Case study: School of One and Teach to One: Math [1]

Teach to One is a North American program with some encouraging results. It uses data to diagnose and assess students’ skill and understanding of maths fundamentals and personalises learning so that students can learn at their own pace and bed down skills before moving on to higher level skills.

What is the problem?

In North America there is a need to improve mathematics. The US is ranked below average (27th out of 34 countries) in mathematics in the OECD’s PISA test [2]. Over one-quarter of 15-year-old US students don’t reach the PISA baseline Level 2 of mathematics1 (at which level students begin to demonstrate the skills that will enable them to participate effectively and productively in life) and have a share of top performers in mathematics below the OECD average.

Middle school years (approximately Australian grade 6 to year 8) are seen as the key time when mathematics performance begins to decline2, and these are the students that the Teach to One: Math program is designed for.

How does Teach to One: Math help?

The program’s basis begins from the theory that “students cannot learn at their grade-level when they are missing skills from earlier grades. Similarly more advanced students should be able to move on to higher-level skills when they are ready.”3 The program looks to tailor the teaching level to the knowledge and skills of the students and the learning styles that suit them best to develop their mathematical skills cumulatively.

For teachers, the program helps to track student progress, seeing where each individual get stuck and where they advance. It supports teachers with classroom resources and lesson planning, and provides a range of different modes of teaching to choose from to find ways to see improvement in each student.

How is data helpful?

The program begins with detailed diagnostic individual assessment. These results are used to
identify the most effective ways of learning for each student and develop an initial learning plan.

Students access material through an online portal, finding out what they will be working on and accessing the online instructional tools and assessment. The emphasis is on drawing on seven different "instructional modalities" to engage students, including teacher-led instruction, peer-to-peer instruction, collaborative and group based problem-solving, virtual and online instruction, and independent study. At the end of each lesson students complete a short assessment and get immediate feedback. An algorithm then calibrates the next lesson for each student based on that student's progress. Students move on to advanced material once they are ready and have mastered the skills necessary to do so.

For teachers the adjustment to the Teach to One: Math program is very significant. Through an online portal teachers get detailed information on the progress of each student, and can see what the algorithm has predicted for the next lessons. The program?¡¯s algorithm provides teachers with the details of the skills they will be teaching in the upcoming lessons so that they can prepare lesson plans provided through the program, modifying them as needed. Teachers still provide grades on students? homework, participation and performance, which can be weighted and combined with the online assessments in the program. Where a teacher thinks the algorithm has been incorrect in its planning for a student they have the ability to override it. The program replaces traditional textbook study, but Teach to One: Math is at pains to emphasise that it does not replace teachers or their teaching in the classroom. What it can do is help teachers to sort and categorise students into learning groups and, through progress tracking, give teachers the confidence that what they are teaching and the way they are teaching it is appropriate for their students.

For struggling students, the potential to experience the joy of success when they develop a new skill is great. Instead of feeling like they are always behind the rest of the class, they can feel a sense of achievement before moving on to more difficult material. For students not struggling with the material, they have the opportunity to advance ahead of their class, working at their own pace to be challenged rather than risking being bored having to repeat material they have comfortably learned.

**How did Teach to One: Math start?**

The program first began in 2009 as the School of One with the New York City Department of Education. A school-wide trial of School of One for Grade 6 maths curriculum was undertaken in three NYC schools in 2010-11. In 2010, the School of One and Board of NYC received a $5 million Investing in Innovation (i3) grant from the US federal Department of Education to develop the program in New York City.

Two of the education innovators involved (Joel Rose and Christopher Rush) founded New Classrooms Innovation Partners ? a not-for-profit organisation which is funded by philanthropic donation and through the fees paid by schools and districts for the Teach to One: Math program. The Teach to One: Math program was then implemented in seven schools in 2012-13 (with approximately 3500 students in the program) and 15 schools in 2013-14 (approximately 6000 students). The schools are in urban areas in New York City, Washington DC, Charlotte NC and New Jersey.

In 2014 New Classrooms received a further $3 million Investing in Innovation (i3) grant from
The evidence so far

It is early days for this program and the long-term impact for students is not yet known. Nonetheless, there are positive signs.

An evaluation of the expanded Teach to One: Math in 2014 showed significant positive signs. It found that in its first year, students using Teach to One: Math gained mathematics skills at a rate that was approximately 15 per cent higher than the national average. In the second year of its implementation students in the program gained skills approximately 47 per cent faster than the national average. Those students with the weakest maths skills made some of the largest gains. This built on an evaluation in 2013 which was less conclusive.

Some of the challenges in the success of the program are undoubtedly around implementation, given that it has substantial start-up costs both in terms of the technology needs and also in the time it takes students and, especially, staff to adjust to the way that the program is structured and the different ways of learning. It will be interesting to see if the program's success in the first schools to adopt the program continues in the years to come as teachers become more experienced at using it.

The commitment to the independent evaluation of the program is positive. The most recent funding for the program in the Elizabeth Public Schools includes a three-year study of the program's impact by the Consortium for Policy Research in Education at Columbia University's Teachers College. This research will hopefully provide more data on the impact of the program.

The evaluations of School of One and Teach to One: Math have so far focused on improved test scores as the measurement of the program's effectiveness.

Learn more

New Classrooms website [3]

Taking off with Teach to One: Math [4] (New Classrooms) ? video case study

NC results release [5] (New Classrooms) ? video of detailed conference presentation of the Teach to One: Math evaluation results

Meet the classroom of the future [6] (NPR) ? article about the use of technology and Teach to One: Maths in the classroom

The classroom of the future is full of creativity and critical thinking [7] ? counterpoint response to NPR's article by a school principal

Sources

1 OECD (2013) Results from PISA 2012 ? United States country note (PDF) [8]


4 Douglas D. Ready (2014, December) Student Mathematics Performance in the First Two Years of Teach to One: Math (PDF) [10] (New Classrooms)

Disclosure statement

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Resource Type: Case Studies [18]


Links
[5] https://www.youtube.com/watch?v=ARzP-b-Jfs4