3) Reform teaching methods

"A massive amount of research has made it clear how people learn and don't learn. All human beings learn by doing, analyzing, talking, processing, and problem-solving. Talking at kids never has been and never will be an effective way to help them learn." (Reeder, from Salpeter, 2003)

The most difficult hurdle to overcome in the pursuit of these new educational goals will be to change the way we teach. Change will not come easily. There are approximately 285,700 public school teachers in Florida, many of whom teach as they were taught a generation ago by educators who emulated their own teachers: the "sage on a stage." When teachers comfortable with this "broadcast" method of teaching first encounter technology, they are likely to envision students learning from the technology in the same way that they expect students to learn from their teachers.

For years, however, educators have realized that relying solely on the "sage on a stage" or "broadcast" method of teaching was not ideal. This is especially true now that the millennial generation of students has arrived in our schools. Today's students often come to school with more technological sophistication and experience than their teachers. Many have greater access to technology at home than they do at school. They use the Internet to communicate across boundaries and to access a repository of information and ideas unimaginable to their teachers a few short years ago. Today's students expect their school assignments to be relevant, challenging, and related to the real world. They value problem solving, communication, and the chance to collaborate as adults do in real world occupations.

> **❝It's a waste to use these powerful new technologies simply to reinforce our traditional mindsets about learning and our traditional teacher-learner relationships.**
>
> **❝What's the definition of insanity? It's doing the same thing you always did, but expecting, wanting, or needing completely different results. If we continue to use new technologies to reinforce what we've always done, we'll continue to get the same results we've always gotten.❞**
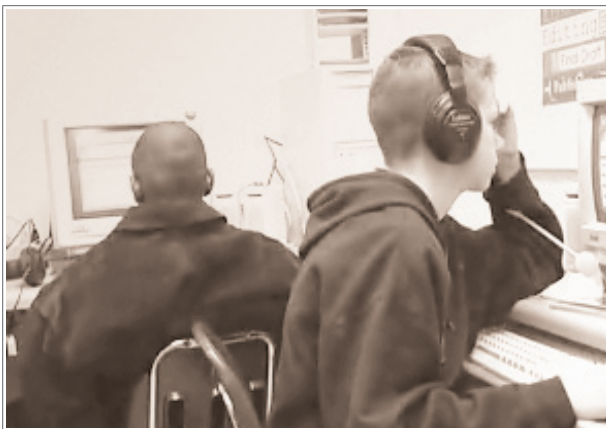>
> *Ian Jukes*

Yesterday's methodologies will not work with today's students.

Portable, wireless, connected laptops give us an unprecedented opportunity to reform teaching practices. Laptops provide the means for students to become active learners with their computers, not passive receivers of knowledge. With laptop computers, students can research and explore areas of interest, construct meaning or knowledge, collaborate with others across the room or across the globe, and work on significant projects that have value beyond school. Students' work in school must prepare them for complex, authentic tasks that will be demanded of them beyond the classroom and as adults. The portable laptop computer can become the most important tool available to an active learner.

The desktop computer labs at the end of the hall are not as conducive to reforming teaching practice. In fact, many labs are used solely to deliver instruction to students who are expected to learn from the technology. Learning from technology is akin to the old "sage on a stage" notion of teaching. The technology is used solely to deliver or broadcast information to students. While some direct instruction certainly has its place in an effective teaching environment, an exclusive diet of direct instruction will never give students the higher order thinking skills they desperately need.

Learning with technology, on the other hand, empowers students with the tools to take responsibility for their own learning. Whether they are researching information on the Internet to solve a problem, communicating with experts, or sharing their work in a presentation or on the web, it is raising the bar for all students to create their own learning. The FCAT measures more than just remembered facts.

Learning *from* Technology	Learning *with* Technology
• teacher centered	• student centered
• provide/deliver instruction	• produce learning
• transfer knowledge from faculty to students	• elicit students' discovery and construction of knowledge
• single sense stimulation	• multi-sensory stimulation
• single-path progression	• multi-path progression
• single media	• multimedia
• isolated work	• collaborative work
• information delivery	• information exchange
• passive learning	• active learning
• factual, knowledge-based	• critical thinking and decision-making
• reactive response	• proactive-planned action
• isolated, artificial context	• authentic, real world context

Table 1. A comparison of approaches to utilizing technology in education.

It requires a higher level of thinking and problem solving that is best accomplished with an emphasis on project-based learning with technology.

"We must educate all teachers and students to use the computer as a productivity tool as well as a tool for learning, research, networking, collaboration, telecommunications, and problem solving. Always using drill-and-practice software does not allow students to participate in meaningful and engaging learning environments." (Swain & Pearson, 2001)

❝Many schools have simply applied technology on top of traditional teaching practices rather than reinventing themselves around the possibilities technology allows. The result is marginal—if any—improvement.

❝Dream how technology can not only improve education but also transform what we think of as education.❞

Rod Paige,
United States Secretary of Education

❑ **Guiding principle:** Teachers must create instructional environments in which students use higher-order cognitive skills to construct meaning or knowledge, engage in disciplined inquiry, and work on products that have value beyond school.