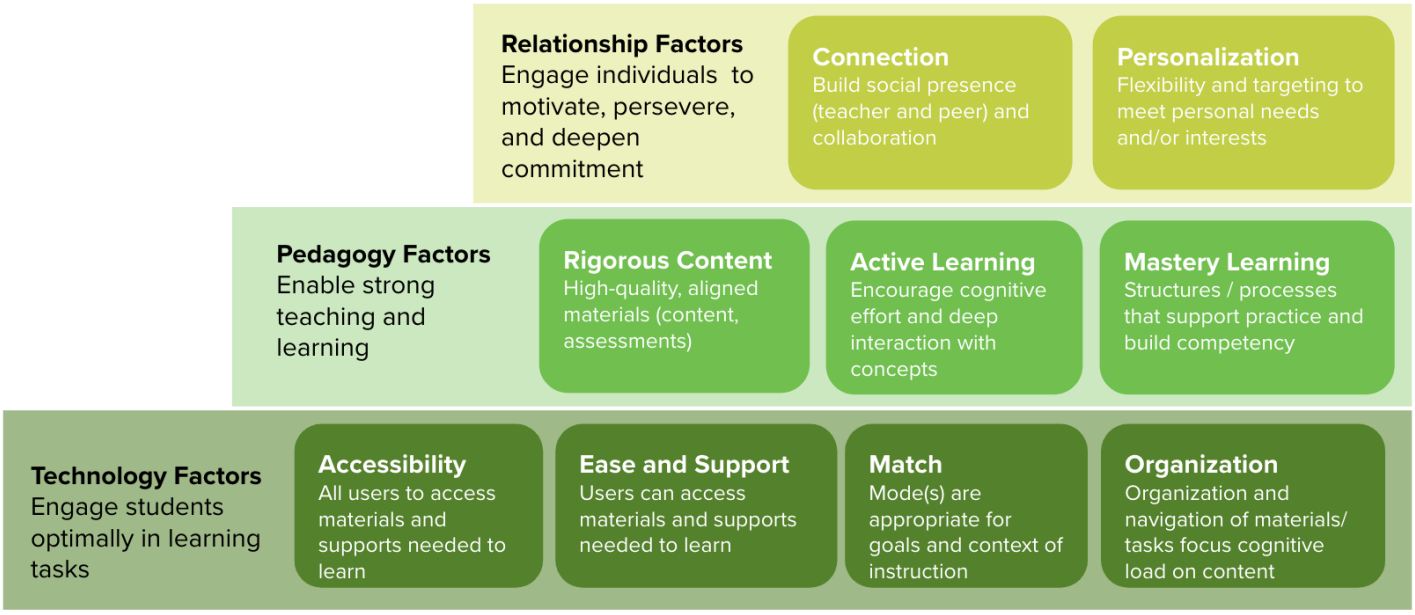
  - Consider how to implement flexibility into instruction and modify classroom management to **prioritize relationships**[47] (as Stafford-Brizard puts it, "relationships are the fuel for human development; they foster trust and belief, and are a buffer against stress"[48]).
  - Examine **discipline practices to ensure they are sensitive, rather than punitive[49] and invest in a school-wide culture of support and self-care**[50] (which Crosby et al[51] defines as "the deliberate practice of engaging in actions or perspectives to improve and care for one's mental, emotional, spiritual and physical health").
  - Model **adaptive behaviors** (such as reflection, expressing of feelings verbally), exercise flexibility and empathy, and establish consistency in coursework expectations and routines[52].
  - Consider **implementing remote practices that acknowledge and support students comprehensively, across different domains of whole-child development.** Cantor and Gomperts [53] suggest that environments that effectively develop the whole child have five characteristics: positive developmental relationships; environments filled with safety and belonging; integrated universal, group, and individual supports for wellness and readiness for learning; intentional development of mindsets, skills, and habits; and rigorous instruction characterized by personalization, engaging practices, and scaffolded support.

[44] Education Endowment Foundation, 2018
[45] Wolpow et al., 2016
[46] Stafford-Brizard, 2016
[47] Crosby et al., 2015; Crosby et al, 2020
[48] Stafford-Brizard, 2016, p4
[49] Baroni et al., 2016
[50] Oehlberg, 2008
[51] Crosby et al, 2020, p4
[52] Crosby et al, 2020
[53] Cantor and Gomperts, 2020, pp 14-15

Powerful Instructional Experiences: Modality, Pedagogy, and Relationships

Effective engagement of the instructional core drives quality of any "in-the-moment" learning experience. The literature suggests that in online learning three specific features can support this engagement:

- **Technology** that support student's engagement with learning objectives and tasks;
- **Pedagogy** that supports active engagement with rigorous content in support of mastery; and,
- **Relationships** (to others as well as to task) that strengthen commitment to and motivation for learning.



While these three factors work interdependently and are reinforcing, they also build on one another serially. For example, the technology chosen supports effective engagement during instruction, but effective pedagogical choices make that engagement worthwhile. Finally, strong relationships foster deeper connection to and perseverance during the learning experience.

Technology: Using Accessible, Well-Organized Tools That Match the Mode of Learning to Goals and Context

Digital tools and platforms can be powerful enablers for remote instruction, supporting communication, greater access to a wide array of content and resources, and connecting students to each other and teachers with greater ease. Indeed, access to learning during spring 2020 school closures was noted to be positively associated with districts' implementation of online platforms such as video conferencing and learning management systems (LMS)[54].

Given this, and when confronted with the task of remote learning, many teachers focus first on the nuts-and bolts "how" of learning online. With both digital and analog resources available, they ask questions such as: Should we choose tools that replicate synchronous instruction that might have happened in-person? Offer mainly independent work? Are certain modalities (i.e., asynchronous or synchronous) more effective than others?

The research indicates that there is no one "right" universal technology or modality; rather, it's critical that choices in mode and format (digital versus analog, asynchronous versus synchronous) are accessible, match objectives and context for instruction, and are designed with clear, consistent organization.

Key Section Highlights

- Technologies can enable multiple means of engagement with content, instructional experiences, and other users, provided access to and use of tools is equitable. Teachers should be clear about instructional goals, choosing tools that enable those goals in a remote format (and that ideally have existing evidence of efficacy).
- There is no one right modality for learning, though different approaches (digital and analog, synchronous and asynchronous) offer different benefits and may be better fits for different objectives and learner/subject contexts.
- Teachers should be intentional about matching the tool (and therefore enabled modality) to their goals and understanding of student needs as well as offer variety to effectively engage different learners.
- It is important that educators do not simply reproduce in-person learning online (either as a standalone remote experience or via having some remote students join into synchronous classes); such approaches combine the "worst of both worlds" and have been shown to underperform traditional face-to-face as well as online learning.
- Quality of design/user experience (attractiveness, ease of sign up/onboarding/navigation/interaction) and the presence of easy-to-find support resources (both guides but also troubleshooting in the form of personalized support/chat/bots) are important to adoption and outcomes.
- Making choices that offer clarity, consistency, simplicity, familiarity, accessibility, and interoperability can reduce the cognitive load associated with navigating a tool (i.e. offering predictable design, allowing the user to focus on learning the content, not making sense of the organization of the content or tool features). It can also help protect student privacy and security.

[54] Malkus, 2020

Decisions about which platforms to use are complex; teachers and leaders need to work together within a shared understanding of operational requirements and needs (e.g., budgets, existing tools). They also must consider the existing evidence base (if available) for any particular tool they intend to use, asking who it might be helpful for and under which conditions to ensure it will be effective within their own context. *(Interested in evaluating a tool against quality factors in this review? Find an editable aligned assessment that includes operational considerations here.)*

From an instructional standpoint, the research specifically suggests that:

- **At the most basic level, chosen technologies and tools must allow for equitable access to learning**. Barriers such as limited internet connectivity and at-home resources (e.g., devices, time for learning) can render all other decisions moot.[55] Teachers must be aware of the resources students have and don't, as well as consider how to offer access to instruction in cases where insufficient resources exist[56].

- **The introduction of specific modalities, in and of themselves, do not appear to add or detract from student learning or be generally associated with specific outcomes**[57]. Efficacy is the result of not one or two specific technology design factors, but rather the "combined influence of implementation, context, and learner characteristics as these factors interact with technology[58]."

- **Teachers often assume they can simply translate offline approaches to a lackluster replication of classroom instruction online[59], which can lead to deleterious effects**[60] due to inefficient use of time[61] and a lack of two-way interaction, which is important regardless of modality[62]. Studies have found that learners' experience in remote settings was not as good as in face-to-face ones when teachers lectured synchronously[63]. Finally, classrooms employing "yoked" learning approaches, where some learners join synchronous in-person instruction remotely, or where curricular materials and instruction do not vary between online and face-to-face conditions have shown a significantly negative effect on learning[64].

- **Teachers should match and blend modalities to best suit their specific instructional goals and needs of learners**[65]. The design of remote learning should be like a "well rounded meal," offering the right combination of modalities that balance independent and social learning as well as time on screen. Different approaches to remote learning suit different tasks and types of content[66], (for example, a check for understanding could be completed synchronously via a poll or through a self-directed asynchronous assessment). Modalities also offer different benefits; for example, synchronous engagement can increase personal participation and motivation, as well as support group convergence of thinking and meaning. Asynchronous learning, on the other hand, might offer more time for cognitive engagement, allowing

[55] Meyer, 2016; Anderson & Perrin, 2018; Clausen, Bunte, & Robertson, 2020
[56] Myung et al 2020
[57] Means et al, 2009; DeLozier & Rhodes, 2016; Education Endowment Foundation, 2020
[58] Ryan et al., 2016, p. 296
[59] Bernard et al, 2004
[60] Anderson, 2008
[61] Barbour, 2011
[62] Bernard, 2004; Machtmes & Asher, 2000
[63] Gilles, 2008
[64] Bernard et al, 2004; Means, 2009
[65] Clark, 1994; Gunawardena & McIsaac, 2004; Blomeyer, 2002; Means, 2009
[66] Education Endowment Foundation, 2020

learners to have more time to reflect and self-monitor.[67]

Online interaction is expository (one-way, focused on delivery of information), active (two-way engagement in tasks and activities), or interactive (two-way, creating new knowledge)[68]. Sotillo[69] argues "asynchronous and synchronous learning events have different discursive elements that may be exploited for different pedagogical purposes;" the same is true for different ages of learners. For example, younger learners may benefit from the structure, immediacy, and spontaneous help-seeking and correction offered in a synchronous experience, whereas older learners can likely learn more independently, holding questions about content and misconceptions until online office hours[70]..

- **Perceived ease of use and support matters**. Perceptions of quality, reliability and ease of platform operation, interface, and tools have significant influence on reported learner satisfaction and intrinsic motivation[71]. This is true for the general user experience design as well as perceptions of ongoing and accessible tech support, which is positively associated with willingness to try as well as persevere.[72]
- **Teachers should choose tools and organizational schemas that offer simplicity and reduce cognitive load on the user.** Clear and consistent online course design that limits technical impediments is associated with higher outcomes[73]. Teachers can leveraging ubiquitous and familiar tools and functionality to reduce participants' "cognitive overhead" (thus helping them deploy focus towards learning tasks)[74]. Teachers should also aim for simplicity, choosing a smaller number of aligned tools (e.g., a single learning management system) to avoid confusing students and parents[75].

  Further, clear and consistent online course design within any tool (e.g. a Learning Management System) supports optimal learning and higher outcomes[76]. If learners have to spend too much energy navigating course design, it can reduce the energy available to focus on the actual learning tasks. This objective can be supported by consistency of lesson and resource design such as through carefully "chunking" and sequencing content as well as providing specific prompts, strategies for navigation, and expectations[77]. Fewer modules per course/unit is positively associated with student satisfaction, engagement, and perceptions of learning[78]. Teachers can also create procedural "scaffolds"[79] and consistent boundaries around which tools get used, when to focus attention and reduce the need to self-direct[80].

- **From an equity and inclusivity standpoint, online modalities offer real access benefits as well as challenges**. For example, research findings indicate that shy students tend to participate more in online environments than in traditional environments[81]. Online environments can also offer extended time and varied multimedia for learners who need them[82]. **At the same time, teachers must actively design with**

[67] Hrastinski, 2007
[68] Means et al, 2013
[69] Sotillo, 2000
[70] Bernard et al, 2004, p 409
[71] Davis, 1989; Kintu et al, 2017
[72] Davis, 1989; Bunn, 2004; Ivankova & Stick, 2007; Ojokheta, 2011; Roblyer and Marshall, 2003
[73] Tallent-Runnels et al., 2006; Harrington & Floyd, 2009; Kelly, 2011
[74] Mayer, Heiser, & Lonn, 2001
[75] Myung et al, 2020
[76] Tallent-Runnels et al., 2006; Harrington & Floyd, 2009; Kelly, 2011
[77] Keeler et al 2007
[78] Swan, 2001
[79] Hill and Hannafin, 2001, p45
[80] Murphy, Rodríguez-Manzanares, and Barbour, 2011
[81] Palloff & Pratt, 1999
[82] Rose & Blomeyer, 2007; Keeler et al 2007

accessibility in mind; designers can incorporate key universal instructional design for learning principles (multiple means of presentation, modes of expression, and engaging interest) to ensure equity of access and inclusion[83] as well as meet web accessibility standards and easy integration of other assistive tools. However, not all learners benefit the same way[84]; for example, offering multiple choices for content representation could be overwhelming for some students[85]. Teachers need to understand the specific needs and profiles of the students[86] they have in their online classrooms.

- **Teachers should consider a tool or platform's interoperability level to support data use and protect student data and privacy.** Interoperability is the seamless, secure and controlled exchange of data between systems and applications. In order to ensure that student data produced or collected by platforms remains secure, and that identifying information is safe, teachers should consider how tools will help them protect those data.[87]

[83]Rose and Meyer, 2002; Elias, 2010
[84] Keeler et al 2007
[85] Bohman, 2003; Burgstahler, 2005
[86] Keeler et al 2007
[87] Project Unicorn, 2020

Pedagogy: Engaging Learners Through Rigorous Content, Active Learning, and Mastery Learning

Effective online learning must engage students in the development of new skills and knowledge in ways that support transfer of this learning to long-term memory and application. As they consider how to build these experiences in remote classrooms, teachers should engage students with rigorous, well-designed content as well as encourage active, mastery-based learning with that content. In the sections that follow, we summarize key takeaways from research on how to bring these pedagogical factors to life in online spaces.

Key Section Highlights

- High-quality content that is aligned to grade level and accelerates learning is essential for quality remote learning, and online content provides options for flexibility in pacing and differentiation. However:
    - Online materials may vary in quality, so teachers must actively ensure standards alignment and rigor.
    - While students might learn independently, teachers must play a significant role selecting and organizing quality as well as providing content expertise.
- It is particularly important that online approaches do not simply replicate passive formats employed in traditional settings (e.g., lecture); the more active the modalities and tasks, the better. Teachers can:
    - Integrate specific active learning strategies into instruction, such as metacognition and application tasks.
    - Leverage interactive multimedia materials (digital and analog), peer collaboration, and model explicit examples of engagement to support active learning.
- Remote instruction should focus on mastering learning objectives. Mastery learning is supported by:
    - Aligning content and assessment to clear objectives and mastery goals.
    - Offering students multiple opportunities for engagement with content and a specific skill over a sustained period.
    - Offering mechanisms for individualized tutoring, coaching, and support.
    - Including mechanisms for practicing deliberately with feedback and support.

Rigorous Content

Rigorous instruction relies on fostering interactions amongst students and teachers around content[88], engaging learners in a high "level of quality in both effort and outcome"[89]. Online instructors must design instructional experiences that leverage high-quality curricular materials clearly and consistently to ensure students achieve mastery of learning objectives.[90]

The research suggests:

- **Instructional materials remain essential to quality learning[91]; however, curricular materials used offline should likely not be simply replicated online.** It has been shown that instructional materials influence teachers' instructional choices and behaviors[92]**;** as the evidence (discussed earlier) suggests that simply replicating in-person instruction online is associated with effects[93], it makes sense that materials also need to shift. Indeed, varying curriculum between face-to-face and remote settings is associated with higher learning outcomes[94]. Further, it is recommended that online settings take advantage of the multimedia functionality technology can provide, rather than just offering static digital worksheets or digitized traditional textbooks[95].
- **Online resource quality can vary significantly. It has been reported that teachers in online environments rely more heavily on vendor-developed resources[96]. A recent review of online supplementary materials found that while they appear visually well-designed, their "**surface appeal" often masked issues such as a lack of alignment to standards, low cognitive demand, and poor instructional support and/or assessment[97]. Teachers need to ensure that they choose materials that align to standards and desired levels of rigor.
- **Online tools offer opportunities for students to engage with content in new ways, often allowing greater flexibility in terms of pacing and interaction.** For example, teachers can support remote learners by allowing students to engage with materials prior to synchronous instruction[98]. At the same time, when students are learning independently, there is a greater risk of ambiguity and misunderstanding in communication[99], so teachers need to make sure content is well organized, instructions are clear, and mechanisms are in place should a student need additional support or checks for understanding (e.g., synchronous follow up, checking to ensure tasks were completed, assessment). Teachers can also clearly explain "why" they are offering content in a specific format to support student understanding of objectives[100].
- **Strong expert presence is needed to design, scaffold, and facilitate learner engagement with content,** whether accomplished through effective up-front design, mediated (or even automated) by technology,

[88] National Research Council, 2001; Cohen et al., 2003; Darling-Hammond, Schachner, & Edgerton, 2020
[89] Ainsworth, 2011, p6
[90] Tallent-Runnels et al., 2006; Harrington & Floyd, 2009; Kelly, 2011
[91] EdReports, 2020
[92] Chingos and Whitehurst, 2012
[93] Anderson, 2008
[94] Means et al 2013; Vrasidas & Zembylas, 2003
[95] Darling-Hammond, Schachner, & Edgerton, 2020)
[96] Basham, Stahl, Ortiz, Rice, & Smith, 2015; Rice & Carter, 2015
[97] Polikoff and Dean, 2019
[98] Myung, J. et al, 2020
[99] Liu et al., 2005
[100] Lo and Hew, 2017

or through more traditional instructor facilitation. Further, not all learning should be independent or self-directed; instructor-led learning has been found to be an important and effective online learning component[101]. Instructors must act proactively and creatively to trigger and facilitate effective learner behaviors[102]. However, expertise is also needed along the way to address inconsistent, unchallenged, or misunderstood ideas as well as to offer guidance for learners to course-correct.[103]

- **In light of likely COVID-19-related learning losses, teachers should place additional emphasis on content that accelerates learning**. It has been suggested that learning losses related to spring 2020 shutdown will be significant[104]. Rather than downtracking students or focusing on remedial material, teachers should put priority on offering grade-appropriate content and acceleration against prioritized standards that help students build prerequisite skills and knowledge for engaging in this grade-level instruction[105]. For example, those standards relate to learning across multiple grade levels, have application across multiple content areas, or are prerequisite[106].

Active Learning

Learning experiences must foster direct engagement with the materials and tasks. Given this, making learning "active" is critical (online and offline[107]) but it appears to be even more so for online environments where learners are working individually and in a self-regulated manner[108]. Studies clearly indicate that more active strategies for engagement foster increased perseverance[109] and performance[110]. This is likely because active forms of engagement facilitate both transformation of existing knowledge and the transfer or new ideas through retrieval and the active production of new information[111].

Examples of active learning include:

- **Using more interactive instructional materials** (interactive video, response clickers, understanding checks, etc.);
- **Engaging students in application tasks** (evaluation of student work, trying out strategies in classroom, etc.);
- **Encouraging learner metacognition** (sense-making, reflection tasks, discussion with others, etc.);
- **Fostering collaboration** (discussion, peer-to-peer engagement); and,
- **Actively presenting material rather than just receiving it** (summarizing, preparing to present to others).[112]

Beyond specific student-facing strategies, the research suggest a few other key ways online learning can be

[101] Means et al 2009
[102] Means et al 2009
[103] Kanuka & Anderson, 1998
[104] Azevedo et al 2020; Dorn et al 2020
[105] Darling-Hammond, 1998; TNTP, 2018
[106] Myung, J. et al, 2020
[107] Bransford et al, 2004
[108] Means et al 2009; Broadbent, 2017
[109] Morris et al., 2005
[110] DeLozier & Rhodes, 2016
[111] Bransford et al, 2004; DeLozier & Rhodes, 2016
[112] DeLozier & Rhodes, 2016

made more active, encouraging deeper as opposed to surface interaction:

- **Designing and producing multimedia resources that support learner attention and engagement**. Online media does not automatically lead to stronger engagement; teachers should think about how media can encourage interaction. For example, videos should be segmented into shorter lengths (reported student median engagement time is six minutes[113]) and presentations should adopt a personal, conversational tone, using terms like "I" and "you" rather than third-person monologue[114]. Teachers should also try to illustrate key ideas to direct attention while "weeding out" interesting but non-important information (extra pictures, colors, music) to reduce extraneous cognitive load[115].
- **Offering opportunities for students to reflect and create collaboratively.** Students can use web tools (such as web-based documents) to annotate together to engage in social reading, group sense-making and knowledge construction, and community building[116]. Encouraging students to apply ideas to create their own multimodal content (e.g., interactive presentations, websites) can also support the development of multiliteracies and deeper content engagement[117]. It's important that these opportunities be closely tied to pedagogical goals (e.g., requesting response and critique in comments, rather than long summary), create clear norms and expectations (e.g., shared norms for color coding, tagging, annotating, highlighting), offer explicit instructor expectations and supports, and provide feedback on the quality of product produced[118].
- **Provide explicit models for what active learning looks like online.** Students who are given explicit models outperform students who don't receive them[119]. Given this, it's important teachers offer starting points and models for what active learning looks like. Teachers might consider offering step-by-step instruction to guide students' video watching [120] , create graphic organizers or processes for note-taking [121], and model exactly how to use tools in active ways[122]. For example, in a study of 8th grade online math students engaging in online instruction, students were asked to solve a real-life task and provide feedback to their peers about the solution process. Some students were offered self-questioning strategies focused on comprehending the task, making connections, selecting strategy, and reflection as metacognitive feedback guidance for self-regulation of learning; these students significantly outperformed in mathematical problem solving and explanations, and transfer tasks[123].

[113] Guo et al, 2014
[114] Mayer, 2014
[115] Grypp and Luebeck 2015; Schultz et al. 2014; Snyder et al. 2014
[116] Zhu et al 2020; Lu and Deng, 2013
[117] Kress, 2009; Cope & Kalantzis, 2000
[118] Zhu et al 2020
[119] Kramarski 2011
[120] Grypp and Luebeck 2015
[121] Snyder et al. 2014
[122] Lu and Deng, 2013
[123] Kramarski, 2009

Mastery Learning

Effective learning experiences focus on working towards building understanding and competency through cycles of practice, assessment, and feedback. As is true in traditional environments, instruction too often focuses on time-on-task rather than mastery (e.g., measuring learning by the minute rather than by demonstration of learned knowledge and skills). A unique benefit of online learning is that it offers the opportunity to shift from time-based learning experiences towards more flexible practice and achievement of mastery.

The research suggests that learning for mastery online:

- **Should offer opportunities for deliberate practice**, or individualized training activities specially designed by an expert (coach, teacher, instructor, etc.) to improve specific aspects of an individual's performance through repetition and successive refinement of a given skill[124]. Deliberate practice occurs at an individual's zone of proximal development[125] , so asynchronous tools (like video or a playlist) can offer opportunities to pause learning (e.g., metacognitive delay)[126] as well as reflect on existing knowledge and connected ideas (e.g., retrieval). Online platforms and tools designed specifically to engage students in revision (e.g., online writing and commenting tools) can increase the amount of interaction by teachers and peers that surround a student's writing[127].
- **Should take advantage of technology to offer immediacy in feedback.** Students learning asynchronously report frustration when awaiting teacher response[128]. Educators should consider how to use available tools, like adaptive software, tutoring tools, and assessments to offer quicker feedback. For example, studies of middle school math students learning at home (i.e., homework) have shown that students receiving immediate feedback and computer-based tutoring (e.g., scaffolding questions or hints) perform significantly better on post-tests than those who complete pen and paper assignments that are reviewed with teachers in-person the following day[129]. However, **it's important that computer-provided feedback is a supplement and does not replace other forms of teacher or peer engagement**[130], which can reduce sense of engagement and connection.
- **Should utilize multiple means of feedback.** High-quality, actionable, and prompt feedback supports learner reflection and growth in all settings. In online settings, consistent feedback[131] is strongly associated with learner persistence and feelings of connection[132]. How feedback is provided can matter, however. For example, audio feedback can be more effective than text-based feedback for conveying nuance and is associated with increased retention of content, perception of care, and application[133]. **Teachers should consider how to embed feedback beyond written comments**, such as video, audio, and scoring on online rubrics.
- **Should support authentic, ongoing assessment of mastery.** Online tools offer opportunities for diagnostic, ongoing, and formative assessment (which has been shown to increase online learning

[124] Ericsson & Lehmann, 1996
[125] Vgotsky, 1978
[126] O'Byrne & Pytash, 2015
[127] McCarthey et al., 2013
[128] O'Byrne & Pytash, 2015
[129] Mendicino, Razzaq, and Heffernan, 2009; Swire, Pardos, and Heffernan, 2011
[130] Education Endowment Foundation, 2020
[131] Ivankova & Stick, 2007
[132] Dunlap & Lowenthal, 2014
[133] Ice et al 2007

performance)[134]; teachers can turn to tools like quizzes to encourage student self-assessment as well as individualized progress tracking. Synchronous polling can offer quick checks for understanding. Online environments can also be particularly helpful for offering learners the ability to produce other types of products to demonstrate mastery. For example, literacy researchers have found technologies, such as social media platforms, blogs, and digital portfolios, allow writers (younger and older) to write for a wider audience that can provide authentic opportunities to demonstrate mastery, leading to an increased awareness of purpose, context, and audience.[135]

An important note is that mastery learning requires a common understanding of standards to be learned as well as what mastery looks like. Teams should work together to review alignment of tools and expectations.

[134] Roediger et al., 2011
[135] Jaramillo, 2013; McGrail & Davis, 2011; McGrail & McGrail, 2013; Vasudevan & Reily, 2013; West, 2008; Witte, 2007

Relationships: Building Connection and Personalization to Motivate and Sustain

Learning takes place through the "indivisible" interplay between cognition and motivation[136]. Remote learners (particularly those working asynchronously) often report greater challenges in maintaining engagement. The research suggests that an increased emphasis on social connection and personalization can help increase motivation, which is a significant factor in learner engagement and goal achievement — online and offline[137]. Given the range of student academic and non-academic experience during the pandemic, educators need to build the relationships (between people as well as to the tasks of learning) needed to effectively understand, tailor, and re-engage learners as they return to school (regardless of format).

Educators have two powerful levers for doing this:

- **Building a student's sense of connection** during remote instruction by emphasizing connections with teachers and peers; and,
- Creating opportunities for students to **deepen the relationship between learning tasks and their own goals and needs** through personalization.

Key Section Highlights

- Teachers can explicitly and actively build relationships between people and to the purpose of any instructional experience as an effective strategy for improving remote learning outcomes.
- Approaches that build social presence and engagement as well as allow students, teachers, and parents to easily engage with each other in an ongoing manner should be present and can include:
    - Actively make a connection with every student before school starts, and maintaining a cadence for checking in
    - Utilizing models that build on pre-existing relationships, e.g., looping with teachers and classmates
    - Conferencing, coaching, and commenting in multiple formats, such as video and audio
    - Creatingsmaller, bounded communities, including cohort-based groupings and/or advisories
    - Encouraging and scaffolding use (i.e., with explicit ground rules and norms) of non-verbal features, such as posted videos, pictures, and paralanguage
    - Using chat functionionality and moderated discussion forums
    - Dedicating time for personal sharing, connection-making, and check-ins
- Personalization strategies can help students stay motivated and make meaningful connections to their own interests, needs, and goals. Dimensions of personalization can include:
    - Supporting learner goal setting and monitoring (as supported by mastery data and shared objectives)
    - Offering learners meaningful choices around content, pathway, time of learning, etc.
    - Asking students to reflect on and make connections to prior knowledge and cultural connections
    - Building in flexibility to tailor to individual needs through data-informed differentiation (e.g., tutoring, small group instruction, tailored content)
    - Ensuring work is motivating and meaningful (i.e., it has an audience and has impact outside of the classroom)

[136] Pintrich & Schunk, 2002; Stefanou & Salisbury-Glennon, 2002
[137] Goslin 2003; Lim & Kim, 2003

Connection

"Distance is not a matter of geography but rather psychology." (Rice, 2006[138])

Given the nature of online interaction and media[139], online students report greater levels of isolation and missing the social presence (the sense of being perceived as real and perceiving others as real, regardless of physical place[140]) that they more easily establish in face-to-face courses[141]. Constructing social presence in such that the "the virtuality of experience is unnoticed[142]" is therefore vitally important in online education because it helps create a positive social-emotional climate, supporting positive perceptions[143].

It's not surprising, then, that building strong foundation for and ongoing practices that support social learning takes on even more importance in online settings[144]. Online environments that foster greater peer-to-peer learning and interaction are associated with higher learner satisfaction, perseverance, comfort, and learning outcomes[145].

The research suggests that:

- **Connections with the lead teacher or expert through online presence and immediacy is significantly important for a number of outcomes**, including perseverance and satisfaction[146] as well as cognition, motivation, and affect[147]. Learners report that instructor sociability[148] as well as responsiveness and complete/timely communication with instructor is critical[149]. Students report lower teacher presence in asynchronous online experiences than synchronous ones[150], so teachers should make sure they are working proactively to be "visible" in these environments. Strategies such as asynchronous audio and video postings can help[151].
- **Relationships with peers, staff, and even parents/guardians as part of online instruction can positively or negatively impact engagement**[152]. Engagement is amplifying and reinforcing; students appear more likely to participate and contribute when others are also doing so[153]. Teachers can actively influence the building of relationships by proactively reaching out to underconnected or passively engaged students[154]
- Given all of this, **online interpersonal connections and community must be carefully constructed and facilitated**, as they rarely form organically[155]. Interactive and ongoing cohesive communication are

[138] Rice, 2006, p 4 citing Moore, 1989
[139] Short, Williams, and Christie, 1976
[140] Witmer & Singer, 1998
[141] McInnerney & Roberts, 2004; Stodel, Thompson, & McDonald, 2006; Joksimovic et al., 2015; Barber, King & Buchanan, 2015; Fletcher & Bullock, 2015; Tunison & Noonan, 2001
[142] Lee, 2004, p. 32
[143] Caspi & Blau, 2008; Lee and Burkham, 2001; Bransford et al, 2004
[144] Bransford et al, 2004
[145] Swan, 2001; Choi, 2016; Holder, 2007; Ivankova & Stick, 2007
[146] Tomas et al., 2015; Joksimovic et al., 2015; Frid, 2001; Lee and Burkham, 2001; Zweig, 2003
[147] Baker, 2010
[148] Aydin, 2012
[149] Aragon & Johnson, 2008; Bunn, 2004
[150] Baker, 2010
[151] Ice et al, 2007; Clark, Strudler, & Grove, 2015
[152] Borup et al, 2014
[153] Frid, 2001; Weiner, 2003
[154] Hung et al., 2010
[155] Wilson et al., 2004

needed to build social presence and a community of learners[156], which requires purposeful design and cultivation. This is true for both social and academic activities. For example, students may not naturally know "how" to engage together productively and constructively online; for example, studies[157] of online writing collaboration found students offer significant feedback, but that feedback was provided at a low level (e.g., grammar, mechanics, rather than deeper pushes on content or ideas). Teachers can positively exert control over how and when students use different interactive features, allowing bounded opportunities for student-initiated interaction (e.g., chats, talking before class starts)[158]. Even factors like discussion group size affect interaction; designers recommend creating bounded smaller groups even in larger learning communities[159].

- **Offering blended or hybrid opportunities in addition to online learning can enhance feelings of community and inclusion**[160]. If students are unfamiliar with each other, these experiences can help build familiarity and sources for support[161].
- **Synchronous video instruction is not inherently social and interactive.** This assumption (particularly on the part of novice online instructors) has been documented by research — this is not often the case (a student simply watching a video is pretty passive!). Teachers need to be highly skilled at traversing the real and perceived distance between participants in a videoconference. For example, attending to emotion on the other side of a screen, championing the videoconferencing in the community to get widespread buy-in and support, creating a sense of real presence, and building relationships and fostering interaction between students across sites.[162] Another limiting factor in synchronous learning is time; if teachers are relying on synchronous experiences as the main form of interaction, they may be missing out on many other opportunities to build engagement[163].
- **Integrate out-of-the ordinary approaches and features that support social presence**. Teachers can and should leverage supplementary tools (polls, chats, discussion boards, etc.) and social media[164] to engage learners. Teachers should be careful not to underestimate the value of these activities; one study[165] of learners found that while teachers relied mainly on synchronous instruction to express their presence, students relied mainly on instant messaging.
- Another key challenge in online interactions is the lack of nonverbal behaviors and cues; for this reason, designers can **explicitly build mechanisms for sharing nonverbal information** such as video and pictures, "nonverbal surrogates,"[166] and norms[167] that help build better communication and connection. The use of "paralanguage" (e.g., emoticons, memes, gifs) is a surprisingly effective means for humanizing interactions, creating a sense of community, and increasing satisfaction[168]. Take caution, however, as students need support figuring out how to use these approaches in respectful and consistent ways; teachers can explicitly encourage and model them to support this[169].

[156] Rourke et al., 1999
[157] Zheng, 2015; Dalke et al. 2007
[158] Murphy, Rodríguez-Manzanares, and Barbour, 2011
[159] DeLozier & Rhodes, 2016
[160] Rodrigo & Nyugen, 2013
[161] Nippard and Murphy, 2007
[162] Rehn, Maor, and McConney, 2018
[163] Nippard and Murphy, 2007
[164] Rehn, Maor, and McConney, 2018
[165] Nippard and Murphy, 2007
[166] Derks, Bos, & Grumbkow, 2007
[167] Dunlap et al, 2016
[168] Rourke, et al, 1999; Stein, Wanstreet, & Calvin, 2005; Moore, 2013; Dunlap et al, 2016
[169] Vrasidasa & McIsaac, 1999; Weiss, 2000; Woo & Reeves, 2008; Dunlap et al, 2016

One final and major caveat is that connection-building must be aligned to instructional objectives and intent; Simonson et al.[170] (2006) summarize that, "although interaction seems intuitively important to the learning experience, interaction should not be added without real purpose."

Personalization

"As students have spent more time outside the confines of physical school, they have had to become more responsible for their learning and for their lives. Schools have responded by trying to replicate the structures of schools from afar. But we suspect that schools will be more successful if they lean into students' growing sense of agency, and find ways to build on and amplify it." (Reich and Mehta, 2020, p3)

How learners are motivated differs across individuals and cultural contexts[171]— understanding a student's attitudes, preferences, and intrinsic motivations can help teachers make effective planning and resource choices,[172] and giving students greater control over delivery method[173], interactions with materials, and goal setting and monitoring has been associated with a lower dropout rate, higher-quality learning, better learning strategies, and greater enjoyment of school.[174] Adapting content and delivery to students' strengths and interests, or allowing them to make appropriate choices themselves, can also be an effective culturally-responsive strategy[175] as well as help increase the value they see in learning tasks, which has been positively associated with higher academic performance[176].

Creating greater flexibility, opportunities for choice-making, and making motivating connections can support students in remote learning. The literature suggests adult learners need greater flexibility, with the timing and tasks informed by the competing demands on time[177]; this is likely true for younger learners working from home who may have jobs or caretaking responsibilities. Further, students who have not been effectively engaged during COVID-19 may benefit from remote learning characteristics identified as successful for students placed-at-risk or historically underserved within traditional settings, including self-pacing and personalization of materials and pathways[178].

The research suggests that teachers can personalize:

- **Personal goal setting and individualized support can improve learner perceptions and outcomes**. By offering higher levels of customization, individualization of content, feedback, timing of learning, and goals, individualized approaches can increase motivation, perseverance, a feeling of social presence, and commitment to completion[179]. Focused, individualized instruction (e.g., tutoring) yields consistent, substantial positive effects on learners (particularly elementary students)[180].

[170] Simonson et al., 2006, p81
[171] Lim, 2004
[172] Federico, 2000
[173] Roblyer, 1999; Tunison & Noonan, 2001
[174] Czubaj, 2004; Deci & Ryan, 1985
[175] Mader and Lynch, 2020
[176] Pintrich, 1999
[177] Ivankova & Stick, 2007; Nash, 2005; Müller, 2008; Bunn 2004
[178] Barr & Parrett, 2001
[179] Catlin, Lewan, and Perignon, 1999; Handoko et al 2019
[180] Nikow, Oreopoulos, and Quan, 2020

- **Encouraging students to reflect on, activate, and assess prior knowledge and personal connection material** prior to instruction to make connections and understand relevance and purpose[181].
- **Perception of course/content relevancy is reported as the top factor that motivates students to engage with and persevere** during online learning experiences across students, regardless of previous online learning experiences, national orientation, gender, and academic and work background[182]. Teachers can better engage students by supporting their understanding of and helping them make personal connections to learning objectives and activities.

[181] Palloff and Pratt, 1999; Mader and Lynch, 2020
[182] Lim & Kim, 2003; Lim, 2004; Repetto and Spitler, 2014

Taking It Into Practice: Tools For Your Own Reflection

So, how can educators translate these ideas into their decision-making and work? There's no one right approach — making the "right" choice will depend a lot on the goals of the learner and context of implementation. But by designing with these quality factors in mind, teachers can leverage research-informed practices.

Questions for individual and team reflection

The table below is designed to serve as a guide for thinking about how your current or planned remote instruction approach integrates quality factors. The sample questions are intended as examples and to elicit additional thinking and inquiry in each driver area.

Quality Area	Questions to Consider	Notes/Actions
Foundation For Self-Directed Learning	• Have we articulated **clear expectations for remote learning** as well as ways students and families can access support? • Are we **providing specific modeling and support for self-direction**? • Are we e**ngaging consistently and clearly with families** as partners in learning? • How are we **prioritizing relationships**? • Are we aware of **specific non-academic needs**? How are we supporting those?	
Effective Instruction		
Technology	• Do all of our students have **universal access** to tools, materials, and supports? (Physical and cognitive) • Are the resources and tasks **easy to navigate**? • Do our technology tools offer the features/functions needed to support objectives? • Do we have **common norms for organizing content and feature**s across classrooms? How much time are students spending navigating vs learning? • Are we providing **adequate training**? • Do students **know where and how to get support**?	
Pedagogy	• Do our current **materials work well in digital formats**? Are they **aligned to standards and interoperable** with each other? • Do **formats encourage students to engage** in activities like activating prior knowledge, retrieval, reflection, connection-making, discourse? • How are we **assessing mastery** and offering opportunities for **deliberate practice with feedback**? • How are we **delivering targeted interventions**	

	and opportunities for acceleration?	
Relationships	• How are teachers going to build a strong**, ongoing presence** with learners? • How are we building a **sense of community**? • Are we encouraging **peer engagement** in ways that connect to learning objectives? • How are we helping students see r**elevance of tasks to their goals**? Are we helping them set goals? • Can students make (scaffolded, appropriate) **choices to build agency**?	

Additional resources:

The following additional resources could be helpful as you and your team take next steps....

- **TLA One Thing Series on Remote Learning**
- **Problem of Practice Series**
- **Editable Learning Management System assessment tool** to help district and school teams evaluate platforms and tools for remote learning.

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