Introducing Learning Technologies into Egyptian Schools: Where There is Demand There is a Way

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Little evidence demonstrates that the introduction of technology in schools can improve learning, unless it is accompanied by key educational conditions, including the ability to secure high quality teachers and improve teaching practice, and systems of accountability, competition, and local decision–making. The Technology for Improved Learning Outcomes project, funded by USAID and implemented by Creative Associates International, Inc., and its partners, Pal-Tech, Keys to Effective Learning, and Seward, Inc., is using approaches based on these conclusions to introduce computers in classrooms in Egypt. The article outlines several strategies which connect the introduction of technology to improved teaching practice, and which build capacity and demand through greater local decision making and competition between schools. The article highlights a study showing early changes in teaching behaviors and experience that demonstrate that competitive school and teacher selection processes can increase demand, local decision making, and longer term support for teacher professional development.

Key Words: *computer technology, instructional technology, education quality, Egypt, learning outcomes*

I. Introduction

After twenty years of experimentation with education technology in developing and middle income countries, few studies can demonstrate a direct link between technology and improvements in learning. Those studies that do also point to particular instructional methods, changes in larger instructional systems and the strategic ways in which technology leverages these priorities. They reinforce the mantra of a growing number of educators and researchers: it is not the technology itself, but how it is used to improve the educational environment that matters. Yet, far too many efforts still reveal a lack of understanding of what produces learning and what the technology can do to support a system focused upon education quality.

The dearth of evidence on hardware as catalyst has not slowed down the vigilance by which development organizations, governments, community organizations, and schools work to

acquire computers in the name of reducing the digital divide. Governments, principals, teachers and parents aim to introduce technology in schools for all the same reasons that we want new gadgets everywhere. They offer us the promise of a new era that is brighter, smarter, more informed and more connected, and which makes our lives easier due to the power of modern tools. Inside the box exists the hope that, upon opening, the school or community will be on a new path to success. Even with the fear of owning (and god forbid, breaking) new technology, the demand – and the potential – for technology to impact learning continues to grow. Still, the demand for the technology is not always coupled with a commitment to an instructional system where technology can improve learning.

This article highlights some of the early findings of the Technology for Improved Learning Outcomes (TILO) education technology project in Egypt as it works to build capacity and support the effective use of technology in schools to improve learning. TILO is a four year US Agency for International Development-funded project that works closely with the Egyptian Ministry of Education and Ministry of Communication and Information Technology, and is implemented by Creative Associates International, Inc. and its partners: Pal-Tech, Keys to Effective Learning, and Seward, Inc. In the TILO project, like many education technology projects around the world, the demand for technology is high: government officials want it, teachers want it, parents and students want it. But this article does not look at the demand for the technology. It reviews how the project used the demand for hardware to build a greater demand, capacity, and commitment to conditions within the system that are shown to improve educational quality, and how the unique attributes of technology can leverage them further.

II. So What Increases Education Quality?

Research specifically looking at technology as catalyst to improve education internationally has results as mixed as the products, contexts, and applications that are being tested (Kozma, 2007). There is no consistent evidence that the introduction of technology is sufficient to increase learning. However, studies that also look at other conditions in the school and how the technology is utilized reap more interesting results. In studies where teachers and others within the school work together to plan how to utilize technology use as a means to maximize particular teacher and student practices and content and support mechanisms are in place at the school, results are generally positive. In a long term study of the Project Explore program in Union City, New Jersey in the United States, for example, student performance improved results on standardized tests in writing and mathematics consistently as part of broad-based educational change that connected the use of educational technology to other prioritized elements in the system. Project Explore combined (a) the integration of technology with instruction, (b) extensive professional development for teachers, and (c) computer use with:

- school site leadership
- effective school improvement plans
- a strong emphasis on student creativity and expression of ideas in multiple formats
- an emphasis on different points of entry into a task for students working at different ability levels. (Honey, 1999).

Other recent studies are drawing similar conclusions about the necessary integration of technology with other prioritized elements at the school, such as teacher professional development and local planning (Metiri Group, 2009).

So, if technology introduced into a supportive environment with well-planned priorities can lead to positive results, what are the key factors that influence achievement? How can technology make a difference? Compelling research analyzing decades of studies on education quality suggests two sets of drivers are linked to high performing schools: (1) competent and well-supported teachers and (2) systems of accountability, competition, and local decision-making. A recent McKinsey Report (2007) concluded from an analysis of factors associated with school quality in top performing schools around the world that, while a number of factors could make a difference, there are three factors consistently related to the quality of instruction that have the greatest impact: *"(1) getting the right people to become teachers, (2) developing them into effective teachers, and (3) ensuring that the system is able to deliver the best possible instruction to every child." (p.1)*

The Report states,

> *"The top-performing school systems recognize that the only way to improve outcomes is to improve instruction: learning occurs when students and teachers interact, and thus to improve learning implies improving the quality of that interaction. They have understood which interventions are effective in achieving this – coaching classroom practice, moving teacher training to the classroom, developing stronger school leaders, and enabling teachers to learn from each other – and have found ways to deliver these interventions throughout their school system" (p.35).*

Other leading meta-research adds that, alongside ongoing attention to teacher quality, several key institutional characteristics are linked to high performing schools. In a recent analysis of international data and the factors linking schools to achievement, Hanuchek (2007) concludes,

> *"Evidence suggests that three institutional features may be part of a successful system of providing students with cognitive skills:*
> - *Choice and competition*
> - *Decentralization and autonomy of schools*
> - *Accountability for outcomes" (p.16)*

While researchers vary in the degree to which they emphasize teachers ability to instruct or local systems of accountability, decision making, and competition, there appears to be a growing consensus that these are the leading factors to producing high performing schools, and other inputs or efforts to produce change do not consistently pay off.

III. A Very Brief History of Education Technology and TILO in Egypt

Egypt is no stranger to education technology. Over the past decade Egypt has engaged in a variety of initiatives aimed at bringing Egyptian teachers and students into the 21st century through the introduction of technology for computer based skills. Egypt was one of the pioneers of the World Economic Forum's public-private partnership program, the Egyptian Education Initiative (EEI), where invited technology companies in the private sector were invited to contribute their innovations and good thinking to the field of education. Implemented by the Ministry of Communication and Information Technology, with support from the Ministry of Education, EEI aimed to increase technology usage in schools and foster innovation in schools.

Egypt also developed the Smart School Initiative, a program designed to introduce computer technology and support into experimental preparatory (middle) schools. The Smart School Initiative

in its original construction was a project with a closed school management system and a focus on computer literacy. Like EEI, it was not intended to reach across the massive education system of 44,000 public schools or to specifically increase achievement, but to test ways to use computers in schools and develop essential computer based skills. These and other technology-focused projects enabled Egypt to experiment with different models and types of interventions.

Supportive of the Egyptian government's overall commitment to instructional technology, the U.S. Agency for International Development, the European Union and other funders worked with the government and contributed millions of dollars to introduce technology in schools and to build Ministry capacity to manage it and study its potential in different areas. In 2006, the Egyptian Ministry of Education (MOE) developed a new five-year Strategic Plan with education reform at its center. Reform included the introduction of national standards, more decentralized school and idara (district) level decision-making, a more systemic teacher professional development structure, and a plan to introduce education technology into schools. In 2007 the USAID-funded TILO project began implementation under the existing bilateral agreement between the governments of the United States and Egypt to complement other projects supporting education reform. Unlike the projects before it, the TILO project was created to increase learning gains, however, the initial project design still contained some of the trademarks of programs developed around the technology, not around education quality. The project was lean on teacher professional development and training, lean on content, and school selection and decision making were primarily top down. The timing of the project start was good, however, as TILO could work with the Ministry of Education through the new reform framework at a time when change was not only possible, it was expected. TILO could draw links to these new priorities as it began to study and recommend that the introduction and eventual role of technology be one that strengthens key educational elements in the system known to produce learning.

The four year TILO project developed a phased approach to the introduction of educational technology where clusters of six to twelve schools would be trained and practice with new digital resources and new governorates would be gradually brought into the program. The assumptions of the project were based generally on the research and included:

1. The quality of the instruction depends foremost on the quality of the teacher
2. The success of the teacher to use new strategies is dependent upon certain enabling conditions and people, all of which need to be taken into account
3. Technology use should be built upon and support a strong foundation of good pedagogical practice. Strengthening that foundation is the first step.
4. Technology use should be integrated in such a way to make teaching and learning easier and richer, and not as an additional long term burden.

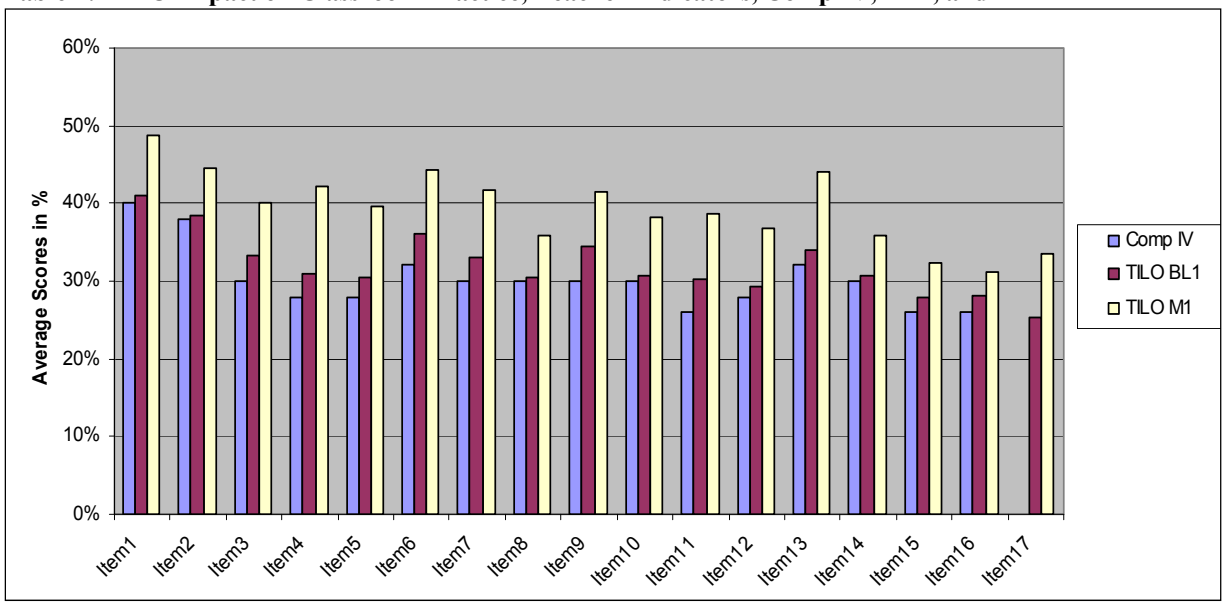
5. Local decision making, choices, and accountability make people more engaged and motivated and systems more sustainable.
6. Demand and commitment to building an enabling institutional environment at the school level is a necessary prerequisite to taking part in the project.

By the end of the four years, TILO will work in approximately 275 schools across ten governorates in Egypt and with the national, governorate and idara levels of the Ministry of Education to negotiate and manage larger training and support programs.

IV. Introducing Technology as Tool in Support of Educational Quality in Egypt

If we learn nothing else from the international research on educational quality, we can surmise that technology can be a more effective tool to impact learning when it helps to build and strengthen an environment where teachers and their behaviors matter, decision making and accountability are experienced locally, and competition and incentives are used as motivators for quality. A year and a half into the project, the TILO team and its Ministry counterparts began to learn firsthand why these factors mattered. The local TILO training organization, Keys to Effective Learning, structured its training in ways that were consistent with the research. Training was delivered to teachers who went through a stringent teacher selection process, was school-based, included coaching and hands-on practice, and began with an introduction into pedagogical practice which led to ways that the technology could improve instructional quality. While TILO has not yet conducted studies of learning gains, an early study of changes in teacher and student practice in schools, as measured by a pre/post controlled study using the Standard-Based Classroom Observation Protocol for Egypt (SCOPE) instrument in a sample of TILO supported schools which received a partial TILO intervention, suggests that teacher and students practices are already improving, even with minimal exposure to technology tools. The SCOPE tool rates the quality of teacher student practice and interaction based on international criteria and the local Egyptian education standards.

Table 1: TILO Impact on Classroom Practice, Teacher Indicators, Comp IV, BL1, and M1



Comp IV are a group of comparison schools in neighboring idaras. BL1 is a baseline conducted in October 2008 and M1 is the first midterm test conducted in May 2009 in the same classrooms. Source: Gabr, 2009.

We also began to study other elements of project implementation, such as the role and implications of competition and local decision making. While training modules were delivered equally to all schools, school selection, teacher support systems and local decision making were not experienced evenly. Early on, we could see that commitment, motivation and a demand for quality, even with encouragement from the MOE, were much higher in some schools than others.

The differences emerged slowly, but were hard to ignore. The TILO project serves two types of schools: (1) 85 experimental preparatory schools, which were selected by the central Ministry of Education and (2) approximately 190 "School Based Reform" schools, which were selected through a competitive school selection process that worked to identify and build demand and commit the school and idara administration to basic principles of local and joint decision making, teacher professional support, and collaboration and adherence to a set of overall methods that would be expanded at the idara level.

We implemented the following strategies in both sets of schools, all which were considered essential to TILO's approach:

1. Stringent master teacher selection, based on observations of teacher – student interaction and a requirement to work closely and train other teachers in the school;
2. Introduction of a basic technology package, including (among other items) computer stations for 3-5 students on a computer in an Activity Room and floating IT suitcases with a laptop/projector to be used by a teacher in a classroom;
3. Introduction of a digital resource package, organized by use for grade and subject (largely free or open source);
4. Explicit connections between technology use and the Egyptian curriculum requirements, based on the need for teachers to understand how their jobs and teaching are improved through the use of technology;
5. Teacher professional development and school-based teacher training and practice for approximately one school year, first emphasizing good pedagogy and management, and then, technology and digital content as tools to practice it;
6. Administrator and supervisor level participation in school-based training, based on the concept that if good teacher practice is not recognized and supported by supervisors and others enabling them in the system, it will not be sustained;
7. Joint decision making and leadership support at the governorate level, based on aligning program 'enablers' and planning for institutionalization;
8. School-based Education Technology Management Plans as part of larger School Improvement Plans, as a way to create a local responsibility and accountability;
9. Full orientation of school principals; and
10. Support from higher levels in the MOE, as demonstrated by the TILO Steering Committee, led by the Deputy Minister of Education.

However, in the 190 School Based Reform schools, we also implemented the following strategies that emphasized competition and local decision making:

1. Competitive school selection, based on criteria including previous experience and commitment to joint local planning and decision making;
2. Joint decision making and leadership support at the idara (district) level, based on the need to constantly learn, plan, and troubleshoot at a local level for a large group of schools;

3. Idara level participation in school-based training, based on the concept that local decision making needs to be supported and the idara level will supervise and replicate training and management systems.

While the competitive process of school selection for the school based reform schools was time consuming, it generated and rewarded demand and rewarded commitment to the activities and approaches. Schools that could not make the commitment to the key elements of the program were allowed to opt out.

After schools were selected and training in the first phase of schools was underway major differences became clear. The principals in the schools that did not go through the demand-driven selection process complained more about the requirements of teacher training and were less apt to help develop solutions to problems or to develop locally acceptable systems. While the school based reform schools took great pride in their achievements and often offered praise for the success of the school-based training or the joint decision making, the experimental schools seemed to believe that TILO project staff were responsible for the inputs, and that school administrators were not. They did not express the same level of demand and commitment to cultivate the kind of educational environment needed for the technology interventions to be successful. While there were other distinctions between schools, after a few months, members of the Ministry of Education and Ministry of Communication and Information Technology also noticed differences in the commitment levels and dedication to teacher professional development in the different types of schools.

In the end, we agreed that we would go back and try to re-engage the leadership in the experimental schools and find ways to build greater demand and ownership among them. We have begun to plan future competitions to reward schools which have completed training, action plans for ongoing teacher professional development, management, and good practice with digital resources with small technology or training packages. Time will tell if these measures will increase ownership and commitment, but until then, valuable lessons have already been learned.

V. Conclusions So Far

Given current research on educational quality and increasing demand for education technology to play a role in education, can technology be introduced to maximize learning outcomes? There are some critics that maintain that technology in schools is irrelevant to learning outcomes based on the broad access to technology elsewhere and competing teacher responsibilities (Cuban, 2001). We believe that education technology has a significant role to play in many schools in developing and middle income countries, and in school environments willing and able to make a commitment to teacher professional development, local decision making, accountability and competitive practice, technology can play an even more meaningful role in improving instruction and increasing learning outcomes. While some of the identified drivers to educational quality in recent international comparison studies highlight factors that directly influence high quality instruction, such as teacher selection, professional development, and instructional support, other less tangible drivers of educational quality, such as competition, accountability, and local decision, making also play an important role. In Egypt, these less tangible factors helped the Ministry of Education and the TILO project recognize and build demand, and secure the commitment necessary to plan and problem solve through the challenges of growth and change associated with the effective use of technology for learning.

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