

# MATRIX Conference Talk

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Hi - my name is Philipp, I'm a Software Engineer at Google, and I want to talk to you about Technology in Education.

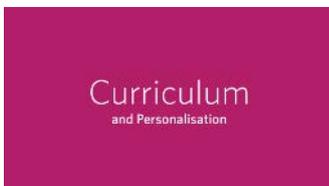


During the last century, technology has made huge changes in education - from radio and TV to websites, videos, apps, even robots, or touch-screens in museums: technology is everywhere.



But when we really think about it, in most cases we use don't use technology to do anything that's actually new. Textbooks are replaced by tables, lecture halls by online videos, blackboards by smart boards, and so on.

We've got completely new mediums with shiny new features, but we still teach the same content in basically the same way as before. And I think changing that will be one of the greatest opportunities in the future - and what I want to talk about.



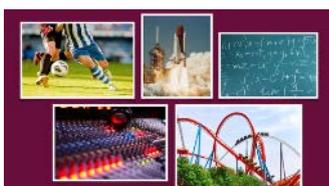
Let's think about the curriculum, which in maths hasn't really changed much ... ever.



Students learn arithmetic, algebra, and trigonometry, and calculus - just like they did 100 years ago. But, at least in my experience, there are very few of these topics that are actually useful in everyday life.



But that's ok, because that's not really the point: we teach these topics because they improve problem solving, abstract thinking, discipline and rigour, as well as teamwork while interacting with other students.



My point is, though, that if the important part is that you learn mathematics, rather than what you learn, why not let every student decide what they're interested in? Some might like to do statistical analysis of the champions league. Or create digital music. Or calculate the paths of rockets, or design the shape of roller coasters. And some might even like to study pure mathematics.

Notice that in all those cases there is an actual reason to learn mathematics, rather than just random equations without any context.



Lets think about how we actually teach mathematics.

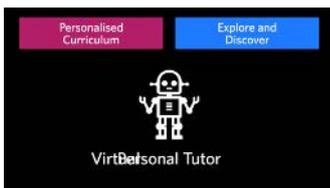


Whatever the topic is, maths lessons usually work like this: the teacher or textbook tells the student how to solve a particular kind of question. They memorise it, and then they use it to solve lots of practice questions. This is great for passing exams, but not so much for the original goal of teaching problem solving.



I think students should be able to explore and investigate independently, discover interesting results on their own, and then be amazed by their discoveries. Not only will this be much more fun, but also much more effective: there are so many times when I've seen good students unable to solve a problem, just because is was phrased in a slightly different way than what they were used to.

But of course for this to work, there needs to be a lot of individual help and nudging and guidance from a teacher.



Unfortunately, these ideas are almost impossible in present classrooms, where a single teacher has many students with a wide range of interests and abilities. We would really need a personal tutor for every individual student.

But that might actually be possible in the not-so-distant future, through the power of artificial intelligence. Imagine that we could create a virtual personal tutor for every student, who knows their ability, previous knowledge, interests and learning style, and can adapt perfectly.



Actually building something like this might take years, even decades. But you have to start somewhere, and I have been working on an online platform that attempts to do a few of these things in a basic way. It's called Mathigon, it's completely free, and this is what it looks like.

## DEMO



And with that, I think, I'm almost out of time... Are there any questions?