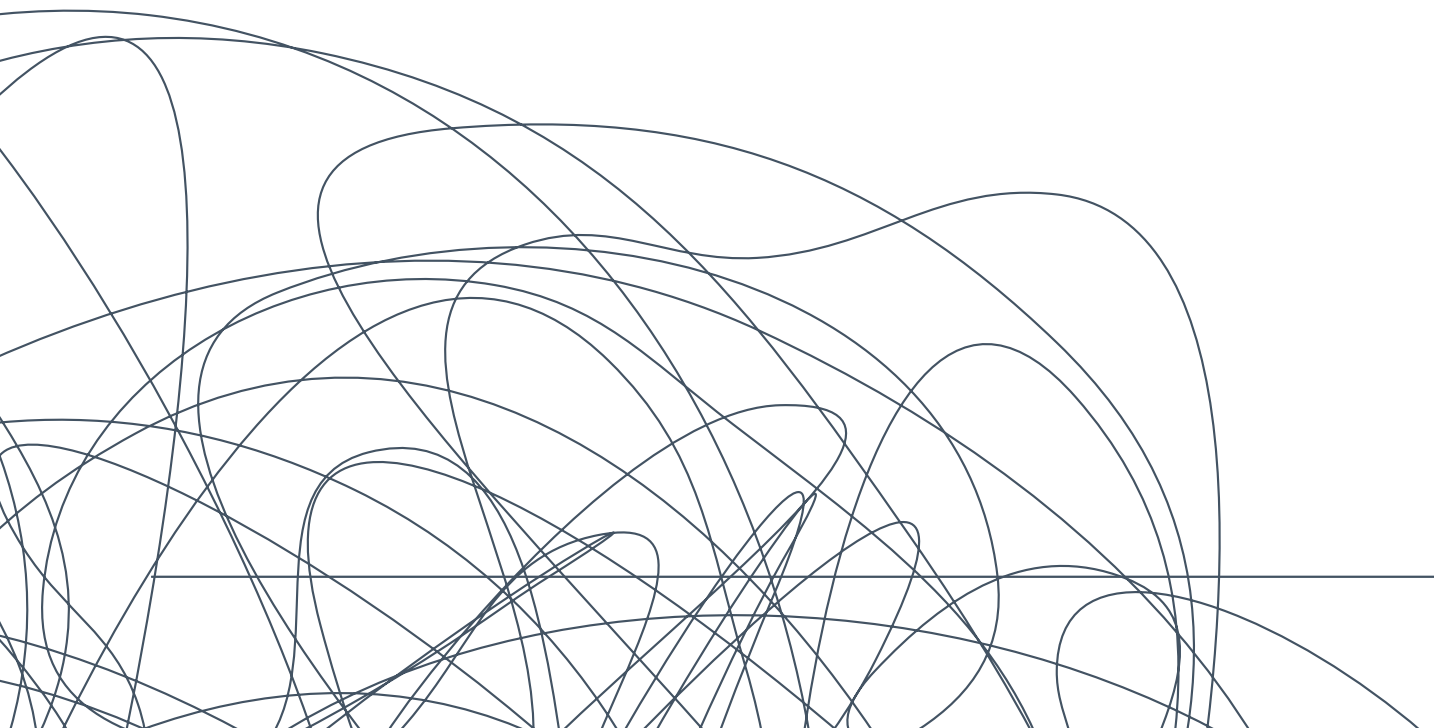


TURKEY'S FATİH PROJECT: A PLAN TO CONQUER THE DIGITAL DIVIDE OR A TECHNOLOGICAL LEAP OF FAITH?

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In 2013, Education Reform Initiative (ERI), a think-and-do tank in Turkey, teamed up with Research Triangle Institute (RTI International) to study Turkey's FATIH project. For ERI, this has been considered as a major part of its ongoing efforts of monitoring education policy issues and a thorough evaluation of FATIH necessitated cooperation with a research center endowed with comprehensive international experience regarding information and communication technologies in education.

As an international non-profit organization implementing education reform projects worldwide, RTI is committed to seeking evidence of best practices through qualitative and quantitative research and applying evidence-based solutions to education's most pressing challenges. RTI welcomed the opportunity to learn more about the implementation of FATIH in collaboration with ERI in order to contribute to the recommendations based on experiences of other large-scale technology in education programs worldwide.

The lead author of this report is Sarah Pouezevara (RTI); and Alper Dinçer (ERI), Scott Kipp (RTI) and Yaprak Sarıışık (ERI) are contributing authors.

RTI is a tradename of Research Triangle Institute, International. RTI is a non-profit organization with headquarters in the United States (North Carolina) and more than 4000 staff in offices worldwide.

For more information, contact Carmen Strigel,
ICT for Education and Training Team Leader: cstrigel@rti.org

ERI was established within Sabancı University in 2003 with the aim of improving education policy and decision-making processes in Turkey through research, advocacy and training.

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For more information, contact Batuhan Aydagul,
ERI Director: baydagul@sabanciuniv.edu



INTRODUCTION

Turkey is embarking on one of the world's largest educational technology projects: putting tablet computers in the hands of every student from grade 5 to 12, and interactive whiteboards in every classroom. Though massive in its planned scope, the goals and approach of Turkey's FATIH Project (The Movement to Enhance Opportunities and Improve Technology) are little understood. The objective of this brief is to analyze FATIH through the lens of ongoing and previous international, large-scale ICT in education experiences, and to use those experiences to suggest ways in which this important investment in educational technology can lead to the best possible learning outcomes for all students in Turkey.

THE FATIH OPPORTUNITY

Governments around the world are increasingly looking towards one-to-one technology programs¹ as a way to address educational access, improve learning outcomes, and equip their children with modern skills. Though each country's context and challenges are unique in such efforts, they often espouse common goals: equalize access to educational resources, engage children with learner-centric pedagogy, and disrupt ineffective classroom models. The pathway to achieving those goals may include providing technology, but it neither starts nor ends there. It is critical that lessons learned at all stages of the process—from planning, to implementation, to evaluation—are shared and explored in order to maximize efficiencies and above all, benefits to the learner. With FATIH, Turkey's Ministry of National Education (MoNE) is in a unique position on the world stage: the project is nascent and grandiose enough to at the same time affect real and lasting change; and become a model for a host of other nations looking for effective ways to prepare their children for leading roles in the global knowledge economy.

Yet at present there are many unanswered questions about FATIH and a lack of official documentation about the purposes, objectives, inputs and expected outcomes of the project available to the public with which to answer them. Even for those closest to FATIH (at the MoNE, in schools and in academia), perceptions of the program vary widely between those who optimistically see this as an inevitable step to coming up to par with other European "schools of the future",² to those who are certain it is a catastrophic waste of resources. This paper does not claim to have uncovered the government's official position on any of the questions raised herein; instead, it presents the different viewpoints currently circulating among stakeholders. The authors also recognize that FATIH is not a proposal up for debate at this time. Since 2011, at least 63

¹ One-to-one technology programs in education can roughly be defined as programs that make use of technology at a 1:1 ratio (i.e., each child has a device—laptop, netbook, tablet computer, phone).

² The former UK Secretary of State for Education and Skills, Charles Clarke, is quoted as saying "Every school of the future will have an interactive whiteboard in every classroom, technology has already revolutionized learning" (Smith et al., 2005).

thousand tablets were distributed to students and 84 thousand classrooms were equipped with interactive whiteboards (IWB) as part of initial distributions; the tablet procurement process is underway, and the authors expect considerable program deployment in the 2013-2014 school year for thousands of classrooms across the country. As the decision to invest in and proceed with FATIH has already been made, the goal of this analysis³ is to present the current implementation scenario alongside the best known practices from around the world so that whatever the current outlook may be, Turkey can approach the future armed with an understanding of the opportunities and concrete recommendations for channeling this investment into positive educational change. Additionally, we hope that this paper will help demystify FATIH for the general public, and contribute to the facilitation of constructive dialogue.

EDUCATION AND ICT IN TURKEY

Turkey's education system can be characterized as predominantly public and centralized. The share of enrollment accounted for private education institutions is as low as 3.3 % and public schools are run by the MoNE, which is responsible for all dimensions concerning public education provision. The MoNE hires, assigns and pays principals and teachers, maintains school buildings and other educational facilities, and administers programs. Access to primary level (grades 1 to 4) is almost universal with a net enrollment rate of 98.9 %; however this rate drops to 93.1 % at the lower secondary level (grades 5 to 8) and 70.1 % at the upper secondary level (grades 9 to 12). Access to upper secondary education is expected to increase in the coming years given that compulsory education has been extended from 8 to 12 years in 2012.⁴ Additionally, Turkey also has challenges ahead regarding quality of education. According to TIMSS 2011, 23 % of 4th graders and 33 % of 8th graders could not even perform at the lowest level of international benchmarks in mathematics achievement.⁵ However, compared to previous international assessments, these figures still reflect an improvement and OECD as well as the World Bank acknowledge the progress Turkey has made in increasing the quality of education and reducing educational inequality across lines of gender and socioeconomic background.⁶

The education system has long valued the integration of information and communication technologies (ICT) in classrooms, and various efforts have been made to provide schools with access to computing equipment and interactive teaching technologies. For example, the World Bank supported Basic Education Project implemented between 1998 and 2004 aimed to improve basic education quality by providing computer labs and educational materials to schools. Within the scope of the project, computer equipment was provided to 2,802 classrooms and ICT trainers and coordinators were trained. However, the World Bank notes that insufficient computer software was provided to the schools; the actual courses taught by the ICT trainers were limited to laboratories and focused on basic computer skills. Additionally, subject teachers were not trained in how to integrate computers into their subject teaching.⁷ It should be also noted that Turkey's first ICT in education intervention was implemented without an official ICT policy paper, which

3 This paper combines desk research with interviews of key informants and stakeholders in Turkey. The authors have reviewed local and international literature about the FATIH Project and about other one-to-one technology initiatives; they have monitored the Turkish press and some of the earliest Turkish academic research done within the FATIH Project's pilot schools. Over several weeks in August and September 2013, they have met with local academics, non-governmental organizations, the private sector, TUBITAK, and Ministry of National Education officials from the departments involved in FATIH, including YEGITEK and Board of Education.

4 ERI, 2013a.

5 ERI, 2013b.

6 OECD, 2010; World Bank, 2013.

7 World Bank, 2004.

was not available until July 2006. This policy paper titled *Information Society Strategy (2006-2010)*,⁸ which was in place when FATIH was conceived of, suggests that widespread introduction and use of ICT is considered as one of the primary means of maintaining sustainable economic growth. This would involve increased spending on physical infrastructure and also “building human capital that will exploit these technologies effectively.”⁹

Turkey has a very young population—25 % under the age of 15—and the government considers it an imperative to prepare this generation to be “a driving force” of Turkey’s economic growth and transformation to “the information society”. The Information Society Strategy (ISS) implies that the means to this end is by ensuring that ICT is used in school both to support the curriculum and to impart ICT skills, and that relevant content is available for lifelong learning outside of school. It is expected that this will also create sustainable demand for ICT and build the sector. According to TURKSTAT’s Information and Communication Technology Usage Survey, computer and Internet usage of individuals aged 16-74 are 49.9 % and 48.9%, respectively, and the highest proportion of computer and Internet usage is in the 16-24 age group.¹⁰ The proportion of regular Internet users is 39.5 %. Additionally 41.1 % of Internet users aged 16-74 use mobile or smart phones, while 17.1 % use portable computers (e.g. laptop, tablet) to access the Internet away from home or work.¹¹ While these statistics describe a country which is neither poor nor exceedingly wealthy, it is evident that there is considerable room for growth with respect to ownership of ICTs and access to the Internet. At a minimum, FATIH can be expected to dramatically alter the presence of ICT in the home and in the school.

⁸ SPO, 2006.

⁹ Ibid, p. 4.

¹⁰ TURKSTAT, 2013.

¹¹ Ibid.

WHAT IS THE FATİH PROJECT?

Evoking the powerful Ottoman Sultan Mehmet II, or “Fatih” (the conqueror), FATİH in this case is an acronym for *Fırsatları Artırma ve Teknolojiyi İyileştirme Hareketi*, or Movement to Increase Opportunities and Improve Technology. It is often referred to as the “FATİH Project”, although some individuals argue that it should not be considered a “project”. This term implies something much more limited and short-term in nature, whereas FATİH is, in reality, a major—and presumably permanent—shift in the way education is delivered.

The MoNE designed FATİH to provide IWBs, tablet computers and Internet network infrastructure to all schools in basic education (IWBs for pre-primary and primary levels and IWBs and tablets for lower and upper secondary levels) in an attempt to enhance equality of opportunity in education and to improve ICT use in teaching and learning processes in schools. FATİH intends to set up ICT hardware in 40,000 schools and 620,000 classrooms across Turkey. The project, which was initially launched in secondary schools but will eventually reach all grade levels between 2011 and 2019, has five main components as laid out in the official FATİH website:¹²

- Preparation of the infrastructure for hardware and software that comprises effective procurement, distribution and technical set-up of equipment in schools.
- Provision and management of the e-content that entails creating new class materials consistent with ICT-supported instruction.
- Effective ICT usage in line with curricula that aims to find new channels of integrating ICT usage with course curricula.
- Conscious, reliable and measurable usage of ICT and the Internet that focuses on teaching users of ICT how to use relevant ICT tools with complementary information on the web as well as evaluating how people use ICT.
- In-service training to teachers for ICT instruction in classrooms that enables teachers to use ICT tools effectively in a classroom environment properly.

FATİH’s first distribution phase excluding tablets began in the 2010-2011 school year in four schools. Each classroom in these schools was equipped with a laptop, a projector, and an IWB.¹³ The second distribution phase including tablets was completed in 17 provinces and 52 schools in 2012-2013. During this phase tablets had only intranet access with limited coverage determined by MoNE. Following the second phase of distribution, MoNE decided to grant Internet access to tablets while in schools. The specific modalities for ensuring equitable access to the Internet after school hours and at home are still under development.

Within the FATİH framework 680 thousand teachers should receive two modules of training. Starting in 2012, implementation of 30-hour trainings on ICT use in education and 25-hour trainings on preparatory education were launched. According to MoNE, more than 120 thousand

¹² <http://FATIHprojesi.meb.gov.tr/tr/english.php>

¹³ <http://FATIHprojesi.meb.gov.tr/tr/icerikincele.php?id=10>

teachers received trainings as of April 2013.¹⁴ MoNE has also established 110 distance learning centers in 81 provinces, which will facilitate teacher access in the future.

There is a perception both internationally and locally that FATIH is largely techno-centric because of the scale of the initial investment of 570,000 IWBs and accessories and 10.6 million tablet computers in the first three years alone. Yet the project components above do recognize that in addition to hardware, teacher training and content must be addressed. Furthermore, although FATIH is best known for its one-tablet-per-student aspect of the hardware deployment, it is equally important to note that it also includes an IWB per classroom. The goal of equipping schools with technology—particularly IWBs and computer classrooms—predates FATIH by over a decade in Turkey, as described above. However, previously schools had to fundraise locally for ICT equipment; as a result, schools in wealthier communities were better resourced while other schools remained marginalized. The word “opportunity” in the acronym FATIH refers to the effort to counter this trend and ensure that all schools and students have comparable opportunities.

“*To be a country that has become a focal point in the production of science and technology, that uses information and technology as an effective tool, that produces more value with information-based decision-making processes and that is successful in global competition, with a high level of welfare.*”

– Information Society Strategy (2006)

Exactly when and why the decision to include one-to-one tablets was made remains somewhat elusive; there are multiple anecdotes that circulate leading to perceptions that this was mainly a political move to get attention, or an economic growth strategy to encourage local industries and spending. Official documentation is lacking or inconsistent, and sources such as the official FATIH website speak of broad goals of access, equality, and modernization of education without specifically explaining why this particular choice of hardware is appropriate for those goals. Arguably any inputs at the school level should aim for nothing other than educational transformation. Nevertheless, identifying the specific objectives of the effort is necessary in order to evaluate whether inputs are appropriately designed and supported, and ultimately, whether the objectives have been achieved. Some of the plausible objectives—societal transformation, political transformation, economic transformation and educational transformation—are discussed briefly below.

POLITICAL TRANSFORMATION

The timing of the announcement of “one tablet per child”—in April 2011, two months before the election of the Prime Minister—makes it very easy to claim that FATIH is little more than a political move and this is a common perception among stakeholders who met with ERI and RTI. FATIH was conceived without prior demand from within the education system or among parents, the costs of the project are very large, and the potential for failure is significant. This is a big risk to take in the name of political transformation when there are many other competing priorities and there are clear opportunity costs of not investing in more certain ways of improving education quality such as investing in teacher training, early childhood education, or building more schools to reduce the number of double-shift schools. At the same time, the government—

¹⁴ <http://www.meb.gov.tr/haberler/haberayrinti.asp?ID=10157>

with this move and its persistence—does show considerable political will, which is key to sustained public service transformation. No doubt, the current administration will be remembered in the future because of FATİH, but will it be for the right reasons?

SOCIAL TRANSFORMATION

“Turning ICT usage into economic and social benefits” is among the seven strategic priorities of Turkey’s Information Society Strategy.¹⁵ The theory is that as the digital divide is reduced through improved infrastructure and access in schools and home, citizens—including businesses and government—begin adopting ICT in their daily lives and increasingly become users of information and communication technologies. As demand for technologies and digital services increases, it follows that production of innovations that add value for both internal and external consumption also increase. Furthermore, increased access and use can foster cultural development, social integration, and democratic participation.¹⁶ Therefore, by reaching the youth of today using the schools as an entry point, FATİH can potentially contribute to Turkey’s vision of an information society and transforming the country’s human capital to be more competitive. Although FATİH is not mentioned by name in the ISS or other national education strategy documents, the name alone communicates a commitment to social change through improving equitable access to technology. That such a commitment is made under a named initiative signals an intent to rally societal support behind a common, progressive goal. Other large-scale one-to-one educational technology programs have explicitly cited societal transformation and civic engagement as a goal (in Peru and Uruguay, respectively), and some report that the mere presence of the technology improves social morale as a positive symbol of “modern” opportunity and progress (Haiti, Peru).

ECONOMIC TRANSFORMATION

Economic transformation is often used to justify ICT in education investments, either directly through manufacturing or indirectly through human capital development.¹⁷ Michael Trucano of the World Bank notes in a recent blog post that it is not unusual to find that large-scale technology in education programs are actually designed to spur a local technology industry, as in the case of Portugal.¹⁸ There is a significant amount of evidence suggesting that economic transformation is a key driver for the choice of IWBs and one-to-one tablets in FATİH. The 84,000 IWBs so far purchased for schools come from a Turkish manufacturer (Vestel), there is a local operating system (Pardus) being promoted for use with the tablets and IWBs as a way to improve local ownership and avoid long-term dependence on a closed system. There was also reportedly an intent to require that 50 % of the manufacturing of the screens, 30% of the integrated circuits and 70 % of batteries be done in Turkey; however, the feasibility of this is questionable. The government is also encouraging foreign firms to be involved in FATİH, provided that they meet requirements such as establishing production and research & development facilities in Turkey.¹⁹ There is little evidence to be found internationally about the actual economic impact of other large-scale technology initiatives like FATİH, but a report from the Turkish Ministry of Development²⁰ suggests that the impact of total investment in FATİH will not have a long term (2023) impact

¹⁵ SPO, 2006, p. 22.

¹⁶ Kozma, 2005.

¹⁷ Kozma 2005; UNESCO, 2004.

¹⁸ Trucano, 2012.

¹⁹ http://www.todayszaman.com/newsDetail_getNewsById.action?newsId=308016; <http://www.dunya.com/nihat-ergun-googleda-207297h.htm>

²⁰ Kalkınma Bakanlığı, 2013.

on GDP growth. Kozma notes that the causal connection between education ICT investments and economic (or social) transformation is usually not made explicit, but doing so should be a key consideration for policy-makers attempting to orchestrate economic growth through education inputs.²¹

EDUCATIONAL TRANSFORMATION

Such a large investment in tools for teachers and students will necessarily transform the educational system; however, it is not clear that this was ever the main driver of FATIH. As one MoNE official told us: “We are not determining which technology best fits specified education goals, it’s the other way around; we are trying to make education fit the given technology.” To date there is no comparable example of a national tablet and IWB deployment at this scale, but there are some lessons to be learned from other large-scale laptop and tablet programs in the USA (Maine, Texas), Europe (Portugal) and South America (Peru, Uruguay), as well as more than a decade of IWB use in the United Kingdom. Some of the expected outcomes when investing in these technologies include: more engaged learners (and subsequently, better attendance and improved behavior); increased and improved collaboration between students; more student-centered pedagogy through personal devices and personalized content; reduced costs of textbook procurement in favor of digital texts; increased use of visual, auditory and kinesthetic learning methods including games and simulations; and potential for robust data analytics and student progress monitoring. Although these goals seem self-evident to technology proponents, very few of them have actually been proven to result from implementation of one-to-one tablets. This analytical report cites some of the most recent and most rigorously evaluated, large-scale one-to-one programs in the world.²²

²¹ Kozma, 2005.

²² For more information, please see list of references.

CAN FATİH TRANSFORM EDUCATION IN TURKEY?

Scholars and practitioners who write about ICT in education agree over and over again that the mere presence of technology will not improve any kind of school-level outcomes, and “technology favors the prepared organization.”²³ But what has our collective global experience in the past few decades provided in terms of concrete lessons for improving the chances that technology will make a difference? What are the elements that go into effective planning? Many sources point to several recurring factors: political will, a strong institutional context that effectively supports change management at national as well as school levels; responsible choice of technology—including hardware, software and content; sufficient attention to professional development; and a culture of monitoring and evaluation. How well is FATİH currently addressing these components during the planning stage? The next section will try to answer this question, providing some of the best-known evidence from other large-scale ICT in education programs around the world.

“STUDENTS ARE READY, IT’S THE ADULTS WHO AREN’T”:²⁴ FOSTERING AN ENABLING ENVIRONMENT AT THE NATIONAL LEVEL

UNESCO’s 2004 guidance for integrating ICT in education at large scale recognizes the value of inter-ministerial collaboration when implementing an ICT in Education plan; but it also emphasizes the importance of clearly defined roles, concrete work plans attached to realistic budgets, and having “central support from the [Ministries of Education] to pursue a clear and measurable vision.”²⁵ More recently, lessons learned from one-to-one programs emphasize the importance of multi-stakeholder involvement including private sector, communities, and parents.²⁶ In fact there are seven ministries involved in FATİH’s coordination, which ensures that ICT in education supports cross-sectoral goals and benefits from other government services (i.e., telecommunications). On the other hand, the involvement of seven different ministries naturally creates bureaucratic and leadership challenges, especially when administrations change. To date there have been three different Ministers of National Education since FATİH was announced. Some institutions such as YEGİTEK (*Yenilik ve Eğitim Teknolojileri Genel Müdürlüğü*, General Directorate of Innovation and Education Technologies under MoNE), the Board of Education (under MoNE) and TUBİTAK (*Türkiye Bilimsel ve Teknolojik Araştırma Kurumu*, The Scientific and Technological Research Council of Turkey) have clearly defined leadership roles focusing on elements such as content or training. For example, one area that TUBİTAK is focusing extensively on is Internet security. The government recognizes the need to regulate some aspects of Internet usage in a school environment and following through with this will require strong leadership at the policy level and the multi-stakeholder coordination mentioned above.

²³ Venezky et al., 2002.

²⁴ All quotations, unless otherwise cited, are direct quotes or their translations from interviews with FATİH stakeholders in Turkey during the research period.

²⁵ UNESCO Bangkok, 2004, p. 45.

²⁶ Balanskat et al., 2013.

Is there otherwise a clear and measurable vision at the national level for FATİH? As described above, it is not really clear whether the focus is on economic, social, political or educational transformation; and if the latter, what specific aspect of educational transformation would be expected. At the moment the project goals have been translated into actionable plans with targets and timelines which were shared with the public in the 2012 Activity Report of the MoNE.²⁷ However these remain at the level of inputs (number of schools to be connected, number of tablets to be delivered, etc.), and technology seems to be an end rather than a means to implementation of broader strategies. Additionally, there are no incentives to use the technology, to get training, to improve teaching through technology; there are no disincentives to not use the technology, to not take care of it, to not make it last. Policies that would provide a conducive environment for local innovation regarding content, intellectual property and software licenses are not yet in place. These are areas where high-level leadership implemented through transparent and frequent public communications can make a huge difference in the impact of the investment.

**“SCHOOLS AND MINISTRY IS AN ECOSYSTEM AND THE NEEDS OF THE ECOSYSTEM DETERMINE DECISIONS IN IMPLEMENTATION”:
SCHOOL-LEVEL POLICY, VISION AND STRATEGY.**

High-level leadership and coordination is important, but it is ultimately what happens in the schools—and homes—that will make a difference at the level of student learning outcomes. The UNESCO report begins the chapter on school-level policy, vision and strategy with this quite pragmatic lesson learned: “Teachers need to know exactly how ICT is used as a teaching and learning tool”²⁸ and go on to explain that optimizing the integration of ICT in schools to shift the learning paradigm requires a shared vision—one that is developed by all stakeholders, including parents and communities—of how technology will be used. Numerous other studies, including the One Laptop Per Child (OLPC) program in Peru note that for technology to make a difference it must be integrated with specific teaching and learning goals in mind, and accompanied by implementation model that is practical and incentivizing to allow these goals to materialize. Therefore a critical question is what the implementation model of FATİH is, or whether the educational outcomes are being left to chance, with no specific model being promoted. The MoNE in Turkey has looked to other countries for examples of appropriate implementation models (South America, USA, Kazakhstan and Russia). According to interviews with some of the individuals responsible for teacher training, the initial model is to integrate technology into existing lesson plans through multimedia supplementary materials. However, little guidance was provided on how this is to be achieved. The training seems to have communicated that no more than 10 % of a lesson should involve the technology. Moreover, there is no evidence that schools themselves have been involved in designing a vision for implementation based on their own capacities and institutional culture of learning.

If a teacher, school, district or country does not know whether they want to leverage ICT for assessment, student engagement, dropout-reduction, multimedia teaching support, classroom management, access to research, or many of the other potential uses, they will most likely not succeed in any of them. At a minimum, they will not know whether they can attribute positive learning outcomes to ICT, as they have not defined specific learning goals around the integration of such tools. Project RED, a large-scale survey of one-to-one programs in the USA, found that it is the implementation model—when, how, by whom and for what (assessment, student

²⁷ Milli Eğitim Bakanlığı Strateji Geliştirme Başkanlığı, 2013.

²⁸ UNESCO Bangkok, 2004, p. 77.

motivation, classroom management, etc.) the technology is used—that counts, not the presence of the technology.²⁹ At present, there is no apparent differentiation in implementation based on grade or subject area (with the exception of targeted content, to be discussed in a later section), thus an untapped potential to align implementation with the growing cognitive abilities of children from primary via secondary to high school to leverage the tablets for their learning. Finally, key questions related to the day-to-day management of the technology are a part of the implementation model that remains unanswered. For instance, who owns the tablets? Who is responsible for repair/replacement? What kind of out-of-school use is expected and how is this facilitated (or hindered) by the available infrastructure?

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The challenge ahead lies in identifying specific models of computer use by grade, subject, and context that can produce measurable learning gains. These educational models should lay out not only the hardware and software needed, but also—and very importantly—the training and support activities required so teachers can adopt them effectively.

- Juliàn Cristia on the way forward for the Peru OLPC program (2013).

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Having a guiding framework does not imply that an implementation model must be designed at the central level and imposed consistently across all schools in the country—on the contrary, Fullan et al. conclude that local autonomy in general will be a strong determining factor not just in program variance, but also in leadership.³⁰ An important distinction here is that while a measure of “autonomy” can provide room for innovation and encourage local ownership, such encouragement would not likely exist in an environment where autonomy exists only as a result of a lack of goals which are understood effectively by leaders, schools, teachers and parents.

It is also worth mentioning that there is a counterargument popular among advocates of OLPC programs that focusing on distribution first and the implementation model second is a completely appropriate deployment model since children can learn a lot very quickly on their own. Teacher training programs, following this logic, should be tailored around real demands and needs exhibited by children using the technology, and not based on expectations on what will or should happen with it once deployed. However, evidence of failures abound in contexts where hardware was the primary—or only—input, while positive evidence of self-taught students remain largely anecdotal. Furthermore, the actual skills that children learn, or extent to which this learning continues to expand and evolve over time (or whether it stagnates and then ends in the absence of a teacher) have not been mentioned by these advocates. Either way, this counterargument underscores the need for some broad vision of the purpose of the technology, the expected outcomes, and the logic model that will lead to those expected outcome, even if it is one that espouses self-taught, independent learners disconnected from the national curriculum. This vision is currently lacking in FATIH.

²⁹ Greaves et al., 2010.

³⁰ Fullan et al., 2013.

“TURKEY IS BUILDING THE MUSCLE, BUT NOT THE SOUL”: TECHNOLOGY CHOICE AND INFRASTRUCTURE.

The one-to-one vision of FATIH recognizes what other countries/projects took a long time to realize: computer-to-child ratios make a difference to promote regular use by all children. On the other hand, ideally the intended purpose of this “use” should guide the choice of hardware/software. As mentioned earlier, there is no available evidence to suggest that the current choice of IWBs and one-tablet-per-child was based on expectations for how technology improves the teaching and learning process. Once again, it seems to be taking a great leap of faith in assuming that this model will bring about educational transformation. In spite of that, both technologies have shown potential to dramatically change and enhance instruction and learning given their specific features.

IWBs have the ability to project a wide variety of rich multimedia to the whole class at once, especially simulations, demonstrations, film, and Internet resources, or present pre-prepared notes, diagrams and exercises more efficiently (at a faster pace). Like tablets, it is argued that the medium also captures the students’ attention and keeps them engaged, and through a medium much faster, richer and more dynamic than a traditional chalkboard. However, whether IWBs actually become “interactive” and not just more attractive, digital presentation of traditional teacher-centered transmission of information is largely dependent on the model procured, the software and content available, and the teacher’s capacity to learn and adapt to a new style of teaching which incorporates such capabilities. Yet it is this element of *pedagogical* (as opposed to technological) interactivity that is recognized as the key to transformed learning.³¹ Whereas prior projective technology has been predominantly used by pedagogues using controlled, didactic content, interactive boards are increasingly used to “pull” content directly from students integrating their work directly into whole-group instruction, encouraging active discussion, collaboration and production of learning products by students. There is no indication so far that FATIH’s teacher training or content development focus on these more advanced interactive functions of the technology that have the potential to transform the teaching and learning process, and that present a real opportunity to promote instructional change.

Tablets have the ability to function as a lightweight, electronic reader, storing volumes of electronic (and potentially interactive) textbooks and reducing the burden of carrying either a heavy laptop or many books to school. Tablets are also user-friendly (especially for young learners), easy to learn, and attractive to children, therefore potentially increasing student motivation and engagement and rapid uptake of the technology in the absence of significant teacher training. They have a longer battery life (than laptops) and are not subject to local power cuts or surges, therefore providing a more reliable source of multimedia interaction. They are not (at present) subject to computer viruses that often cause significant down-time in older model computers. Perhaps most significantly, with a tablet for every student there is now the ability to capture a wide variety of student-level data, including assessment, real-time feedback, surveys, learning analytics. Finally, tablets are portable and can be perpetually connected, therefore creating potential for use outside of school (or extending school to include outdoor extension activities), and bridging the gap between school and home.

Among these potential affordances, our interviews indicate that a key driver was the user-friendliness of the tablets and the ability to function as portable e-readers. A significant amount

³¹ Smith et al., 2005.

of content has been digitized in the form of e-books (digitized versions of existing textbooks) and “z-books” (enhanced e-books for tablets and IWBs, but currently with limited interactive capacity). The Minister of National Education recently announced that the tablets would be used for high-stake tests (regulating the transition from primary to secondary schools) and evaluating teacher effectiveness, but the current content of teacher training and the available software resources do not indicate any emphasis on real-time student-level data analytics as a key driver for selecting the tablets.

While the children are expected to take the tablets home and use them outside of school, the specific mechanisms for home access are still being considered (network bandwidth capacities, safe Internet browsing, cost of access outside of school, etc.). There is no indication that a focus on mobile learning will be integrated formally as part of the pedagogical model, but is rather being left as an informal consequence. Yet in a Texas laptop immersion (one-to-one) program, it was found that the level of student access and use had a significant positive relationship with reading and math achievement on standardized tests.³² Findings also indicate that it was the after-school (home) use that seemed to make the difference rather than the number of days during the school year where they had access or the frequency of reported use during core subject classes.³³

HEALTH AND ENVIRONMENTAL EFFECTS

Notably absent from official FATIH documentation has been the issue of e-waste, or what will be done with all of the hardware as it inevitably becomes obsolete or irreparable and has to be disposed of. A May 2012 bylaw by the Ministry of Environment and Urban Planning on the Management of Waste Electrical and Electronic Equipment (WEEE) limits the use of hazardous materials in the manufacture of electrical and electronic equipment; and also sets the framework for recycling electronics and reducing the amount of WEEEs. As per these regulations, manufacturers and importers of electronic equipment are responsible in part for their recycling. The bylaw became fully effective after a year of its published date, therefore it is expected that manufacturers and importers of tablets within the scope of FATIH will comply with these regulations on WEEE. Although this is also an area that could potentially promote some local economic opportunity, it also has the potential to create other economic and environmental burdens, further undermining the return on investment.

Furthermore, the health effects are unknown. It is expected that when the next phase of tablet deployment occurs, the communication between tablet and IWB will require some kind of wireless classroom network, and access to the pedagogical resources will necessitate an Internet connection. We were told anecdotally that because of the pressure to keep the same tablet throughout several years, some children have become over-protective, and reportedly some even sleep with the tablet under their pillow or refuse to go to recess or do sporting activities where they would have to leave their tablets unattended. The effect of such constant exposure to wireless radiation is unknown. While a nascent but growing body of evidence suggests that Wi-Fi radiation levels are generally too low to cause harm, the same cannot be said with much certainty for constant exposure to mobile phone signal radiation, and it is conceivable that while constant Wi-Fi exposure has not been found to be overtly harmful, it is very unlikely to be beneficial.

³² TCER, 2008.

³³ Ibid.

This was also the conclusion of other major European studies³⁴ as well as the one-laptop-per-child program in Uruguay. The Berkshire Wireless Learning Initiative (BWLI) laptop program evaluation found a positive statistically significant relationship between students' "recreational home use of computers" and their English language arts achievement.³⁵ Linking use of the technology to out-of-school activities, whether in the home or in the community (through extension projects in science, health or local environment), has been shown to increase motivation, engagement and use. Furthermore, if parents better understand and support the reasons why the technology is being introduced, they are more likely to support its use in the home. This is another opportunity for the government to leverage though improved communication with parents about the initiative.

There are still many unanswered questions about the hardware and the software, and it is difficult to have access to the procurement documents (though we are told they are open to the public at the MoNE office in Ankara—only to be read on site though, not for taking copies). Without this information, it is difficult to determine who is expected to take on specific and critical roles related to asset management, usage policies, enabling administrative and pedagogical software; and how these align with other international experiences. Furthermore it is hardly possible for non-governmental entities (private enterprises, community-based organizations, etc.) to start planning efforts to support some of these potential gaps and areas where specialized expertise could improve efficiency and innovations.

“THE INTERNET IS A JUNKYARD—THERE ARE GOOD PIECES, BUT THEY NEED TO BE SORTED OUT”: INSTRUCTIONAL CONTENT AND PEDAGOGY

There are lessons learned from other comparable large-scale technology initiatives about the dangers of an overly techno-centric implementation model that can help inform FATIH plans in regard to content and pedagogy. For example, the deployment of the 'Magalhães' laptops in Portugal have been widely critiqued for being overly focused on technology and access and not enough on pedagogy and the development of digital literacy skills in children.³⁶ Backlash from parents, media and interested stakeholders caused considerable delays and other problems with the project in Portugal. However, some of the most significant experience regarding the importance of content and pedagogy comes from within Turkey and past experiences with ICT in education. According to certain key informants, Turkey has a history of technology failing to be implemented effectively, from providing overhead projectors with no transparencies, to computers with no content or software (at least not licensed versions). The World Bank reports that, within the Second Basic Education Program (2002-2006), one component on development of digital educational materials has been cancelled due to significant delays in the development phase as well as lack of coordination between the directorates of the MoNE and Board of Education.³⁷

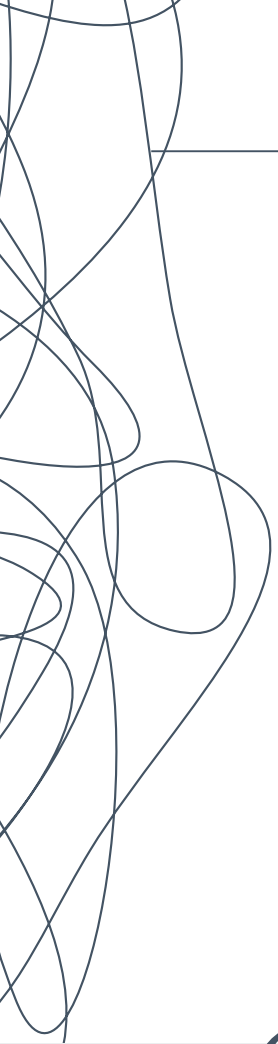
ICT will never replace ineffective teaching; but it can, in fact, enable more of certain traditional teaching practices (i.e., drill-and-practice test preparation) that educational transformation is meant to change. It can also be disruptive enough to undermine some effective practices. When planning, implementing, or evaluating ICT in education, it is important to remember that any hardware is only as good as the software it runs, the content that it delivers, and the wider learning environment in which it is used. IWB research in the UK mostly concludes that there has

³⁴ Hinostroza et al., 2011.

³⁵ Bebell and Kay, 2010, p. 42.

³⁶ Pereira and Melro, 2012.

³⁷ World Bank, 2008.



been no measurable impact on achievement even if it may have altered the way learning takes place. “The research literature has yet to demonstrate the direction that teachers need to move to ensure that the proven changes the IWB can bring about in classroom discourse and pedagogy are translated into similar and positive changes in learning.”³⁸ In other words, the transition from digital presentation to effective interaction is required in order to truly transform education, and after many years of experience in the UK, there is still no clear model for achieving this; yet it is clear that the onus is on the teacher, with support from school administration to evoke change.

In Haiti, one of the earliest OLPC pilots in the world, researchers found through several weeks of classroom observation that students were easily distracted by the technology, but that “greater teacher engagement decreases student distraction.”³⁹ Evidence from a large controlled study of an OLPC program in Maine (USA) found that only when teachers “specifically target content and/or skills and integrate the use of laptops in teaching these” is there evidence of greater achievement.⁴⁰ In fact, in a large nationwide survey of ICT immersion programs in the USA, the biggest effects were found when the technology was tailored for learners with the greatest needs through special interventions.⁴¹ As mentioned above, teachers need to be in control of the use of technology in their classroom through flexible policies that promote innovation, yet initially they also need concrete guidance and best practice examples to follow. Without that guidance, the tablets risk becoming little more than digital desktops, focusing students on their own work and less on collaboration with each other, at a time when it is increasingly recognized that a key component of learning for the “knowledge society” and “21st century skills” is collaborative, project-based learning that models the changing demands of the modern workplace.⁴²

“*Technology-transformed interventions in ELL [English Language Learning], Title I [special funding linked to low socio-economic profile of the school], special education, and reading intervention are the top-model predictor of improved high-stakes test scores, dropout rate reduction, course completion, and improved discipline.*

- Project RED, a study of one-to-one laptop programs around the USA.

According to the MoNE experts involved in content development and training, the technology was never meant to be at the center of the teaching, to be used 100 % of the time, or to replace the teacher. It is a tool that should be used to add value to lessons through multimedia content and supplemental resources. There is a large and growing pool of these interactive and multimedia learning objects available through YEGITEK’s *Eğitim Bilişim Ağı* (EBA, Education and Informatics Network).⁴³ The resources come from within Turkey and internationally and include other digital resources like magazines, royalty-free images, instructional videos and a forum for teachers. To maximize the use of FATİH-supported technology, with particular attention paid to collaborative and dynamic content, the creation and curation of material by students and teachers alike could be considered. As noted in the National Educational Technology Standards (NETS) for Teachers—

³⁸ Higgins et al., 2007, p.221.

³⁹ Naslund-Hadley et al., 2009.

⁴⁰ Silvernail et al., 2011, p. 21.

⁴¹ For more detailed information on Project RED and the findings of the study on technology implementations across the USA, see: <http://www.projectred.org/about/research-overview/findings.html>

⁴² For an excellent discussion of the importance of the teacher and danger of premature independent learning driven by Internet and ICT in classrooms, see: <http://edtechnow.net/2013/08/27/blind/>

⁴³ www.eba.gov.tr

which Turkey has been involved in adapting locally—such an approach can “clarify students’ conceptual understanding and thinking, planning, and creative processes.”⁴⁴ Yet the potential for teacher-generated content and for using the tablets for enhanced e-book reading will not be realized until there are clear policies in place for intellectual property and incentives for authors, including small business, established publishers, and individuals (teachers, school leaders). All content currently under development must be cross-platform compatible since there is no official statement on what operating system(s) will be used to power the tablets and IWBs.

“*Personalize learning for all students through frequent, appropriate use of technology integrated with curriculum and instruction in all classrooms and other learning places. Technology cannot be viewed as a supplement. It must be an integral part of students’ lives in the classroom and must be integrated in meaningful ways into the core curriculum.*”

- Wilson & Gielniak (2012)

The EBA repository has significant potential, but since it is currently available in beta version and still under development, some users express the content is not clearly organized and teachers are not provided with comprehensive guidance to know how to select and use the learning objects appropriately. MoNE officials stated that they don’t feel that teachers need a significant amount of training in order to find or use the content; they believe the resources are straightforward enough that they can be used without guidance. However, international experience suggests that this is a very high-risk model to assume that developing and distributing large amounts of content is the end in itself, but how this content is going to be used is left entirely up to chance. Another big leap of faith, where success primarily hinges on teachers and their will and capacity (which may be fostered by a strong school-level vision and leadership, and enabled by national-level policies). Are Turkish teachers prepared to meet this challenge?

“IT IS NOT THE BOARDS THAT ARE SMART, IT IS THE TEACHER”: PROFESSIONAL DEVELOPMENT

From the choice of technology to the way teachers are trained and content is being provided, FATIH seems to assume that the technology will teach itself in the absence of significant professional development. Yet over and over ICT in education programs emphasize that training is never sufficient. The BWLI evaluation found that poor implementation is linked to lack of teacher knowledge and buy-in, and concluded “It is impossible to overstate the power of individual teachers in the success or failure of 1:1 computing,”⁴⁵ a point the present report has also made repeatedly in the previous sections. FATIH also has direct evidence of this from their own pilot which found that a key factor in how the technology was used was the teacher—if the teacher did not use the technology the students did not either; where no other guidance was provided, students mainly used the tablets to take notes.

Currently teachers are receiving an initial 8 hours of training, and then another week (30 hours) of follow-up training. Training is focusing mainly on functionality of the hardware and software, but not on content (choice of appropriate media, functionality of the media) or pedagogical

⁴⁴ ISTE, 2008.

⁴⁵ Bebell and Kay, 2010, p. 47.

integration of the content in strategic ways, including interaction between the tablets, IWB, teacher and student. Some MoNE officials we spoke with recognize that this level of training is not enough and that although they are currently focusing on functionality, there are plans to develop subject-specific training in the future to integrate technology into the teaching of specific subjects.

The concern at this point is that teachers are being trained to digitize their teaching, but not teach differently. Experience with many types of teacher professional development, including ICT integration, indicates that it is very difficult to change teaching behaviors with only one-off, isolated training programs. It is critical to follow up training with school-based support, mentoring, teacher collaboration, and promotion of best practices. In Uruguay, reviews of Plan Ceibal have consistently identified the lack of teacher-teacher collaboration time as a factor limiting the effective use of the technology.⁴⁶ In the Texas technology immersion program (one-to-one laptop model), “the strength of administrative leadership and the intensity of campus professional development supporting immersion were significantly associated with higher levels of Classroom Immersion.”⁴⁷ In Turkey, there are reportedly 500 FATIH trainers in schools committed to solving school-level FATIH problems, and an additional 700 rotating between schools. In addition, the ICT teachers in every school are a considerable asset to ensure ongoing, successful integration; however, the quality and capacity of these ICT teachers vary since there has been no standardized training for them. There are additionally 110 distance education centers that have recently been established. Although these distance learning centers were not established solely for the FATIH Project, they may be a significant resource for professional development in the future.

Current successful models of ICT integration suggest that a whole-school approach to change involving ongoing peer-to-peer collaboration, supported by school management and periodic input from experts in targeted, subject-specific ICT integration are effective at transforming the culture of learning. Plan Ceibal in Uruguay has repeatedly found that teachers and educators report more value and incorporate more change into their pedagogical practice when receiving training and support inside their institutions, as compared with such services delivered away from the teachers’ practice environments and in larger group settings.⁴⁸ The ICT teachers mentioned above may be the key to catalyzing ongoing this type of ongoing professional development – communities of practice, sharing resources, evaluating content, monitoring experiences with use—but elevating these individuals to key level of support within the schools is important.

**“THE DESIGN OF FATIH IS A CONTINUOUS PROCESS—IT NEEDS TO BE REVISED EVERY DAY, BUILDING UPON THE MAIN FRAMEWORK”:
MONITORING AND EVALUATION**

As mentioned early in this paper, a key objective is to attempt to inform the future of FATIH based on lessons learned from other large-scale technology immersion programs. However, the types of evaluations that allow us to call something a “lesson learned” are rare. Readers of any evaluation report should always use caution when judging the reported outcomes—negative or positive—of a particular program if they do not also discuss what actually led to the particular outcomes. This lesson is equally as valid for the FATIH’s pilot evaluation; many reports in the Turkish press point to the failure of the technology pilot to lead to any positive outcomes,

⁴⁶ Fullan et al., 2013.

⁴⁷ TCER, 2008, p. 80.

⁴⁸ Flor de Ceibo, 2012.

but they also fail to report that, in fact, there was no specific intervention in place that was designed to lead to outcomes nor was there enough time to implement anything with a chance of provoking significant change. The four-month pilot could not have resulted in anything more useful than initial perceptions and challenges in distribution and installation—one very precise kind of information that is needed for successfully scaling up later. Similarly, there are many reports, both anecdotal and more rigorous/quantitative, suggesting that use of technology, especially one-to-one programs, leads to increases in “student engagement and motivation”. Both of these terms are hard to define and even harder to measure, but more importantly, the reports generally stop at the link between technology and student engagement, without necessarily showing the effect of student engagement on learning outcomes. Though it is intuitive to believe that increased attention leads to increased time on task, which leads to increased learning, the content that the student’s attention is focused on remains the critical piece of the puzzle.

It is commendable that there was a pilot program in Turkey that served to inform the larger hardware procurement, and to identify some critical shortcomings of the technology that were rectified prior to the larger roll-out (i.e., need for tablets to communicate with the IWBs). Elsewhere, the phasing in of technology roll-out has also been linked to a strategy of learning lessons from each phase and incorporating those lessons into the next phase of distribution. According to YEGITEK’s research and development unit, there are many plans in place to do further research on student achievement and on the specific processes of how children learn and how the technology transforms learning. However, these plans have yet to be backed up by an appropriate budget, and serious consideration should be given to whether research performed by the MoNE itself would be credible if not accompanied by some measure of objectivity as provided by an external evaluator. (The evaluation of the pilot program involved a consortium of researchers from across several local universities). There is a real opportunity for FATIH to couple further implementation with small-scale research studies on the impact of the tablets on specific types of pedagogies, types of target groups, and investigating specific characteristics like teacher and school factors. Furthermore, a commitment to disseminating the results, whether positive or negative must be made. Learning from continuous evaluation at large scale, like the evaluation of Peru’s OLPC initiative, or small-scale action research by teachers themselves is critical in any technology immersion program in order to move from a situation where actions are based on a leap of faith to one where they are based on plausible evidence.

OPPORTUNITIES FOR FATIH GOING FORWARD

This report has provided a brief analysis of several key considerations of FATIH, based on available information about FATIH and examples of other large-scale ICT initiatives around the world. Examples of rigorous, controlled research may be scarce, yet some are available, and it is possible to find reports of evidence that one-to-one technology programs do have an effect on student engagement, reducing disciplinary problems, moving towards student-centered classrooms, improving literacy, math or science scores. However, because each context is unique, lessons learned from other countries must always be viewed according to the specific details of these different components—institutional context, school-level policy and vision, technology choice, professional development, and monitoring and evaluation methodology—and not simply as “x” input led to “y” outcome. Every outcome is somehow a function of how these different elements work together.

As the hardware procurement and distribution processes are moving forward, this paper does not attempt to take a position on whether distributing one tablet per child and one IWB per classroom is a good or bad idea. Instead, it aims to lay out lessons learned from previous and ongoing international experiences that can guide FATIH towards achieving positive educational change along the way. The above sections have highlighted examples from the literature that feature interventions or actions associated with improved learning outcomes or otherwise positive changes in teaching behaviors and classroom interactions. Building on these examples, this section is focused on summarizing and prioritizing the most critical opportunities for FATIH to build on its achievements to date and maximize the positive effects on student achievement as a result of the introduction of these technologies.

1. ADOPT A PHASED STRATEGY

It is understandable that the initial focus may be on access, which explains the associated hardware procurement and distribution plan to phase distribution over three years nationally, by grade levels. An alternative would be to allow schools to opt in (or out) based on established school readiness criteria or demand, thereby increasing the chances that the early adopters will also establish best practices that can benefit those who enter later—even if this wouldn’t immediately create the universal access or equality of opportunity that is at the core of the program. Another alternative to consider is tiered roll-out based on estimated home computer ownership (starting with those who do not have computers at home). The TURKSTAT estimates that 30.5 % of Turkish homes own desktop computers and 31.4 % own laptop computers,⁴⁹ and research shows that cognitive gains derived from using computers in the home is more likely in homes without prior ownership.⁵⁰ This strategy would then address the equity issue in some ways, and would conceivably help provide insight on the capacity thresholds most critical for low-resource schools. That is, such an approach would help MoNE better understand which minimal conditions are necessary for effective integration of technology towards FATIH’s goals.

⁴⁹ TURKSTAT, 2013.

⁵⁰ Beuermann et al., 2012.

Either way, the MoNE may need a targeted strategy to ensure that the focus on equal opportunity pays attention to implementation levels in economically disadvantaged areas. Lessons from technology immersion programs in Texas (USA) showed that implementation was lower in larger schools and schools with a greater proportion of economically disadvantaged and that this is consistent with other studies showing that “unequal technology opportunities between higher and lower socioeconomic status schools generally persist despite the infusion of resources that have diminished the digital divide.”⁵¹ These schools may need more specific and targeted supports in place.

Finally, the idea of a phased approach assumes that there is also some kind of “final” phase. It would be worthwhile to consider at this early stage whether there will ever be an end to FATIH, or if, in fact, this is expected to be just the start of a long-term dedication to progressive and measured educational change aided by technology. At minimum, it should be made clear in implementation plans and public communications that distribution is just the first phase and that “the FATIH Project” will continue in a second phase to address implementation quality and targeted outcomes. The government may also need to change the way it talks about FATIH as a “project”, and consider the possibility that, like Ceibal in Uruguay or the Jordan Education Initiative, as FATIH matures it may be able to evolve into either a governmental or a non-governmental agency of the same name that is responsible for fostering ongoing system change and improvement. In Uruguay, Ceibal has also spawned a number of community- or university-based initiatives such as Flor de Ceibo, CeibalJAM, and RAP Ceibal (*Red de Apoyo al Plan Ceibal*, Support Network for Plan Ceibal), aiming to involve the stakeholders in monitoring and continually contributing to the implementation effects of the one-to-one laptop program.

2. ACCELERATE AND REFOCUS PROFESSIONAL DEVELOPMENT

How school leaders are preparing teachers and supporting them day-to-day may be the deciding factor in the project’s successful implementation. A study of laptop and netbook initiatives across Europe concluded that critical success factors are that schools are self-organizing; they promote autonomy in management and professional development; teachers, students, and families are involved in the design and feedback of programs; and innovative teaching and learning methods like collaborative and blended learning are used.⁵² Although it may be possible to simply trust teachers to take the initiative, a more responsible strategy would be for leadership to help teachers by providing a support structure, encouraging (or even requiring) teachers to use technologies as part of their daily routines, and modeling the use of technology themselves. To begin with, teachers should have the same tablets as students. From there, the use of the tablets for reporting classroom statistics such as attendance could be required, or establishing communication and resource-sharing with and among teachers using the tablets could be encouraged. Providing guidelines and pedagogical learning scenarios in different subjects is a way of nudging teachers towards appropriation of the technologies, and finally towards innovation, therefore it does not imply laying down strict rules or imposing single models of adoption that would stifle innovation. It can be regarded positively that FATIH is allowing for flexibility in implementation and has provided minimum guidelines; however, it may be erring too much on this model of flexibility which is dependent upon individual motivation and capacity for innovation without having provided a gradual scaffolding for teachers to support them, including opportunities for peer-support, action research, sharing of best practices, and incentives for risk-taking and innovation.

51 TCER, 2008, p. 98.

52 Balanskat and Garoia, 2010.

3. CLEARLY DEFINE THE OBJECTIVES AND ESTABLISH A MONITORING & EVALUATION FRAMEWORK TO MEASURE THEM

If implemented and supported in the right way, technology can act as the catalyst for a new kind of teaching and learning that activates children in building and expanding knowledge through a wider variety of collaborative and guided enquiry, which can lead to effective educational transformation. If supported with a sound educational model, a targeted strategy for home Internet access and parental involvement, FATIH holds the potential to set off such a transformation. It would be worthwhile now and in the years to come to have a more clearly articulated goal and a logic model for achieving this goal based upon integration of technology that can be translated into a useful monitoring and evaluation framework.

From there, there is an enormous opportunity to design and implement controlled studies to evaluate what works technologically and pedagogically based on that framework. Ongoing monitoring and evaluation during initial phases or among the first cohorts should serve to establish lessons learned, but recognizing that effectively measuring the effects requires time and careful attention to the specific variations in implementation contexts which may be responsible for a given outcome. The result of such a monitoring framework is a key component of a supportive and adaptive ecosystem around FATIH, one which is able to identify, quantify and qualify all types of inputs (such as support, training) and outputs (such as achievement, attendance, academic and civic engagement).

There are many aspects of the learning process that can be considered outcomes linked to the use of technology. The inherent problem is narrowing down to something specific enough that causality can realistically be determined. In monitoring and evaluation, measuring the effect of the project must be differentiated from those of the technology, teaching methods, learning materials, curricula, or a combination of these elements. The monitoring and evaluation framework could incorporate elements of changes in interaction, attainment (presence, engagement) and achievement. Much of this can be done through the tablets themselves if the evaluation framework is well-defined and investments made in analytical software. Another element of a rigorous research framework is to have a valid counterfactual with which to determine what effect the presence and use of the technology has in comparison to a situation where it is not present. A phased approach to distribution would allow such comparison groups to emerge as part of overall implementation. Most importantly, however, is to recognize that it may take years to actually see results, since by all other accounts there is always a period of appropriation and adaptation required before the technology starts to be used in a way that is transformative.

4. IMPROVE INSTITUTIONAL LEADERSHIP AND COMMUNICATION WITH STAKEHOLDERS

Getting stakeholders, especially parents and schools, involved has proven critical to sustainability of many types of educational reform initiatives, including ICT in education, and as pointed out earlier can provide the tipping point where real student-level change in achievement happens. Yet the current model of distribution and management of hardware, content and training is currently very centralized and lacks obvious feedback mechanisms. The procurement documents are not easy to obtain and therefore prevent a range of other large and small actors from preparing to play important supportive roles in content development, technical support, and more. The lack of transparency may ultimately reduce the effectiveness of this large investment. As FATIH

progresses, it may be useful to implement a leadership model that includes open and transparent communication with all stakeholders, integrates the necessary feedback mechanisms and promotes the multi-stakeholder coordination and innovation required to bring about successful change.

The MoNE and FATIH would benefit from a communication plan that more effectively disseminates information about the project, and seeks feedback in a meaningful way (and one which is open to the possibility of change based on feedback). The current communication plan has been criticized for excessive spending and little to show for it.⁵³ Including parental outreach should be a priority to make sure that parents know how to support children's technology use at home and in extracurricular activities. For instance, encouraging families to contribute to monitoring safe Internet use, could prove to be a more effective strategy than relying on failsafe algorithms for safe Internet use.

Finally, overall leadership and execution of the project needs to put in place mechanisms to ensure that policies and practices survive changes in government—the next major one coming in 2015. Encouraging more active involvement in the project at school and community levels could be one of the ways to strengthen and ensure continuity of the project.

CONCLUDING REMARKS AND ACKNOWLEDGEMENT

This paper highlights key areas where FATIH offers opportunities for improvement and transparent communication forms one of these areas. This paper is one of the initial products of steps taken towards such a direction. Therefore, we are grateful to our interviewees at the MoNE for their sincere approach during the interviews, their help and guidance during the subsequent data and document collection process. We are also thankful to our interviewees from academia, non-governmental organizations and local industry. They generously assisted us to gather different point of views and interpretations of FATIH from diverse sources.

⁵³ http://www.radikal.com.tr/turkiye/FATIH_sorusturmalik_oldu-1147196

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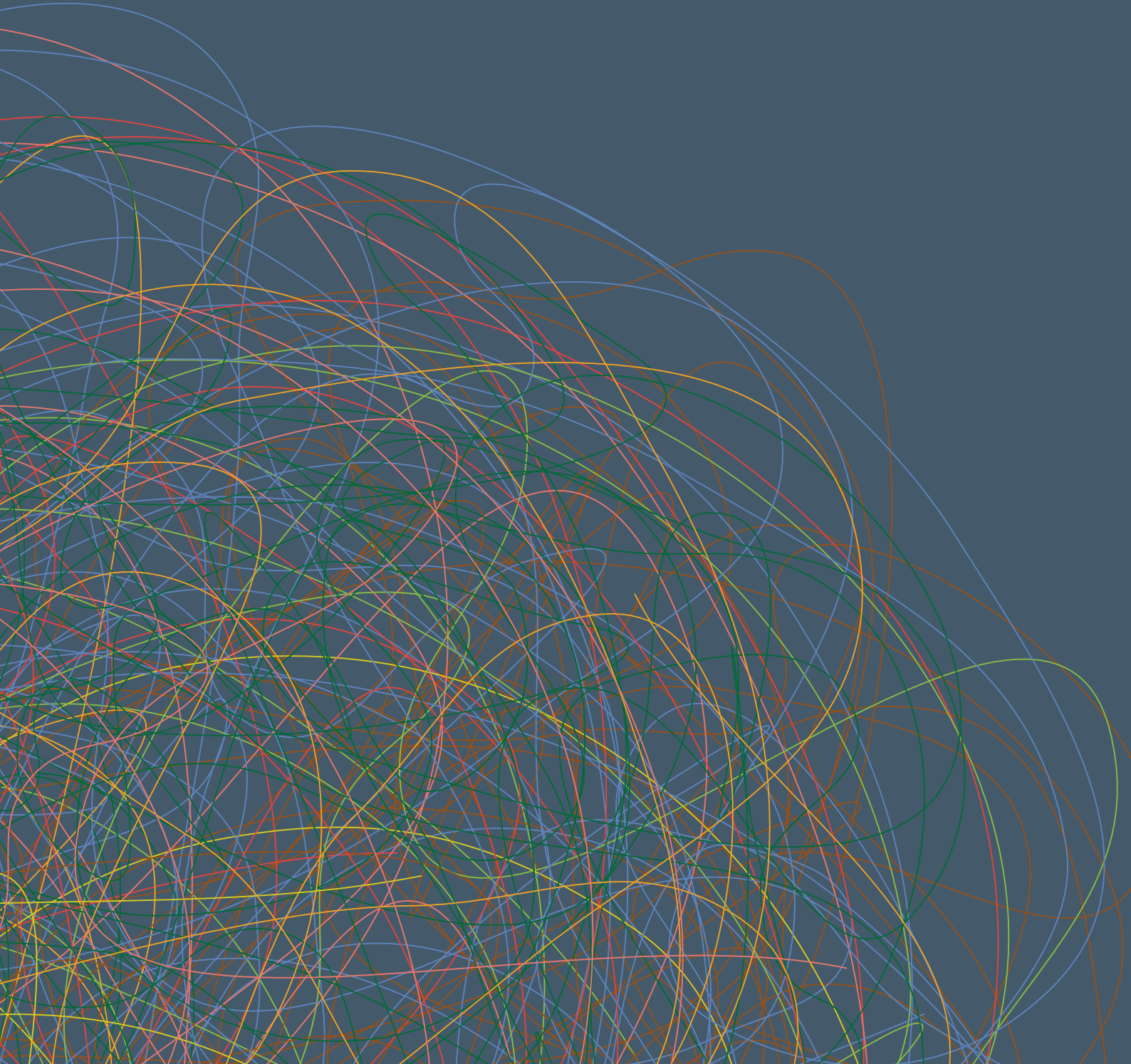
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Bankalar Caddesi
Minerva Han No 2 Kat 5
Karaköy 34420 İstanbul

T +90 (212) 292 05 42
F +90 (212) 292 02 95

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