

Research Evidence Base



HMH research mission

HMH® is committed to developing evidence-based educational solutions, assessments, and professional services. To support this goal, the Efficacy Research Team collaborates with school districts and third-party research organizations to evaluate the impact of our programs and services on student outcomes, teacher practice, and school leadership.

TABLE OF CONTENTS

1 INTRODUCTION

2 HIGH IMPACT, HIGHLY EFFICACIOUS INSTRUCTIONAL ROUTINES

Learning Goals

Try It Out

Turn and Talk

Response Activity

Quick Check

View and Respond

Words to Learn

Focus and Learn

Class Prompt

Poll

23 EVIDENCE-BASED BEST PRACTICES TO BENEFITS

Visible Learning

High Levels of Student Engagement

Increased Time on Task

Ongoing Formative Assessment

32 ENHANCED CLASSROOM MANAGEMENT VIA EVIDENCE-BASED STRATEGIES AND TOOLS

Point-of-Use Tools and Resources to Facilitate Planning and Instruction

Increased Teacher Agency and Self-Efficacy

37 REFERENCES

INTRODUCTION

HMH Classcraft® supports the craft of teaching by merging efficacious K–8 ELA and math content with consistent, seamless delivery of research-based, standards-aligned whole-class learning. *Classcraft* is designed to support passionate educators at all levels of experience. The pre-built, time- and stress-saving daily lessons allow teachers to focus on optimizing student experiences and administrators to be confident that the curriculum is being implemented with fidelity. Instructional content is curated from proven, high-quality core curriculums—*HMH Into Reading*®, *HMH Into Literature*®, and *HMH Into Math*®—and conveniently available from one location, *Ed*®, the HMH® learning platform.

Classcraft provides synchronous instruction with optional scripting and point-of-use teacher support that yields real-time assessment insights and ongoing feedback for in-class responsive remediation, transforming whole-class learning. The program makes appropriate, essential resources readily available, not only reducing teachers' planning time, but also increasing students' targeted instruction. *Classcraft* also offers interactivity and peer-to-peer collaboration that boosts student engagement within a structured format.

Classcraft aggregates and displays real-time data on student performance and readiness, enabling educators to quickly adapt instruction to the needs of individual students or entire classrooms. This also eliminates unnecessary time spent outside of class collating data from different platforms, finding resources, and adapting lesson plans.

Transforming Every Classroom – Engaging Every Student

HIGH-IMPACT, HIGHLY EFFICACIOUS INSTRUCTIONAL ROUTINES

Managing numerous student dynamics and meeting diverse student needs makes teaching a demanding job; doing so with consistent, predictable, and high-impact routines best supports students and teachers by creating a learning environment that increases the teacher's capacity to deliver effective instruction as well as students' capacity to succeed (Hiebert & Morris, 2012; Lucenta & Kelemanik, 2020; Scott, Park, Swain-Bradway, & Landers, 2007). As the typical way that instruction is carried out in the classroom, routines save time and reduce stress because both students and teachers know what they are expected to do, what materials they need, and how and when they are to take action (Archer & Hughes, 2011; Kelemanik et al., 2016; Marzano, 2007). This supports increased focus and time on task, two key factors for successful learning (Godwin et al., 2013; Rosenshine, 2007). Instructional strategies embedded into routinized classroom practices that have shown, by experiential and meta-analytic research, to improve learning outcomes include goal setting, explicit vocabulary development, progress monitoring, peer dialogue, and practice, as well as ongoing feedback that boosts self-assessment, self-regulation, and metacognition (Dean & Hubbell, 2012; Hattie, 2009; Hattie & Clarke, 2019; Haystead & Marzano, 2009; Wiliam, 2013). Additionally, systematically presenting material incrementally, in smaller, sequenced steps, checking frequently for student understanding, and engaging the active participation of all students fosters academic achievement (Fisher & Frey, 2021; Rosenshine, 2007).

Fisher and Frey's (2021) structured gradual release framework has students engaged in whole-group direct instruction, followed by guided and collaborative learning activities in which students expand, practice, and apply new content and skills, with the aim of increasing students' independence; at every step, learning is monitored and accordingly adjusted for individual students or groups via feedback loops and ongoing formative assessment. "Essentially, an instructional framework is a way to organize strategies and deploy them to create cohesive learning experiences for students. It's a defense against the all-too-common and, frankly, exhausting 'buffet model' of professional learning, where teachers are prompted to keep adding to their plates without any idea of where they're going to 'put' it all" (p. 2).

Research also demonstrates that consistent, structured mathematical language routines are useful tools to foster the development of math and language proficiency in tandem—and especially so when they provide ongoing opportunities for interaction with peers around collaborative reasoning, communication, and problem-solving. Partner talk, small-group talk, and whole-class talk that features language-rich exchanges in which students are encouraged to apply and practice new skills to explain thinking, question and justify ideas, and compare solutions are key; these structured math talks improve student-to-student interaction via effective listening and questioning and allow students to engage in collaborative sense making and explanations, promoting deeper mathematical understanding (Feldman & Kinsella, 2005; Lampert, 2015; Lucenta & Kelemanik, 2020; Thanheiser & Melhuish, 2023; Zwiers, 2014). "Developing routines for complex cognitive behavior such as problem solving is beneficial for learners as it creates an external scaffold for internal processes" (Lambert & Sugita, 2016, p. 14). It is important that students use their own words and reasoning, in tasks that invite multiple representations (verbal, visual, symbolic) and comparisons so students engage with how mathematical ideas are expressed in different ways, which promotes discourse and language work and aligns with Universal Design for Learning (UDL) principles to support all students, including English learners (ELs) (CAST, 2018; Lambert, 2024). Zwiers and colleagues' Understanding Language (UL) Framework (2017) is an effective model for promoting a dual focus on content and language development within mathematics instruction. This model is based on four design principles to guide curriculum planning and teaching practices: support sense-making (scaffold tasks and amplify language so students can make their own meaning); optimize output (strengthen the opportunities and supports for helping students to describe clearly their mathematical thinking to others, orally, visually, and in writing); cultivate conversation (strengthen the opportunities and supports for constructive mathematical conversations in pairs, groups, and whole class); and maximize linguistic and cognitive meta-awareness (strengthen the "meta-" connections and distinctions between mathematical ideas, reasoning, and language).

Effective mathematical language routines are supportive of all students within both monolingual and multilingual classrooms and ensure that ELs participate fully in discursive activities and engage as contributing members of the classroom community (Kinsella, 2016; Lambert, 2024; Zwiers, 2014). Kinsella (2013) emphasizes the critical role of explicit, targeted vocabulary instruction to support ELs in content area learning, as it demands knowledge of high-utility and domain-specific vocabulary to comprehend and respond effectively. For ELs, such routines can structure explicit instruction in vocabulary, syntax, and grammar, as well as authentic practice in language usage (Kinsella, 2016).

HMH Classcraft delivers evidence-based, synchronous instructional components within an effective framework of efficacious routines that support educators in managing the flow of high-engagement, whole-class learning and adapting it in real-time to ongoing student needs. Such structures support students in knowing what to expect and how to succeed. The instructional routines included in *Classcraft* were designed to make learning interactive and immersive while enabling educators to put into practice the most efficacious strategies that build content and language proficiency simultaneously and provide ongoing opportunity to apply and practice new skills. These ready-to-go instructional routines allow educators to maximize efficacy, simplify classroom management, and have a high impact on student engagement to encourage ownership of learning. They can be used for both collaborative projects and individual tasks.

Learning Goals

Research demonstrates that clarity between teachers and students regarding intentions for what is to be learned and why it is to be learned, as well as criteria for what constitutes success, is one of the most effective teaching practices for yielding targeted outcomes (Almarode & Vandas, 2018; Hattie, 2009, 2012, 2023). "Formulating clear, explicit learning goals sets the stage for everything else" (Hiebert et al., 2007, p. 57). Standards offer a guide for teachers to ensure that they are helping students build the foundations they need to move on to the next grade and, ultimately, be ready for college and careers. Standards can help ensure that teachers are providing effective instruction for all students and can help students set clear goals for learning (William, 2011). Establishing clear priorities from among national, state, or local content standards is an essential component of instructional planning that will ultimately achieve targeted goals. While standards-based teaching with quality materials is demonstrably effective and standards provide a guide to what is critical to teach, standards alone are insufficient in achieving broad improvement to learning. Standards typically call for more content than can be reasonably and effectively addressed within available instructional time; therefore, teachers must make choices based on the specific needs of their students (Senn et al., 2014; Wiggins & McTighe, 2005). Within standards-aligned instruction, focus and coherence are critical (Schmidt et al., 2002), particularly as instruction is adapted based on individual students' progress and needs (Pak et al., 2020). Even beyond what state standards require of teachers and students in terms of outcomes, best practices in effective instruction along the pathway toward meeting standards are marked by intentionality and purpose within lesson planning and execution (Fisher et al., 2016). Curriculum designed and developed for 21st-century learning makes learning goals transparent to students; continuously monitors, provides feedback, and responds to students' learning progress toward goals; and engages students in self- and peer assessment in achieving goals (National Research Council [NRC], 2012).

Clearly communicated goal setting drives learning and achievement (Hattie, 2012; Frey, Fisher, & Hattie, 2018). Setting specific goals and expectations that articulate for each student a clear pathway for behavior and desired performance serves as motivation for learning and a greater sense of competence, particularly when students also perceive that their learning environment supports them in attaining those goals (Bransford, Brown, & Cocking, 2000; Marzano, 2009a; Theis et al., 2020; William, 2011). Wiggins and McTighe (2005) describe effective instructional design in the classroom as centered on goal-driven, guiding questions such as, what should students know, understand, and be able to do? How will we know if students have achieved the desired results? How will we support learners as they come to understand important ideas and processes? Work by Haystead & Marzano (2009) and Hattie (2009) shows that students in classrooms where goals are clear perform at higher levels than students who are unaware of the expectations. "What is the one thing that will not only have a significant influence in my classroom but also serve as a foundation for which other significant influences are possible? The answer: clarity in teaching and learning" (Almarode & Vandas, 2018, p. 2).

Rigor within instructional settings is achieved largely through clear, non-negotiable goals for learning, with aligned assessment that provides each student with a viable, meaningful, active, and strategic pathway to reach those goals (Ainsworth, 2010; Cohen, 2011; Jones, 2010; Marzano & Toth, 2014; Thompson, Hagenah, Kang, Stroupe, Braaten, Colley, & Windschitl, 2016). As described by Ainsworth (2010): "A rigorous curriculum must keep students at the center of its design. Although such a curriculum is based on a present list of necessary components, in no way does this imply that rigor should be equated to rigidity. A rigorous curriculum must remain flexible, adaptable to the diverse, and continuously changing learning needs of all the students it serves. By deliberately planning and creating engaging classroom learning experiences, the authors of a rigorous curriculum can provide the means for both new and experienced teachers to motivate reluctant, insecure learners as well as those students who have disengaged from learning out of disinterest or outright boredom. One of the ways rigorous curriculum design can help teachers address these challenges is by offering students precise learning targets, meaningful and relevant lessons and activities, and multiple opportunities to succeed" (p. 8).

Establishing goals allows students to focus on set expectations and become more aware of their own thinking and learning, a process that fosters metacognition (Hattie & Timperley, 2007). It is critical that classroom experiences also connect to what students need to know and make learning purposeful. Intentional design allows students to recognize, with clarity and intentionality, what is expected of them, including what they are learning and why they are learning it; in addition to helping students become better learners, such clarity of goals and intentions also helps them become more adept at assessment, both their own and that of their teachers or state (Frey et al., 2018; William, 2011). Additionally, promoting self-determination is an important component in classroom instruction aimed at helping all students attain post-academic success and quality of life. Particularly for those with special needs, helping students develop skills associated with self-determination (e.g., planning, self-management, self-awareness, problem-solving, and goal setting) is critical in preparation for experiences within and beyond school (Raley, Shogren, & McDonald, 2018).


However, students knowing their end goals alone will not suffice; student need consistent, clear feedback at every step of the learning process to keep their efforts toward goals and their awareness of how they are doing relative to those goals on track (Hattie, 2009, 2013, 2023; Hattie & Clarke, 2019; Frey et al., 2018). Feedback, while invaluable to learning, loses its impact if students are not fully aware of their learning targets (Brookhart, 2008). Per Wiggins (2012), helpful feedback meets the following criteria: it is goal-referenced, tangible, transparent, timely, actionable, consistent, constant, and user-friendly to its specific audience. "Feedback is not advice, praise, or evaluation. Feedback is information about how we are doing in our efforts to reach a goal" (Wiggins, 2012, p. 10).


HOW CLASSCRAFT DELIVERS


Classcraft provides daily core ELA and math K–8 lessons that meet or exceed state and national guidelines. This standardization simplifies compliance checks and quality assurance for district leaders and provides confidence that a high-quality curriculum is being implemented with fidelity. At the classroom level, every *Classcraft* essential session launches with clear learning goals and a self-check.

Choose the option that tells how you feel about this learning goal.

Learning Goal:
I can use arrays to represent problems about equal groups and to write multiplication equations.

 I've got it!

 I need more practice.

 I don't understand.

Submit

In the interactive **Get Ready** activity, students are introduced to lesson objectives and set their own learning goals. Students may also reengage with previously reviewed content. The **Learning Goals** routine includes an **I Can** statement and a related **poll** to activate students' prior knowledge, self-assessment, and self-efficacy. This feature also provides teachers with actionable information about students' readiness levels going into the lesson. **Learning Goals** drive and support instruction throughout the learning progression. At the end of each session, students revisit their **Learning Goals** in the **Assess** section to remeasure how they feel about the goals and how they've succeeded in meeting their goals. This reflection reinforces learning as well as promotes metacognition.

Activity Responses Insights Close Control Panel

Insights

Responses (30 filtered Results)

Applied Filters: Complete In Progress

Sort By: All Questions

Unapplied Filter: Current Status

Group: 1. Use Arrays and Equal Groups to Represent Problems

Area: Elementary Math

Students' Responses (30)

Student	Response	Status
Anderson, Brian	I got it	Progress
Carry, James	I need more practice	Complete
Doko, Edward	I got it	Complete
Smith, Adam	I got it	Complete
Jean, Emily	I need more practice	Complete
Burke, Claudia		Teacher Notes

Try It Out

Effective classroom organization aims to maximize academic learning time marked by sustained attention and engagement in meaningful academic work. (Fisher et al., 2014; Godwin et al., 2013; Wang & Degol, 2014). Evidence-based models of explicit instruction treat classroom routines as instructional infrastructure. Clear and predictable entry procedures, transitions, discussion protocols, independent-work expectations, and closures reduce downtime and prevent both distraction and escalation because students know what to do and what success looks like (Archer & Hughes, 2011; Fisher & Frey, 2021; Rosenshine, 2012). Predictability also supports engagement beyond behavior. When expectations are consistent and feedback is constructive, students' motivation and sense of competence increase, supporting persistence and participation (Hattie, 2012, 2023; Wang & Eccles, 2013). Predictable does not mean monotonous, though. Research on achievement emotions suggests boredom is less likely when students experience meaningful control and when learning tasks include variety and cognitive challenge rather than repetitive, low-stimulation work (Hattie, 2009; Pekrun et al., 2010). Well-managed classrooms therefore pair consistent routines with dynamic instructional design featuring small, sequenced steps, frequent checks for understanding, and active engagement structures that keep all students thinking, participating, and practicing newly acquired skills (Agarwal & Bain, 2019; Archer & Hughes, 2011; Rosenshine, 2007).

Practice is most powerful when it is designed to build durable knowledge and flexible application. Cognitive load theory helps explain why the structure of practice matters: "human cognitive processing is heavily constrained by our limited working memory which can only process a limited number of information elements at a time. Cognitive load is increased when unnecessary demands are imposed on the cognitive system. If cognitive load becomes too high, it hampers learning and transfer. Such demands include inadequate instructional methods to educate students about a subject as well as unnecessary distractions of the environment. Cognitive load may also be increased by processes that are germane to learning, such as instructional methods that emphasize subject information that is intrinsically complex. In order to promote learning and transfer, cognitive load is best managed in such a way that cognitive processing irrelevant to learning is minimized and cognitive processing germane to learning is optimized, always within the limits of available cognitive capacity" (Sweller et al., 2019, online).

Other evidence-backed features of effective practice include retrieval and spacing. Retrieval practice strengthens learning because students must bring prior learning back to mind, articulate it, and use it (Agarwal & Bain, 2019; Brown et al., 2014). When retrieval opportunities are spaced across time in what's known as distributed practice, students retain and transfer more than when the same time is "massed" into a single session (Cepeda et al., 2006; Dunlosky et al., 2013; National Academies of Science, Engineering, & Medicine (NASEM), 2018). In mathematics, these principles support connecting conceptual understanding and procedural fluency through varied, meaningful practice rather than isolated sets of identical items (National Council of Teachers of Mathematics (NCTM), 2014; Rohrer, 2009). Feedback and formative assessment routines make practice even more effective. Learning accelerates when students get information that helps them judge progress toward goals and decide what to do next (Hattie & Clarke, 2019; Hattie & Timperley, 2007). Feedback is most useful when it is timely, aligned to clear success criteria, and includes both verification (correct/incorrect) and elaboration that explains errors or provides guidance for improvement (Metcalfe, 2017; Rosenshine, 2012; Shute, 2008). As discussed elsewhere in this

paper, well-run classrooms embed routines that continuously elicit evidence of learning (e.g., checks for understanding, prompts, peer/self-review protocols) and respond instructionally in real time, keeping students engaged while improving the precision of practice.

Universal Design for Learning (UDL) is a proactive framework for designing curriculum and instruction that anticipates learner variability and reduces predictable barriers before students fall behind (CAST, 2018; Meyer et al., 2014; Rao & Meo, 2016). Its three principles around multiple means of engagement, representation, and action/expression provide a practical way to keep expectations high while increasing accessibility and agency for all learners, including those with disabilities and neurodivergence as well as ELs. UDL further achieves this by leveraging students' unique learning styles, strengths, and experiences. UDL is especially powerful for mathematics and ELA because both disciplines depend on language and multiple forms of representation and expression (CAST, 2018; Lambert, 2024; Novak et al., 2023). A defining strength of UDL for both math and language learning is its emphasis on multimodal learning. Research demonstrates that providing multiple access points for learning and means of engagement, both linguistic and nonlinguistic, increases understanding, recall, and reflection for all students and multilingual learners in particular (Eitel et al., 2013; Grapin, 2019; Holloway & Qaisi, 2022; Marzano et al., 2001; Sydorenko, 2010; WIDA, 2020; Yu & Liu, 2022). Multimodal instruction—coordinating verbal, visual, and interactive supports—can improve understanding and recall when it is purposeful and does not overload learners with extraneous information (Darling-Hammond et al., 2020; Mayer, 2020; Sweller et al., 2019). In math, multimodal representation might include manipulatives, diagrams, and visuals that clarify the relationships named by mathematical vocabulary; in ELA, it can include text paired with audio or graphic organizers that make sentence and discourse structure visible (CAST, 2018; Meyer et al., 2014). UDL-aligned action and expression strengthens learning by allowing students to show understanding through multiple modes, such as oral explanation, annotated solutions, visual models, or multimedia products, while remaining accountable to common learning targets (CAST, 2018).

Vocabulary and word learning are critical to both math and language learning. Students must acquire technical terms, symbolic conventions, and the dense language of explanations and word problems in mathematics, while also expanding academic vocabulary, disciplinary literacy, and meaning-making strategies in ELA. Building word wealth and building conceptual schemas should be treated as integrated goals rather than isolated skills (Cervetti & Wright, 2020; Willingham, 2006). As they advance through schooling, students, particularly those with disabilities and ELs, cannot be expected to automatically pick up the language of complex texts and concepts without repeated, guided interaction and explicit strategy instruction in key vocabulary (Kamil et al., 2008; Kinsella, 2013, 2016; Lee & Spratley, 2010; Nagy & Townsend, 2012; Vaughn et al., 2022; Wang et al., 2023). Multimodal supports (e.g., images, gestures, semantic maps, sentence frames, examples/nonexamples) help make new words comprehensible and memorable, especially when combined with evidence-based vocabulary routines such as multiple exposures and meaningful use (Beck et al., 2013; CAST, 2018; Marzano et al., 2001; WIDA, 2020). Spaced retrieval of vocabulary across lessons and contexts further strengthens durable word knowledge in both disciplines (Agarwal & Bain, 2019; NASEM, 2018). ELs benefit from comprehensible input, explicit language supports, structured interaction, and instruction that builds academic language and disciplinary literacy (NASEM, 2017).

Turn and Talk

Opportunities for informal collaboration with peers to discuss and develop ideas, solve problems, and engage in inquiry following direct instruction should be a regular component within classroom routines rather than a once-in-a-while event; such exchanges allow for students to expand understanding and consolidate thinking, as well as apply and practice new learning (Fisher & Frey, 2021). In direct instruction learning environments, informal cooperative dialogue with peers integrated throughout the teaching of a specific topic is an effective way for students to confirm accuracy and understanding of information presented and to boost mastery (Knight, 2013). A significant body of research attests to the efficacy of collaborative learning, reciprocal teaching, and peer tutoring (Brown & Campione, 1994; Gillies, 2014; Palinscar, 2013; Slavin, 1980; Slavin et al., 2003)—and how skilled students at all levels can be advancing and assessing each other's work when the focus is on improvement instead of grading (William, 2013). Hattie (2012) found that cooperative learning is useful for building conceptual understanding, boosting retention and memory, guessing and categorizing, and verbal and spatial problem-solving—and that it is most powerful after students have acquired surface knowledge to then be involved in discussion and learning with their peers. Classroom talk during a lesson can foster disciplinary knowledge and cognitive skill building, affecting not only what students learn, but also how, as well as how they express what they know (Khong, Saito, & Gilles, 2019; O'Connor, Michaels, & Chapin, 2015). Exploratory speech is a fundamental means through which young people make sense of their world, within classrooms and beyond (Boyd & Galda, 2011; Mercer & Littleton, 2007; Vygotsky, 1986).

Teacher-facilitated, informal pair or small-group interactions are particularly beneficial in linguistically diverse K–12 classrooms, as these interactions aid in language development for both native speakers and English learners (ELs), and they additionally promote oral language practice, increased participation, and community belonging for ELs (Ardasheva et al., 2016; Boyd & Galda, 2011; Bray et al., 2006; de Jong, 2012; Swain, et al., 2002). “By some estimates, [ELs] spend less than 2% of their school day in oral interaction. We must find ways to provide students learning opportunities that engage them in productive talk, and then we must listen carefully to the language they use in order to support their continued growth” (Walqui & Heritage, 2018, p. 20). Frequent discussion of text is a research-based best practice to develop understanding of text and improve literacy (Fisher et al., 2016; Kamil et al., 2008; Langer, 2001; Mihalakis, Petrosky, & McConachie, 2015). “[A] number of studies show that reading comprehension is enhanced by the classroom interaction of students with their teachers and peers” (Nystrand, 2006, p. 398). A meta-analysis of 42 studies on the effects of classroom discussion concluded that “many of the approaches were highly effective at promoting students’ literal and inferential comprehension” (Murphy et al., 2009, p. 759). In providing regular opportunities for peer discussion of texts, questions should be both stimulating and directly connected to learning goals (Kamil et al., 2008). Additionally, students should be given formats and protocols for talking with peers that they then practice in the course exchanges about texts. “The theory underpinning discussion-based approaches to improve reading comprehension rests on the idea that students can, and will, internalize thinking processes experienced repeatedly during discussions” (p. 22). Peer dialogue about text, including commenting on each other’s own writing, extends language skills and metacognition (Fisher et al., 2016; William, 2013).

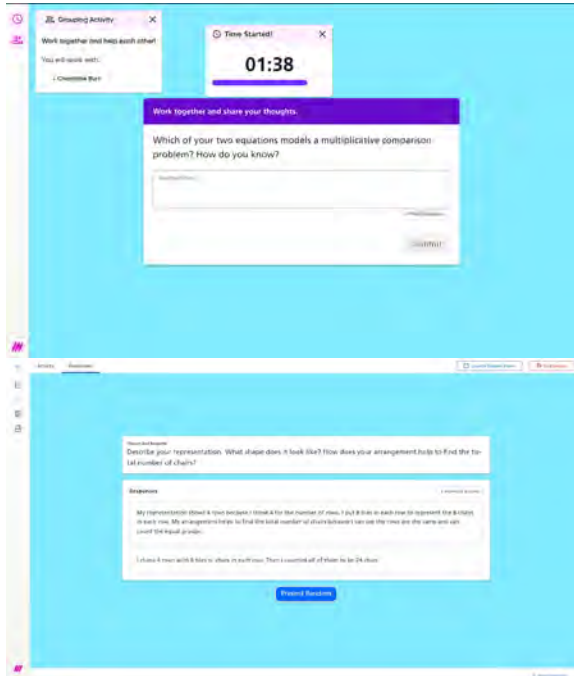
Mathematical discourse is an important way for students to learn and make sense of mathematics; such communicative exchanges, particularly when accompanied by teacher feedback, provide access to ideas and recognition of relationships among those ideas, as well as foster deeper understanding and positive attitudes toward mathematics (Humphreys & Parker, 2015; Morgan et al. 2014; Michaels, O'Connor, & Resnick, 2008; Parrish & Dominick, 2016). “Mathematical conversations provide opportunities for teachers to hear regularly from their students and to learn about the range of ideas students have about a particular mathematical idea, the details supporting students’ ideas, the values students attach to those ideas, and the language students use to express those ideas. The knowledge teachers gain from engaging with their students in conversations is essential for teaching for understanding” (Franke et al., 2007, p. 237). Math talk encourages students to actively, strategically, and meaningfully participate in their learning and provides students the opportunity to learn from each other, yielding higher levels of skill, engagement, and confidence for students and teachers alike (Hufferd-Ackles et al., 2004; Humphreys & Parker, 2015; Michaels et al., 2010; Morgan et al., 2014; Parrish & Dominick, 2016; Wagganer, 2015). The process of having students talk about their mathematical thinking makes learning visible, providing teachers with a means of addressing students’ misconceptions and moving students from surface to deeper understanding (Fuson et al., 2005; Fuson & Leinwand, 2023; Almarode, Fisher, Thunder, Hattie, & Frey, 2019). Research firmly supports math talk as an equitable teaching process that benefits students at all levels of learning, including historically marginalized students (Bray et al., 2006; Fuson & Leinwand, 2023; Hufferd-Ackles et al., 2004; Murphey et al., 2017).

Key to ensuring that classroom talk among students is productive is for teachers to closely observe what is being said. The processing of noting and analyzing classroom talk then also becomes an effective means of formative assessment. By monitoring the content of peer-to-peer exchanges and verifying that students understand the targeted learning, teachers can adjust instruction for the whole class or small groups accordingly (Cazden, 2001; Fisher & Frey, 2007). Additionally, when teachers strategically structure Turn and Talks with pointed questions that promote understanding and reasoning and build in accountability for each student’s participation and the classroom community at-large, these exchanges better support equity and the development of pro-social behaviors in addition to learning (Boyd & Galda, 2011; Michaels et al., 2008; Resnick et al., 2018). Crediting Resnick, the developer of the Accountability Talk framework, Fisher and Frey (2007) offer the following guidelines for teachers to use in structuring meaningful partner conversations about academic topics: Ensure exchanges remain on topic; encourage students to share information that is accurate and appropriate for the topic and carefully consider what their partners say; and have students practice protocols for accountable, productive, and supportive conversations, including respectfully asking for clarification, explanation, or justification from their partners and referencing back to partners’ understanding of what they say. To ensure Turn and Talks are effective, Knight (2013) recommends that students know the following from the outset of every session: who their learning partner will be; what prep is needed, if any, before turning to their partner; how partners should communicate with each other (protocols); what tasks are to be completed; and the outcome to be produced by the talk’s end (e.g., a written product, a comment, a poll response, etc.).

HOW CLASSCRAFT DELIVERS

Each session also includes at least one opportunity for students to engage in a **Turn and Talk** interactive instructional component that facilitates peer dialogue with built-in accountability. As surface learning takes hold, students work in pairs to consider and respond to stimulating, central questions collaboratively to develop deeper conceptual knowledge and skills. Then each student constructs and submits an individual response. Teachers are able to monitor whether students are on task and redirect learning if needed.

Teachers also have an opportunity to review students' responses to gauge understanding levels and address misconceptions, as well as share or discuss one on one or with the whole class. **Turn and Talk** supports learning, fosters student engagement, enables metacognition, and contributes to the instructional feedback cycle critical to student success.



Response Activity

Teachers' ongoing engagement with student thinking is critical for supporting student learning, especially when part of a larger responsive approach in which teachers use evidence of student thinking to infer and adapt instructional objectives (Black et al., 2003; Datnow et al., 2021; Wiggins & McTighe, 2005). To discover what students know or don't know and what they do well or poorly, the teacher must be able to closely examine students' work. A focus on an evidence approach is a critical component of effective, systematic formative assessment (Wiliam, 2011). Evidence of student thinking takes a variety of forms, such as verbal responses, gestures, and written responses. It is important that the eliciting of thinking happens strategically, via deliberate questions aimed at identifying specific understandings and conceptual gaps as well as consideration of common patterns of reasoning that are revealed in a student's thinking, which include difficulties, errors, and misconceptions. To be effective, evidence gathering and subsequent responsive action must be taken while learning unfolds and before remediation becomes necessary (Heritage, 2013; Wiliam, 2013).

According to Beyer (1998), learning environments that nurture and support student thinking provide continuous opportunities to engage in meaningful thinking beyond the level of recall along with encouragement to engage and stay engaged in such thinking. "The secret to providing repeated classroom opportunities to engage in thinking is to engage students in productive learning tasks. These are tasks that require students to produce knowledge new to them, rather than simply to produce information or knowledge claims already presented to them in texts, lectures, or media" (p. 262). Multiple studies have investigated the impacts of questioning on learning outcomes. Findings include that the use of adjunct questions promotes retention and that students' performance on summative assessments improve when they have responded to adjunct questions connected to reading material; "[a]djunct questions prompt students to engage in active cognitive processing of the material being learned, thus fostering meaningful learning as opposed to rote memorization (Hunsu et al., 2016, online). Inserted into text for the purpose of alerting readers to be attentive to key points or material or to encourage readers to review or reread sections of text to evaluate significance within the text or confirm understanding, adjunct questions used skillfully have also been shown by research to enhance comprehension by increasing learner attention to specific text information and guiding learners in organizing and interpreting text content (Dornisch, 2012).

Assessment for learning is an activity that has the promotion of student learning (rather than accountability or ranking) as its function; assessment for learning provides information that teachers and students can use to modify teaching and learning (Black et al., 2004). Classroom practices for assessment for learning include questions or tasks, sharing criteria, self- and peer assessment, and feedback. "Self and peer assessment make unique contributions to the progress of learning as, through this process, students come to understand what counts as quality through examples" (Lauf & Dole, 2010, p. 320). Effective recognition of student work in the course of assessment for learning is task-focused; it rewards attainment of specific criteria associated with the task and is given to acknowledge noteworthy effort; and it focuses students' attention on their own task-relevant behavior (Marzano et al., 2001). However, the feedback component of such classroom activities can have an especially powerful effect on learning and achievement because the feedback helps students develop error-detection skills that improve their own self-feedback capabilities and because, as the learning goal is clarified and

reinforced and students become more aware of what they need to do to succeed, students become more motivated to increase their learning efforts (Hattie & Clarke, 2019; Hattie & Timperley, 2007).

The writing that students do in classrooms can be categorized as formally presented as a measure of accountability on some level or informal, the latter of which serves to develop thinking and understanding and is considered "writing to learn" (Fisher & Frey, 2007). "[W]riting offers an excellent pathway for brainstorming, clarifying, and questioning. There is evidence of increased student performance when writing is used as a tool for thinking. . . Writing clarifies thinking. For that matter, writing *is* thinking. Analyzing student writing is a great way for teachers to determine what their students know" (Fisher & Frey, 2007, p. 57). Students need opportunities to write informally and formally. Exploratory writing exercises encourage students to make sense of new ideas for which they do not yet have a solid understanding (Lance & Lance, 2006). The very act of writing can help students process new information, make sense of complex ideas, and connect to their prior knowledge and experiences (Bridges, 2014; Knipper & Duggan, 2006). "Not only is writing an important facet of education, but writing to learn is a vital tool at each teacher's disposal" (Boyer, 2006, p. 158). Indeed, writing is one of the most effective research-based methods of promoting learning across content areas, and it is a gateway for higher-order thinking (Graham & Hebert, 2010; Graham & Perin, 2007). The recursive, mutually supportive connection among reading, writing, and thinking is well established in the research literature (Calkins, 1985; Graham et al., 2017; Tierney & Shanahan, 1991). Students who write about what they read demonstrate evidence of critical thinking and better retention of information (Biancarosa & Snow, 2006; Fitzgerald & Shanahan, 2000; Klingner et al., 2015). In a meta-analysis, Graham and Hebert (2010) found that writing after reading a text appears to be more beneficial than just reading, rereading, reading and discussion, or receiving reading instruction with the text.

Advances in the use of technology as a tool to promote more writing within classrooms are additionally promising in how they can be used to foster evidence- and process-based practices (Deane, 2022). Written responses within computer-based learning environments have a more frequent and timely feedback—while affording historically disadvantaged students additional benefits via greater equity of access to high-quality education (Johnson, Walton, Strickler, & Elliott, 2023; O'Byrne & Pytash, 2015; Patrick & Powell, 2009; U.S. Department of Education [USDOE], 2017). Digital learning tools can also provide more flexibility and support for individual students by modifying content and complexity; additionally, advances in software technology have increased adaptive learning along with improved feedback (Anthony, 2019; O'Byrne & Pytash, 2015). Further, current digital learning platforms afford opportunities for timely progress monitoring and assessment; teachers can use such technologies to meet instructional needs of individual students and collect assessment data from multiple sources for progress monitoring, as well as provide prompt, direct feedback to guide specific learning (Anthony, 2019; Kerton & Cervato, 2014; Pulham & Graham, 2018; Turley & Graham, 2019). Research has found that historically disadvantaged students in particular benefit from timely, consistent feedback (Hattie & Clarke, 2019; Black & Wiliam, 1998a, 1998b).

HOW CLASSCRAFT DELIVERS

Classcraft **Response Activities** are an interactive instructional component embedded within direct instruction. This feature has students respond independently in writing to prompts related to the lesson's essential questions and content.

Response Activities provide teachers with real-time insight as to how each student is understanding and progressing—and then opportunity to give feedback, reteach, or advance students along the instructional pathway as this type of ongoing formative assessment for learning indicates.



Quick Check

"No matter how carefully we design and implement the instruction, what our students learn cannot be predicted with any certainty. It is only through assessment that we can discover whether the instructional activities in which we engaged our students resulted in the intended learning. Assessment really is the bridge between teaching and learning" (Wiliam, 2013, p. 15). Students don't always ask questions if they don't understand what they are learning or recognize what precisely is confusing to them. At every interval of instruction, effective teachers check for understanding via pointed questions and review responses from each student in the class (Rosenshine, 2012). Routinely and systematically identifying and resolving misconceptions that interfere with learning while the instructional process is still ongoing is an essential and evidenced-based method of preventing larger or longstanding issues; additionally, frequent checking for understanding provides data that can be used to determine how well students are grasping the curriculum over time (Fisher & Frey, 2007).

Across all disciplines and levels of learning, assessment is an integral part of the instruction process and one through which teachers can continuously monitor student understanding and progress. Effective assessment tools allow teachers to collect data about what is working and what is not so that they can take precise, swift, and effective action to better serve students. Assessment that authentically supports learning is ongoing, embedded, and often informal; it is used to guide the learning that each student needs to reach designated goals for learning (Brookhart, 2008; Fisher & Frey, 2007; Greenberg & Walsh, 2012; Heritage, 2013; Wiliam, 2013). Assessment data informs teachers of the knowledge and skills that students have acquired and their level of mastery; the practice of consistently taking low-stakes performance assessments, coupled with high expectations and meaningful feedback, helps all students become assessment-capable learners (Frey et al., 2018). While ongoing informal assessment is beneficial for all students, it is particularly helpful for those who are struggling, as it highlights troublesome areas and provides guidance on what needs to be done to overcome them (Black & Wiliam, 2009; Heritage, 2013; Jimenez & Modaffari, 2021).

"Teachers should be adjusting their lessons in real time as they collect and analyze the data that they get from students, whether that be during focused, guided, collaborative, or independent learning. Assessment is the engine that drives instructional decisions; it's what allows teachers to know if we are having an impact. When we are not achieving the desired impact—learning—we have to change course and try something else" (Fisher & Frey, 2021, p. viii–ix). Current digital learning platforms afford opportunities for timely progress monitoring and assessment; teachers can use such technologies to meet instructional needs of individual students and collect assessment data from multiple sources for progress monitoring, as well as provide prompt, direct feedback to guide specific learning (Anthony, 2019; Curtis & Werth, 2015; Johnson et al., 2023; Kerton & Cervato,

2014; Pulham & Graham, 2018; Turley & Graham, 2019). "Assessment and instruction become the same where students are not assessed only at the end of a unit, but are continually assessed with a variety of strategies, resulting in the teacher having a continuous flow of information on what the students know and do not know, yet. Assessment for learning helps the teacher to create the scaffolding that enables more and better student understanding of what is being taught. This assessment is used to re-focus teaching and learning activities to help students meet learning expectations, and is essentially diagnostic" (Mathison & Fragnoli, 2006, p. 201).

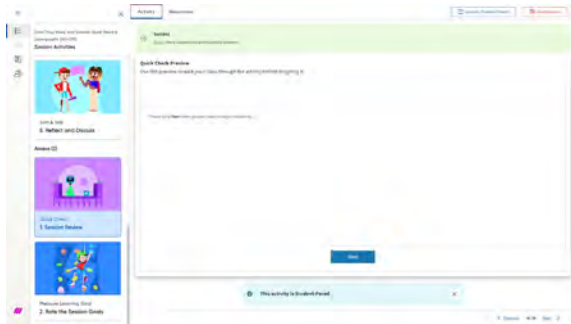
Feedback to students is key to monitoring and promoting understanding. "During the multiple opportunities for learning and engagement, teachers need to provide feedback to refine the student's understanding of the content. Teachers need to plan for students' misconceptions to be identified, explored and challenged, to make transparent the links with their prior experiences and to provide multiple opportunities and scaffolding to make those links with new information: the essence of effective feedback" (Hattie & Clarke, 2019, p. 3). Timely feedback from regular assessment helps students evaluate their own strengths and weaknesses and gauge their progress toward meeting clearly specified learning goals, and it helps teachers produce significant—and often substantial—gains in student learning and performance (Black & Wiliam, 1998a, 1998b; Cotton, 1995; Hattie, 2012; Roschelle, Feng, Murphy, & Mason, 2016).

In the course of classroom assessment, teachers must make constructive use of students' incorrect answers and, rather than simply mark them wrong, examine incorrect responses to see whether they reveal specific student misunderstandings that could provide instructional insight or remedy (Popham, 2006). Normalizing and celebrating error is essential to new learning (Hattie & Clarke, 2019): "Good feedback should be part of a classroom assessment environment in which students see constructive criticism as a good thing and understand that learning cannot occur without practice. If part of the classroom culture is to always 'get things right,' then if something needs improvement, it's 'wrong.' If, instead, the classroom culture values finding and using suggestions for improvement, students will be able to use feedback, plan and execute steps for improvement, and in the long run reach further than they could if they were stuck with assignments on which they could already get an A without any new learning. It is not fair to students to present them with feedback and no opportunities to use it. It is not fair to students to present them with what seems like constructive criticism and then use it against them in a grade or final evaluation" (p. 2).

Checking for understanding should additionally include a facet of self-assessment to foster students' awareness and reflection on how well they are grasping material. The benefits of effective classroom assessment practices are augmented when students are given ongoing opportunities for metacognitive self-reflection (Afflerbach & Meuwissen, 2005; Desoete & De Craene, 2019; Fisher & Frey, 2007; Lee, et al., 2020; Schneider & Artelt, 2010; Wiliam, 2011).

HOW CLASSCRAFT DELIVERS

Every session ends with a **Quick Check** that includes embedded formative assessment to capture the outcomes of that teaching session. This allows educators to check student understanding to inform instructional next steps and differentiation. The **Quick Check** section also includes an opportunity for students to measure their learning goals.



Quick Check allows teachers to monitor student progress while automating assessment data collection and analysis to help make data-driven decisions for instructional planning. This feature also fosters students' self-assessment and metacognitive awareness.

A screenshot of the 'Quick Check' data analysis table. The table has a white background and a blue header. It displays a list of students and their scores for various activities. The table is organized into columns for 'Name', 'Score', and 'Target'. The data is as follows:

Name	Score	Target
John	100%	100%
John	100%	100%
John	100%	100%
John	100%	100%
John	100%	100%
John	100%	100%
John	100%	100%
John	100%	100%
John	100%	100%
John	100%	100%

View and Respond

Interactivity—interactions between teachers and students, students and students, and students and the instructional material or format—is commonly considered beneficial in all educational contexts but particularly those of computer-based learning (Evans & Gibbons, 2007). Interactivity and responsiveness have been associated in research with increased motivation, engagement, and satisfaction levels for students in digital learning environments (Chen et al., 2018; Johnson et al., 2023; Schunk, 2008; Zhang, 2005). “Advances in computer and communication technologies now allow instructors to supplement verbal modes of instruction with visual modes of instruction, including dazzling graphics that students can interact with. Research on multimedia learning provides encouraging evidence that under appropriate circumstances, students learn better from words and pictures than from words alone” (Mayer, 2013, p. 396). A study conducted by Evans and Gibbons (2007) found evidence indicating that, by actively engaging students, interactive instructional systems facilitate deep learning and understanding, suggesting that interactivity should be adopted as a critical design principle.

As Buehl (2017) points out, proficient readers and learners are both interactive and strategic; they engage in an ongoing interplay of thinking modes when they engage in efforts to understand. “Proficient reading abilities are integral to the literacy challenges and choices we make as adults each day of our lives. Likewise, proficient reading abilities are integral to learning. For students to achieve success in social studies and science, literature and mathematics, in fact, in all curricular disciplines, they need to develop strategic comprehension processes” (p. 4). Buehl cites specific modes of thinking that research has shown to be essential to comprehension, which include: connecting prior knowledge, generating questions, visualizing or creating sensory associations and mental images, making inferences, determining importance, synthesizing and summarizing ideas, and monitoring understanding and strategically applying fixups and adjustments to optimize comprehension.

Chunking content into manageable segments, scaffolding understanding through the use of prompts and questioning, drawing students’ attention to important features of a text or information in a lesson, and providing opportunities for students to respond and receive feedback are effective techniques for optimizing outcomes within explicit learning environments, particularly for students with learning difficulties (Hughes et al., 2017). Wiggins and McTighe (2005) encourage teachers to use a “backward design” (so called because, all too often, the opposite occurs) planning sequence that serves to develop an ongoing process of inquiry and rethinking, as well as formative assessment of understanding: First, identify desired results for what students should know and be able to do; then, determine acceptable evidence of student understanding proficiency and how it will be collected to validate attainment of targeted results; and finally, plan learning experiences, or the form and content of the instruction. This approach ensures that learning goals are at the forefront of planning and that, woven throughout learning, students are given continual opportunity to engage in self-assessment of their own learning while teachers are given continual opportunity to monitor their understanding. Further, it sets up formative feedback cycles that research has continually demonstrated are essential to impactful learning (Black & William, 1998a, 1998b; Brookhart, 2008; Hattie, 2009, 2012, 2023; Hattie & Clarke, 2019; Hattie & Timperley, 2007).

Molin and colleagues (2020) emphasize that formative feedback is not simply a critical means for students to dialogue with teachers and peers to clarify misunderstanding and identify gaps in knowledge and skills; it also fosters the development of self-regulated learning and metacognition. Molin’s team further points out that research has found that students evaluate their learning status via available cues predictive of future assessment performance—but these cues may be vague or unreliable, and students themselves often lack metacognitive awareness or self-regulation to sufficiently grasp their level of understanding. To improve students’ capacity to use diagnostic cues to gauge levels of learning and success, it’s likely that interventions such as metacognitive prompts will be required. However, such interventions must be delivered within a larger system that delivers consistent, ongoing formative feedback from teachers and peers and yields information that allows students to confirm, refine, or restructure memory and understanding. Digital learning environments can offer the functionality needed for optimal responsiveness within a formative feedback system.

HOW CLASSCRAFT DELIVERS

View and Respond activities are interspersed throughout direct instruction sessions to help students focus and remain on task, while helping teachers monitor understanding for individual students and the whole class. **View and Respond** features a variety of constructed open-ended and multiple-choice questions tied to key content. Teachers can review responses individually and in aggregate and take timely action as needed to optimize learning outcomes.

The screenshot displays the Classcraft interface for a reading activity. At the top, there are navigation buttons for 'Read Text' and 'Answer Questions'. The main content area features a red background with a portrait of Frederick Douglass. The text reads: 'from Narrative of the Life of Frederick Douglass, an American Slave' and 'Autobiography by Frederick Douglass'. Below the text, there is a 'NOTICE & NOTE' section with a pink heart icon, stating: 'In this excerpt, Douglass explains the profound effect learning to read had on him. As you read, use the sticky notes tool to make notes about the text.' Below this, there is a section titled 'Analyze Structure' with a text box explaining cause and effect relationships in narratives. At the bottom, there is a table with two columns: 'Cause' and 'Effect'. The table has three rows for notes and a 'Submit' button at the bottom right.

Cause	Effect

Words to Learn

Domain-specific academic vocabulary reflects the background knowledge students bring to new learning and has a determinant impact on academic success (Black & Wright, 2024; Willingham, 2006). "What a person knows at a given point in time determines what a person can comprehend (in print or orally) and what a person can learn in the future" (Fitzgerald et al., 2020, p. 3). Decades of research strongly affirm that direct, explicit instruction of high-utility academic vocabulary and discipline-specific terminology is one of the most powerful and reliable ways to improve students' academic achievement across grade levels and content areas, including mathematics (Beck, McKeown, & Kucan, 2013; Biancarosa & Snow, 2006; Graves & Slater, 2016; Kamil et al., 2008; Marzano, 2009b, 2020; National Reading Panel [NRP], 2000; Nagy, 1988; Wang et al., 2023). Vocabulary learning does not occur incidentally for many students and therefore requires intentional, systematic, and sustained instructional attention, particularly for English learners and students with limited academic language experience (August & Shanahan, 2007; Calderón & Soto, 2016; Francis et al., 2006; Zeng, Kuo, Chen, Lin, & Shen, 2025).

Research consistently demonstrates that word learning is strengthened by multiple, varied exposures in rich contexts that involve speaking, listening, writing, and visual representation (Beck et al., 2013; Feldman & Kinsella, 2005; Marzano, 2003, 2004; Stahl & Fairbanks, 1986). Instruction is most effective when students actively process words by analyzing meanings, connecting them to prior knowledge, and using them in thoughtful and meaningful ways (Durkin, 2003; Graves, 2006). Frequency of instruction further supports retention and depth of understanding (Biemiller, 2012; Kamil et al., 2008; NRP, 2000), and flexible instructional structures, including whole-class introduction with follow-up in small groups and peer pairs, enhance access and effectiveness for diverse learners (Archer & Hughes, 2011; Marzano et al., 2001). Particularly for ELs, effective vocabulary instruction cannot rely solely on definitional teaching; rather, strong instructional approaches combine explicit teaching of meanings with contextual application and morphological awareness (Zeng et al., 2025).

Academic language serves as the primary medium through which schooling occurs, enabling students to comprehend texts, engage with disciplinary ideas, and demonstrate understanding across subject areas. The research base is unequivocal in establishing the central role of academic language in student success; as Francis and colleagues (2006) assert, "[m]astery of academic language is arguably the single most important determinant of academic success for individual students" (p. 5). Vocabulary knowledge and reading comprehension share a strong reciprocal relationship, each reinforcing the other (Baumann et al., 2003; Duke & Pearson, 2002; Gersten et al., 2001). Discipline-specific vocabulary, in particular, has long been associated with successful content-area learning, particularly in grades four through twelve where texts and concepts become increasingly complex (Baumann & Graves, 2010; Biemiller, 2012; Fisher et al., 2016; Lee & Spratley, 2010; Marzano, 2003, 2004, 2020; Nagy & Townsend, 2012). Vocabulary functions not merely as a set of labels—indeed, it underpins conceptual understanding; as Fisher and Frey (2014) explain, "Vocabulary lies at the heart of content learning, as it serves as a proxy for students' understanding of concepts" (p. 598). Because new knowledge is constructed on the foundation of prior knowledge (Bransford et al., 2000; Hirsch & Pondiscio, 2010; Willingham, 2006), developing academic vocabulary and background knowledge is essential for literacy development and content mastery.

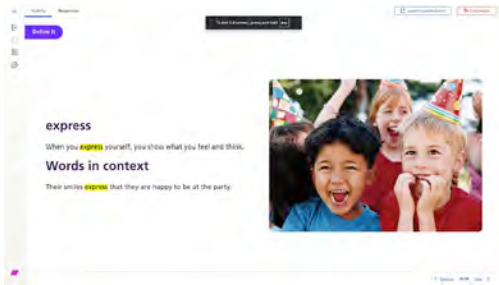
Marzano's extensive body of broadly implemented research further clarifies best practices for effective vocabulary instruction. He demonstrates that direct, explicit, systematic instruction is essential, particularly because many students are unlikely to acquire critical academic and disciplinary terms through incidental exposure in reading alone (Marzano, 2003, 2004). Marzano (2009b, 2020) emphasizes teaching the most conceptually important words and building vocabulary knowledge through both linguistic and visual systems, grounded in dual-coding theory, explaining that "one of the best ways to learn a new word is to associate an image with it. . . . Numerous studies support the powerful effects of associating mental images or symbolic representations with words being learned" (Marzano et al., 2001, p. 126). Marzano says embedding vocabulary practice within games is also effective (2009b). Marzano (2012, 2020) further categorizes vocabulary into three tiers: Tier 1 words are common and rarely require instruction; Tier 2 words are high-utility academic terms that warrant direct teaching; and Tier 3 words are discipline-specific and essential for content learning.

The importance of vocabulary instruction is particularly evident in mathematics, a discipline with its own specialized language and terminology. Mathematical development is influenced not only by conceptual understanding but also by students' language and vocabulary knowledge. "Mathematical development is shaped in obvious and unexpected ways by differences in the structures and contents of children's languages, as well as by individual differences in their vocabulary knowledge, syntactic knowledge, and phonological processing" (Espinas & Fuchs, 2022, p. 70). The language of mathematics is challenging for many students and especially for English learners, yet it is fundamental to expressing reasoning, interpreting problems, and developing conceptual understanding (Janzen, 2008; Vasuki, Celestin, & Kumar, 2016). Peng et al. (2020) further demonstrate that language use supports foundational mathematics skills and strengthens higher-level mathematical thinking and fluency across development. Riccomini and colleagues (2022) identify mathematical vocabulary as uniquely difficult to learn due to its technical precision, abstract nature, and frequent divergence from everyday meanings, arguing that incidental instruction is insufficient. They recommend a systematic approach that includes explicit teaching of high-priority terms, activation of prior knowledge, development of conceptual understanding, repeated exposure, differentiation, and cooperative learning opportunities in which new words are explored and practiced in meaningful contexts. Vocabulary learning in mathematics is most effective when combined with sustained mathematical discourse that promotes application of burgeoning skills via language-rich interactions with peers. Through structured opportunities for speaking, writing, and listening about mathematics, students clarify meaning, connect ideas, articulate strategies, and deepen conceptual understanding while simultaneously strengthening mathematical language; well-supported math talks provide developmental scaffolding and not only improve academic performance but also students' confidence, engagement, and long-term success (Mercer & Howe, 2012; Lucenta & Kelemanik, 2020; Thanheiser & Melhuish, 2023; Zwiers et al., 2017). "With development, the use of language to retrieve mathematics knowledge may be more important for foundational mathematics skills, which in turn further strengthens linguistic thought processes for performing more advanced mathematics tasks. Such use of language may boost the mutual effects of cognition and mathematics across development" (Peng et al., 2020, abstract).

HOW CLASSCRAFT DELIVERS

Based highly on Marzano's work, **Words to Learn** are an instructional component integrated within *Classcraft* essential sessions that engage students in interactive, guided word study to aid comprehension of text central to core instruction and build vocabulary knowledge and academic language generally.

Words to Learn activities provide repeated opportunities for students to encounter, engage with, and connect background knowledge, new context, and visual, sensory associations with targeted words for rich, multimodal vocabulary development that boosts literacy and supports content-area learning.



Focus and Learn

Directed, sustained attention is critical to successful learning within the classroom and in life. It is necessary for encoding information and task performance. In general, the longer one focuses on an activity, the better the learning outcomes (Fisher, Godwin, & Seltman, 2014; Godwin et al., 2013). However, given the limitations of humans' processing capacities and working memory, piling too much information on students in a single stretch of time puts them at risk for cognitive overload; it is therefore recommended that direct instruction be delivered over short periods, interspersed with opportunities for distributed, meaningful response, peer interaction, and practice to reinforce learning and understanding and ongoing feedback on their progress throughout (Archer & Hughes, 2011; Fuson & Beckmann, 2012; Seabrook et al., 2005; Rosenshine, 2007).

Drawing on an established body of research, Archer and Hughes (2011) identify the instructional practices that comprise an effective, evidence-based approach to explicit instruction. These include a focus on critical content—the strategies, skills, concepts, vocabulary, and patterns that allow students to meet learning goals and succeed in school and that align with students' individual needs. The content is sequenced logically and progressively, moving from easier to more difficult skill level and high frequency across the curriculum to low frequency, with more complex skills and concepts broken down into smaller steps to avoid cognitive overload. The lessons themselves are well-organized and focused, optimizing instructional time without irrelevant or unnecessary digressions. Additionally, the lessons are presented in unambiguous, concise language; each begins with a clear statement of goals and expectations. Such explicit instruction also includes frequent verification that students understand the targeted content as well as prerequisite skills and knowledge, and additional models or opportunities for practice are provided for each student until mastery is demonstrated.

Across the grade span, even at the primary level, critical to a student's capacity to focus is self-regulation. Self-regulation entails a complex set of habits, skills, and dispositions that include metacognition (thinking about one's thinking), control, interest, motivation, affect, goals, and persistence in tasks (Bandura, 1991; Fisher & Frey, 2021; Malmberg et al., 2014; Molin et al., 2020; Zimmerman & Schunk, 2011). "Self-regulatory systems lie at the very heart of causal processes. They not only mediate the effects of most external influences but also provide the very basis for purposeful action" (Bandura, 1991, p. 248). Both theoretical and empirical research shows that self-regulated learning and learning strategy use are key determinates in learning success, and that even young children can self-regulate when the learning context provides opportunities for self-regulated learning (Malmberg et al., 2014). "Individuals who can self-regulate are able to direct

their attention, organize their thinking, and make decisions about what they need to do next" (Fisher & Frey, 2021, p. 14). Molin and colleagues (2020) explain that self-regulated learners are goal-directed and, during the process of learning, can evaluate whether their progress is aligning with their goals, adjusting strategies as needed to accommodate task demands; however, without appropriate and sufficient support, confusing or overly complex learning tasks can impede both strategy use and motivation. Alternatively, ill-structured tasks lacking obvious solutions may result in avoidance or self-sabotage. Therefore, a balance of the two task types yields optimal challenge and meaningful learning.

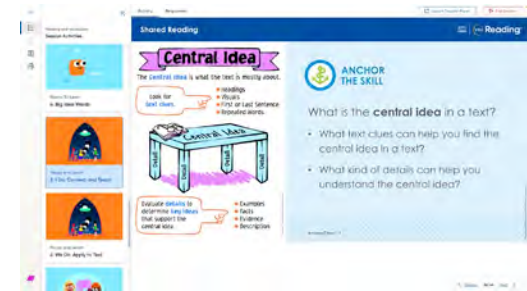
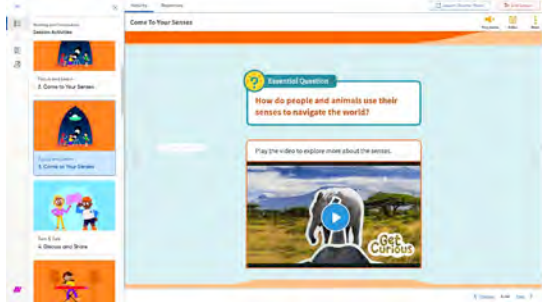
Boredom, which is a pervasive issue across all educational levels and contexts and has deleterious effects on learning, is another threat to the attention, concentration, and cognitive strategy uses, as well as the motivation required for learning. Empirical study has found that increasing students' level of perceived control in the learning process along with reducing the amount of repetitive, monotonous tasks lacking variety, complexity, and cognitive stimulation can stave off boredom (Pekrun et al., 2010). Boredom, along with other affective-cognitive states, was examined in multiple computer-based learning environments, and it was concluded that to maintain students' persistence through learning tasks, efforts should be made to disrupt potential cycles of boredom by injecting higher incidences of positive emotions (Baker et al., 2010). Per Hattie (2009), so many students are bored by what their classrooms have to offer; learning environments need "better indicators of success, more challenging material, higher expectations, and more successful ways to orient students to succeed in school" (p. 32).

Findings suggest that students are engaged in academic learning for only about 20% of the school day (Archer & Hughes, 2011). Because their capacity to focus on learning tasks during designated academic learning is dependent upon students' self-regulatory processes, instruction should be designed to optimize students' self-regulation (Lee, 2018). Effective explicit instruction provides a series of scaffolding throughout to help students focus, remain on task, and attend to what they need to do to meet learning goals (Archer & Hughes, 2011). As described by Fisher and Frey (2021), focused instruction that allows students to assume increased responsibility for their own learning is comprised of two distinct components: first, establishing a specific purpose for learning based on explicitly set intentions and clearly defined criteria for success and, second, providing opportunities for "cognitive apprenticeship" via modeling and demonstration. While typically about 15 minutes in length, focused learning can happen at any point in a lesson or throughout the school year to introduce new content or support learning along its progression to proficiency. To support focused learning, it should be made clear to students going into the lesson or activity what the goals and success criteria are, as well as how the learning is relevant to them. Carefully structured and focused instructional design ultimately supports independent learning.

HOW CLASSCRAFT DELIVERS

Focus and Learn is *Classcraft*'s whole-class, synchronous direct instruction in core English language arts and mathematics curricular content, in which the high-impact routines described here are embedded. With point-of-use tools and other features of the *Classcraft* learning experience, through **Focus and Learn**, teachers guide student learning, model important concepts, facilitate classroom discussion through **Turn and Talk** routines, monitor understanding, and provide feedback.

The routines offer ongoing opportunities for interactivity and responsiveness to keep students engaged and focused on content and instructional goals.



Class Prompt

"When students do not have the knowledge necessary to comprehend a particular text, such knowledge needs to be built; one cannot activate what is not there, and one cannot strategize about things one does not know" (Learned et al., 2011, p. 181). A learner's capacity to understand a text or the content of a lesson is dependent on what the learner already knows (Buehl, 2017; Fitzgerald et al., 2020; Marzano, 2004; Willingham, 2006). "Educational researchers have shown that the activation of prior knowledge is critical to learning of all types. Indeed, our background knowledge can even influence what we perceive" (Marzano et al., 2001, p. 111). This is why, when introducing unfamiliar material in any form to a class, it is essential to offer a form of scaffold and a means of engagement that allow a pathway into what the students are to comprehend or learn; this is sometimes referred to as a "frontloading" activity, and it can take one of numerous forms that prompt learning. "The strategies for frontloading learning prepare students for successful reading. In particular, they address teaching to the match—matching knowledge demands of a text with the background knowledge students bring to a text. The comprehension processes that receive primary emphasis are making connections and generating questions, and frontloading strategies also cue purpose for reading, which sets up determining importance (Buehl, 2017, p. 49).

The use of cues and prompts to shape and practice learning ensures a strong stimulus response and is then considered a component within good instructional design (Ertmer & Newby, 2013). Teachers can use cues as a straightforward means of activating students' prior knowledge and providing a preview of what's ahead. Questions are effective cueing tools before a learning experience. Advance organizers are another separate or complementary way of doing this, especially when the advance organizer focuses students on what is important and central, and not minor or unusual (Marzano et al., 2001). Advance organizers emerged from the learning theory work of Ausubel in the 1960s as a tool to facilitate meaningful learning by relating new information to students' existing cognitive structures; Ausubel (1968) recommended that advance organizers be provided upon introduction to new, generally text-based material "and presented at a higher level of abstraction, generality, and inclusiveness than the information presented after it. The organizer serves to provide ideational scaffolding for the stable incorporation and retention of the more detailed and differentiated materials that follow. Thus, advance organizers are not the same as summaries or overviews, which comprise text at the same level of abstraction as the material to be learned" (p.

148). Rather, they "are educational tools to help fill the gap between what learners already know and what they need to learn most quickly and effectively" (p. 11).

Cues, questions, prompts, and advance organizers help students develop understanding at the beginning or across the duration of a lesson (Dean & Hubbell, 2012); these scaffolds provide a means of guiding students' learning toward increasingly complex thinking without simply telling them answers or exactly what they are expected to grasp or take away (Fisher & Frey, 2021). Such prompting can focus students' attention to content and learning objectives and is particularly good practice to support students with cognitive disabilities (Hughes et al., 2017). Concept mapping and behavior/advanced organizers—such "graphical representations or conceptual structure of the content to be learned" that incorporates cognition strategies to link old information with new—are high-yield techniques that make learning visible (Hattie, 2009, p. 168). Advance organizers and questioning to support cognition and focus attention on key concepts or information engage students in constructivist learning activity ahead of direct instruction activity, such as a lesson or text reading, and, particularly within a multimedia learning environment, these tools facilitate knowledge transfer and retention (Mayer, 2009). Per Knight (2013), effective prompts to activate students' thinking embody one or more of the following characteristics: provocative (readily generates a response and ideally a desire to share or explore it); complex (open to varying interpretations and responses); personally relevant (appeals to or reflects students' lived experiences); positive (elicits good feelings); and concise (entails a brief experience as well as a limited response).

Frontloading activities that cue and prompt cognition before and during processes of interacting with complex text and content, such as via advance organizers, promotes rigor for all students (Marzano & Toth, 2014) and, by extension, self-efficacy too (Perron et al., 2016). Aksoy (2021) found that advance organizers ahead of text-based learning positively impacted the comprehension and perceived reading self-efficacy for students of low socioeconomic backgrounds. Additionally, Aksoy reports that the use of visual aids such as pictures fosters student interest in a text, facilitating understanding of abstract ideas and concepts. Results from an investigation of impacts of visual cues and self-explanation prompts (prediction prompts vs. reflection prompts vs. no prompts) in an interactive multimedia environment "suggest that the cues may not only enhance learning, but also indirectly impact learning, cognitive load, and intrinsic motivation" (Lin et al., 2016, online).

HOW *CLASSCRAFT* DELIVERS

Class Prompts embedded with *Classcraft*'s whole-class direct instruction take the form of advance organizers, questions, and graphics that activate students' prior knowledge and focus attention on key ideas and learning goals. **Class Prompts** provide another layer of interactivity and engagement with content and facilitate application of background knowledge to improve processing of new information.



Poll

Polling is a tool that educators can use effectively to gather many types of information from students. While asking students to raise hands or give a thumbs-up or thumbs-down are traditional means of classroom polling, increasingly instructional technologies, such as clickers or web-based response systems, offer various means of generating immediate student feedback, including polling, that additionally places students in a more active and self-aware role within their learning (Bernsten & Linares, 2016; Hunsu et al., 2016; Molin et al., 2020; Sun et al., 2014).

As Penuel and colleagues (2007) point out, though K–12 education reform efforts often seek increases to the amount of small-group activity and discussion students do, whole-class instruction still has a vital role within schools, including for introducing new content, providing demonstrations, or as efficient delivery of information—and technology-based response systems offer opportunities for teachers to improve indications of students' understanding and promote student engagement. Web-based polling methods (versus a clicker device) have the capacity for either synchronous or asynchronous use, meaning that an instructor can collect feedback on students' prior knowledge or understanding of course content before, during, or after a learning session, which offers multiple opportunities for adjusting instruction or providing intervention; teachers can also modify plans ahead of time or "just-in-time" as confusion or difficulties arise (Sun et al., 2014). This type of formative feedback that polling provides is a crucial component of impactful learning as, in addition to enabling teachers to monitor students' progress and take structured, strategic action promptly, feedback enabled by polling further allows students to evaluate their own understanding and performance, which fosters metacognition and self-regulated learning (Molin et al., 2020).

Building on their review of the research literature on digital polling practices within classrooms and student engagement and self-efficacy effects on learning outcomes, Sun and colleagues (2014) conducted a study comparing how different forms of student engagement (cognitive, behavioral, and emotional) as well as student self-efficacy. Confirming results of previous research, they found that the use of in-class polls yielded higher levels of engagement. More specifically, they also found indication that web-based polling, via pre- and post-class questions to gauge student understanding and that allows for adjustment to teaching ahead of time, "creates an environment that facilitates students' positive emotions and helps students concentrate on the classroom instruction" (p. 242).

As a form of instructional response system, polling can be used effectively for many different pedagogical purposes at various intervals throughout a learning sequence.

This includes having students access background knowledge to aid understanding, share personal opinions or experiences to stimulate discussion, or predict the outcome of a demonstration or experiment. Polling can also be used to elicit students' pre-conceptions or prior learning about content to be introduced, allowing teachers to pivot or adjust plans accordingly to better meet students' specific needs. Polling also has unique value and application as a tool for formative assessment. Teachers can assess individual or collective learning needs and gains by reviewing singular or aggregate student responses or the distribution of responses across a class and then clarify misconceptions, repeat or redirect instruction, or proceed to another topic with confidence (Hunsu et al., 2016; Molin et al., 2020; Penuel et al., 2007; Wit, 2003). The process of generating responses to frequent polling questions with minimal cues and the ongoing retrieval of information the process entails strengthens students' neural connections and develops long-term retention and transfer of what they are learning—while also making learning visible to teachers (Stover, Noel, McNutt, & Heilman, 2015).

Especially when combined with opportunities to discuss and extend ideas, polling can further increase student involvement and interaction with peers and teachers, two factors that yield positive learning outcomes (Molin et al., 2020; Smith et al., 2009). Immediacy of a teacher's attention and responsiveness plays a role in how students perceive whether their learning is their teacher's priority; related to a sense of urgency is the constructive use of instructional time, and both factors help teachers establish trust with their students (Fisher & Frey, 2021). Polling provides immediate responsiveness, which, in itself, is a form of feedback; feedback boosts learning achievement through increased motivation and self-efficacy as well as by helping students to develop error-detection skills (Fisher & Frey, 2007; Hattie & Timperley, 2007). Peer discussion followed by teacher feedback when polling devices are used for formative assessment is associated with improved metacognition (Molin et al., 2020). Students' individual polling responses within digital mechanisms can be shared with the rest of the class or posted anonymously—with anonymity affording the benefits of lessening the anxiety some students feel when participating in larger classroom discussion and then likely eliciting more honest responses from students. "Compared with feedback in low-tech settings, the teachers' feedback can be more authentic and is less threatening to students' self-esteem, because their performance is evaluated in a more private way" (Molin et al., 2020, p. 3). However, when poll responses are made public within the class, the effect of students seeing that they are not alone in their answers or their difficulties can be validating. So, both anonymous and shared poll responses have the potential to boost student confidence and attention levels (Bernsten & Linares, 2016; Hunsu et al., 2016; Molin et al., 2020).

HOW *CLASSCRAFT* DELIVERS

Polling is used at the beginning and throughout *Classcraft* direct instruction to serve multiple functions shown to be efficacious within learning environments. **Polling** is used as part of the **Learning Goals** activity, which launches lessons to aid students in accessing their prior knowledge and to engage their self-assessment. Polling responses within the **Learning Goals** activity can be viewed within the **Control Panel**, both for individual students and in aggregate for the whole class, allowing teachers to make diagnostic decisions about students' prerequisite knowledge and skill levels to adjust or proceed with instruction accordingly.



Throughout sessions, ongoing **Polling** provides similar, consistent, and ongoing means of monitoring student learning levels and collecting actionable formative assessment data. Beyond purposes of instructional assessment, decision-making, and feedback, teachers also have the option of sharing individual student responses anonymously or with attribution to the student respondent. Doing so can provide the class with model answers and examples of student thinking as well as fodder for rich, productive discussion and additional learning. This form of ongoing responsiveness can be validating for students and illuminating for both teachers and students. **Polls** also foster students' self-efficacy, engagement, motivation, and metacognition.

EVIDENCE-BASED BEST PRACTICES TO BENEFIT STUDENTS

"The major message is simple—what teachers *do* matters. However, this has become a cliché that masks the fact that the greatest source of variance in our system relates to teachers—they can vary in major ways. The codicil is that what "some" teachers do matters—especially those who teach in a most deliberate and visible manner. When these professionals see learning occurring or not occurring, they intervene in calculated and meaningful ways to alter the direction of learning to attain various shared, specific, and challenging goals. In particular, they provide students with multiple opportunities and alternatives for developing learning strategies based on the surface *and* deep levels of learning some content or domain matter, leading to students building conceptual understanding of this learning which the students and teachers then use in future learning. Learners can be so different, making it difficult for a teacher to achieve such teaching acts—students can be in different learning places at various times using a multiplicity of unique learning strategies, meeting different and appropriately challenging goals. Learning is a very personal journey for the teacher and the student, although there are remarkable commonalities in this journey for both" (Hattie, 2009, pp. 22–23).

Given the evidence attesting to the significant effect a teacher has on student learning as well as the evidence—scientific, experimental, and anecdotal research spanning decades in the literature—demonstrating what works in student learning, it is critical and also possible to supply teachers with materials, strategies, and support to deliver high-quality, efficacious instruction to all learners (Dean & Hubbell, 2012; Hamilton et al., 2016).

Classcraft offers an innovative, student-centered and teacher-supportive system for providing what research has long established is best practice. *Classcraft* was developed upon the principle that high-quality teaching and learning does not mean students and teachers doing more, but instead doing better—through structures and supports that work for all.

Visible Learning

Visible Learning is a set of principles and model for instruction developed by John Hattie. Hattie introduced this pedagogy in his 2009 book of the same name. *Visible Learning* detailed Hattie's findings from a synthesis of 50,000+ studies and 800+ meta-analyses conducted over previous decades to determine what works (and what doesn't) in education. The book garnered the attention of educators around the world. Among its notable features, *Visible Learning* offers "barometers" indicating which attributes within a learning environment contribute most (and least) toward meeting designated targeted effects, based on copious evidence from the research literature and effect size comparisons of various influences on instructional outcomes. The core tenet of Visible Learning is that learning must be seen—and never assumed; further, teachers must see learning through the eyes of their students. Hattie's follow-up, *Visible Learning for Teachers* (2012), provides practical guidance for how to implement his research-based recommendations within classrooms and urges teachers to become evaluators of their own learning—and model for students to do the same. In numerous subsequent works with collaborators as well as in 2023's *Visible Learning: The Sequel*, Hattie reports findings from the still ongoing research base and expands and refines the Visible Learning model in the service of continuously improving teaching and learning.

Visible Learning (2009, 2023) acknowledges that many factors across students, schools, homes, curricula, and teachers facilitate or impede learning for an individual student within a classroom. Contributions of the student include prior knowledge, expectations, openness, values, engagement, and capacity to build a sense of self from engagement in learning—all of which are informed by the student's disposition, innate or impacted. Enacted Visible Learning principles engage students in the same evaluative, curious, and responsive behaviors as teachers. Ultimately, however, as demonstrated by research findings, teachers have the most influence on learning (and also account for the greatest variance within and across schools); it is through teachers' mindsets—their attitudes and beliefs—and evidence-based practices that learning transforms, and specifically via how students themselves perceive the quality of teaching they receive.

From the outset, Visible Learning is promoted when learning goals are clear and explicit, as well as appropriately challenging. Teachers must be aware of when each student is meeting a goal or falling shy and then intervene in meaningful, impactful ways to get learning back on track to successful outcomes. Ongoing formative assessment to monitor progress is essential within the model, as is deliberate practice to attain mastery of goals (Hattie, 2009, 2012, 2013). Cooperative learning, including peer dialogue and peer assessment, is another important component of Visible Learning (Hattie, 2009; Hattie & Clarke, 2019), as well as a classroom factor that has been a focus for other researchers (e.g., Knight, 2013; Molin et al., 2020; O'Connor et al., 2015; Palinscar, 2013; Slavin, 1980; William, 2013). Hattie (2012) recommends that following introduction of new content, as surface learning is established, students engage with peers to construct deeper learning of concepts, solve problems of various types, practice, and provide feedback on each other's ideas, work, and efforts. The process of engaging with peers cooperatively and constructively with a strong focus on tasks develops students' metacognitive capacities, another essential aspect of Visible Learning that has been addressed

by Hattie and other researchers cited in this document. "During the multiple opportunities for learning and engagement, teachers need to provide feedback to refine the student's understanding of the content. Teachers need to plan for students' misconceptions to be identified, explored, and challenged to make transparent the links with their prior experiences and to provide multiple opportunities and scaffolding to make those links with new information: the essence of effective feedback" (Hattie & Clarke, 2019, p. 3).

Indeed, learning is made visible when feedback permeates all learning activity and teachers create a classroom culture of feedback (Hattie, 2012; Hattie & Clarke, 2019; Hattie & Timperley, 2007). The cycle of "feedback for learning: 1) sparks learning; 2) flourishes in the right environment; 3) clarifies for students where they are going; 4) informs students how they are doing; 5) highlights the next steps for improvement; 6) matches the needs of the learner; 7) promotes self-regulation; and 8) flows bidirectionally between learners and teachers" (Hattie & Clarke, 2019, p. 6). As described by Wiggins (2012), helpful feedback is goal-referenced, tangible, transparent, actionable, user-friendly (specific and personalized), timely, ongoing, and consistent. William (2013) points out that the only effective feedback is that which is actionable and acted upon; it must move students toward their specific learning goals. "Students need to know their learning target—the specific skill they're supposed to learn—or else 'feedback' is just someone telling them what to do" (Brookhart, 2008, p. 24). In his research on systematic instruction, Rosenshine (2007) found that for learning to be successful, feedback not only has to be provided throughout, but also the feedback has to be corrective: "[w]hen a student made an error the more effective teachers helped them by simplifying the question, providing hints, or reteaching the material. But the less effective teachers often supplied the correct answer and then moved on to the next student. Whether one uses hints or reteaching, or reteaching outside the lesson, the important point is that, unless the errors are corrected, misconceptions and problems will remain" (p. 9). Or as Wiggins (2012) notes, "[f]eedback is not advice, praise, or evaluation. Feedback is information about how we are doing in our efforts to reach a goal" (Wiggins, 2012, p. 10).

Hattie (2009) describes how Visible Learning folds its core elements at play with one another: "Visible teaching and learning occurs when learning is the explicit goal, when it is appropriately challenging, when the teacher and the student both (in their various ways) seek to ascertain whether and to what degree the challenging goal is attained, when there is deliberate practice aimed at attaining mastery of the goal, when there is feedback given and sought, and when there are active, passionate, and engaging people (teacher, student, peers, and so on) participating in the act of learning. It is teachers seeing learning through the eyes of students, and students seeing teaching as the key to their ongoing learning. The remarkable feature of the evidence is that the biggest effects on student learning occur when teachers become learners of their own teaching, and when students become their own teachers. When students become their own teachers, they exhibit the self-regulatory attributes that seem most desirable for learners (self-monitoring, self-evaluation, self-assessment, self-teaching). Thus, it is visible teaching and learning by teachers and students that makes the difference" (p. 22).

HOW *CLASSCRAFT* DELIVERS

The principles and practices of Hattie's **Visible Learning** model permeates all aspects of the *Classcraft* teaching and learning experience. *Classcraft* creates for students and teachers a goal-focused, highly interactive experience in which students are engaged agents of their own growth. Feedback in support of learning is consistent and constant—both provided and acted upon. Direct instruction via **Focus and Learn** launches and is interspersed with opportunities for students to respond to the content, share their thinking with teacher and peers, and monitor their own progress and levels of understanding via **Class Prompts, Polls, View and Respond**, and **Response Activities**. These embedded instructional components help students focus and actively engage in their learning as well as provide ongoing formative assessment for learning.

Additional end-of-lesson and actionable formative assessment happens via **Quick Checks**. Students also have ongoing opportunities to dialogue collaboratively with peers to build conceptual understanding, practice skills, and shift from surface- to deeper-level learning. Helping students develop into capable and self-efficacious learners who meet current **Learning Goals** as well as future aims as they progress through school, Marzano-aligned **Words to Learn** expands students' vocabulary knowledge and academic language.



High Levels of Student Engagement

Student engagement is considered “the holy grail of learning” among educational psychologists, researchers, and practitioners (Sinatra et al., 2015, p. 1). Per Hattie (2009), school reform efforts will have limited impact until we resolve the issue of student engagement. An extensive body of research spanning decades has explored and continually confirmed that, across all education levels, content areas, and socioeconomic factors, active engagement in classroom activities is essential for meaningful and successful learning as well as academic achievement (Eccles & Wigfield, 2002; Eccles, Wigfield, & Schiefele, 1998; Frommelt et al., 2021; Guthrie & Humenick, 2004; Jansen et al., 2022; Kamil et al., 2008; Lee & Shute, 2010; Schunk & Mullen, 2012; Wang & Degol, 2014; Wang et al., 2016). Learning engagement is a multifaceted construct that encompasses three dimensions: behavioral, emotional, and cognitive (Fredricks et al., 2004). Studies have shown that engagement, motivation, and interest comprise a complex, interrelated dynamic of processes that, separately and combined, have significant impacts on learning (Ainley, 2012; Bandura, 1986; Ryan & Deci, 2000; Eccles & Wigfield, 2002; Schunk et al., 2008; Skinner, Kindermann, Connell, & Wellborn, 2009). Learning itself is an active process of engagement, and, recursively, engagement leads to motivation, which leads to learning. When students are engaged, they can focus attention and efforts on completing tasks and mastering content, persisting through difficulties as needed (Wang & Degol, 2014). Actively participating in classroom activities is a precursor to meaningful learning; active involvement in the classroom yields positive learning outcomes and aids the acquisition and retention of knowledge across all educational levels (Chi & Wylie, 2014; Finn & Zimmer, 2012; Hunsu et al., 2016).

Engagement in school at all levels is critical to students’ educational attainment and academic motivation is a key predictor of school success; however, its widespread decline as students progress through the grade span is well documented (Duckworth et al., 2007; Farrington et al., 2012; Jansen et al., 2022; Kuo et al., 2021; Lazowski & Hulleman, 2016; Lepper, Corpus, & Iyengar, 2005; Parsons & Taylor, 2011; Wang & Eccles, 2013). This is an issue particularly at the secondary level, when drops in interest, motivation, and performance coincide with the formalization of attitudes toward academic endeavors and decisions related to college and career—and it contributes toward historically disadvantaged students’ exclusion from STEM learning paths and professions (Martin et al. 2015; Morgan et al., 2016; Quinn & Cooc, 2015; Singh et al., 2002; Sinatra et al., 2015; Tyson et al., 2007; Wang & Degol, 2014; Wang & Fredricks, 2014). In the area of literacy, numerous correlational, longitudinal, and experimental studies have linked motivation, engagement, and interest to reading achievement, which, due to the extent of text-based instruction students receive from Grade 3 on—when they transition from learning to read to reading to learn—this particular form of diminished engagement then has ripple effects on broader educational outcomes (Biancarosa & Snow, 2006; Guthrie et al., 2013; Morgan & Fuchs, 2007; Schiefele et al., 2012; Toste et al., 2020; Wigfield & Guthrie, 2013).

Fortunately, research has also demonstrated that engagement is malleable (Fredricks et al., 2004; Wang & Degol, 2014) and that student engagement, motivation, persistence, and commitment to learning are directly connected to teacher actions and the learning context (Frommelt et al., 2021; Skinner & Belmont, 1993; Wang & Eccles,

2013). Effective teachers know that students must be engaged by the content and activities presented to them to be motivated to persist in the learning process and, ultimately, to succeed in achieving learning targets (Eccles et al., 1998; Finn & Zimmer, 2012; Guthrie & Humenick, 2004; Guthrie et al., 2013; Hidi & Boscolo, 2006). Effective teachers know that students must be engaged and interested in learning to be motivated to persist, and they leverage such factors to improve outcomes for their students (Eccles et al., 1998; Guthrie & Humenick, 2004; Hidi & Boscolo, 2006; Marzano & Pickering, 2011).

Structured learning environments—in which tasks and experiences are organized predictably, expectations are made clear, teacher responses are consistent, teacher feedback is constructive, and teacher guidance is strong—foster within students a sense of competence, as they know how to be successful in these contexts; in turn, students in such classrooms have been found to be more emotionally and behaviorally engaged in their learning (Jang, Reeve, & Deci, 2010; Skinner & Belmont, 1993; Wang & Eccles, 2013). Studies have found that students are more engaged when receiving instruction or supervision from a teacher than when working independently (Rosenshine, 2015). “Substantive interaction is related to higher engagement. Substantive interaction (i.e., questions, answers, feedback, and explanations) during group work was correlated both with higher overall engagement and higher engagement during seatwork, suggesting that the practice and corrections during groupwork led to more engagement during seatwork” (p. 42). Further, to boost student engagement in learning, it is critical that instruction allows students to focus on explicit and realistic goals for learning, evaluate their own progress, increase their self-efficacy, and have frequent opportunities for collaborative work with peers and to receive feedback (Hattie, 2009; Hattie & Clarke, 2019; Guthrie et al., 2013; Jansen et al., 2022; Kamil et al., 2008; Schunk & Zimmerman, 2007). “Clear learning intentions, transparent success criteria, and making learning visible to the student are the key elements of engaging students” (Hattie, 2009, p. 49).

An established body of evidence supports the idea that effective technology use in the classroom through a blended learning format has multiple benefits, including increased student engagement and motivation (Anthony, 2019; Halverson & Graham, 2019; Moore, Robinson, Sheffield, & Phillips, 2017; O’Byrne & Pytash, 2015; Patrick & Sturgis, 2015; U.S. Department of Education [USDOE], 2017). Research also indicates that instruction improves when technology-based multimedia is incorporated; the effect is enhanced student engagement and motivation, which are critical factors that facilitate learning (Chen et al., 2018; Johnson et al., 2023; Mayer, 2013, 2017). In their synthesis of research on improving student engagement, Parsons and Taylor (2011) found multimedia and technology use to be a key shared element in engaging classroom environments. Effective technology use in the classroom has an additionally motivating effect by allowing students to take greater charge of their own learning and that digital learning itself is enhanced when students are given more agency and autonomy over their interaction with content (Horn & Staker, 2011; Patrick & Powell, 2009; USDOE, 2010, 2017).

HOW *CLASSCRAFT* DELIVERS

Every facet of *Classcraft* instruction seeks to boost student engagement while providing teachers with the tools to manage the flow of a dynamic learning environment. *Classcraft* provides an interactive, immersive experience for live in-class and whole-class instruction supported with proven, high-impact instructional strategies and predictable, consistent opportunities for multidirectional responsiveness that nourishes feedback cycles for learning.



Class Prompts, Polls, View and Respond, and **Response Activities** provide continual on-ramps for high engagement throughout the synchronous **Focus and Learn** sessions while **Turn & Talk** provides structured peer interactions to make learning dynamic, constructive, and collaborative. The interactivity, agency, and multimedia features of the digital platform from which *Classcraft* delivers learning add more dimensionality to student engagement with content and the learning environment.

Increased Time on Task

In both research and practice, the variable of the amount of time students spend actively and willingly engaged in learning has long been considered an important factor in academic achievement (Bloom, 1976; Carroll, 1963, 1989; Fisher et al., 2014; Gettinger, 1984; Godwin et al., 2016; Karweit & Slavin, 1980; Kovanović et al., 2015; Lee, 2018; Rosenshine, 2015). Loss of instructional time due to off-task behavior is a well-documented issue and an impediment to learning (Godwin et al., 2013). Low rates of on-task behavior (and related, more severe disruptive behaviors) associated with students who have emotional and behavioral disorders (EBD) present additional negative outcomes, particularly when compounded by the greater likelihood of students with EBD being removed from the learning environment (Blood, Johnson, Ridenour, Simmons, & Crouch, 2011; Sheaffer, Majeika, Gilmour, & Wehby, 2021). Time on task is associated with student learning, particularly in blended learning environments (Anthony, 2019).

It is commonly understood that students should receive the time each needs to master content (Bloom, 1971, 1976), but the amount of time must take into account each student's unique aptitudinal and affective needs (Carroll, 1963, 1989). Ultimately, however, studies have shown that it is the quality of educational time spent—more so than simply the quantity of time—that impacts instructional outcomes and that other factors such as a given student's perseverance and engagement can mitigate or exacerbate the effects of lost instructional time (Archer & Hughes, 2011; Carroll, 1963, 1989; Godwin et al., 2013; Kovanović et al., 2015; Rosenshine, 2015). Research indicates that teachers with a strong academic focus in their classrooms—in terms of both time and engagement—have students who demonstrate higher achievement gains (Archer & Hughes, 2011; Fisher et al., 2014; Rosenshine, 2015). So, while planning that maximizes instructional time is important, at least equally so is good instructional design that supports students in optimizing opportunities to learn (Godwin et al., 2013). "The model of school learning assumes that students differ in the amount of learning time they need. If these differences are to be adequately taken account of, considerable skill in classroom management is required of teachers" (Carroll, 1989, p. 29).

Explicit instruction that employs evidence-based elements can effectively increase academic learning time (Archer & Hughes, 2011). Godwin and colleagues (2013, 2016) found that instructional format can support or deter on-task behavior and that whole-class formats are associated with the highest levels of off-task behavior. An emphasis on substantive interactions during groupwork can foster a strong academic focus that optimizes time spent learning (Rosenshine, 2015).

Godwin and colleagues (2013, 2016) have also found that on-task behavior declines as duration of instruction increases. Based on their empirical research and reviews of the

literature, Godwin and colleagues (2013) speculate that to increase students' on-task behavior as well as focused attention, teachers should break learning tasks into smaller blocks rather than ones of longer duration. This recommendation is supported by other research, including a 2016 study by Godwin and colleagues as well as Fisher and Frey (2021). "The teachers with the highest engaged minutes were able to reduce student off-task time (daydreaming, socializing) from the average of 8 minutes per hour to 4 minutes per hour" (Rosenshine, 2015, p. 41).

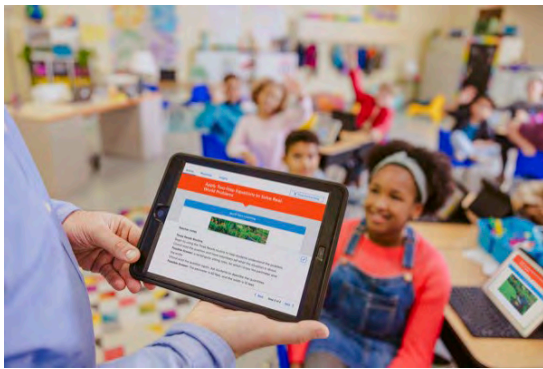
Drawing on Bloom's Mastery Learning Model (1971, 1976), which posits the basic principle that students can succeed in school if given ample time to learn what is taught and if provided quality instruction, Guskey (2010) offers guidelines that also align with what other research (e.g., Guskey, 2009; Marzano, 2009a; Rosenshine, 2007) has deemed effective practice; it also fits with explicit, focused instruction models advanced by Archer & Hughes (2011) and Fisher & Frey (2021). Guskey's Bloom-based mastery strategies call for teachers to prioritize and organize the most critical concepts and skills students should learn into short units (1–2 weeks long). Before each unit, teachers administer diagnostic assessment of prerequisite skills and provide instruction to remedy any deficiencies identified. After whole-class instruction for each unit, the teacher conducts formative assessment to determine which is ready to move on to enrichment or extension activities or instead requires corrective activity. For those receiving intervention, instruction would be direct, focused, and sustained for the length of time each student needs to master the targeted learning.

"[I]t has been shown that student inattentiveness (i.e., engagement in off-task behavior during instructional time) is the biggest factor that accounts for loss of instructional time" (Godwin et al., 2013, p. 2428). To minimize off-task time in classrooms, affective factors that boost students' attention and motivation as well as self-regulation capacity should be addressed (Godwin et al., 2013; Fisher et al., 2014; Lee, 2018). "Uninterrupted time-on-task is closely related to Self-Regulated Learning (SRL) because it involves allocating time and effort to improve learning performance. Students with higher SRL ability would have longer time-on-task that is uninterrupted by off-task activities than students who do not possess enough SRL ability. Previous studies found that SRL is important for students to be successful" (Lee, 2018, p. 178). Teacher behaviors also play an important role. Buric and Moe (2020) have linked teacher enthusiasm to increased on-task behavior for students. Additionally, establishing routines, reducing transitions between activities, and having all materials prepared and organized in advance can significantly increase academic learning time (Archer & Hughes, 2011).

HOW *CLASSCRAFT* DELIVERS

Classcraft takes a multipronged approach toward promoting high levels of time on task that optimize learning outcomes for all students across formats: direct instruction, independent response, and collaborative peer work. It provides a curated and intentionally sequenced collection of only the most essential resources and educator supports needed to deliver quality whole-class instruction, streamlining teaching and learning and maximizing efficiency. Having *Classcraft* preloaded and seamlessly integrated with HMH content minimizes not only teacher preparation outside of class but also the amount of transition time between learning activities within class, resulting in less wasted instructional time and efforts.

Further, the predictable, ready-to-go instructional routines allow educators to simplify classroom management and maintain engagement and allow students to sustain focus and attention, as well as take ownership of their learning. Robust tools for interactivity and responsiveness further keep students on task for longer stretches, fostering deeper understanding and progress. Additional Classroom Management Tools to keep students on task include the ability to mute student screens along with a built-in timer, stopwatch, grouping feature, volume meter, and “Eyes on Me.”



Ongoing Formative Assessment

"[T]he idea that assessment can help learning is not new, but what is new is a growing body of evidence that suggests that attention to what is sometimes called formative assessment, or assessment for learning, is one of the most powerful ways of improving student achievement" (Wiliam, 2013, p. 15). The phrase "formative assessment" encompasses the wide variety of activities—formal (such as quizzes or homework assignments) and informal (such as discussion and observation)—that teachers employ throughout the learning process to gather data about student understanding and progress that then drives instructional decisions; formative assessment moves testing from the end into the middle of instruction to guide teaching and learning as it occurs (Black et al., 2004; Fisher & Frey, 2007; Greenberg & Walsh, 2012; Hattie & Clarke, 2019; Hattie & Timperley, 2007; Heritage, 2013; Jimenez & Modaffari, 2021; Mathison & Fragnoli, 2006; Shepard, 2000; Wiliam, 2013). Formative assessments—typically informal, low-stakes and classroom-based—are used to monitor student learning and provide ongoing feedback at the individual student level, while summative assessments, which may include interim or benchmark tests, are formal and typically administered at the end of a major unit of instruction or a school year; the results of formative assessments are used to determine grades, placements, or ranking for a student, class, school, or district (Fisher & Frey, 2007; Klingner et al., 2015). In a comprehensive, balanced assessment system, teachers use tests of both types as part of ongoing classroom assessment (formative) plus interim or benchmark assessments and year-end tests (summative) (Black et al., 2004; Jimenez & Modaffari, 2021; Schneider, Egan, & Julian, 2013). Assessment is formative when outcomes—information gathered from the assessment practice or instrument—is fed back within the system, interpreted, and used to improve the type and quality of instruction, on specific topics or generally, that an individual student receives (Wiliam & Thompson, 2017). Curriculum designed and developed for 21st-century learning should use formative assessment to "(a) make learning goals clear to students; (b) continuously monitor, provide feedback, and respond to students' learning progress; and (c) involve students in self- and peer assessment" (NRC, 2012, p. 182). Critical components of effective formative classroom assessment include prompt feedback—both teacher to student and peer to peer—as well as the direct, active involvement of students themselves throughout the assessment process, which includes setting goals for learning and outcomes (Frey, Fisher, & Hattie, 2018; Hattie & Timperley, 2007; Heritage, 2013; NRC, 2012; Wiliam, 2013). The timely feedback students receive from regular assessment helps them evaluate their strengths and weaknesses and gauge their progress toward meeting clearly specified learning goals and helps teachers produce significant—and often substantial—gains in student learning and performance (Black & Wiliam 1998a, 1998b; Brookhart, 2008; Cotton, 1995; Hattie, 2009, 2012; Hattie & Clarke, 2019; Lee et al., 2020; Wiggins,

2012). Per Wiliam (2011), formative assessment serves three distinct learning processes: making goals, making progress toward the goals, and making better progress. Eliciting evidence from students and providing feedback to students is integral to effective formative assessment. However, "effective feedback requires a plan of action about what to do with the evidence before it is collected" (Wiliam, 2013, p. 17), and such an action plan should be part of a classroom's systematic formative assessment.

A wealth of studies, including meta-analytic examinations, indicate that, across grade levels and content areas, regular use of assessment to monitor student progress can mitigate and prevent learning difficulties and improve student learning outcomes (Black & Wiliam, 1998a, 1998b; Clarke & Shinn, 2004; Graham et al., 2015; Kingston & Nash, 2011; Klute et al., 2017; Lee et al., 2020; Stecker et al., 2005; Wiliam, 2011). "[P]roviding teachers and students with specific information on how each student is performing seems to enhance achievement consistently. . . . The effect of such practice is substantial" (Baker et al., 2002, p. 67). Use of ongoing formative assessments benefits all students but is especially beneficial for lower-performing and at-risk students, including those historically underserved due to ethnicity, poverty, and disabilities and those enrolled in special education programs; monitoring student progress and directly involving students in the classroom assessment process shrinks achievement gaps and improves overall achievement (Black & Wiliam, 1998a, 1998b; Jimenez & Modaffari, 2021; Xenofontas, 2019). Frequent classroom-based assessment to guide learning is a common practice within countries with high-performing education systems. Formative assessment is an essential component within data-driven education systems. Data-driven instruction comprises a more organized and collaborative commitment to use data from a variety of assessments and other sources to guide instructional decision-making (Darling-Hammond, 2010; Greenberg & Walsh, 2012; Jimenez & Modaffari, 2021; Wiliam & Thompson, 2017).

It must also be noted that good assessment practice with greater impact is not something done to students so much as it is demonstrated by students—through tasks that generate useful feedback, promote strategic engagement and awareness, and foster self-assessment, and which students themselves recognize as valuable and meaningful (Brookhart & Durkin 2003; Conley & Darling-Hammond, 2013; Frey et al., 2018; Mathison & Fragnoli, 2006). Studies suggest that assessment itself enhances learning by strengthening students' recall and memory representation (Bond & Ellis, 2013; Greenberg & Walsh, 2012). "Formative and summative assessments are done largely by teachers. But good assessment also creates a role for students to engage in self-assessment, which has the broader objective of developing self-motivated learners with a repertoire of meta-cognitive strategies that encourage self-reflection and self-feedback" (Mathison & Fragnoli, 2006, p. 202).

HOW CLASSCRAFT DELIVERS

Varied and systematic formative assessment is built into every *Classcraft* session at ongoing intervals throughout the learning path to monitor progress and growth at every step. *Classcraft's* data-first approach gives teachers the actionable insights they need to adapt instruction in real time, saving them the burden of collecting and evaluating data from different platforms. *Classcraft* also provides planning tools and recommendations for additional resources and session modification. *Classcraft* not only offers educators efficiency and convenience in assessment data collection; it also saves time and effort outside of school in lesson planning and adapting to best meet whole-class or individual student needs.

Classcraft also provides comprehensive analytics on student readiness and performance, offering diagnostic and summative information. Leaders have access to data aggregated at a district level, helping them to make efficient, informed decisions about resource allocation, teacher training, and educational strategies.



ENHANCED CLASSROOM MANAGEMENT VIA EVIDENCE-BASED STRATEGIES AND TOOLS

In traditional learning settings, educators are responsible for sourcing and presenting materials, planning and delivering instructional content and formats, classroom management, evaluation of student work, and meeting the needs of individual students. It's an increasingly overwhelming prospect for new teachers as well as veterans. The technology exists to significantly lessen teacher burdens and improve learning for students—and it has the potential to enhance and evolve educational practices (Hamilton, 2018). Indeed, research by Cho, Mansfield, and Claughton (2020) provides hope that there is possibility for a paradigmatic shift away from seeing technology as a tool for learning classroom management skills toward seeing technology as integrated within the flow of practice. This promises both cognitive and affective benefits all around; teachers who feel more enthusiastic and motivated in their work have been found to impact students over the course of the school year with a greater perceived support for their needs for autonomy, competence, and social relatedness, as well as higher levels of support for subject matter relevance (Frommelt et al., 2021).

Classcraft offers a rich teaching and learning experience with high-impact tools to support and enhance learning for students and alleviate planning and management tasks for teachers in a single, fully integrated solution.

Point-of-Use Tools and Resources to Facilitate Planning and Instruction

"With the ubiquity of technology in today's interconnected world, it is imperative for teachers to understand how to use technology to promote student learning and achievement (Lei et al., 2008). Specifically, teachers must first understand the relationships between teaching, technology, and learning to promote student growth and achievement (Koehler et al., 2014). If they understand these relationships, they will be better equipped to access and use technology to support and enhance student learning" (Hamilton et al., 2016, p. 439). Advances in educational technology provide tremendous opportunities to expand the possibility of growth for all students in the form of enhanced, efficacious, and engaging content; agency regarding pace, environment, interest, and other key components of their own learning; and more frequent and timely feedback—while affording historically disadvantaged students additional benefits via greater equity of access to high-quality education (Johnson et al., 2023; O'Byrne & Pytash, 2015; Patrick & Powell, 2009; USDOE, 2017).

Digital learning tools can also provide more flexibility and support for individual students by modifying content and complexity; additionally, advances in software technology have increased adaptive learning and improved feedback (Anthony, 2019; O'Byrne & Pytash, 2015). Further, current digital learning platforms afford opportunities for timely progress monitoring and assessment; teachers can use such technologies to meet instructional needs of individual students and collect assessment data from multiple sources for progress monitoring, as well as provide prompt, direct feedback to guide specific learning (Anthony, 2019; Hamilton, 2018; Kerton & Cervato, 2014; Pulham & Graham, 2018; Turley & Graham, 2019). When instructional goals and criteria for success are clear, students can effectively leverage digital tools as resources for demonstrating evidence of their learning and reflecting on it (Hamilton, 2018). Multimedia learning platforms can further reduce cognitive load, freeing up students' capacity to acquire new information and build frameworks for conceptual understanding (Sweller et al., 2019; Mayer, 2020). Computer-based tools allow for online interactions that can create and strengthen a community of learners that offers improved peer-to-peer and teacher-to-student feedback and fosters student collaboration and communications skills while simultaneously increasing student agency and self-regulation (Agosto et al., 2013; Dikkers, 2018; Hamilton, 2018; Hattie & Clarke, 2019). "When students use tech tools, they talk—and if their work is engaging, their talk is productive. Students want to talk to you and their peers about what they are doing, the problems they encounter, the discoveries they make. In fact, a student's discovery of a tool, a solution, or a factoid can become useful for the whole class in only minutes. Rather than squelching conversations, teachers should design students' tech tasks to encourage

discussions about what they are learning. This approach allows students to practice the life skill of teamwork, while making deeper connections with each other than a teacher alone could instigate" (Hamilton, 2018, p. 4).

Yet research also suggests that the best practices in digital learning environments are largely the same as those in conventional classrooms (Anthony, 2019; Borup & Archambault, 2018; Hattie & Clarke, 2019). Teaching still matters more than technology when it comes to quality instruction; ultimately, teachers should use digital platforms and tools purposefully to optimize learning experiences and outcomes for all students (Fisher et al., 2020; Hamilton, 2018; Horn & Staker, 2011), and one of the most effective enhancements that technology offers is making classrooms more personalized, student-centered, active, and engaging (Moore et al., 2017; O'Byrne & Pytash, 2015; USDOE, 2017). "Technology integration is not an isolated goal to be achieved separately from pedagogical goals, but simply the means by which students engage in relevant and meaningful work. Promoting best practice and effective pedagogy is key to achieving effective technology integration. As such, we need to promote and support educational ideas, not technological ones" (Ertmer et al., 2015, p. 414).

For teachers, digital platforms offer additional benefits of increased efficiency and consistency in how instruction is delivered (Hamilton, 2018). They also provide automation, which can significantly reduce educator burdens by eliminating manual tasks (Moore et al., 2017). Teachers can constructively use technology to record and track student progress and locate and assign materials (Wolfe & Poon, 2015). Such automations free up time and resources so that educators can "take advantage of the things that leading brick-and-mortar schools do well, such as creating a strong, supportive culture that promotes rigor and high expectations for all students, as well as providing healthy, supportive relationships and mentorship" (Horn & Staker, 2011, p. 7). Indeed, structuring digital technology ecosystems to enable a redistribution of learning tasks in which students assume more autonomy, agency, choice, and interest allows a shift from teacher-directed to student-centered practices; in this shift within a digital learning community, a teacher can become more of a facilitator, curator, and coach for students rather than solely responsible for every instructional activity that takes place (Kallio & Halverson, 2020; Zhao & Watterson, 2021). "[E]fficiency is, and should be, one outcome of increasing technology use in classrooms. The opportunity to use digital tools to efficiently manage administrative tasks frees teachers to devote more time to working directly with students" (Hamilton, 2018, p. 250).

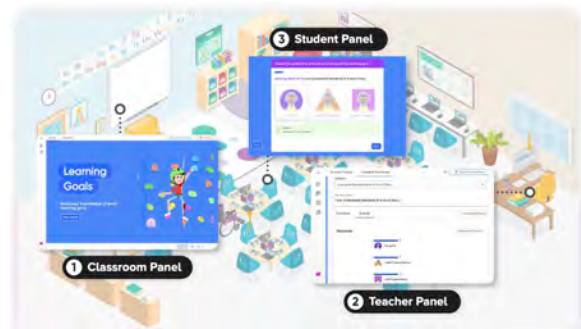
HOW CLASSCRAFT DELIVERS

Classcraft provides a suite of tools designed to help educators maximize efficacy, simplify classroom management, and optimize learner engagement and for students to encourage interactivity, agency, and ownership of learning. Key features and differentiators among *Classcraft* tools include:

- **Integrated Curriculum Planning:** *Classcraft* delivers daily standards-aligned lessons conveniently available from one location, the HMH *Ed* learning platform. These ready-to-use lessons cover core math and ELA content for the entire year so that teachers spend less time planning and searching through curriculum resources for relevant content and then uploading the content to PowerPoint. Teachers can easily adjust classroom instruction, adding and reorganizing parts of the lesson, based on real-time student responses.
- **Classroom Planning and Management:** *Classcraft* aligns instructional components to foster effective whole-classroom learning. The solution helps teachers manage the flow of a lesson. Embedded tools to support classroom management include a timer, a countdown, a volume meter, a student picker, Eyes-on-Me, the ability to mute student screens, and grouping.
- **Interactive Instructional Tools:** Robust tools designed to make learning interactive and immersive enable teachers to put into practice the most efficacious instructional strategies. Teachers can engage students in a range of learning activities, from collaborative projects to individual tasks.
- **Real-Time Insights Dashboard:** *Classcraft* aggregates and displays real-time insights on student performance and readiness, allowing teachers to quickly adapt instruction to the needs of individual students or entire classrooms.
- **Support for All Educators:** *Classcraft* is designed to support teachers at all experience levels. The ready-made lessons take the stress out of planning, and real-time assessment insights help teachers more quickly identify student needs to adapt instruction accordingly.

Classcraft allows educators to implement a cohesive classroom experience with a three-screen view.

1. **Classroom Panel View:** The Classroom Panel is what is presented to the entire class during direct, whole-class instruction. In most classrooms, this is what would be projected or shown on the screen in front of the room. Both teachers and students can interact with the Classroom Panel when interacting with the material during the session.
2. **Student Panel View:** When students are on their individual devices, they will see the student view of the material without the teacher controls; it looks very much like the Classroom Panel. This is called the Student Panel because they are actively participating in the session taking place.
3. **Teacher Panel View:** The Teacher Panel is where teachers have full control over *Classcraft* and the delivery of instruction to students. With this panel, teachers can use *Classcraft's* tools, review individual student responses, and preview portions of the lesson while the students are working on a specific portion of the session on the Classroom Panel and Student Panel.



Increased Teacher Agency and Self-Efficacy

Teaching has long been regarded as a demanding profession, and teachers' corresponding workplace stress is a serious issue with widespread implications. In recent years, teachers in the U.S. have reported worse well-being than other working adults, with the poorest levels of well-being among educators of color and those who are mid-career and female (Doan et al., 2023). Teacher burnout from the toll of professional demands on physical and mental health, documented for decades, has been exacerbated by COVID-19 (Madigan et al., 2023). More than 4 in 10 teachers reported in a Gallup poll that they are "always" or "very often" burned out at work, significantly exceeding average burnout rates among all other full-time U.S. workers, including those in healthcare (Casterphen, 2022). During the 2022–2023 school year, nearly a quarter of teachers indicated they were likely to not return to their position in the fall (Doan et al., 2023). Estimates for new teachers suggest that roughly half quit the profession within five years (Madigan & Kim, 2021). Teacher turnover is linked to adverse outcomes for students, and the process of replacing teachers is disruptive and costly to school districts. On a national level, as student enrollments are growing, schools face increasing teacher shortages, with the worst of this trend disproportionately affecting schools serving low-income populations. However, there is a silver lining: the relationship between teacher well-being and working conditions is bidirectional—improving working conditions for teachers can increase their job satisfaction and performance and, for schools, bolster teacher retention rates (Doan et al., 2023; Sutcher et al., 2016).

As is the case for any occupation, teacher job satisfaction is more likely to rise when demands lessen and resources grow (Madigan & Kim, 2021). Additionally, efforts to address teacher retention should not neglect another key factor: teacher enthusiasm. Teacher enthusiasm, which has received due attention in the research literature, encompasses a set of attitudes and behaviors that reflect the degree of enjoyment or excitement teachers derive from professional activities. Teacher enthusiasm is a feature of high-quality teaching that confers benefits to both teachers and students. Teacher enthusiasm has been linked to higher levels of well-being for teachers as well as multiple cognitive and affective impacts on students, including increased motivation, on-task behavior, interest, enjoyment, subject matter relevance, and recall (Burić & Moè, 2020; Frommelt et al., 2021; Keller et al., 2013; Kunter & Holzberger, 2014; Patrick et al., 2000). How do teachers become more enthusiastic? According to findings from Burić and Moè (2020), teacher enthusiasm results from an interplay of positive emotions along with greater self-efficacy and job satisfaction. Research has repeatedly demonstrated the relationship between teacher autonomy, self-efficacy, and job satisfaction (Bandura, 1997; Klassen & Chiu, 2010; Skaalvik & Skaalvik, 2009; Wang et al., 2015; Worth & Van den Brande, 2020). Workload is often cited as a primary reason that people quit teaching, and, for teachers, perceived autonomy is a significant contributor to reported workload manageability: "This suggests that increased autonomy may enable teachers to adapt what tasks they do

and how they do them to manage their overall workload in a more acceptable way" (Worth & Van den Brande, 2020, p. 15). Activities in the dimensions of instructional strategies, classroom management, and student engagement that allow teachers to feel valued, confident, and successful promote their sense of self-efficacy: "Teachers with high efficacy are confident in their capability to help students achieve academic success, which is a primary driver of teacher satisfaction" (Edinger & Edinger, 2018, p. 12).

Increased and facilitated integration of educational technologies into the classroom has the potential to provide resolution and relief for the quality of teachers' work life (Cho et al., 2020; Hamilton, 2018), specifically within a blended learning environment, which affords numerous benefits to students as well (Moore et al., 2017). Research has indicated that, for teachers, affective factors, including self-efficacy, professional development, pedagogical beliefs, and sense of agency, strongly contribute to whether and how they incorporate technology within their practices. However, related findings further suggest that, ultimately, if teachers perceive that technology facilitates instructional goals, supports learning needs, and directly benefits students, they will value and more effectively utilize such digital tools (Holden & Rada, 2011; Perrotta, 2017).

Blended learning has the capacity to support teachers in being flexible and responsive to students, integrating multiple data sources into their constant stream of formative assessment, and incorporating more rigorous and personalized learning activities (Anthony, 2019). Current, comprehensive digital learning platforms can support teachers in significantly improving differentiated instruction; differentiation itself is an essential aspect of effective instruction, but technology can optimize it by providing real-time assessment and prompt, direct feedback to students (Curtis & Werth, 2015; Johnson et al., 2023; Turley & Graham, 2019).

Teacher-to-teacher collaboration and communities have been shown to positively influence instructional practice, job satisfaction, and student achievement (Banerjee et al., 2017; Lomos et al., 2011; Vescio et al., 2008; Wiliam & Thompson, 2017). An extension of the technology-based teacher professional development that has emerged over the past few decades, large-scale online teacher communities are growing in popularity and impact (Greenhow & Askari, 2017; Macià & García, 2016; Ravenscroft et al., 2012). A review of 52 empirical studies conducted over the past two decades (Lantz-Andersson et al., 2018) concluded that both formally organized and informally developed online teacher communities can be a valuable means of developing supportive and collegial professional practices. Teacher networks provide "knowledge [that] is situated in the day-to-day lived experiences of teachers and best understood through critical reflection with others who share the same experience" (Vescio et al., 2008, p. 81).

HOW CLASSCRAFT DELIVERS

Classcraft provides ready-made, easily accessible classroom lessons that are aligned to standards, have proven efficacy, and are developed to engage and impact every student. *Classcraft* allows educators to significantly reduce time and stress that accompanies instructional planning and instead focus on personalizing, differentiating instruction, and improving engagement—with the confidence that comes with real-time, actionable assessment insights to meet the needs of each student and standards-based curriculum implemented with fidelity.

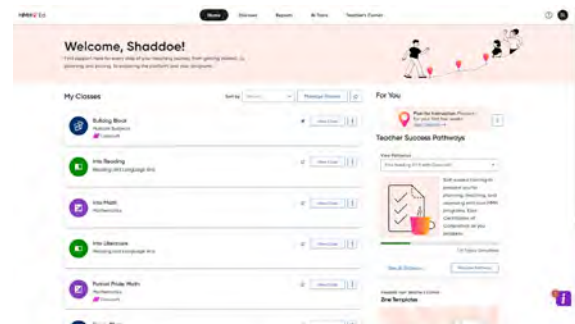
Classcraft frees up teachers to perfect their craft, optimizing learning and outcomes for all students as well as increasing their own agency and self-efficacy. *Classcraft* augments and enhances the instructional environment with cutting-edge features that support each educator’s unique teaching style and level of experience as well as facilitate instructional adaptations to best serve each learner.

Everything educators need to deliver efficacious, high-engagement core instruction and track student progress is readily available on the user-friendly HMH learning platform, *Ed*.



Classcraft also provides educators with access to ongoing professional development to help them grow their teaching methodologies and become more effective and efficient in delivering top-notch instruction:

- **Personalized Teacher Success Pathway on Ed.** Teachers’ recommended learning pathway is personalized to ensure they have exactly what’s needed for the first 30 days of implementation. Teachers can choose from live or on-demand sessions designed to fit busy calendars and experience levels.
- **Teacher’s Corner® on Ed.** Available throughout the year, HMH’s best-in-class professional learning offers live online, in-person, and asynchronous learning for unlimited access, unlimited choice, and unlimited benefits. Educators can search from a database of topics that is updated regularly.



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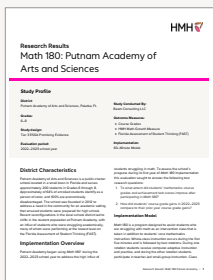
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