APPLICANT INFORMATION

Gigabit City (Chattanooga, Kansas City, Multi-City): Chattanooga

Project Type (Curriculum Development, Multi-Org, Multi-City): Multi-Org

Applicant: MathLeap, Inc.

Type of Organization (Corporation, LLC, Non profit 501(c)3, Government Agency): Corporation

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REQUIRED COMPONENTS FOR ALL PROJECTS

Project Title

MathLeap: Mapping Early Math Mistakes to Relevant Web Content

Project Summary (140 Characters)

We provide a way for students to solve math problems online and automatically grade assignments to save teachers time and give personalized feedback.

Collaborators

Gareth Aye - I was a lead engineer at Mozilla (Firefox OS group) for 3 years until Feb 2016. I'm now working full-time on building the future of feedback & assessments for STEM classes. I am planning to build out MathLeap's ability to categorize student mistakes and map them to content (articles, video, interactive visualizations) that address specific misunderstandings. During the pilot, I will provide engineering support to iterate on feedback from Chattanooga admins and teachers.

Will Lifferth - Will is a MathLeap employee based in East TN and would work with administrators and teachers in Chattanooga to help them adopt and pilot MathLeap in their classes. Will is already supporting MathLeap's pilots in the nearby Knox County and Williamson County districts.

Irun Siregar - Irun is the visual designer behind MathLeap's original design and is already working to visually integrate interactive content into our graded assignment views.

Project Overview (500 word limit)

Nearly 2/3rds of 8th grade US students test below proficient in math. A large contributing factor is that students aren't getting the personalized feedback they need to understand and learn from their mistakes. An average public school teacher is responsible for upwards of eighty students at a time but spends fewer than five hours grading each week. That amounts to fewer than four minutes per student per week! MathLeap aims to use smart technology to scale personalized feedback beyond what overloaded teachers can provide.

Most STEM assessments software will ask students to perform their work offline and only submit their final answer (or multiple choice selection). That precludes these programs understanding students' mistakes and providing personal feedback. The first step to providing more impactful feedback was to create a way for students to show their math work in the browser. MathLeap's web-based math expression editor does just that.

From there, we built a smart grading engine that can identify the specific line(s) where students have made mistakes -- a huge improvement from the status quo. We launched a public beta at the end of January with that key differentiator and have already (in a month) attracted over 1500 users to our platform. One of the avenues we'd like to explore is to provide even smarter grading than identifying where mistakes are made. We're looking to categorize the kinds of mistakes students are making (much like a compiler gives specific error messages that help developers make sense of their mistakes).

Going even further, we want to pull in web content (from knowledge repositories like Khan Academy, Wolfram, & Wikipedia) that addresses each of the kinds of mistakes we are able to

identify. Imagine students instantly getting back graded assignments full of videos and interactive graphs that help them learn from their mistakes.

We'd like to use this opportunity with school districts in Chattanooga to demonstrate that students with the resources and bandwidth to bring graded assignments to life will have better, more constructive experiences solving homework problems and quizzes.

Area of Impact (limit 150 words)

MathLeap helps teachers focus on teaching. Many teachers interviewed during customer development expressed concern that their students weren't getting enough feedback but struggled to grade papers every night of the week. Incorporating MathLeap in their classes will help teachers give students the feedback they need.

Another interesting and related project underway at MathLeap is helping teachers understand class performance on their assignments. We're building an insights dashboard that strives to help teachers answer questions like "which topics do I need reinforcement?" and "who among my students needs extra help?".

MathLeap helps students understand and learn from their mistakes. I think MathLeap is going to make doing math with pencil and paper sound like using punch cards for programming. Instantaneous, granular, personalized feedback is what students need to succeed.

Pilot (limit 300 words)

We'll do our pilot in Chattanooga schools by tapping into our connections through Mozilla, LaunchTN, and Project Inspire. There are 44 schools with middle and high school students in Chattanooga's Hamilton County School District. We'd plan to have teachers in at least 10 different schools test MathLeap with their classes. We'll plan and coordinate individual school visits for Will to present MathLeap to teachers and administrators, sit down with teachers and students for usability testing, and interview pilot teachers and students to learn about their experiences and iterate on their feedback. We'll also provide free, virtual (phone and email)

support to teachers throughout the pilot.

Gigabit Advantage (limit 150 words)

We want to make relevant articles, visualizations, and videos that address student misunderstandings instantly available to students when they finish their assignments. Faster networks mean faster feedback.

Learning Outcomes (limit 300 words)

Our vision for MathLeap is to scale personalized feedback in STEM subjects beyond what teachers are able to offer their students. We want to make it so that all students can receive the kind of individual feedback that was previously only available to students with private tutors. We expect for students to understand and learn from the mistakes they're making in pre-algebra and algebra 1 during the program.

Key Metrics & Evaluation (limit 300 words)

There are a few metrics we want to optimize for during the program

1. Number of teachers and students in Chattanooga schools using MathLeap regularly
2. Amount of content (ie questions, topics) available to pre-algebra and algebra 1 teachers
3. Percentage of mistakes we can map to relevant educational content

We'll know that we've succeeded if a large number (20+) of Chattanooga pre-algebra and algebra 1 classes use MathLeap regularly in the fall. We're also aiming to have 100% question coverage for pre-algebra and algebra 1 teachers following common core. If we map 90% of the mistakes students make to videos, articles, and visualizations that directly address the source of misunderstanding, we'd be very happy.

Open Work Summary (limit 150 words)

We have a blog https://blog.mathleap.org/ that we try to update weekly with articles relevant to STEM teachers. We're also going to begin writing a weekly email to our teacher community. We also love sharing our story at events and are already booked for Portland React, NewTech PDX, StartupWeekend EDU, and TechFestNW over the next couple months.

Project Scalability and Sustainability (limit 150 words)

We're currently working to raise seed funding to support our project for Q3 2016 through Q4 2017. We're talking to organizations like Techstars, 500 startups, and Oregon Angel Fund, but we would greatly appreciate any connections Mozilla could make to investing groups interested in edtech. As far as scaling goes, we're focused on distribution through marketplaces like Edmodo, presenting at conferences that connect educators with technology, rewarding teachers with more content for referring other teachers, and exploring textbook partnerships.

Risks, Challenges & Help (limit 300 words)

I'm sure that this is a problem for all education-focused groups, but Chattanooga schools aren't in session over the summer so administrator and teacher schedules and availabilities may vary. Another risk is that we might have trouble getting in front of Chattanooga math teachers. Administrators and teachers tend to be busy and slow-to-respond. Any help that Mozilla can provide connecting us to administrators and teachers and organizations that can facilitate school connections in Chattanooga would be hugely helpful.

Project Timeline

Week 1. Work with LaunchTN, Project Inspire, and Mozilla's Chattanooga Hive to connect to administrators and teachers representing at least 10 Chattanooga schools.
Week 2. Make presentations about piloting MathLeap in the classroom to administrators, math department chairs, and individual teachers. Schedule user testing sessions with teachers.
Week 3. Conduct user testing sessions with teachers.
Weeks 4-13. Iterate on teacher feedback from user testing. Provide virtual (phone and email) support to pilot teachers. Keep teachers and administrators in the loop with weekly blog posts and a newsletter.
Week 14. Reach out to administrators and teachers to schedule second round of user testing (including testing with students).
Week 15. Conduct second round user testing sessions with teachers and students.
Week 16. Summarize and share findings, lessons learned from pilots. Send letters of appreciation to everyone involved in Chattanooga schools.

Requested Funding Amount

$25,000

Project Budget *(insert table or list)*

Line Item	Justification	Amount
Cloud Services	MathLeap has server costs that will grow during our free Chattanooga teacher pilot.	$500.00
William Lifferth Stipend	Will plans to devote ~320 hours to presenting to, interviewing, and supporting Chattanooga teachers and students over the 16 week period.	$4000.00
Software Development	I plan to implement mathematical error triaging and UI components to embed articles, videos, and interactive visualizations that address student mistakes. I'll also provide technical support for issues teachers and students encounter during the pilot and iterate on their feedback.	$15000.00
User Testing Budget	We would like to offer teachers and students a small amount for participating in our 1:1 user studies.	$1000.00
Transportation & Housing	Will plans to make trips to Chattanooga from Knoxville at least 5 times during the pilot.	$500.00
Design	Irun plans to devote ~160 hours to designing interfaces for interactive content and iterating on teacher and student feedback over the 16 week period.	$4000.00
	TOTAL	**$25,000.00**

REQUIRED COMPONENTS FOR CURRICULUM DEVELOPMENT PROJECTS ONLY

Grade Level

US Grades 7-9

Professional Development (limit 200 words)

We're striving to make MathLeap as frictionless and intuitive as it can be for teachers. We would plan during the pilot to present and demo the software for educators. We're also leveraging

- instructional videos
- In-app tutorials
- Informational pamphlets

User testing sessions conducted with teachers during the pilot would also provide opportunities for teachers to ask questions.

REQUIRED COMPONENTS FOR MULTI-ORG PROJECTS ONLY

Local Gigabit Ecosystem (limit 200 words)

MathLeap's pilot will help grow Chattanooga's gigabit ecosystem by demonstrating new learning experiences that smart software running on next generation networks can enable. I think that the pilot will result in more teachers and administrators becoming aware of and involved in discourse around bringing formative technologies into classrooms.

OPTIONAL COMPONENTS FOR ALL APPLICANTS

Supporting Material (limit 5 links)

Item	Description	Link
1	Pitch deck	https://mathleap.org/public/mathleap-pitch-deck.pdf
2	Product demo	https://www.youtube.com/watch?v=Aajx4gXeye4
3	Dylan Oliver [:doliver] Letter of Recommendation	https://drive.google.com/file/d/0B6SXr8b1hQDpUU1QVTNtVVU0WTg/
4	Andrew Sutherland [:asuth] Letter of Recommendation	https://docs.google.com/document/d/1FYaB-Eq4VLJe8ccRVeZJTDrlZ1LSkWefg9phFEyfp9I/

5	James Lal [:lightsofapollo] Letter of Recommendation	https://docs.google.com/document/d/1S6IrD7wNf710MmSoU1rzKbOLvLAMneGTyY3cZBJGeVY/