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A Teacher's Time: The Key to Scaling Math Success

Using Derivita to reduce teacher workload by 28% and focus time where it has the greatest impact on student outcomes.

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Executive Summary

This white paper explores how technology-assisted automation and real-time analytics can reduce teacher workload by up to 28%, allowing them to focus on high-impact instructional strategies that improve student outcomes at scale.

Key challenges in math education include:

- Over-reliance on multiple-choice assessments
- Delayed feedback loops
- Reactive instead of proactive intervention
- Unsustainable teacher workloads

To address these issues, a comprehensive, scalable solution is needed—one that seamlessly integrates automated grading, real-time analytics, and dynamic practice.

Derivita: A Solution Designed for These Challenges

Derivita was purpose-built to empower math educators by combining intelligent automation with real-time instructional insights:

- Automated grading
- Real-Time analytics
- Dynamic practice
- Seamless LMS integration

By leveraging these capabilities, Derivita enables schools to transform math instruction, making personalized learning at scale a reality. Educators gain the tools to focus on what matters most—teaching—while students receive the timely, targeted support they need to succeed.

Introduction: A Teacher's Time = The Key to Scaling Math Success

Education leaders are facing an unprecedented challenge: how to maximize instructional effectiveness in math education while balancing finite teacher resources. The demand for personalized learning, timely interventions, and high-quality assessment has never been greater, yet traditional models leave math educators overwhelmed by grading, data interpretation, and intervention planning. This white paper explores how automated grading, real-time analytics, and dynamic practice tools can alleviate these challenges, empowering educators to make data-driven decisions that improve math outcomes at scale.

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The Challenge: Instructional Time is Finite, But Expectations Are Growing

In modern K-12 math education, instructional time is one of the most valuable yet constrained resources. Math teachers must juggle lesson planning, instruction, grading, and student interventions—all within limited timeframes. This constraint often results in:

- **Overreliance on multiple-choice assessments** – Not because they are the best measure of math proficiency, but because they are easier to grade.

- **Delayed feedback loops** – Students receive assessments long after they have moved on, reducing the effectiveness of remediation in foundational math concepts.

- **Reactive rather than proactive intervention** – Without real-time data, instructional adjustments happen too late to be maximally effective.

- **Unsustainable teacher workloads** – A reliance on manual grading consumes hours of prep time and evening work, limiting time for personalized student support.

The need for a more efficient, data-driven approach in math education has never been more clear. Traditional data-driven models often rely on delayed assessments and aggregate reports, making it difficult for educators to adjust instruction in the moment. Without real-time insights, gaps in understanding can persist undetected, leading to ineffective interventions. A modern approach must provide immediate, actionable data that allows educators to make informed decisions at the pace of student learning.

The Solution: Automated Grading, Real-Time Analytics, and Dynamic Practice

A scalable, research-backed solution to these challenges lies in automated grading, real-time analytics, and dynamic practice technologies—specifically tailored to enhance math instruction. These innovations work together to optimize educator time and elevate student learning outcomes in mathematics.

Automated Grading Reduces Administrative Load

Automated grading technology eliminates one of the most time-consuming burdens for math teachers. Grading open-ended math responses can take up to 3-5 minutes per question, quickly adding up across multiple assignments. By leveraging intelligent assessment tools that grade complex, open-ended responses as well as traditional formats, educators can:

- Reallocate time from grading to instructional planning and student intervention.
- Expand the use of high-rigor, problem-solving question types without the grading burden that typically accompanies them.
- Ensure grading consistency and equity across student responses, particularly in multi-step math problems.

The impact is substantial: Automating grading—especially for open-ended math questions—can save teachers up to 405 hours per school year, representing 28.1% of their total work hours. This time savings allows educators to focus on instructional strategies, student support, and targeted intervention rather than spending excessive hours on grading.

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This aligns with Bloom's Two Sigma Problem, which demonstrated that students receiving one-on-one tutoring perform two standard deviations better than those in conventional classrooms. By automating grading and freeing teachers to provide more targeted support, math educators can replicate some of the benefits of personalized tutoring at scale. For example, in a typical classroom, a teacher grading assignments manually might not recognize a student's repeated struggle with factoring quadratic equations until a formal test is graded. With automated grading and real-time analytics, the teacher can immediately see which students are making consistent errors, allowing for a quick, targeted small-group intervention before misconceptions solidify.

This time savings allows educators to focus on high-impact activities such as differentiated instruction, small-group interventions, and deeper conceptual discussions—enhancing both teaching efficiency and student engagement.

Real-Time Analytics: Precision in Math Instructional Decision-Making

Every student interaction with a math assessment provides immediate, actionable insights, including distinctions between procedural errors and conceptual misunderstandings. This level of granularity enables educators to differentiate whether a student is struggling due to calculation mistakes, misinterpretation of

problem structure, or gaps in foundational understanding, allowing for precise intervention strategies. With real-time analytics, educators can:

- Pinpoint gaps in math mastery at the individual, small-group, or class-wide level.
- Course-correct in real time, preventing misunderstandings in foundational math concepts from compounding.
- Optimize intervention efforts, ensuring teacher time is spent where it has the greatest impact.

Dynamic Practice: Personalized, Scalable Math Learning

Traditional math assessments measure student performance after instruction, but dynamic practice tools facilitate real-time learning through intelligent feedback and question regeneration. Students receive reasoning-aware feedback that identifies specific misconceptions and guides them to the correct mathematical reasoning. Regenerative question sets allow students to practice toward proficiency without running out of problems, reinforcing skills in an adaptive manner. Teachers can prescribe math practice sessions based on real-time mastery data, ensuring every student progresses at their own pace.

For instance, if a student repeatedly struggles with fraction operations, the system dynamically generates new problem variations, offering real-time feedback tailored to their errors and alerting the teacher when additional support is needed. This process aligns with research-based strategies in mastery learning and scaffolding.

These approaches are rooted in Vygotsky's Zone of Proximal Development (ZPD), which emphasizes that students learn best when they receive support just beyond

their independent ability. Traditional assessment models often fail to provide timely intervention, leaving struggling students without the scaffolding they need.

The mix of independent practice to proficiency, guided by real-time feedback, allows students to refine their understanding at their own pace. When independent practice is insufficient, targeted teacher intervention ensures that students receive the structured support they need exactly when and where it will be most effective. and the teacher being made aware of when and where they need structured intervention align directly with ZDP best practices, without increasing teacher work-load.

Implementation at Scale: A Model for Math Education Leaders

For district and school administrators, the priority is not just identifying effective solutions, but implementing them in ways that are scalable and sustainable within math departments. The following considerations are essential for system-wide adoption:

- **Seamless LMS integration** – Educators should not need additional logins or training; solutions should work within existing platforms to minimize disruptions in math instruction.
- **Data-driven decision making** – District-level leaders can leverage analytics to inform curriculum decisions, professional development, and resource allocation for math educators.
- **Equity in access** – Technology should support diverse learners by providing adaptive feedback and enabling personalized instruction across all student populations, especially in mathematics where early gaps can compound over

time. Real-time analytics play a crucial role in this by proactively identifying learning deficiencies before they become entrenched, allowing educators to intervene early and prevent long-term struggles in math proficiency.

Conclusion: Scaling Math Instructional Impact With Technology Assistance

The combination of automated grading, real-time analytics, and dynamic practice represents a transformational shift in K-12 math education. By reducing teacher workload, providing precise instructional insights, and enabling scalable personalized learning, these tools empower educators to focus their time where it matters most—on instruction and student engagement in mathematics.

Next Steps: A Solution Designed for These Challenges

Many existing solutions address isolated aspects of these challenges, but a truly transformative platform must integrate all these capabilities seamlessly. Derivita was purpose-built to solve these problems—bridging the gap between high-quality math instruction, effective assessment, and actionable insights.

With its dynamic question engine, Derivita enables unlimited, real-time student practice with intelligent feedback, ensuring students receive the support they need at the moment of learning. By automatically grading even open-ended responses and complex math problems, the platform significantly reduces the administrative burden on teachers, freeing them to focus on instruction and intervention. Unlike traditional assessment tools that provide static questions and limited adaptability, Derivita's smart-randomization technology ensures every student receives a unique

but equivalent learning experience, reducing cheating and encouraging genuine mastery.

Additionally, Derivita integrates seamlessly with existing Learning Management Systems (LMSs), eliminating technological barriers and allowing schools and districts to implement mastery-based learning at scale. Real-time analytics provide educators with deep insights into student performance at the individual, class, school, and district levels, empowering data-driven decision-making to close learning gaps and improve outcomes.

Derivita is not just another digital math tool—it is a comprehensive Support, Assessment, and Analytics Platform designed to align instruction, assessment, and student success. To learn more about how Derivita is helping schools and districts implement these strategies in math education, visit Derivita.com or schedule a time to speak with your local Derivita representative at www.derivita.com/request-a-demo.

About Derivita

Derivita enables high-quality, rigorous math instruction at scale, from individual students and classes to school and district levels. Derivita uniquely streamlines your math workflows, content and data, automating common tasks, and seamlessly integrating it all within your LMS.

Our holistic design reduces teacher workload, enables collaboration, and connects data to provide real-time analytics that drive instructional improvements—from student and class levels to school- and district-wide. No other math platform offers more comprehensive support for educators to deliver personalized pathways to math proficiency for every student.

To learn how Derivita can support your efforts to improve student math outcomes, schedule a conversation with your local Derivita representative at https://www.derivita.com/request-a-demo