

## **Information and life transitions among youths: Evaluating the impact of ICT in a developing country**

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**Background** During the ages 12-24, youths make major life transitions that have long-lasting consequences for them, their families, and their societies—continuing schooling beyond the primary level, finding work, developing a healthful lifestyle, beginning a family, and engaging with the larger community. The World Bank’s 2007 World Development Report *Development and the Next Generation* stresses the importance of helping youth navigate these life transitions because the decisions and experiences regarding these transitions affect countries’ prospects for growth and poverty reduction.<sup>1</sup> Some of the challenges have to do with the availability to youth of opportunities to access services and work experiences that build their human capital. Other challenges are about addressing shortages in information, resources, and experienced decision making. Information shortages grow in importance because as youths get older, decision-making shifts from parents and families to youth themselves, that is, youth increasingly exercise their own “agency.” But what can be done to better inform youth about the benefits and costs of investing in their human capital, of avoiding unnecessary risky behaviors, or about the opportunities for them in the labor market? One recommendation of the WDR 2007 is to allow youth to harvest worldwide knowledge through new technologies, such as the Internet.

The use of computers and the Internet has grown rapidly in developing countries. Between 2000 and 2005, the number of Internet users in those countries grew by a quarter of a billion people, and many of whom are young people.<sup>2</sup> There is a wide variance across countries, however. According to recent surveys, the share of 15-24 year-olds who have ever used the Internet varies from less than 1 percent in Ethiopia to 12 percent in Indonesia, 13 percent in Ghana, 15 percent in Egypt, 29 percent in Armenia, and 53 percent in China.<sup>3</sup> Illustrating the age differences in Internet use, in 2003 in China, 23% of those in ages 18–34 years were using the Internet, compared to 9% of those aged 35–49 and only 3% of those over 50.<sup>4</sup> School-based access to the Internet varies even more. Some richer developing countries such as Chile and Thailand have connected many of their public schools. Chile’s Enlaces Project, for example, has linked almost all secondary schools and more than half of all primary schools to the Internet; schools are provided with computers, technical support, and technical training.

Not only the middle-income and industrialized countries that are determinedly expanding the supply of computers in their schools in the belief that schools will benefit from the use of the new technologies and that students need to be exposed early. Poorer countries are taking interest too. For example, African countries are considering a program to procure \$100-laptops for schools. The New Partnership for African Development (NPAD) has an *e-school* program that aims to equip model schools in 16 countries in Sub-Saharan Africa for Internet access. The WorldLinks program has been providing hundreds of hours of teacher training to introduce computers and Internet use into teaching and learning in developing countries. There is no doubt that this is a

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<sup>1</sup> World Bank. 2006. World Development Report 2007. Development and the Next Generation. Washington, DC: The World Bank.

<sup>2</sup> World Bank, *ibid.*

<sup>3</sup> World Bank, *ibid.*

<sup>4</sup> Zhu, Jonathan J. H. and Enhai Wang. 2005. “The diffusion, use and effect of the Internet in China,” *Communication of the ACM* 48(4): 49-53.

growth area in the education sector in the developing world and that there is need to measure its likely impact on education and also on other important outcomes pertaining to youth.

Despite the growing adoption of new information and communications technologies (ICT) in developing countries, there is very little hard and systematic research about the nature and the degree of that use, and even less about its impact on educational outcomes, social behavior, or jobs and worker productivity, for youth or anyone else. The impact of computers is expected to be revolutionizing, affecting not only the manner in which people acquire and transmit knowledge but also the manner in which students and teachers work, communicate with each other, maintain relationships, and influence decisions. Although some of these consequences have received attention in mass media, they have not been examined in any systematic way.

**Research objectives** The study will focus on how information affects the expectations that youths have about their future life transitions and the choices that they make. In particular, the research will evaluate the impact of ICT use on 4<sup>th</sup>-year secondary school students in the Philippines, a lower-middle income country, within the context of an ongoing program that is a partnership between the Department of Education and a consortium of private enterprises and NGOs.

The Philippine program, called *Gearing up Internet Literacy and Access for Students*, or GILAS, is providing computers to public secondary schools and connecting them to the Internet. GILAS was launched in 2005 with the goal of providing each public high school a package consisting of telephone line installation with free Internet access for one year, a complete Internet laboratory with software, hardware and basic computer, and Internet training for teachers and administrators. The program is meant to cover only the fourth-year students, partly because of the relative scarcity of computers in the schools and partly because the aim is to give at least those students computer and Internet literacy prior to school-leaving. The graduating students are expected to be helped by their experience with the new technology in finding a job or in pursuing higher education. According to the latest data (for school year 2006) from the Department of Education, 42 percent of public high schools do not have a computer, and 41 percent have computers but no Internet access, leaving 17 percent with Internet access now. Schools with computers but no Internet access have an average of 13 computers while the GILAS schools have 15 computers on average.

As part of the program, the largest telecommunications companies in the country pledged to connect schools for free for one year, using, where possible, a DSL facility.<sup>5</sup> To be connected, a school has to have at least 10 working computers. Program volunteers visited schools with computers to determine the state of those computer labs (e.g., whether they still existed and whether the computers were still operational), whether the schools had phone lines, and whether there was an Internet Service Provider (ISP) in the area. Businesses, organizations, and private individuals were solicited to make contributions to finance the program; local governments have stepped in also to provide computers to schools. The program trains one teacher in the school who is considered the “computer expert,” but does not provide any special training to students;

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<sup>5</sup> The phone penetration in the Philippines is largely via mobile phones, but the most cost-effective and reliable way for Internet connectivity is through landlines. The GILAS secretariat worked with the telecom companies to explore the options with wireless connectivity, especially in the smaller islands and outlying communities where landlines are not commercially feasible. In the extremely remote areas, there was some experimentation with the use of satellite phones, but such phones are more than twice as costly to install and there are concerns that the schools in poorer areas will not be able to continue paying the higher fees for a satellite phone and Internet access.

the presumption is that the ICT-expert teachers would do so. The high school curriculum sanctioned by the Department of Education has a subject area called Technology & Livelihood Education (TLE) which is an elective for fourth-year students and which covers computer training. Computer training for students is not necessarily mainstreamed into the main subjects unless the teachers in those subject areas have received training from the software companies or from the Philippine Business for Social Progress (PBSP) which sponsors such training programs also. As of December 2006, 1,059 public schools across various regions had been connected through the program.

The study will examine not only the impact of ICT on the academic development of students but also its impact on other aspects of youth development. By increasing youth's access to such information as the returns to a college diploma or a training certificate in the labor market, the prospects of migration to the city, and the health risks of smoking or drug use or early teen pregnancy, they might make better decisions (in terms of nature and timing) about these life transitions. Thus, the overarching research question of the proposed study will be: Can ICT introduced in schools help students to make better life choices by increasing their access to information? The research will examine:

- Nature and frequency of computer use by students, such as the ways in which they use ICT to study, acquire information, and communicate;
- Students' probability of completing high school and doing so at a good level of performance;
- Students' knowledge, attitudes and expectations about their life transitions—further schooling, health-related behaviors, sexuality and family formation, work, and citizenship;
- Quality of students' decision-making, such as the sources of information and advice they rely on; and
- Youth choices and behaviors regarding these transitions.

**Methodology** There is a growing literature on ICT in developed and developing countries, but most of the empirical evidence on impact is still based on simple correlations and the findings even of the serious evaluations do not sum up to clear conclusions. The study will implement a randomized intervention to influence the use of ICT by students in secondary schools by providing specific information on selected websites on topics such as school choice at the tertiary level, work opportunities for the educated labor force, and the health risks of smoking or alcohol consumption. The specific form of this intervention is being explored with ICT experts (e.g., WorldLinks program, Google), but it could take the form of a simple list of web addresses or Uniform Resource Identifiers (URIs or URL's) on a brochure, or it could be software to be installed with the Internet connection to the school.

With the collaboration of the program administrators, the research team will match pairs of schools within the universe of program schools (1,059 as of the end of 2006) on the basis of observable characteristics such as rural/urban location, enrollment size, student-teacher ratio, and test scores on a national achievement test. Within each matched pair, we will randomly assign one school to the treatment group and one to the control group. This randomization method should maximize the balance among the groups over all as well as within important stratifications such as urban-rural location. We have been able to ascertain that the deployment of the program itself across geographic regions has been influenced by two factors: the availability of the telecommunications infrastructure which is determined by business considerations *external* to the program schools, and the targeting of program funds by the donors, including political patrons

and bilateral donor agencies, who tend to have geographical favorites that are independent of the characteristics of schools. Given these factors, we believe that program placement (or the universe of program schools) is not determined in a significant way by *unobserved* variables that is correlated with the student outcomes we are interested in measuring.

From the universe of 1,059 schools, we will select randomly 150 pairs according to the method described above. The schools will be divided into two groups:

- “GILAS-basic” which has Internet access, but no intervention regarding use;
- “GILAS-plus” which has Internet access and an intervention to direct use of students to specific websites that provide information related to youth outcomes.

An experimental design ensures that, at least before the intervention, the treatment and control groups are on average statistically equivalent with respect to all characteristics, and that differences in their average outcomes after the intervention can be attributed to the program. With randomization, it would be possible to make a simple comparison of outcomes between the treatment and control schools to estimate the program impact. In general, the randomization allows us to estimate the following model:

$$Y_{ijt} = b_0T_t + b_1D_j + b_2D_j*T_t + B_{ijt}X_{ijt} + e_{ijt}$$

where  $Y_{ijt}$ , is an impact measure for child  $i$  in school  $j$  at year  $t$  (e.g., dropping out, standardized test score);  $T_t$  is a dummy variable that takes the value of 1 for observations after the program starts and zero before;  $D_j$  is a dummy variable equal to 1 for students in GILAS-plus schools and 0 for those in GILAS-basic schools;  $X_{ijt}$  is a set of observable characteristics of individuals and schools; and  $e_{ijt}$  comprises all unobservable characteristics. The effect of the program is given by the coefficient  $b_2$ . A preliminary list of outcomes  $Y_{ijt}$  that we plan to measure is given in Table 1. We will conduct baseline and follow-up surveys which will be school-based but will also collect information on students’ personal characteristics and household background. We will develop measurement methods for school-based ICT use by students that do not rely solely on self-reporting, and for the impact of ICT on academic performance as well as on knowledge, attitudes and perceptions about a range of youth behaviors and outcomes.

**Table 1. ICT use, knowledge and attitudes among youths: Outcome indicators**

<b>Domains</b>	<b>Indicators</b>
<b>Computer and Internet use</b> (students & teachers)	Change in knowledge about computers and Internet access Change in quantity and nature of computer and Internet use (frequency, intensity, sites visited) Change in nature of information accessed (range, accuracy and speed)
<b>Academic performance</b> (students)	Change in daily attendance and performance Change in assessment of self as a student High school completion and graduation NAT test scores
<b>Knowledge, attitudes, perceptions (KAP)</b> (students)	Change in KAP pertaining to education, health, work, migration, sexuality and family formation, civic participation
<b>Expectations for self</b>	Change in plans for self pertaining to health behavior, work, migration, sexuality and family formation, civic participation
<b>Behavioral change</b> (students & teachers)	Membership in civic/social organizations Change in knowledge, values and expectations related to civic/social participation

We believe that 300 schools would yield sufficient statistical power to be able to measure reasonable impacts on outcomes of interest for teachers and students. Within each school, we will take a random sample of students on the basis of shift (morning, afternoon or evening) or section, with the objective of having a maximum sample of 100 students per school. This sampling design is still tentative and requires further estimates of inter-cluster correlation. In order to limit the cost of the evaluation, the study will focus geographically, possibly on Central and Western Visayas and the Southern Tagalog regions, depending on where the density of program schools is highest. Outside metropolitan Manila, these regions have the largest number of high school students; they also provide a good mix of urban and rural schools.

The full evaluation design includes a tracer study one year after the students leave school (starting April 2008) on a random sample of the students in order to assess impact on continuation and performance levels in university or other training, labor market outcomes, migration, health-related behaviors, family formation, and citizenship. This tracer survey will require finding students in their homes and following those who have migrated out of the area. At that time, they will also be tested to measure how much of their knowledge of the new technology they have retained and what uses they make of it.

**Work program and deliverables** The evaluation starts this coming school year (June-March). The baseline survey will be conducted in June-July 2007, and a follow-up survey will be fielded in March 2008. The surveys will collect information on the socioeconomic and educational background and the computer knowledge and use of students and teachers. A school questionnaire will also be given to the principal and two teachers to obtain information on basic school characteristics and computer supply and use (e.g., where the computer labs are situated in the school, the condition of the computers, how they are maintained, whether computer access is regulated and how this is done). Reports based on the baseline and first follow-up survey will be delivered by December 2008.

**Budget estimate** The total cost of the complete evaluation design is about \$500,000, of which \$64,000 has been obtained from the BNPP grant in order to cover the costs related to the design and pilot-tests of the intervention and the survey instruments. An additional \$100,000 has been requested from the Knowledge for Change Trust Fund in DEC to cover the cost of fielding the baseline survey, and a proposal will also be submitted to the Bank's Research Support Budget to cover the remaining costs.

**Capacity building** The research is possible only with the active cooperation of the GILAS program administration unit and the public-private consortium that initiated and supports the program. In preparation for this proposal, we have had to explain micro impact evaluation methods and the benefits of alternative approaches to program staff and representatives of the members of the consortium. Local researchers have been involved throughout this preparation phase. The implementation of this research will involve the direct collaboration of local survey firms and local research economists. This direct collaboration on the development of survey instruments, implementation of the surveys, and the analysis of survey data is the best way of building local capacity.

**Research team** The Bank research team will consist of Elizabeth King (Task Manager) who has experience conducting impact evaluation studies, including those with an experimental design. The research team will consist also of Aniceto Orbeta (Ph. D., Economist and Senior Fellow, Philippine Institute of Development Studies), Socorro Gultiano (Ph. D., Demographer and Director, Office of Population Studies, University of San Carlos, Philippines), and Sharon

Ghuman (Ph. D., Population Council, New York). The research team will be working closely in coordination with the operational team of the GILAS program, led by Victoria Garchitorena, President of Ayala Foundation and Mario Derquito. The surveys will be conducted by experienced survey teams based at the University of San Carlos (Cebu City) and at the University of the Philippines (Los Baños, Laguna). The Cebu team, based in the Office of Population Studies, is known for collecting the data for the Cebu Longitudinal Health and Nutrition Study, a long panel survey that has included both household and school modules of a rather complex design, and for the Early Childhood Development Study, also a panel household survey. The Cebu team will be in charge of data collection in the multi-island Visayas study areas. The Los Baños team, which has been involved also with the Early Childhood Development Study, will conduct the data collection in the Tagalog region. These two survey teams will work together in order to coordinate the preparations for the field work and the data entry and processing. This will involve some joint pilot-testing of the survey instruments, preparing jointly the field training materials, and developing jointly the data entry platforms. The research team will work closely with the Bank's operational staff focusing on education issues in the Philippines (Lynnette Perez in the Manila office, and Dingyong Hou in Washington).