By Carol Mortensen

Mission Possible: Keys to One

Making a one-to-one computing program work calls for more than just placing a computer on everyone's desk. It takes a complete transformation of learning and teaching. Here are a few lessons one technology integration specialist learned on the path to one-to-one success.

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-to-One Success

My first experience with one-to-one computing was at Hillcrest Middle School in Ysleta Independent School District (ISD) in El Paso, Texas. As a Texas Technology Immersion Pilot (TIP) grant recipient, Hillcrest became a one-to-one campus in 2004.

I knew the experience would be powerful. What I didn't know was how much one-to-one would open up the school day and create new opportunities for learning—opportunities I continue to build on today at Fairmont Junior High in Pasadena, Texas.

I found out that when it's done right, a one-to-one program can deepen student learning, create more real-life experiences, and help students take greater responsibility for their education. One-to-one computing also teaches students to be self-directed, allows them to receive personalized instruction, and gives them valuable digital age skills. And because the computers keep the students engaged, the classroom becomes a place of excitement about learning, which leads to a decrease in discipline issues and improved student achievement.

Something else I learned, however, is that successful one-to-one implementation takes more than just placing a computer on every student's desk. It requires a transformation of how students learn and teachers teach. To truly improve learning and teaching with one-to-one computing, schools must:

- Provide leadership, training, and support
- Adapt traditional tools and practices to support technology immersion
- Use technology to create 24/7 learning opportunities

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From the Top Down

From the outset, district and school leaders must be committed to the one-to-one model. Administrators must have a well-conceived plan for implementation, set high expectations, and hold teachers accountable. To set the standard, administrators should model the use of technology as part of their daily practice. For example, instead of sending written memos to teachers, they should send e-newsletters or podcasts. Administrators should also spread their enthusiasm to teachers, students, and parents—both through technology and the old-fashioned way—and they should listen to teacher input to ensure they don't miss any pressing needs.

As with any technology program, high-quality professional development is also vital to one-to-one success. At Ysleta, we received intensive training and support to prepare for the arrival of the computers and instructional technology tools, and that continued throughout the TIP project. What made the training successful was that we learned much more than just how to use the technology; we learned how to teach with the technology.

We also discovered that before you show teachers how to use a technology, you have to demonstrate how it will affect their students. All teachers want to help their students succeed. If a teacher can't see how a tool or technique will help students improve academically, he/she is are far less likely to give you buy-in.

One training session at Ysleta began with a demonstration of a student digital movie. Because we could see what the students achieved—and the positive effect it had on them—we wanted to know how to do it. And we saw how the process of creating movies, which can easily be done in each core content area, is motivating to students. After watching student movies on tessellations for a math class and on tectonic plates for a science class, we saw how students' understanding of the material increased when they created a project that explains it to their peers. We also saw that the students were engaged and focused, bad behavior decreased, and academic performance improved.

The teachers then created their own digital movies using the same tools their students would use. We learned

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how these projects would help students master the Texas Assessment of Knowledge and Skills (TAKS), and we received and developed content-specific lesson plans we could bring back to our classrooms.

But integrating technology requires more than just a one-off training session. It's essential that the district's instructional technology (IT) department support teachers before, during, and after introducing the technology.

Ysleta's IT department played a central role in the success of the TIP project. While many IT departments are staffed with "techies," Ysleta's is made up of teachers. That means they have an insider's understanding of the issues involved with using technology in a classroom. Throughout the TIP project, IT staff were visible and accessible in our building.

The school also created a technology cadre of teachers who received additional training to troubleshoot, assist other teachers, and address campus-specific issues.

In addition, it is essential to post resources online. When manuals, tutorials, and trouble-shooting guides are available 24/7, teachers can get support when they need it, at school or home.

From Old to New

In the early stages of a one-to-one initiative, teachers often find themselves caught between the print and digital worlds. That's why it's important to create or update policies to ensure teachers don't have to duplicate their work for both. For example, if a teacher creates a thorough, resource-filled lesson on an assignment webpage for students, he or she should not have to also create a written lesson plan just because it's always been done that way.

Similarly, it's very helpful to switch to a digital core curriculum. During the TIP project, Ysleta had only productivity software, online instructional resources, and online formative assessment tools, but none of these were connected in a meaningful way. To fill this gap, I scoured the internet to create my own digital curriculum. While I found some good materials and dramatically enhanced my internet search skills, the process was extremely time consuming. I spent at least one to two hours each weekday and six to eight hours each weekend hunting for materials to use with my students.

Fortunately, new products are emerging to maximize the strengths of one-to-one computing. One new product category, the digital teaching platform, operates as the primary carrier of core curriculum content and supports the teacher with tools for curriculum planning, classroom management, and assessment. In Grand Prairie ISD in Texas, teachers are using the Time To Know digital teaching platform and interactive core curriculum to manage classroom activities and deliver a personalized curriculum to every student. As a result, the district is realizing the benefits of strategic engagement, including improved student achievement.

On the 2010 TAKS exams, the students using this digital platform and curriculum achieved statistically significant gains in mathematics, reading, and writing and outscored students in control classrooms in the district. A greater proportion of those students also reached the "met the standard" and "commended" performance levels on the TAKS.

While a key strength of one-to-one computing is differentiated instruction, whole-group instruction and collaboration are still vital to the one-to-one classroom experience. Like traditional lessons, one-to-one lessons should include teaching, guided practice, and independent practice. Using an LCD projector to show lesson introductions, videos, and animations is helpful for whole-class instruction and discussions. It is also important to integrate open-ended explorations and collaboration tools, such as blogs or wikis, to deepen student understanding, increase motivation, and strengthen problem-solving skills. Teachers can facilitate collaboration and the sharing of student work both online and offline.

Benefits without Boundaries

One of the most important benefits of one-to-one computing is that it expands learning past the boundaries of the school day. In my math and algebra classes, I use blogs to give students opportunities to think and write about math inside and outside the classroom. I created a MathBloggers section on my website (http://tinyurl.com/3mya27t), where I post starter questions and ask students to give me their answers in a

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blog (see "Sample Blog Starter Problem," page 20). I also post a blogging rubric so students understand how I will grade their responses (see "Blogging Rubric," page 20).

I soon discovered that students would much rather write math strategies in a blog than on paper. At first, it took them three or four attempts to answer a question well, but they adapted quickly. Each time they blogged, the quality of their work and their level of understanding improved. Their use of academic language increased as well. Overall, this approach helped students develop the ability to problem-solve at a deeper level. When students took the TAKS, they were able to take apart each problem, analyze it, and creatively apply problem-solving strategies to improve their performance.

I also use MathBloggers to provide a forum where students can ask for and get help from their peers. I give them extra credit for correctly answering a question in detail for another student, which encourages collaboration and strengthens critical-thinking and problem-solving skills. One student was struggling to understand a problem involving two parallel lines cut by a transversal and asked for help on MathBloggers. A second student offered assistance and described in detail, using words only, what an alternate exterior angle was and what an alternate interior angle was. This process helped both students go through the problem step by step and deepen their understanding. I also found that students who helped their peers with homework questions on MathBloggers improved their own grades as well. By teaching their peers, many went from average to above-average performance.

This collaboration outside the school day also carried over into the classroom. Students felt more like they were on the same team. As a result, discipline issues decreased and motivation and participation increased.

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Tips for a One-to-One Classroom

Setting Expectations

- Make it a class rule that students can help one another but can never touch another student's computer. That way, you can be sure learning occurs even when students help one another.
- Always have a low-tech backup lesson ready in case the technology fails.

Managing Classroom Behavior and Disruptions

- Create a frequently-asked-questions (FAQ) webpage or binder of self-help instructions. Teach the class how to locate and use them. If using a binder, split the FAQs into related areas with dividers. For younger students, include picture support.
- Establish the "try three before me" rule. This means the student tries three other methods before interrupting the teacher. These methods may include using the help or support feature on a software program, using the FAQ binder or webpage, or asking a neighbor.
- Use colored paper cups to signal for help. For example, a blue cup means "all is well," and a red cup means "help is needed." Students should place the red cup on the computer or desk and go back to work while waiting for the teacher to assist.
- Develop a team of student experts who can assist students with computer projects. Rotate this job every six weeks.
- Provide online educational resources for students to explore when they finish early. Create online learning centers to provide differentiated instruction.

Evaluating Computer Projects

- Have a gallery walk. Allow students to walk around the room and view their peers' work. This generates good ideas for the next lesson and allows students to say something positive about each other's work.
- Grade projects in stages (such as outline, rough draft, and final draft) instead of waiting until the end to offer evaluation.

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Blogging Rubric

Category	4 High Advanced	3 Advanced	2 Intermediate	1 Beginning
Mathematical Concepts	Shows complete understanding of the mathematical concepts used to solve the problem(s)	Shows substantial understanding of the mathematical concepts used to solve the problem(s)	Shows some understanding of the mathematical concepts used to solve the problem(s)	Shows very limited understanding of the mathematical concepts used to solve the problem(s) or does not include
Mathematical Reasoning	Uses complex and refined mathematical reasoning	Uses effective mathematical reasoning	Some evidence of mathematical reasoning	Little evidence of mathematical reasoning, or not included
Explanation	Detailed and clear	Clear	Difficult to understand but includes critical components	Difficult to understand and missing several components, or explanation is not included
Mathematical Terminology and Notation	Always uses correct terminology and notation, making it easy to understand what was done	Usually uses correct terminology and notation, making it fairly easy to understand what was done	Uses correct terminology and notation, but it is sometimes not easy to understand what was done	Little use, or a lot of inappropriate use, of terminology and notation
Completion	Answers all problems and/or questions completely	Answers most of the problems and/or questions completely	Attempts some of the problems and/or questions but not completely	Did not attempt some of the problems and/or questions

Sample Blog Starter Question

Problem Solving: What's Your Style?

Everyone has a different way of solving word problems. Some people use a four-step problem-solving process, and others underline words or circle important information. In fact, your style of problem solving is probably as unique as you are.

For this blog, I'm going to give you a typical word problem. I want you to solve it and let us know the answer. But then I want you to tell us the steps you used to solve the problem. Share every little detail that you used. Put your problem-solving steps in a numbered list:

1. _____

2. _____

3. _____

You want to be so clear that someone else reading your list would know exactly how you found the answer.

Here's your problem: On an algebra test, I had seven times as many correct answers as incorrect ones. There were 120 items on the test. How many did I get right?

One-to-one computing also opens up new worlds to students' families. Early in the TIP project at Hillcrest, which has a large population of economically disadvantaged students, few families had internet access. I went to school one Sunday and saw a row of 25 kids sitting with their laptops along the school fence to get internet access for their schoolwork. Soon after, a district partnership with a local internet provider allowed parents to get low-cost internet at home, exposing entire families to the benefits of 24/7 access to information (see "How to Pay for Your One-to-One Program," page 22).

Another key benefit of one-to-one computing is that it can help a teacher transition from being the "sage on the stage" to being a real facilitator of student learning. With online tools for instruction, planning, and assessment, teachers can easily differentiate learn-

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ing to address each student's needs and gain more time for one-on-one instruction. Further, real-time assessment and reporting can provide teachers and administrators with the data they need to immediately address areas of concern and close learning gaps.

Outside school, students live in a world of technology. As one-to-one computing continues to gain momentum and the use of digital teaching platforms increases, we can bring the vast digital world into the classroom, expand the educational boundaries of the school day, and truly transform student learning.

Resources

Evaluation of the Texas Technology Immersion Pilot (eTxTIP): www.etxtip.info

One-to-One Institute: www.one-to-one institute.org

Time To Know: www.timetoknow.com

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