Innovative Information and Communication Technology in Education and Its Potential for Reducing Poverty in the Asia and Pacific Region

Learning Communities Enabled by Mobile Technology: A Case Study of School-Based, In-Service Secondary Teacher Training in Rural Bangladesh

December 2007

Appendix 11 of Final Report

Sarah Lucas Pouezevara
Rubina Khan

RTI INTERNATIONAL

Technical Assistance Consultant's Report

Appendix 11 of Final Report

Bangladesh: Innovative Information and Communication Technology in Education and Its Potential for Reducing Poverty in the Asia and Pacific Region: **"Learning Communities Enabled by Mobile Technology: A Case Study of School-Based, In-Service Secondary Teacher Training in Rural Bangladesh"**
(Financed by the Poverty Reduction Cooperation Fund, Asian Development Bank)

Prepared by
Sarah Lucas Pouezevara
Rubina Khan
RTI International
3040 Cornwallis Road
Research Triangle Park, NC 27709-2194
USA

For
Asian Development Bank
ATTN: Jouko Sarvi
Principal Education Specialist
Capacity Development and Governance Division
Regional and Sustainable Development Department
6 ADB Avenue, Mandaluyong City
1550 Metro Manila, Philippines

RTI International is a trade name of Research Triangle Institute.

Asian Development Bank

CONTENTS

List of Exhibits

Abbreviations

ADB	Asian Development Bank
AVEC	Audio-Visual Education Centre
BBS	Bangladesh Bureau of Statistics
bEARN	Bangladesh Education and Resource Network
B.Ed.	Bachelor of Education
BOU	Bangladesh Open University
CAMPE	Campaign for Popular Education
CD	compact disc
CPD	continuous professional development; the Continuous Professional Development Program (within TQI-SEP)
DEO	District Education Officer
DMC	developing member country
EFA	Education for All
EMIS	education management information system
GPRS	general packet radio service
GSM	global system for mobile communications
HSC	Higher Secondary Certificate
ICT	information and communication technology
iEARN	International Education and Resource Network
MDG	Millennium Development Goal
MMS	multimedia messaging service
MoE	Ministry of Education
NAEM	National Academy of Educational Management
NTRCA	Nongovernment Teachers Registration and Certification Agency
PDA	personal digital assistant
RETA	Regional Technical Assistance
RTI	Research Triangle Institute
SE-SDP	Secondary Education Sector Development Plan
SESIP	Secondary Education Support and Improvement Project
SMS	short messaging service
SSC	Secondary School Certificate
TC	technical coordinator
Tk	taka (Bangladesh currency)
TQI-SEP	Teacher Quality Improvement for Secondary Education Project
TTC	teacher training college
UNESCO	United Nations Educational, Scientific and Cultural Organization
USEO	*Upazila* Secondary Education Officer
WAP	wireless application protocol

Acknowledgments

As this report was being finalized, two tragic events took place that affected participants of this project. First, Ms. Patricia Williams, TQI-SEP Distance Learning Specialist, passed away unexpectedly. Her support to the project was invaluable and we regret that she will not see the outcomes and future application of the findings. Second, the cyclone Sidr hit Bangladesh on November 15, 2007, and the Barisal region, including the Patuakhali Sadar and Galachipa upazilas where this study took place, were among the worst-hit areas. Although all of the participants of the project are reported to be safe, they were displaced by the storm and their schools and homes were severely damaged. Our thoughts are with them as they begin the task of rebuilding their communities and schools, and we hope that the links forged among communities during this pilot project will prove to make this task a little bit easier.

I. EXECUTIVE SUMMARY

A. Background of the Study

1. With the aim of providing developing member countries (DMCs) with better guidance to use information and communication technology (ICT) effectively in education, the Asian Development Bank (ADB) funded a 21-month regional technical assistance (RETA) in Bangladesh, Nepal, Mongolia, and Samoa. The RETA researched approaches to using ICT in education in ways that succeed in improving teaching and learning and also are sustainable given the region's development challenges. The study was implemented by RTI International in partnership with iEARN-USA. Titled "Innovative Information and Communication Technology in Education and Its Potential for Reducing Poverty in Asia and the Pacific Region,"[1] the program commenced in April 2006. Study outcomes from all four countries were shared at an International ICT for Education Conference that took place October 16–18, 2007, at ADB headquarters in Manila, Philippines.

2. The study's aims were (i) to highlight promising models of ICT integration and best practices, (ii) to identify drivers and barriers to successful ICT integration, and (iii) to share lessons learned, with a specific focus on rural and remote areas. The study combined policy analysis, program evaluation, and small-scale activities. Countries chosen by ADB, based on geographic and demographic characteristics, provided their perspectives and country context. The study linked with existing education projects in each of the four participating countries that already featured ICT elements. The RETA was structured along three technical components:

   (i) Policy and Strategy component (regional),
   (ii) e-Resources component (Mongolia and Samoa), and
   (iii) e-Teacher Training component (Nepal and Bangladesh).

3. The study in Bangladesh, part of the e-Teacher Training component, complements the existing ADB-funded Teaching Quality Improvement in Secondary Education Project (TQI-SEP; 2005–2011), which has as one of its objectives, to provide in-service professional development to all serving teachers working in secondary schools recognized by the Ministry of Education (MoE) at least once during the project period. This Continuous Professional Development (CPD) Program provides 14-day, face-to-face, subject-based training programs that require participants to come to one of the government teacher training colleges for the duration of the training. However, TQI-SEP staff recognize that for many teachers it is difficult to leave their home, family, school, and other obligations for an extended period and are therefore looking for alternative methods of delivering CPD courses.

4. The study equipped two subject trainers, a training coordinator, and a cluster of 10 schools with "smartphones"[2] (with video, speakerphone, and three-way calling capabilities), for use by 20 Bangla and math teachers in 10 schools of the Barisal region in southern Bangladesh (for a map indicating the study area, see Appendix 1 of this report). The existing training curriculum was revised from a 2-week, face-to-face workshop to a 6-week distance-mode training based on printed materials and practical application of training content with peers. The

---

[1] Referred to as "the study" from here forward.
[2] A smartphone is defined as a mobile cellular telephone that is built with many of the same functions as a handheld computer—that is, e-mail, photo and video capture, document viewing, Web browsing, etc.

phones were intended primarily to enhance communication, motivation, and multimedia delivery.

5.   The objective of the study was to develop a case study on the use of mobile connectivity in support of distance education and to determine whether:

- it is an effective mode for teacher training and improvement in classroom practice

- it is a suitable mode to reach rural and remote teachers, including women and disadvantaged groups

- it presents other benefits in terms of education administration (including student assessment and costs) and pedagogy.

6.   The study also sought to determine the costs of this model, and the features of the smartphones that would be most useful as a support to distance learning.

B.   Study Process and Findings

7.   The pilot 6-week training program, which was conducted from June 15 to July 30, 2007, is considered successful based on the perspectives gathered from trainees, trainers, and administrators. Data collected using questionnaires, interviews, focus groups, journals, and log sheets kept by the trainees revealed that participants were satisfied overall with the learning experience, and strongly preferred training that allowed them to remain in their homes and classrooms. Trainers and trainees alike were very receptive to the idea of training at a distance with support of smartphones, and adapted easily to certain constraints encountered (e.g., lack of adequate training to use technology, technical failure of phones, rigid conference timing, insufficient number of phones).

8.   Participants noted clear benefits of using this new modality of training for professional development:

- Convenience—easy access to training from their workplace; not being separated from their families or having to take leave from school

- Opportunities for ongoing communication—with trainer and fellow trainees at other schools

- Modern and exciting approach—as opposed to the traditional approach; increased the interest of the pupils as well

- Increased face-to-face interaction—between teachers and school administrators at the school level, due to the school-based nature of professional development

- Fostering of collegiality—due to the need to work together and provide feedback to one another.

9.   The experience has generated interest and enthusiasm on the part of participating teachers, other subject teachers, and even neighboring schools, who inquire about the process and use of new technology. Comments from participating trainees indicate that they have discovered a learning community within their own school, and realized that they can learn through group discussion and self-directed methods. The trainees, when compared with a control group of trainees who completed the face-to-face training at the same time, demonstrated equivalent content-knowledge gains based on pre- and post-training scores. (The Bangla subject trainees scored slightly higher in terms of content retention.) Head teachers also reported that they had observed new teaching methods being applied in the schools, indicating

that the distance-mode training is as effective as the face-to-face mode for improving knowledge and skills. There is reason to believe that the training concepts will be more effectively put into practice since the trainees could immediately apply and experiment with the techniques that they were learning, rather than waiting until after the training period to do so. Follow-up research would help to confirm that hypothesis.

10.   The mobile communications technology gives the trainers confidence that the trainees will complete the training program effectively, since the trainer and training providers have a way of following up regularly and ensuring that the trainees stay on task. Major factors contributing to the success of the training have been the enthusiasm, patience, and resourcefulness of the participating trainees, head teachers, trainers, and training coordinator, as well as the support and supervision of the Teacher Training College (TTC) principal and local education officers.

11.   At the same time, the study has helped to achieve the TQI-SEP project objective of strengthening in-service teacher training by helping to reach the large number of untrained teachers through in-service training. The study also contributed to the improvement of the existing professional development training materials by illustrating how the existing materials could be adapted to distance training, and making improvements at the same time. It also contributes to the component that aims to improve teaching quality and community participation in rural areas by offering a solution that encourages female teachers to complete training because they are not required to leave their homes and families for a 2-week, face-to-face training.

C.   Study Recommendations

12.   Given the ambitious task of TQI-SEP to train all teachers nationwide, it would be worthwhile to consider implementing this experience on a larger scale, keeping in mind that the phone technology should be considered a supplement to traditional distance learning based on pedagogically sound curriculum materials and active learning, and not as the main mode of delivery of course content. Some further considerations for future use are:

- Use a simpler and more low-cost model if more phones would be purchased. Or consider using the trainees' own personal phones by finding a way to reimburse them for the cost of the calls that they make.

- Ensure that teachers have access to the phones at all times, including taking responsibility for them after school hours, if phones must be shared. Teachers on a school-to-school basis can plan a schedule to share the phones and schedule conference calls.

- Encourage schools to consider financing this type of experience using the Innovation and Development Fund, a TQI-SEP small-grant mechanism for schools.

- Improve the orientation program by providing more effective training on the use of the phone features, and developing a trainers' manual that specifically suggests how and when they might use the phones to prompt discussion, provoke reflection, assess progress, etc. Experienced trainers could be called upon to help develop this manual.

- Continue to experiment with the didactic application of different phone features, including preparation of clips of model teaching examples that are very clear and short, or photos of unique teaching aids and other learning materials or classroom

configurations, to the extent that smartphones are still available and the network can accommodate multimedia messaging service (MMS).

- Ensure that the trainers take the lead with advanced use of the phone features, so that the trainees can concentrate on the course content and not the use of the technology. For example, trainers could still make use of MMS and short messaging service (SMS) features of the phones to send content and instructions to the trainees, even if trainees only respond through traditional person-to-person calls.

- Use the laptop more effectively, if possible. The laptop should be linked to the Internet and e-mail in order to permit correspondence with TQI-SEP and other education administrators at the central level. This may be possible using the phone as a router to connect through global system for mobile communications (GSM) technology or general packet radio service (GPRS) technology.

13.   Although future distance learning courses for teachers could be implemented in any location across the country, there are advantages to continuing the program in the selected district (Patuakhali) because the trainers, training coordinator, and District Education Officers (DEOs) now have experience with the technology and the distance learning curriculum and will be able to continually improve the program. The trainers and training coordinator who participated in this experience should be recognized for the additional expertise that they have gained, and be given appropriate incentives to continue to develop their skills as distance trainers, mentors, and subject-matter experts.

14.   The study contributes to existing knowledge about distance learning, and the use of mobile phones in education, by providing lessons learned concerning:

- The advantage of school-based distance learning for in-service teacher professional development

- The possibility of telephone communication as a support for distance learning (particularly relevant in Bangladesh for the Bangladesh Open University [BOU], which enrolls over 200,000 students per year) or other formal learning situations involving a trainer and trainee.

- The feasibility of using advanced mobile phone features in place of desktop computers or other large multimedia projection equipment for delivering additional course content in a distance learning program.

- The learning curve required for the use of advanced phone features even by experienced mobile phone users.

15.   Further research is required to know the long-term effectiveness of the training, the benefit of the technology to the distance learning environment, and the full didactic potential of the phone features. The following could be starting points for further research:

- Visiting the control and implementation trainees who participated in this study to observe their classroom teaching practice and compare the extent to which the trainees of each learning method are implementing what they had learned.

- Comparing the study schools (using the same equipment and curriculum) to a set of control schools that would use only the print-based learning materials.

- Documenting the usability of the phones and phone features over a longer period of time, to determine the value of different features (synchronous and asynchronous

voice, video, text) for the learning experience, and possibly recommend a particular model of phone for the intended purposes.

16.   This report acknowledges the many factors that influence the effectiveness of ICT in education initiatives. The report therefore aims to provide a comprehensive picture of the environment in which those initiatives took place, including country context (Chapter II) and education system context (Chapter III). It also contains an overview of the specific activities carried out under both TQI-SEP (Chapter IV) and this study (Chapter V). Chapter VI explains the study methodology applied, and Chapter VII outlines and discusses the findings from the study. This is followed by elaborations in Chapters VIII and IX of the conclusions and recommendations for future initiatives and research that are listed immediately above. At the end of Chapter IX is a synthesis of the applicability of lessons learned for TQI-SEP in general, and an overview of knowledge this study adds to existing knowledge in mobile learning and its potential especially for similar contexts. The report ends with a complete list of references, some information about the authors of this report, a map of the study area, a sample unit from a distance learning curriculum, an overview on the six week distance training schedule developed for this RETA, and a more detailed literature review on other experiences in mobile learning.

II. COUNTRY CONTEXT

A. Overview

17. Bangladesh is a low-lying country surrounded by India on almost all sides, except where it borders the Bay of Bengal and Myanmar to the south and southeast. The country is primarily a delta plain created by the confluence of three rivers, including the Ganges. Most of the country is less than 12 meters above sea level, making it extremely vulnerable to flooding, especially during the monsoon season (June to October). Arable land comprises approximately 61.1% of the total area.[3]

18. Formerly called East Pakistan, Bangladesh became an independent nation in 1971 after an armed struggle by Bengali nationalists; prior to 1947 it had been under British rule, and, for centuries before that, Muslim rule. Bangladesh has an area of 130,200 km^2, and has a population of approximately 138.8 million people (2006 figure from footnote 3), making it the seventh most populous country in the world[4]—and one of the most densely populated with nearly 1,000 people per square kilometer. Bangladesh is characterized as a moderate Muslim, democratic country. Most of the population speaks Bangla, although English is widely spoken as well. The culture is highly patriarchal, with men controlling most decisions and assets within the household. Modern democracy was challenged in early 2007, when supporters of the two opposing political parties (Awami League and the Bangladesh Nationalist Party) clashed shortly before elections were to be held, and an interim government, backed by the military, was forced to step in to prepare the country for elections planned for the end of 2008.

19. There are six administrative divisions (provinces): Dhaka, Barisal, Chittagong, Rajshahi, Khulna, and Sylhet. Provinces are broken into a total of 64 districts (*zila*) and 465 subdistricts (*upazila*). It is primarily an agrarian economy (rice and potatoes are major crops), with about 75% of the population living in rural areas. Yet a major export is the ready-made garment industry—with approximately 4,000 factories in and around the capitol of Dhaka—accounting for 75% of export revenue.[5] Exhibit 1 summarizes some key population and economic indicators.

20. The country is making significant progress toward the Millennium Development Goals (MDGs).[6] The overall poverty rate has declined and primary school enrollment and literacy rates have increased. Women's participation in many aspects of society (public service, seats in Parliament, etc.) has also become more equal over the past 20 years, including primary and secondary school enrollment, where male and female participation is nearly the same. Infant mortality rates have decreased, more children are being immunized, and nearly all households have access to safe drinking water. The birth rate has been reduced and life expectancy extended. Despite these advances, poverty is still widespread, with half of the population living below the poverty line.

---

[3] 2005 figure. ADB. 2007. *Key Indicators 2007.* (Volume 38). Manila.
[4] Wikipedia. 2006. *World Population Aspects.* Available: http://en.wikipedia.org/wiki/List_of_countries_by_ population#_note-unpop. A compilation based on country estimates and data from the United Nations population database. On its Web site, the National Academy of Educational Management (NAEM) lists it as the eighth most populous country. Available: http://www.naem.gov.bd/about_bd.php.
[5] Bangladesh Bureau of Statistics (BBS). 2006. *Statistics Bangladesh 2006.* Dhaka.
[6] Hoque, E., A. Sikder, and S. Alam. Undated. *Statistics for Monitoring Attainment of MDGs in Bangladesh.* Bangladesh Bureau of Statistics. Dhaka. Available: http://bbs.gov.bd/dataindex/ MDGs%20in%20Bangladesh.doc.

Exhibit 1. Bangladesh: Key Facts

Annual population growth rate (2006)	1.3%
Total fertility rate (births per woman, 2005)	3.0
Urban population (2006)	25%
Percentage of population under 15 (2006)	35%
Percentage of people living below $1 a day (2005)	36.3%
Gross national income per capita (2005)	$470
Gross domestic product growth and inflation rates (2006)	6.7%, 7.2%
Economically active (as % of working age pop., 2003):	
Female	26.1%
Male	87.4%)
Life expectancy at birth (2005):	
Female	65
Male	63
Infant mortality rate (per 1,000 live births, 2005)	54

Source: ADB. 2007. *Key Indicators 2007.* Vol. 38. Manila.

B.   ICT in Bangladesh

21.   The past 10 years has seen a rapid growth in the telecommunications network in Bangladesh. The total number of mobile phone subscribers reached 32.5 million at the end of July 2007, bringing tele-density to 23.23%.[7] In recent years, Bangladesh has invested in a submarine cable to enable the population to connect to the rest of the world through high-speed Internet technologies. The ICT sector in Bangladesh is a promising sector, attracting investment from government and private organizations, as well as international actors, and creating a growing employment sector for Bangladeshi people. Bangladesh is well known for founding the microcredit concept through the Grameen Bank, which expanded to the telecommunication sector in the 1990s (through the nonprofit organization Grameen Telecommunications). In this model, the bank lends money to purchase a mobile phone, which the buyer then uses to sell phone services within the village, charging on a per-call basis. This model has spread to parts of Africa in recent years as an effective means of improving livelihoods of the rural poor. At least 50,000 women earn a living that exceeds the average national per capita income through Grameen's Village Phone Initiative in Bangladesh.[8]

22.   Although the ICT sector shows considerable increase in access to various forms of technology in recent years (see Exhibit 2, below), statistics remain lower than average in the south Asia region or even within the low-income group of countries.[9] Due to costs, technologies remain inaccessible to most individuals. The most significant change is in the number of mobile subscribers, which has increased from 2 to 27 subscribers per 1,000 people between 2000 and 2004. About 11% of the population (6% in rural areas) has a mobile phone, and 50% of the

---

[7]   Bangladesh Telecommunication Regulatory Commission.2007. *Mobile Phone Subscribers in Bangladesh.* Dhaka. Available: http://www.btrc.gov.bd/mobile_subscribers_may-july2007.htm.

[8]   Reddi, U.V., and V. Sinha. 2003. Bangladesh: ICT Use in Education. In UNESCO. 2003. *Meta-Survey on the Use of Technologies in Education in Asia and the Pacific, 2003–2004.* Bangkok.

[9]   World Bank. 2007. *ICT at a Glance.* Available: http://devdata.worldbank.org/ict/bgd_ict.pdf.

country is covered by mobile telephony. On the other hand, Bangladesh counts only two Internet users per 1,000 people, compared to 21 in other parts of Asia, including other low-income countries. It costs about 1,000 Bangladesh taka (Tk) per month (about $14) for an Internet connection using Enhanced Data Rates for Global Evolution[10] technology after an initial purchase of a Tk9,000 modem. Dial-up access costs about Tk500 per month ($7). To put this in perspective, a typical secondary school teacher makes less than $50 per month.

Exhibit 2. Access to Electricity, Telephone, and Mobile Phones by Residence

Area	Electricity	Telephone	Mobile Phone
National	44.23	2.87	11.29
Rural	31.19	0.33	6.05
Urban	82.61		

Source: Bangladesh Bureau of Statistics (BBS). Undated. *Statistics for Monitoring Attainment of MDGs in Bangladesh.* Dhaka. 17. Available: http://www.bbs.gov.bd/dataindex/MDGs%20in%20Bangladesh.doc.

23.   The government's national ICT policy is one of encouraging human resource development for the global ICT market, and creating a knowledge-based society. This translates into a focus on training for basic ICT skills, beginning in the school system at all levels (Section III.D, Distance Education in Bangladesh), and culminating in computer science and engineering degrees at the university level. Three science and technology universities have been established under the fifth Five-Year Plan (1997–2002), and in-service trainings are planned to upgrade the skills of professionals in the public and private sectors. However, Bangladesh lacks a comprehensive regulatory and financial environment for supporting the use of ICTs.

24.   There are several different entities within the government that deal with ICT issues: the Ministry of Planning; the Ministry of Science and ICT; and the Bangladesh Computer Council, which is under the Ministry of Science and ICT. In addition, there is a United Nations Development Programme initiative, known as "Strengthening the ICT Capacity of the Prime Minister's Office," which was set up as an oversight for all ICT-related issues and to help the Prime Minister's Office to develop ICT policy and access information, especially on e-governance. The Prime Minister is the Chair of the National ICT Task Force, a multisectoral committee looking into ICT policy issues, with a view toward implementation of the national ICT policy. Furthermore, the Government of Bangladesh also implements a National Drivers Project that deals with land registration and passport/Identification cards, as well as an Enabling Environment Unit for capacity building. The Policy and Strategy Report from this study provides more details on relevant factors of the enabling environment in Bangladesh.[11]

---

[10] This is a particular type of connectivity for mobile users, with data transfer speeds of up to 384 kilobits per second available on GSM or time division multiple access networks.

[11] See Appendix 7 of the RETA Final Report, the Policy and Strategy Report.

III.   EDUCATION SYSTEM CONTEXT

A.   Overview

25.   The education system in Bangladesh consists of 5 years of primary education, 7 years of secondary education, and higher education. The 7-year cycle of secondary school is divided into junior, secondary, and higher secondary levels. A Secondary School Certificate (SSC) is awarded by examination after the 10th year of schooling, and a Higher Secondary Certificate (HSC) after the 12th. The enrollment age for primary school is 6 years and higher secondary school is generally completed by age of 17. A parallel stream of Islamic (*madrasah*) schools exists at all levels, and there also exists a technical-vocational stream at the secondary level. In the general secondary schools, students are required to choose one of four streams during the ninth grade—humanities, science, commerce, or vocational. Ninety-eight percent of secondary schools are private, although they receive substantial subsidies from the government.

26.   Higher secondary school may be followed by university level courses leading to a 3- to 4-year bachelor's degree with either a Pass or Honors recognition—the key difference being that Honors students may finish a master's degree in only 1 year, but Pass students require an additional 2 years. Degrees in technical education—which refers primarily to engineering, agriculture, business, medicine, and information and communication technology—all require a 5-year course of study to obtain a master's degree, with the exception of medical degrees, which take 5 years for an undergraduate degree.

27.   Education in Bangladesh is managed by two Ministries: the MoE and the Ministry of Primary and Mass Education, in association with their attached departments and directorates, as well as a number of autonomous bodies, including:

- Directorate of Secondary and Higher Education
- Directorate of Technical Education
- Bangladesh National Commission for the United Nations Educational, Scientific and Cultural Organization (UNESCO)
- Chief Accounts Office.

28.   Additionally, the following departments/professional bodies of the MoE perform specialized functions assigned to them:

- National Academy for Educational Management (NAEM)
- National Curriculum and Textbook Board
- Bangladesh Bureau of Educational Information and Statistics
- Directorate of Inspection and Audit.

29.   There are a number of autonomous institutes that also provide administrative support for education, including:

- University Grants Commission
- National University
- Education Boards

- *Madrasah* Education Board
- Technical Education Board
- Nongovernment Teachers Registration and Certification Authority (NTRCA).

30.   **Key Indicators.** In 1981, a Universal Primary Education Program and a Mass Education Program were introduced in order to expand access to quality education for all. Subsequently, following the World Conference on Education for All (EFA) in 2000, the government prepared the first EFA Plan of Action for the period 1991 to 2000. Educational expenditure as percent of gross domestic product increased to 2.3% in 1999–2000 from 0.88% in 1990–1991.[12] As a result of these and other commitments made and acted upon, significant gains have been made in access to and quality of education. The literacy rate increased by 19.33 percentage points in the past 20 years, with the increase significantly higher for females; in 2004 it was calculated at 47% for individuals above 7 years old. Gender parity has been achieved in primary school; female participation has surpassed that of males in secondary schools; primary school enrollment has increased by nearly 20% over a 10-year period (see Exhibit 3, below); secondary education enrollment has tripled; and the number of secondary school institutions has doubled since 1980.[13] Although female enrollment in higher education has increased, women still represent only about a quarter of total enrollment in colleges and universities. The government is now implementing EFA II—the second Plan of Action—from 2003 to 2015.

31.   While these gains are encouraging, there is evidence that increases in enrollment have led to decreases in quality, resulting in high student-teacher ratios in the classroom and high dropout and failure rates for public examinations.[14]

Exhibit 3. Primary School Net Enrollment Rate

	Enrollment rate (%)							
	2003	**2000**	**1999**	**1997**	**1996**	**1995**	**1994**	**1993**
Total	83	81.8	78.3	81.5	78.8	82.0	81.3	69.8
Male	81	80.7	76.9	80.0	78.5	81.7	81.5	70.2
Female	84	82.8	79.7	82.9	79.1	82.2	81.0	69.3

Source: Bangladesh Bureau of Statistics (BBS). Undated. *Statistics for Monitoring Attainment of MDGs in Bangladesh.* Dhaka. 6. Available: http://www.bbs.gov.bd/dataindex/MDGs%20in%20Bangladesh.doc.

32.   Some of the constraints to basic education in Bangladesh include:

- an exam-focused culture that encourages rote learning
- inadequate teaching quality and curriculum
- inadequate facilities and teaching aids

---

[12]   Ministry of Primary and Mass Education. 2003. *Education for All: National Plan of Action II, 2003–2015 (Fourth Draft).* Dhaka.

[13]   See Ahmed M., et al. 2006. *Education Watch 2005: The State of Secondary Education: Progress and Challenges.* Campaign for Popular Education (CAMPE). Dhaka. and BBS. Undated. *Statistics for Monitoring Attainment of MDGs in Bangladesh.* Dhaka. Available: http://www.bbs.gov.bd/dataindex/MDGs%20in%20Bangladesh.doc.

[14]   ADB. 2004. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of Bangladesh for the Teaching Quality Improvement in Secondary Education Project.* RPB:BAN 26061. Manila. This report states that pass rates for the HSC declined from 56% in 1999 to 27% in 2002, with a slightly improved result of 38% in 2003.

- weak management and supervision

- highly centralized structure

- few incentives for performance at the individual (teacher) or school level

- large class sizes[15]

- high repetition and dropout rates.

B.   Teacher Training

33.   There are 116 teacher training colleges in Bangladesh—15 government and 101 private. A modular, 1-year Bachelor's of Education (B.Ed.) syllabus was developed with support from the Secondary Education Support and Improvement Project (SESIP; 2000–2005) and introduced in July 2006 in all government and private TTCs as the basic initial qualification for untrained teachers. In 2006, more than 12,000 students were enrolled in the B.Ed. program at government and private TTCs (about 80% in private schools). Teachers are certified through either the NTRCA, a semiautonomous organization responsible for certification of private school teachers; or the Public Service Commission, which does the same for public schools. The qualifications for teachers are the same, even though they are certified by different agencies. Nongovernment schools receive 90–95% of the salary of government teachers, who also have more benefits. As of March 2005, government law says that all teachers must be registered at NTRCA to work in any postprimary, nongovernment institute. The certification is by exam, worth 200 points (100 required and 100 elective), of which 40 points constitutes passing.

34.   Not surprisingly, given the low standard for a passing mark (many teachers pass without formal teacher training), academic achievement of teachers is quite low. A recent survey found that 84% of secondary teachers had a bachelor's degree or higher; however, 57% of these teachers had scored in the lowest of three categories of passing grades, or did not take the degree examination. The same situation occurred with 78% of those who claimed master's qualifications. More than half of the secondary teachers had no professional pedagogic training, but only basic humanities or social science studies (see footnote 13).

35.   In addition to the registration requirement for teachers, all head teachers must also be registered on successful completion of their initial head teacher training course, and only registered head teachers, with teaching experience, may be appointed as head teachers in secondary schools.

C.   ICT in Education

36.   Computer education began in Bangladesh in 1984 with the foundation of the Computer Science and Engineering Department at the Bangladesh University of Engineering and Technology. In 1994, computer science was introduced as an optional subject in secondary schools.

37.   Although the National Education Policy recommends compulsory computer courses at the secondary level, and the government's stated policy toward ICT in education (footnote 15) includes building facilities to promote ICT education and computer-aided education at all levels, these plans have yet to materialize. Very few schools, mostly those in urban areas, have access to computer facilities for their students and staff. A survey of 598 schools conducted by the Campaign for Popular Education (CAMPE) in Bangladesh (footnote 13) found that 37% of

---

[15]   Up to 59 students per teacher in 1998–1999. See Loxley, William and Patrick Julien. 2004. *Information and Communication Technologies in Education and Training in Asia and the Pacific.* ADB. Manila.

schools claimed to have computer education facility, but one-fifth of the schools had only one computer and another fifth had 2–15 computers; the rest had none. Fifty-four percent reported having at least one teacher with training in computer use. Sixty percent of the institutions had electricity, but not always in the classrooms or teachers' rooms.

38.   Many government offices have been equipped with computers, but they are underused. Education management information systems (EMIS) are expanding, but there are problems with data input and utilization, and it is mostly limited to teacher payment. For example, NTRCA lacks staff to enter data into the computers concerning newly registered teachers.

39.   Although the ADB-funded Secondary Education Sector Development Program (2006–2008; for more details, see Exhibit 4) may provide computer access sites for basic computer training, teachers are not yet aware of how computers can be used to increase subject knowledge. SESIP also included a redeveloped course for grades 9–10 on use of computers, but very little on applied ICT knowledge.

Exhibit 4. Summary of External Support to the Secondary Education Subsector

Asian Development Bank

Secondary Science Education Sector Project, 1985–1991
- Improved the content, quality, and relevance of secondary science education

Secondary Education Development Project, 1994–1999
- Improved the quality, relevance, and efficiency of secondary education

Higher Secondary Education Project, 1995–1999
- Financed curriculum development, textbook improvement, in-service teacher training, education management improvement, and construction of higher secondary teacher training institutes and higher secondary schools.

Secondary Education Sector Improvement Project (SESIP), 2000–2006
- Strengthened institutional capacity and assisted the government in implementing its Secondary Education Sector Development Plan (SE-SDP)
- Specific activities included: development of an EMIS, revision of grades 9–10 curriculum, decentralized performance management, school-based assessment, and revised public examination

Secondary Education Sector Development Program (SESDP) (2006–2008)
- Supports the government's updated SE-SDP 2006–2013, including policy reforms identified and begun under SE-SDP and supported through SESIP

Bangladesh Open University Project, 1992–1997
- Established BOU campus, curriculum, and human resources

Other external assistance

European Commission: Program to Motivate, Train, and Employ Female Teachers in Rural Secondary Schools, 1999–2005
- Facilitated the employment of women through fellowships for Bachelor's of Education training, salary support, teaching kits, refurbishment of schools, gender awareness programs, and opportunities for professional development and enhancement

40.   Furthermore, where computer labs are available in teacher training institutes, they are mainly used for computer literacy, they are not yet connected to the Internet, and they lack

technicians and trainers. ADB's TQI-SEP has a component to provide computer labs in all teacher training institutes, but the purpose is limited to teaching basic computer skills or completing administrative tasks. Likewise, the government policy toward ICT in teacher training is limited to (i) building ICT literacy in order to have teachers to teach ICT courses at the secondary level, and (ii) expanding the use of CD and Web-based courseware to provide ICT training and thereby mitigate the shortage of trained teachers of ICT.

D.   Distance Education in Bangladesh

41.   Distance education has been used in Bangladesh since at least 1962, when the Audio-Visual Education Centre (AVEC) was established. Much later, from 1978 to 1980, the School Broadcasting Program was piloted, eventually merging with the AVEC to form the National Institute of Educational Media and Technology in 1983. Finally, this became part of the Bangladesh Institute of Distance Education, which was established in 1995.

42.   The government's Fourth Five-Year Plan (1990–1995) addressed the need for more opportunities for out-of-school individuals, particularly in rural areas, to access education and training through nonformal and continuing education. In support of this goal, ADB provided a loan of $34.3 million to build the BOU. The project, completed in 1998, established BOU's main campus, 12 regional resource centers, and 80 local centers. It also developed 16 formal education programs and 19 nonformal programs for the general public. By 1999, BOU had enrolled 100,000 students, and 210,000 by 2002. Almost half of its enrollment has been in the Secondary School Certificate program as an alternative to traditional secondary schools. Fifteen percent of enrollment in 2002 was in the B.Ed. program, leading to the primary and secondary school teaching certificate.

43.   Established as an autonomous institution, BOU's distance education programs were designed to use radio, television broadcasting, self-study print materials, audio- and videocassettes, and face-to-face tutoring. The programs are designed to reach rural, disadvantaged populations, including women. The ADB project also built and equipped a media center, used for producing audio and videocassettes of BOU's programs, but these are only broadcast by Bangladesh Radio and Bangladesh Television (35 minutes per day); each resource center has a small audiovisual laboratory for viewing or listening to the cassettes, but these are underused, if at all. A typical student completes his or her coursework through self-study print materials and face-to-face support from one of the 1,300 tutorial centers located around the country. Although they have developed a plan for e-administration and course delivery, neither the main campus nor the resource centers are as yet sufficiently equipped with computers and Internet access.

IV.   THE TEACHING QUALITY IMPROVEMENT IN SECONDARY EDUCATION PROJECT

A.   Overview

44.   The goal of the 2005–2011 ADB-funded TQI-SEP is to enhance the quality of secondary education in Bangladesh by improving teaching quality. The project aims to provide quality initial and in-service teacher training, including continuing professional development, to all eligible teachers of grades 6–10 in government and private secondary schools. To this end, the project has four components that build on previous and existing projects funded by ADB and other development partners, notably the Secondary Education Sector Improvement Project (ADB,

2000–2006); and the Program to Motivate, Train, and Employ Female Teachers In Rural Secondary Schools (European Commission, 1999–2005).

45.   The four components are as follows:

1. Improving teaching quality through organizational development and capacity building. This component targets the education management and administration level by improving institutional linkages between different existing teacher training institutions, reforming the NAEM to serve as the one central "institutional home of excellence," and creating an NTRCA. These functions will be linked to the improved capacity within the Bangladesh Bureau of Educational Information and Statistics and the Division of Training within the Directorate of Secondary and Higher Education. Improving capacity of these organizations will set and maintain high standards in teacher training delivery, certification, registration, ongoing professional development, and monitoring. This component also includes provisions for improving and expanding the training and appointment of head teachers and administrators.

2. Improving teacher training facilities. Under this component, the physical facilities of NAEM, and TTC and institutes are being improved through building renovation and provision of furniture, supplies, and teaching aids for classrooms, laboratories, and libraries. Three new teacher training colleges are also being built with resource centers that will provide in-service training in remote and underserved areas. Each government teacher training college and the *madrasah* teacher training institute (a total of 15 institutions) will be equipped with audiovisual and computer laboratories with access to the Internet for use by staff and students. At the time this study was implemented, these laboratories were still in the planning and procurement stage, and so could not be the focus of any targeted research on their effectiveness.

3. Strengthening in-service and pre-service teacher training. Along with improving overall coordination, and improving physical structures at the teacher training colleges, the project also aims to improve the quality of secondary teacher training by controlling accreditation processes and improving the curriculum of the standard B.Ed. degree, which is also the minimum requirement for all new teachers. Improved training materials will be developed "in formats suitable for use through the standard face-to-face training and distance education modes of delivery" (from page 11 of footnote 14). The design of the 1-year syllabus is modular, so that any public or private institution can deliver courses for each module in any mode (face-to-face or distance), but there will only be one national public examination that will be administered by the NTRCA, which students must pass before acquiring the B.Ed. The project will also help all serving, untrained teachers to reach the same equivalent through an in-service certificate training program that will provide credit toward the modular B.Ed. An estimated 100,000 teachers will be trained and will receive a partial salary increase, which will be increased again when they (voluntarily) enroll and complete the remaining B.Ed. modules either by distance or face-to-face mode in any accredited institution. Additionally within this component, all serving teachers, trained or untrained, will undergo compulsory in-service professional development training at least once during this period (see Section IV.B, The Continuous Professional Development Program). This involves an estimated 200,000 total teachers nationwide. Teacher trainers will also be supported to improve their competencies up to the Master of Education level.[16] A small

---

[16]   The study directly contributed to this component by helping to reach the large number of untrained teachers through in-service training. The study also contributed to the improvement of the existing professional

grants program for schools, called the Innovation and Development Fund[17] has been established in order to encourage school-level planning.[18]

4. Increasing equitable access and improving community involvement. This component addresses the need to improve teaching quality in remote and underserved areas, by targeting teachers in these regions, including ethnic minorities and women. Three new outreach centers will be built in remote areas, including Patuakhali district where this study was implemented. Although these centers had not been built at the time of this study, the intention is to pilot "school cluster-based distance education for teachers and professional development in remote and underserved areas" that would be based out of these resource centers (from page 8 of footnote 14). There are also project activities that aim to improve teaching and learning for disadvantaged children, and to improve community relations and school management committees.[19]

B.   The Continuous Professional Development Program

46.   The Continuous Professional Development Program is a major training initiative within TQI-SEP, providing supported 14-day, subject-based in-service courses to all serving secondary teachers working in secondary schools recognized by the MoE. The courses are face-to-face, and require participants to come to one of the government teacher training colleges for the duration of the training. Trainees are paid a stipend and travel allowance for their time. The focus of this training is on inclusive and participatory methodologies. Courses have been developed in 18 subjects based on textbook topics that teachers find difficult to teach. The training begins with trainers modeling the delivery of prepared lessons that illustrate a range of teaching techniques known to assist student learning. Then, the teacher-participants themselves peer-teach other prepared lessons. During and after each teaching session, the trainers stimulate discussion and help participants practice the pedagogical ideas and skills being introduced. Throughout the courses the teachers themselves are encouraged to give and receive feedback on their teaching techniques and skills. The program of CPD courses is being introduced progressively and being delivered at the district level. Planning will ensure that all teachers will have received this training prior to project end in 2011. However, TQI-SEP staff recognize that for many teachers it is difficult to leave their home, family, school, and other obligations for an extended period and are looking for alternative methods of delivering CPD courses.

---

development training materials by illustrating how the existing materials could be adapted to distance mode, and by making improvements at the same time.

[17] Under the third TQI-SEP component, this Innovation and Development Fund will be established and made available to teacher education institutions to support and implement reforms and innovative schemes for improving the quality of teaching, particularly those initiated at the local level through schools. Although the operations manual detailing the application procedures, selection criteria, regulations and guidelines for funding, and reporting and monitoring requirements had not yet been completed at the time of the study, it is anticipated that this fund could be a way to diffuse new technologies within the secondary teacher training system.

[18] This study provides an example of such an innovative approach to quality improvement, and the model could potentially be replicated through this fund (see Chapter IX, Study Recommendations).

[19] This study contributes to this component by providing a solution that encourages female teachers to complete training because they are not required to leave their homes and families for 2-week, face-to-face training.

V. STUDY ACTIVITIES

A. Site Assessment and Study Development

47. Mongolia, Bangladesh, Samoa, and Nepal were the focus countries in this RETA. As described in the Executive Summary, the study featured three technical components: (i) the Policy and Strategy component, (ii) the e-Resources component, and (iii) the e-Teacher Training component. Based on the nature of existing ADB education projects in each of these countries, activities of the e-Resources component were conducted in Mongolia and Samoa, while the e-Teacher Training component was implemented in Nepal and Bangladesh.

48. The RETA study framework and implementation details for Bangladesh were developed through a working group composed of the study team from RTI International and iEARN (through the local counterpart, bEARN), and TQI-SEP staff based in Dhaka.

49. An initial site visit took place in late February 2007 in Bangladesh in order to meet with stakeholders to develop a study framework. In addition to individual meetings with a variety of government and nongovernment actors and teacher training institutes, a 1-day workshop was held on February 27, 2007, at the BOU campus. This workshop involved speakers from the study team, the BOU Vice-Chancellor, the Dean of the School of Science and Technology, the Dean of the School of Education, and approximately 40 participants from the university (of these, about 20 remained for the afternoon working session).

50. As a result of the discussions and meetings, three possible study models were proposed: (i) supporting improved teacher-student communication at BOU through mobile phone technology, (ii) investigating the use of computer labs for improving pre-service training in TTCs, and (iii) providing in-service CPD to teachers in rural areas through mobile technology. Based on overall feasibility and feedback from ADB, the decision was made to proceed with the third study model—using mobile smartphones as an aid in delivering distance training in the Barisal region.

51. After an initial study framework was developed, the Dhaka-based study team met to develop a work plan for the study. They also conducted a planning workshop in Barisal (April 4, 2007), the proposed study location, in order to seek the approval and input of the local education and community authorities concerning appropriate design and implementation strategies.

52. **Study Framework and Objectives.** As mentioned in Chapter IV, The Teaching Quality Improvement in Secondary Education Project, one of TQI-SEP's objectives is to provide in-service training to all currently untrained teachers in Bangladesh's secondary schools. At present, there is no effective way of reaching remote teachers for this purpose except to have them come to TTCs for residential training. Three "Outreach Centers," serving rural and remote areas, are planned in order to be the link between remote schools and training colleges, but they will still require teachers to take leave from their schools to attend training. The purpose of the study was to explore innovative strategies to serve these disadvantaged areas, including distance learning and the application of media and information technologies, in order to inform TQI-SEP of the feasibility of using this model to scale up access to quality in-service training.

53. The process was to equip subject trainers, a training coordinator, and a cluster of 10 schools with smartphones, and redesign the existing training curriculum from a 2-week, face-to-face workshop to a 6-week distance training mode. The phones were intended primarily to

enhance communication, motivation, and multimedia delivery. In order to maintain a focus on training quality and reduce dependency on the technology (and ultimately failure of the project if the technology failed), a blended approach to providing CPD via distance learning was adopted. A combination of print-based learning materials; a face-to-face orientation workshop; synchronous, on-demand voice communication; asynchronous SMS text messaging; video and photo sharing; and school-based group discussion activities were all incorporated into the design of the study.

54. The objectives of the study were to develop a case study on the use of mobile connectivity to support distance education and to determine whether:

- it is an effective mode for teacher training and improvement in classroom practice

- it is a suitable modality to reach rural and remote teachers, including women and disadvantaged groups

- it presents other benefits in terms of education administration (including student assessment and costs) and pedagogy.

55. The study also sought to determine the initial and recurring costs of this model, and the features of the smartphones that would be most useful in such a situation.

B. Procurement, Curriculum Development, and Participant Orientation

56. **Procurement.** During the site visit, some preliminary research into costs and availability of different types of mobile smartphones was carried out. Further research was done after the site visit by reading reviews over the Internet and asking for recommendations from other experienced individuals, including the local phone service provider. This proved to be a very difficult aspect of the planning process because it was impossible to test the features on a phone that was actually connected to local service, or even charged. In considering the instructional design of the project and the purposes of incorporating mobile technology, the features of mobile phones were reviewed to determine those that could best facilitate learning and communication. These were seen to be:

- voice, including audio conference calling between multiple sites

- SMS

- video and photo capture

- transfer of photo and video through MMS.[20]

57. As there would be a print learning package, it was not seen as necessary to use data/text transmission or printing from the phone, nor were e-mail and Internet connectivity seen as critical in this study.[21] Based on these guidelines, requests for quotations were given to three local vendors, asking them to provide the price for 13 phones that had these features, and one laptop computer. The final model chosen was a Sony Ericsson P990i phone, primarily because of the added service contract offered by the vendor, but also because of the large screen size and availability of a full alphabetical keyboard to facilitate writing text messages.

---

[20] Similar to SMS (text messages), MMS uses multimedia to allow telephones to send audio and video clips from one to another.
[21] These are certainly features that can be exploited in the future, particularly for the teacher trainers.

58.   In sum, the study procured the following equipment:

- One laptop computer (for use by the training coordinator and subject teachers for administrative purposes, to create electronic materials to send to the teachers, to send messages, and to browse the Internet for learning resources)

- 13 mobile handsets (one for each of 10 participating schools, with two teachers undergoing training from each school, and one for each subject teacher and the training coordinator)

- Phone service for 13 phones for 2 months from the Grameen phone network.

59.   **Adaptation of the Curriculum.** The equipment was handed over to the teachers during an orientation workshop held in Barisal June 6–8, 2007 (see paragraph 64, below).

60.   A key aspect of the study was to adapt the existing face-to-face professional development curriculum to the distance format, incorporating activities that utilize the features of the mobile phone. The main reasons for choosing the Bangla and math CPD programs chosen were that (i) print materials in draft format were already developed by TQI-SEP and being tested in face-to-face situations, thus providing a control group; and (ii) no formal accreditation was required by an outside institution.

61.   The adaptation of the curriculum took place in three phases, and involved contracting the services of a professional instructional designer and subject-matter experts in Bangla and math instruction. The three phases were as follows.

1. A 3-day writing workshop to convert existing face-to-face in-service training materials to a technology-based format took place at NAEM April 10–12, 2007. During this workshop, the three instructional experts, along with study and TQI-SEP representatives, were given an orientation to the study and the principles of distance learning, and agreed upon the outline for the distance learning curriculum. Together they developed an outline for the entire 6-week course and the detailed module with activities for weeks 1 and 2.

2. Material development continued from home (weeks 3 through 6, and writing of additional reading materials).

3. A 2-day workshop was held on April 22–23, 2007, at NAEM to finalize the curriculum. During this time the instructional experts and study team were able to print the draft materials, revise the guidelines, finalize the reading materials, insert practical examples, weed out inconsistencies in the format, add reading materials at the end of each unit, and make corrections on electronic files.

62.   The materials being used in the face-to-face program are still draft materials in a pilot phase, so the subject-matter experts used this opportunity to improve them with relevant examples from the country, but then they also tried to build in interactive components. In the final model of the revised curriculum, each week consisted of two instructional units; each unit contained the following elements and tasks (see Appendix 2 of this report for a sample unit):

- Trainee receives an introductory set of discussion questions and supplemental readings.

- Trainee reviews the readings, reflects on questions, and plans peer group session.

- Trainee leads a peer group session during which discussion and role-play take place. The group is asked to conclude by stating the two most important aspects of the lesson, and the trainee makes notes in a journal.

- During this time there is unscheduled, informal contact with the trainer using the mobile phone, both to verify that activities are being completed and to ask questions as necessary.

- A conference call is held among trainee, trainer, and colleagues to discuss the main questions and outcomes of peer group sessions.

63.   Therefore, each week there were four peer review sessions and two telephone conferences. Unit summaries, examples, and other reference texts are included throughout the manual. The curriculum did not differ substantially from the face-to-face course, which also uses peer group discussion; the main work of the instructional designers was to split the course appropriately into 6 modules and 12 units (see Appendix 3 of this report for the training schedule), with opportunities for conference calling among the participants. The design included conference calls between schools and with the trainer.[22]

64.   **Orientation Workshop.** A 3-day orientation and training workshop was held at the Barisal TTC June 6–8, 2007, to acquaint trainee teachers, head teachers, principals, trainers, and TTC training coordinators with the new mobile phone supported in-service teacher training materials. The other aims were to train on use of smartphones; orient participants to the various features of the smartphone; and provide opportunities for simulation, group discussion, and question asking. The workshop was facilitated by the study team, along with the instructional designer who was originally contracted to revise the curriculum materials, and a representative of the mobile phone company (Sony Ericsson). Day 1 training was aimed exclusively at TTC training coordinators, trainers, and District Education Officers. The head teachers and trainee teachers were invited to attend from day 2. During this workshop, research questionnaires were administered, including the standard pre-test concerning the content of the course.

C.   Implementation and Monitoring

65.   After the orientation workshop, the participants returned to their schools and the training period began. The trainee teachers completed each module by following the training manual. The weekly teleconferences had been scheduled during the orientation workshop, but the trainees were responsible, with the support of their head teachers, for managing their own learning and scheduling the peer discussion sessions. All trainees finished their modules within the intended 6-week period.

66.   A monitoring visit to Barisal was conducted by members of the study team July 8–10, 2007 (about halfway through the course), during which time the team visited three study schools in the Patuakhali Sadar and Galachipa *upazilas*.[23] The visit achieved the following activities in support of the study:

---

[22]   Because the audio conferencing feature did not work well (the sound quality was poor and the loudspeakers did not function properly), the trainer called trainees individually or as a small group from one school on a rotational basis, rather than having conference calls with several schools. During these calls, they would go through the discussion questions for each session, do some problem solving, and answer specific questions from the trainees.

[23]   *Upazila* - subnational administrative unit, similar to a subdistrict. Patuakhali Sadar and Galachipa are *upazilas* in the Patuakhali District.

- conducting discussions with the TTC training coordinator, trainers, head teachers, teacher trainees, and the DEO, in order to verify the progress of the distance training and identify any problems

- gathering views about the learning materials and technology, as well as suggestions for improvement

- observing audio conferencing sessions

- reviewing log sheets and journal notes of trainees

- reaching an agreement with the TTC training coordinator and trainers about practical arrangements for the wrap-up and evaluation workshop scheduled for the end of the training period.

67.   It was observed at this time that the phone model chosen was much too complicated for the needs and abilities of the users, and it was also not fully compatible with the Grameen phone network. Nevertheless, the participants reported being able to cope with these constraints, and were pleased with the process overall. The DEO also reported having done some monitoring of the program, which resulted in overall positive feedback from the participants.

D.   Closing Activities

68.   A closing and equipment handover workshop was held in Barisal July 30–31, 2007. The agenda covered the following items.

- Post-test administration (standard, content-related questions related to general teaching and learning strategies and subject-specific questions)

- Simultaneous group debriefing sessions and presentations in plenary

- Handover of phones

- Administration of evaluation questionnaires (process-related, prepared for the study)

- Presentation of video clips taken by trainees in their classrooms, using the phones[24]

- Structured interviews with trainees/trainers/TTC staff

- Certificate award ceremony.

69.   Eighteen out of 20 trainee teachers attended, as well as 10 head teachers, four trainers, four TQI-SEP staff, two study consultants, the TTC Barisal principal and training coordinator, the Barisal DEO, and two *Upazila* Secondary Education Officers (USEOs) from Patuakhali Sadar and Galachipa *upazilas*.

70.   During simultaneous group debriefing sessions, math trainees, Bangla trainees, and head teachers formed three separate groups and discussed assigned questions. They were asked to comment, both individually and as a group, on the strengths and weaknesses of the technology-based training program (e.g., learning materials, technology), to comment on any observable changes, and to make recommendations for future implementation of the distance learning training. Head teachers, in addition to identifying strengths and weaknesses and providing suggestions, were asked to comment about their role in the program, highlight its impact, and point out changes in classroom practice if there were any. In each group there was

---

[24]   TQI-SEP has archived these clips for future reference, although it will take an estimated 100 hours to review all of them.

a note-taker and a leader to organize and present the group work at the plenary session the next day.

VI. STUDY METHODOLOGY

A. Overview

71. This research study is exploratory and descriptive. The investigation style reflects quasi-experimental and case study approaches. A control group of teachers undergoing the standard face-to-face training were compared with results of the study group using the smartphone for distance-mode training. The data for the study was collected in several phases during the site assessment, training and closing workshops, and monitoring visits. The phases are briefly outlined below (see details, Chapter V, Study Activities).

- Baseline data for the study was gathered during the initial site assessment (February–March 2007) and the planning and kickoff workshop
- Orientation and training workshop in June 2007
- Monitoring visit July 8–10, 2007
- Final closing workshop July 30–31, 2007.

72. The aims of the study were as follows:

1. To compare two different methods of in-service teacher training
    (a) Face-to-face in-service training (unsupported by technology)
    (b) Distance delivery through mobile smartphones (supported by technology)
2. To study the use of the equipment (smartphone) on its own as a support to in-service professional development.

73. The research methodology would attempt to respond to the study objectives by determining:

- whether learning outcomes of the study (distance learning) group were comparable to those of the control face-to-face group (i.e., did they learn as much as their face-to-face counterparts?), as measured by standard pre- and post-tests and through demonstrated application of participatory and active learning approaches by study teachers
- the cost-effectiveness of the distance delivery mode for CPD
- whether trainees from rural and remote schools felt that distance learning was an appropriate modality to address their training needs
- whether the mobile phones added value to the distance mode and how (i.e., which features had the most useful application for teachers).

74. In order to answer these questions, several specific objects of study were chosen, namely the training materials, the training participants, and the technology itself. Exhibit 5, below, provides an overview of the evaluation study in terms of the object of study, the methods used, and the range of sources.

Exhibit 5. The Evaluation Framework

Evaluation object of investigation	Methods and instruments	Sources
Training materials • Quality • Relevance	Questionnaires and Interviews	Trainers, Trainees, Instructional Designer, Teaching Quality Improvement (TQI) staff
Training participants • Attitudes toward distance mode	Questionnaires and Interviews	Trainers, Trainees, Teacher Training College (TTC) Coordinator, Head Teacher Principal, District Education Officer (DEO), *Upazila* Secondary Education Officers (USEOs)
• Perceived training effectiveness	Questionnaires and Interviews	Trainers, Trainees, TTC Training Coordinator
• Learning outcomes	Pre- and post-test, classroom observation	Trainees, head teacher report of classroom observation, study midterm review observations
Technology (phones) • Uses of the smartphone	Questionnaire and interviews, log sheet and journal notes	Trainers, Trainees, TTC Training Coordinator, Head Teacher
• Recurring costs of phone service	Phone bill analysis	Phone service provider
• Added value of technology for distance mode	Questionnaire, interviews, focus group discussion	TTC Training Coordinator, Trainer, Trainees, TQI-SEP staff

75.   The evaluation framework at a glance reveals that the objects of study involve successive triangulations of perspectives and methods. Data collected from various sources and by different instruments reveals a complete picture of this technology-assisted training program, from the actual uses of the smartphone, to a comparison of face-to-face professional development with distance learning mode, and resulting in implications for future programs. This approach aims to determine not only what has taken place but also the reasons behind the practices that affect success.

B.   Subjects and Sample Size

76.   The following individuals participated in the study:

• Twenty teachers from selected schools of the Patuakhali Sadar and Galachipa *upazilas* (10 Bangla and 10 math). Seventeen were male and three female (this is

15%, comparable to the national average of 17% [footnote 14]). All female teachers were teachers of Bangla. The participating teachers were between 27 and 58 years old, the majority (14) falling between 30 and 39 years old. Sixteen of the teachers held a B.Ed. and two did not (two not reported). Five of the teachers had already completed the CPD training in face-to-face mode.[25]

- Three Bangla and two math trainers from Barisal TTC.[26] Their ages ranged from 36-42 years old, and one was female. All five held at least a B.Ed. Their years of experience ranged from 7 to 17 years.

- Ten head teachers of 10 selected schools from Patuakhali Sadar and Galachipa *upazilas.* All head teachers were male, aged between 38 and 59—the majority (7) was above the age of 50.

- One Training Coordinator, Barisal TTC.

- One principal, Barisal TTC; one DEO, Patuakhali Sadar; and two USEOs (from Patuakhali Sadar and Galachipa *upazilas*) who participated in planning and supervision, and who provided perspectives from the administrator point of view.

- A control group of 42 math teachers and 40 Bangla teachers who followed the face-to-face training workshop in June, from the Barisal TTC (therefore, with the same trainers as the control group). The control group was made up of trainees from rural (40%) and urban (60%) areas in the greater Barisal region. Their ages ranged from 30 to 55 years old, and 8.5% were female (six teachers of Bangla and one math teacher).

77.   Although TQI-SEP staff were partners in planning and implementing the study, they were also considered key informants, and their experiences and feedback were gathered through interviews and informal discussions.

78.   The Patuakhali District was chosen as the study site because it is one of three existing areas where teacher outreach centers are being planned, and because there is a teacher training college (in Barisal). Additionally, there is mobile phone coverage and Internet connectivity (in contrast to Rangamati, which has no coverage). At the same time, the schools there are very remote, and transportation and other communication systems are poor, posing a challenge to conducting face-to-face training and school-based supervision.

79.   Originally it was proposed to have 10 participants from 10 schools. However, in order to have a larger sample size and increase the output of the study, the number of teachers was increased to include two from each school, and having teachers share the mobile phone.

80.   **Prior Technology Use.** According to questionnaires administered at the initial training workshop, all of the trainers had a mobile phone, and three had a computer and experience with e-mail. Most were familiar with sending and receiving SMS, and half had taken pictures with a phone. None had experience sending or receiving multimedia clips or documents using phones,

---

[25] The study did not intend to include participants who had already completed the training; this was an error in selection at the local level. However, it turned out to be an interesting source of comparison because these teachers were able to describe how the face-to-face training experience differed from the distance-mode training. On the other hand, the pre- and post-test scores will be skewed because 20% of the participants were already familiar with the content of the training.

[26] The original study framework only anticipated the participation of two trainers (one for each subject), which is why only two phones were purchased for the trainers. However, the TTC coordinator ended up involving all of the Bangla and math trainers because he wanted them all to be exposed to this new method, and the trainers also expressed interest in being a part of the experience.

nor did they have experience with sending documents or using e-mail and Internet with a phone. Of the trainees, 16 had mobile phones and four did not. Two teachers had access to a computer, but only one had experience with e-mail. The only features of the phone that were familiar to some teachers (other than regular phone calls) were sending and receiving SMS and taking photos, but even that involved only a small percentage of the participants (40%; see Section VII.C, Technology).

C.   Evaluation Instruments

81.   Exhibit 6, below, is an overview of the total number of evaluation instruments and methods used in this study, the phase in which they were introduced, and the size of the sample for each instrument. Pertinent information about each instrument follows, referring to each column of information in the exhibit.

Exhibit 6. Summary of Evaluation Methods and Sample Sizes

A. Questionnaires	B. Interviews	C. Focus group discussion	D. Pre- and post-tests	E. Log sheet & journal notes	F. SMS	G. Group work
June 2007 orientation and training workshop						
Trainees (20) Trainers (5) Head Teachers (10)			Pre-test for study trainees (20) Pre-test for control trainees (82)			
June 2007 monitoring visit						
	Trainees (6) Head Teachers (6) Trainers (2) TTC Training Coord. (1) DEO (1) USEO (1)	Trainees (6) Head Teachers (6)			Head Teachers (10) Trainers (4) Trainees (5) TTC Training Coord. (1)	
July 2007 closing workshop						
Trainees (18)	Trainees (8) Head Teachers (5) Principal(1) TTC Training Coord.(1) DEO (1) USEO (2)	Trainees (4) Trainers (4) Head Teachers (8)	Post-test for study trainees (20) Post-test for control trainees (82)	Trainees (20)		Math trainees (9) Bangla trainees (9) Head Teachers (10)

DEO = District Education Officer; SMS = short messaging service; TTC = Teacher Training College;
USEO = Upazila *Secondary Education Officer*

82.   **Questionnaires** (Column A of Exhibit 6). <u>Pre-training research questionnaires</u> were administered to 20 trainee teachers from Patuakhali Sadar and Galachipa *upazilas* at the beginning of the orientation and training workshop in June. Designed by the study team, the questionnaire requested information about demographics, technology usage, and attitudes toward the study process. Similar questionnaires were given to a training coordinator, five trainers, and 10 head teachers. <u>A workshop evaluation questionnaire</u>, also designed by the

study, was completed by all workshop participants to assess the quality of the orientation workshop and their readiness to begin the distance-mode training. <u>A post-study evaluation questionnaire</u> was completed at the closing workshop by 18 trainees (15 male and three female). The aim was to collect information about their experience, difficulties, and attitudes toward the distance-mode training supported by mobile phones.

83.   **Interviews, Focus Group Discussions, and Group Work** (Columns B, C, and G of Exhibit 6). In-depth interviews were conducted with the trainers, trainees, head teachers, DEO, USEO, TTC principal, and the TTC training coordinator during the final closing workshop in July. Focus group discussions were held with small groups of trainers (four), trainees (four) and head teachers (six). The one-on-one interviews and focus groups were conducted in Bangla and written summaries were prepared in English afterward, in order to facilitate the compilation of key recurring themes, overall impressions, and recommendations from each group and across groups. At the closing workshop, math trainees, Bangla trainees, and head teachers formed three separate groups and discussed questions related to the strengths and weaknesses of the program, different aspects of the training, observable changes, and recommendations for future implementation. The head teacher group was asked to respond to additional questions such as their role in the program and its impact. The three groups exchanged their views and engaged in generating a list of points. They shared their responses, ideas, and recommendation at the plenary session.

84.   **Pre- and Post-Tests** (Column D of Exhibit 6). These tests are the standard method of evaluation for all TQI-SEP in-service CPD workshops. The tests are identical, and cover both pedagogic and content knowledge. The purpose was to determine whether distance-mode participants retained at least as much as their face-to-face counterparts. The control group from Barisal was selected on the basis of timing, chosen because they were the group who were starting their training closest to the study group schedule. The course for the control group was held June 3–16, 2007, and the trainers were the same as those who participated in the study using distance learning methods.

85.   **Log Sheet and Journal Notes** (Column E of Exhibit 6). Log sheets were designed by the study team as a research instrument, and given to all users of mobile phones. These were printed sheets on which users were expected to record their use of the smartphone on a daily basis—for example, whether they used SMS, for what purpose, how many times, etc. The purpose was to be able to know exactly which features of the phone were used the most, and to correlate this use with differences in learning outcomes. Analysis of the log sheets returned by trainees shows that they only recorded outgoing calls, with date, purpose, and destination, as a means of accountability against the phone bills. They did not record whether they used SMS, took pictures, received a call, etc. This was due to a misunderstanding during the training process; the study intended to have them take note of all uses of the phones.

86.   The journal exercise was developed as part of the learning experience. The purpose was to maintain a record of their thoughts, questions, ideas, and reflections for each day of the course and to keep a note of the amount of time they were spending on the various activities including reading, peer discussion, conference calling, sending SMS, or preparing videos and photos. They were also asked to keep an account of the difficulties encountered. Both instruments were printed and given to participants during the initial training workshop in June. Analysis of the journal notes shows they were primarily used to record the day's events, such as "We held a discussion about...," "we came up with ideas...," "we discussed with the instructor." Sometimes the trainees also used the journal to answer the specific questions posed in the curriculum guide, or wrote a summary of the lessons learned in each chapter.

87.　In practice, the journals were filled out in a variety of ways—not necessarily the way they were intended. Some noted only the activities conducted each day, and others noted briefly the topic or content of the lesson taught (description), notes about their discussions, and what they learned from their discussions. Some trainees tried to identify some problems they experienced.

88.　**SMS** (Column F of Exhibit 6 above). One week before the monitoring visit in June, the study sent an SMS to implementation group trainees (four), head teachers (10), trainers (two), and the TTC training coordinator. The purpose was to see if they understood the message and also if they could use this particular feature of the phone and respond. Nearly all the participants responded. Some replied to the text message and some made calls to clarify the message sent. The trainers, TTC training coordinator, and five of the head teachers sent back messages instantly, indicating that they were quite familiar with this function and were able to use it without any problems. Two teacher trainees called to say they did not understand the message. In addition to the problem of operating technology, comprehending and responding to messages in English may have been difficult for rural teachers who were not proficient in English. Sample questions which were asked via SMS are given below:

- How often do you call your trainer to receive instructions?
  1–2 times per week/3–4 times/5–6 or more. (Two respondents said 1–2 times.)

- How often do you contact your fellow trainees to share ideas?
  Never/sometimes/quite often. (Two trainees responded by saying "very often" and one said "sometimes.")

- Do you use the smartphone to solve problems related to the content of the training?
  Never/sometimes/quite often. (Both trainers responded "quite often.")

- Are you satisfied with the "mobile conference" (audio)?
  Very satisfied/satisfied/somewhat satisfied/not satisfied. (Five respondents said they were very satisfied and five said they were satisfied.)

D.　Limitations

89.　Several limitations may have affected the reliability and validity of the methodology and instruments described above.

- The size of the implementation group was small, especially compared to a much larger control group.

- There are many variables that could account for the improved results on the pre- and post-test scores besides an actual increase in knowledge, not just actual learning outcomes. For example, the consistency of scores given between markers—it is not likely that both study groups had the same person grade the activities. Also, as mentioned in footnote 25 above, several trainees were following the program for the second time, so they had already been familiar with the training content.

- The instruments in the study, e.g., the questionnaires, were not flawless. There were some inconsistencies in the wording of the questionnaires when they were translated from English to Bangla. Some of the questions ended up being ambiguous or not focused enough, given that there was no time to pilot test the questionnaires prior to the study. Furthermore, during the orientation workshop, the questionnaires were given to the participants in English, while the facilitator translated orally. This may have caused some inaccuracies as well as inconsistencies between the pre-questionnaire and post-questionnaire, which was translated into written Bangla.

- The final evaluation questionnaire (closing workshop) was perhaps too long. There were a total of 55 questions, including both closed- and open-ended questions, and participants answered in a hurried manner.

VII.   STUDY FINDINGS

90.   Data collected from the evaluation instruments described in Chapter VI, Study Methodology, reveal participants' perceptions and attitudes to (i) the content and structure of the training material, (ii) training effectiveness, (iii) the uses of and added value of the technology, and (iv) attitudes toward face-to-face CPD compared with technology-assisted training. These issues are described in more detail in this chapter.

A.   Training Design and Materials

91.   **Training Materials.** The training materials were perceived to be clear and adequate despite minor flaws, such as lack of additional examples, subject specific examples, lack of answers to questions, spelling mistakes, etc. Some mentioned that there could have been more direction and clarity on specifically what to do and when. (This is a common concern in distance learning programs, where learners are expected to be much more self-directed than in the traditional classrooms.) The format of the distance learning curriculum (see Section V.B, Procurement, Curriculum Development, and Participant Orientation, above) enhanced interaction among teachers, extended the training opportunity to more teachers in the school, and fostered collegiality between trainers and trainees. In particular, they enjoyed the flexibility and independent nature of this new modality. The journal notes indicate that the main points of the lessons were clear from the printed materials, and the group discussion allowed teachers to debate about the ideas and their application. The journals also showed that trainees were able to keep to the expected schedule, usually carrying out activities 6 days per week, in some cases even 7 days. Often, the seventh day was used to review the training process among colleagues in the school and other schools.

92.   **Conference and One-on-One Calling.** In the original curriculum design, the conference calls with trainees and trainers should have taken place among several different groups at different schools. However, the phone model chosen could only connect three different sites, and the sound quality was too poor to have effective discussions. Therefore, the scheduled conference call times were used for one-on-one communication with the trainees. Although the questionnaire responses show that the majority of participants rated the conference time as "suitable" (see Exhibit 7) in-person feedback during interviews, focus groups, and workshop group feedback was frequently that the conference times needed to be outside of school hours—either before or after. They also would have liked to have conference calls every day.

93.   Participants reported that the TTC trainers did not always contact them on time before a conference call (only 10 of 18 said they did contact them on time), but they all reported that they received the necessary cooperation from the head teachers. They reported that on the average they spent approximately 9 minutes talking to their trainers during the conference call. All trainees also contacted fellow trainees often. In most cases, the phone records and log sheet show that trainees called other trainees more often than they called the instructors. Of course, it is impossible to know whether the trainees were actually discussing the content of the training, but journal notes indicate that this was the case.

Exhibit 7. Post-Training Satisfaction Questionnaire (Responses from Trainees)

Instructions	Not adequate	Somewhat adequate	Adequate	Very adequate
	1	2	13	2
Content relevancy	**Not much**	**Somewhat**	**Much**	**Very much**
	1	1	12	4
Activities	**Not suitable**	**Somewhat**	**Much**	**Very much**
	0	3	9	6
Structure of content		**Not proper**	**Proper**	
		1	17	
Duration		**Too short**	**Just right**	**Too long**
		3	15	0
Conference call timing		**Not suitable**	**Suitable**	
		6	**12**	
Conferencing with trainer	**Not at all effective**	**Somewhat effective**	**Effective**	**Very effective**
	0	4	7	7
Trainer availability (at scheduled time)		**Rarely**	**Sometimes**	**All the time**
		1	10	7
Trainers response to messages	**Not satisfactory**	**Somewhat satisfactory**	**Satisfactory**	**Very satisfactory**
	0	2	12	4
Attitudes of peers		**Indifferent**	**Cooperative**	**Enthusiastic**
		1	10	7

Note: Cells with highest responses for each category are indicated with heavy outlines.

94.   One difficulty reported was that the phones were often kept with the head teacher, so trainees were not always able to use the phone when they were needed. This was mainly for security reasons, so that the phones could be locked up after school hours; however, this is the time when trainees most wanted to reach the trainers but could not. However, 17 of 18 trainees were able to contact their trainer outside of the scheduled time on at least one occasion. Nearly all trainees (N=15) felt that the number of phones was inadequate, and that each trainee should have his or her own phone.

95.   The log sheets also show that most calls—and those that lasted the longest—were between trainees in different schools and not between the trainer and trainee. The journal notes also describe calls made to other schools, often on holidays or other after-school time, and they indicate that a great deal of lively discussion and debate was going on, and that this debate was very helpful to understanding and applying the concepts or formulating questions for the trainer. Analysis of the journals and log sheets alike shows that the main purpose of the phone calls were:

- trainee would inform trainer of progress, reporting on outcomes of readings and discussions

- trainee would receive encouragement and motivation to apply techniques from the lessons

- trainer would call and ask questions, verify lesson comprehension

- trainer would answer questions that trainees would have compiled in their group discussion beforehand

- trainees would call when they had problems or didn't understand

- trainer would resolve disagreements that came up between peers during discussions

- trainees and trainers would exchange ideas for school improvement.

96.   Both the journals and log sheets showed that most trainees were engaged in this training 7 days a week. Even on the weekend, they were reflecting on their lesson, or in one case, even met with representatives from the neighboring school to discuss the process and problems with mobile conferences. Most journals show that there were group activities 4–6 days a week. See Exhibit 8 for some excerpts from one participant's training journal.[27]

Exhibit 8. Excerpts from a Sample Training Journal

(Day 1) "Today I feel very delighted mixed with a little feeling of fear as a trainee of Bangla through smartphone. With this feeling I started activity 1. This was a discussion among my colleagues about them and their professions. We gathered individual opinions separately in writing. This activity was completed successfully without any difficulty." (Day 9) "We discussed about the methods and strategies that can yield best results. Discussion, questions and answers, study tour, debate can create lasting effects. The trainer advised us not to place too much emphasis on memorization. Our idea about this was thoroughly changed. This is a very successful part of this training." (Day 11) "Why is management in the classroom important? I could realize its importance after discussing with my colleagues and I got some points to solve the problems, which may arise in the classrooms. From the discussion I also came to know how we can keep the classrooms clean and disciplined. These were very new to me. I could not agree with my colleagues about the inspiration of the learners and at last I felt assured as I called the trainer over mobile phone." (Day 15) "Inclusive Learning: After having a detailed discussion with my colleagues, I could learn about the topic. But we did not have any idea about the value of this method of learning. So to get a clear idea, we waited for a mobile conference. We all completed the other lessons effectively." (Day 17) "Today's activity was mobile conference. The trainer made the subject matter of third week clear to us. He explained about the confidence and sense of values that a teacher should have. We finished today's task happily." (Day 37) "Today the session of mobile conference started happily. We all were excitedly counting the moments when the mobile phone would ring. At last we could hear the sweet voice of the trainer from the other end. Very interestingly, she answered all the queries we had." (Day 41) "Today it was again a mobile conference. Our trainer made the lesson very clear to us by telling a story for a long time. Then he asked several questions to enhance our understanding. So the day was very remarkable to me." (Day 42—last day) "Today was Friday. So after finishing household chores, at 10:00 pm I studied for some time and discussed some points with the teachers from other schools over mobile phone."

---

[27]   Excerpts translated from Bangla by Bangladesh Education and Resource Network.

B.   Training Effectiveness

97.   **Overview.** Analysis of various evaluation instruments indicates that trainees did learn at least as well as through face-to-face training. In particular, analysis of pre- and post-test scores shows that the study teachers did improve their scores after the training program in both Bangla and math. Head teachers also report having observed changes in classroom practice, and the trainees themselves report that a more learner-centered and participatory approach to teaching and learning had been created. Seventeen of 18 trainees reported on the post-training evaluation questionnaires that the training program brought positive changes in the teaching and learning in the classrooms. Specific changes mentioned were:

- Understanding the importance of lesson plans, inclusive teaching concept, participatory and collaborative approach, and classroom management

- Becoming aware of personal development, problem-solving skills and evaluation, learner attitudes, and learner-centered learning.

98.   A majority (13 respondents, or 72%) stated that they very often use a participatory approach in their classes. The remainder said that they use this approach sometimes. Two-thirds of the trainees (12 respondents) rated the experience as "Effective," while an additional five respondents, or 27% of trainees, rated it "Very effective" (see Exhibit 9 below).

Exhibit 9. Post-Training Evaluation Questionnaire Responses from Trainees

Overall effectiveness of the training program	Somewhat	Effective	Very effective
	1	12	5
Use of participatory approach in the classroom		**Sometimes**	**Very often**
		5	13

Note: Cells with highest responses for each category are indicated with heavy outlines.

99.   It was also observed that the syllabus can be completed on time using the given schedule, and students can be prepared for exams.

100.   **Analysis of Pre- and Post-Test Scores.** The pre- and post-test scores of the control and study groups were analyzed and the results are presented in Exhibit 10, below:[28]

---

[28]   Analysis prepared by TQI-SEP Evaluation Advisor.

**Exhibit 10. Summary of the Difference in Average Scores
Between Trainee Pre- and Post-Test Scores**

PART ONE—PEDAGOGY					
Math teachers			Bangla teachers		
Pre-test	Post-test	Gain	Pre-test	Post-test	Gain
Control	9.55	20.00	10.45	6.00	10.15	4.15
Study	10.78	14.11	3.33	7.94	16.44	8.50

PART TWO—SUBJECT KNOWLEDGE					
Math teachers			Bangla teachers		
Pre-test	Post-test	Gain	Pre-test	Post-test	Gain
Control	12.48	14.45	1.98	10.90	12.40	1.50
Study	12.78	14.56	1.78	10.33	11.89	1.56

101.   Analysis of the data in Exhibit 10 shows that there were gains all around from pre-test to post-test, although this may be just the learning effect of doing the same test twice. In Part One (pedagogy and teaching strategies), the scores of the math teachers of the control group (face-to-face training) increased more than these of the study group (distance-mode training). The control group math teachers made significant gains in their Part One post-test scores (mean gain 10.45 as opposed to 3.33 by the study group math teachers). However, this trend is reversed for the Bangla teachers, with the study group gaining an average of 8.50 against 4.15 for the control group. In both subjects the differences appear to be highly significant. In Part Two (the subject knowledge test), there was hardly any difference between groups and subjects, with mean gains in the range of 1.50 to 1.98 points.

102.   Further analysis of differences in Part One mean scores show that the control group (N=82) produced a mean score of 7.82 in the Part One pre-test, whereas the study group produced a mean score of 9.36. In other words, the study group produced better results in the pre-test than the control group. This appears to be a significant difference ($p < 0.05$), although there may be confounding factors affecting the scores. A comparison of scores in the Part One post-test reveals no significant difference.

C.   Technology

103.   All the participants stated that they contacted their fellow trainees via phone and the main mode of communication was voice. Only two reported using SMS. They further stated that 11 respondents sent SMS to trainers and the majority said that the response from the trainers was satisfactory. Some reported receiving SMS from their trainers. Six reported not receiving any SMS and 12 reported not receiving MMS. There were some problems with SMS due to the language barrier, since messages could only be written in English (or using the Latin alphabet).

Some of the teachers were not comfortable with this alphabet. Most likely, MMS did not work because the network could only transfer clips up to 10 seconds long, but the trainees created clips that were several minutes long. Conference calling worked for three sites, but the sound quality diminished so much that the activity was abandoned.

104.   Although participants were not able to use all the smartphone features for training purposes, they were aware of its potential and benefited immensely by talking one-on-one with their trainer and with other teachers. The study recognized as a risk that the technology might be too complicated for the user group, with very little time for training. However, it was important to provide the options of different modes of communication (synchronous, asynchronous, multimedia, etc.) in order to see which ones would even be selected as of interest to the participants. However, although it didn't function properly, participants did try to send multimedia clips to their trainers, and so they did perceive some value in this exercise. This appears to be mainly related to the fact that it is new and exciting, and they felt proud to be able to share their classroom activities with their trainer and fellow trainees. Comparing the research questionnaires from before the study period and after (see Exhibits 11A and 11B), we can see that the teachers did improve their skills significantly in using various aspects of the phone; therefore, it does appear that they were able to learn the functions of the phone over the 6-week period, even though technical difficulties with the network prevented them from making optimal use of these features for training purposes.

105.   Thirteen respondents said that the phone was user-friendly and five said that it was not (i.e., it was difficult to operate). Those who said the phone was not user-friendly did not provide specific reasons why. The respondents were divided in their opinion about the effectiveness of the 1-day orientation. About one-third (N=7) stated that it was effective, six said it was somewhat effective, while five stated it was not effective. The participants suggested a 3-day training program. They said that hands-on experience was an effective method, and should have been used more in the trainings.

Exhibit 11A. Familiarity with the Phone Features Before the Training Program (Trainees)
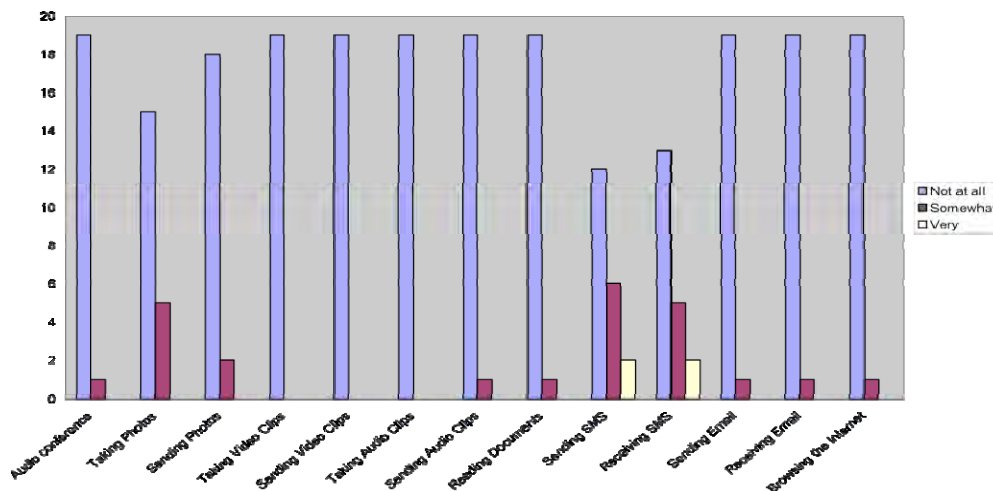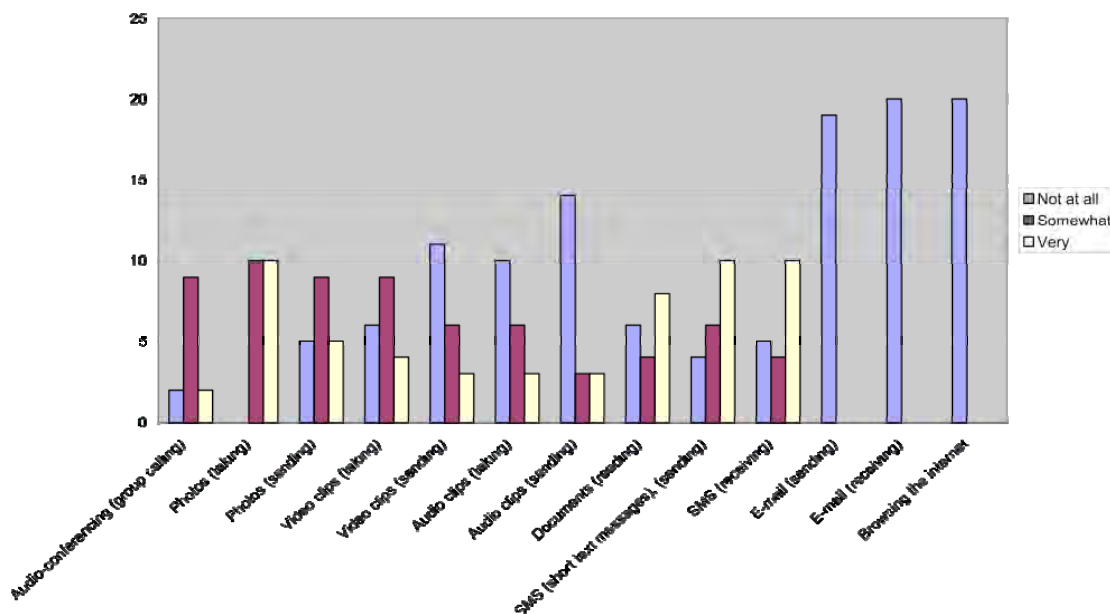
Exhibit 11B. Familiarity with the Phone Features After the Training Program (Trainees)

106.   Although one laptop was purchased for the training program, it was not used by the training coordinator except for a very few administrative purposes (preparing text documents, tracking students, grading). The original intention was that the trainer would be able to download photos and video clips from the participants, and provide feedback. However, the participants were not able to send video clips over the network via MMS, so this feature was not used.

107.   As mentioned in footnote 26, the study did not anticipate that so many trainers would be involved, so only two phones were purchased—one for each trainer. However, because there were five trainers total, they had to share a phone, and therefore complained that it was often not available when they needed it.

D.   Attitudes Toward Technology-Assisted Distance Training Versus Face-to-Face Training

108.   The findings in this area were interesting and significant. The majority of the participants were convinced of the power of technology in bridging the rural and urban gap. They were in favor of distance learning because it allowed them to remain in the schools and with their families during the training period, and the training content could be immediately applied. An additional benefit of the technology was that trainees could solve problems instantly over the phone. Sixteen of 18 trainees said they would choose a technology-based distance learning program over a face-to-face training, if given the choice. Exhibit 12, below, provides an overview of the advantages to distance mode training, as cited by participants of the study.

Exhibit 12. Summary of the Advantages of Distance-Mode Training

The main advantages of the distance-mode training compared to the face-to-face mode:

- allows participation in the training program without disruption to their students, their school, or their family life
- allows the trainee to immediately apply the concepts in the classroom
- saves time (the trainee's) and money (the training provider's)
- requires shared responsibility between trainer and trainee (i.e., cannot be a passive learning experience since they must prepare for conferences).

109.   Many participants—especially trainers, DEOs, USEOs, and head teachers—also changed their attitudes toward technology-assisted training between the orientation workshop and the end of the study. At the outset of the orientation, they were confused and not sure whether this method of training could be effective but afterward they realized its importance and benefits. See Exhibit 13 for some quotes[29] that illustrate this change of attitude.

Exhibit 13. Quotes from Head Teachers at the End of the Training

"Initially we were not sure of the success of this program but now we realize and understand that this is a very useful program. Now we can solve problems by communicating with others. We have undergone a massive change of attitude. This is much better than any other training."

"Like the teachers, we were not familiar with this new mode of training since we are not familiar with technology. We now think it is very effective. This new way of problem solving through smartphones is very effective. Through collaboration between trainer and trainees we have found the program very successful."

"I was not prepared for this kind of a program; I thought it would not be successful. But later on I realized that this is a very useful and practical approach, especially trainers' solving problems through the mobile phone. I noticed a change in the delivery of training. This is a significant step for our educational sector."

110.   In the pre-study questionnaire, the head teachers answered that the areas of teaching and learning that were the most problematic were (the number in brackets indicates how many of the 10 head teachers thought this was a problem):

- Teaching aids (8)

- Teaching learning methods (6)

- Contents of pedagogy (3)

- Classroom management (2)

- Subject content (1).

111.   But they all answered that they felt that mobile phone technology <u>could</u> address these problems, with the following explanations:

- "Problems can be solved through proper training and by ensuring modern facilities."

---

[29]   As gathered through interviews at the closing workshop.

- "We can correspond with our supervisor. All records can be easily kept. Discussion with teachers is possible."
- "Problems can be solved by arranging trainings and through the use of modern technology."
- "Receiving proper training and sufficient and improved teaching aids."
- "Technology helps in various ways in teaching aids."
- "We can easily communicate with authorities concerned."
- "We can keep important information to teach the learners."
- "Technology is one of the best processes to remove the problems."

112.   They also felt that technology could help them perform their duties better, particularly keeping records and their supervision data. There were also several comments that indicated that head teachers perceived technology as a means to access "ideas," "knowledge," "affairs of the world," or "the unknown." In other words, technology was a way to connect to the world outside their rural areas.

113.   Trainers, when asked at the start of the study about what they needed to improve about their practice, indicated that they needed "modern" and "contemporary" knowledge, and technology-based training. They felt that using the features of the phone would primarily help them to answer questions, provide feedback, and solve problems. However, the most important method for delivering the content of the training remained, in their opinion, the printed learning materials and the opportunity to talk with trainees and head teachers. Video clips were moderately of interest to the trainers, but were not top choice. From the start, the trainers were motivated to participate although less optimistic than the trainees about the feasibility of this type of training. Afterward, however, they expressed many positive advantages of the distance mode training compared to face-to-face training, although they still found it difficult to monitor students' progress and actual understanding, especially due to a lack of visual evidence in a subject as highly dependent on figures as mathematics is. This is where the multimedia should have played a role, but the participants were not able to make use of the possibility to send photos or short videos to their trainers.

114.   In the pre-training questionnaires (administered during the initial training workshop), trainees felt very sure that the mobile phone would help them to accomplish tasks, such as receiving feedback on assignments, solving problems related to the training process or training content, sharing experiences and ideas with other teachers in other schools, and improving classroom practice overall. Curiously, the tasks that received the lowest ratings were whether they thought the phones would help them get questions answered by their trainer or by teachers in other schools (i.e., only 11 and 15 teachers responded "Very sure"). Like the trainers, they felt that the printed learning materials and conversations with trainers and other teachers would be the most helpful. They were all very motivated to participate in the experience, knowing that it would allow them to stay in their homes and schools during the training period.

115.   After the experience, the post-training research questionnaires show that teachers still felt that the most important tool for learning the content of the CPD program was the printed materials and the opportunity to speak with their trainer. Interestingly, the ratings for two choices—(i) practicing techniques in front of the classroom and (ii) receiving feedback from head teachers based on classroom observation—went up after the training program, indicating

that the training program helped them to appreciate the value of the learning resources that are available to them at all times in the classroom.

E.   Actual Outcomes Compared to Anticipated Risks

116.   At the outset of the program, several anticipated risks were outlined so that steps could be taken to minimize these risks to the extent possible. Below is a summary of those risks, and the extent to which they were or were not an issue.

1. *Learning curve too great, focus on technology will distract from learning content.* As explained above, this turned out to be partially true. The technology did present a big challenge, and it prevented the trainees from using all of the features of the phones, but there was no indication from questionnaires and interviews that this actually prevented trainees from learning the content. Since the curriculum was mainly based on print materials and group discussion, the absence of technology for any reason could not have completely interrupted the training content.

2. *Abuse of the materials for personal use, and difficulty ensuring that the equipment is attributed to the TTC/TQI and not to the individual.* Many of the phones did appear to have calls registered to numbers other than the other study phones, and so were probably used sometimes for personal phone calls although not extensively "abused." However, in the future this might need to be taken into consideration, by asking for a financial deposit, or withholding the teachers' training certificate in the event that they are found to have made excessive personal calls. The phone log sheets were intended to record every incoming or outgoing call as a measure of accountability, but these instructions were not adhered to, and teachers only recorded in the log sheet the calls pertaining to the training program.

3. *Loss/damage of materials.* These two points were not an issue at all. All of the phones and laptops were very well taken care of, and shared among the training participants as necessary. There was only the problem that for security reasons, the phones were kept with the head teacher most of the time, and so were not always available when needed.

4. *Recurrent costs of phone service.* It was not possible, within the limits of this study, to prepare a detailed analysis of the costs of the mobile phone-supported training compared to the face-to-face training. However, the costs of the phone service were minimal, averaging about $8 per month, per phone. Therefore, when the initial costs of the equipment purchase are not included, this mode of training becomes quite cost effective.

5. *Insufficient capacity to send audio/video over the network.* The capacity of the network allowed for this feature to be used, but trainees did not understand that the size of videos must be limited because of the telephone system's capacity (rather than the phone's), so they thought that the feature did not work after the first unsuccessful try. Therefore, the actual capacity of the phones and the network were not sufficiently tested during this study.

6. *May increase workload for project participants, leading to dissatisfaction and refusal to participate.* This was not a serious issue. The training participants did state that they would have liked the school to make provisions for some light refreshments in exchange for the time spent after school hours on the program. However, no one refused to participate or showed any major dissatisfaction. Nor were there any

reports that the peer teachers felt a sense of resentment that they were essentially following the training as well, but would not be given a certificate.

7. *Involves adapting the existing curriculum for distance mode, and would benefit from adoption of new modes of working in order to effectively use all of the capabilities of the equipment (i.e., creating instructional materials, creating learning partnerships between schools). This may distract TQI-SEP staff from fulfillment of the basic project objectives for something that may not be replicated in the future.* This study definitely took a lot of time from TQI-SEP staff, but much of the work complemented existing responsibilities of TQI-SEP (such as improving the face-to-face learning materials). It is expected that the results of the study will contribute to future implementation, so it was not time lost.

VIII.   CONCLUSIONS

117.   The findings in Chapter VII describe many of the outcomes of this study in terms of improved training quality and enthusiasm from the participants. This chapter discusses the importance of these findings at both the individual level and the school level. It is also important to discuss the relative importance of the technology regarding the training process, since many of the comments really reflect on the advantages of distance learning, as well as the participatory design of the distance learning curriculum. These conclusions then help formulate the recommendations for future use of the phones in Bangladesh, as well as lessons that can be applied elsewhere (Chapter IX).

A.   Individual-Level Effects

118.   On the one hand, the study assumed too much prior phone experience for the users, based on the overall availability of phones and phone service in Bangladesh. In fact, there was a big learning curve between simple phone communication, and more advanced use, including sending SMS messages and having structured conversations or multiparty conversations with a loudspeaker. On the other hand, the study also overestimated the need for sophisticated technology, when in fact the real value of the phones was in their simplest use—one-on-one conversations between trainer and trainee, and among trainees in different schools. Also, the design of the school-based, in-service training was such that a great deal was learned just by discussion and debate among teachers in the school, application of the techniques in the classroom, feedback from colleagues, and then more discussion and debate.

119.   Therefore, regardless of the added value of the technology, the study does provide compelling evidence that distance-mode teacher training can be as effective as face-to-face training. It may in fact be more effective, if the comments from the trainees are an indication that the training content is more effectively put into practice when they can immediately apply and experiment with the techniques that they are learning, rather than waiting until after the training period to do so. Only further research can prove that this is the case, but since the study included some participants who had also participated previously in the face-to-face CPD program, their own comparison of the methods and application is very convincing in this direction.

B.   School-Level Effects

120.   The experience generated interest and enthusiasm on the part of participating teachers, other subject teachers, and even neighboring schools, who inquired about the process and use

of new technology.[30] The trainee comments indicate that they discovered a learning community within their own school, and that they could learn through group discussion or "ongoing team training," as one respondent noted. Although there were many remarks about the need to provide some incentives—at least some refreshments—for the extra time that this requires, one group of trainees remarked during the midterm evaluation that "it has become a daily routine to sit together during leisure period and exchange ideas—we eagerly wait for this time." Head teachers also noticed the improved collegiality among teachers as a result of working in groups, and that the exchange of ideas had helped to foster a more democratic learning environment. Even one trainee who expressed overall dissatisfaction with the training process remarked: "…we met experienced teachers from different areas and we could discuss various points of this profession directly and openly with them. With these, we can make ourselves more confident."

121.   One important lesson learned is that head teachers were critical to success. They took it very seriously as a professional development opportunity for the whole school, and it was only on their initiative that all of the teachers came together on a regular basis. Only two teachers from each school actually received credit for following the course, although the rest of the teachers in the school participated throughout the entire 6-week period in peer learning sessions. This was not voluntary; rather, it required a lot of dedication on the part of all teachers, as well as the trainers. Mobilizing the teachers could only be done with the full support of the head teachers, but according to trainees (who, during interviews for the study, expressed great appreciation for the role of the head teachers), they also provided overall guidance for the learning process and providing feedback on exercises.

122.   An additional factor to note is that trainers do not get paid an additional stipend for CPD (even face-to-face). This is seen as part of their regular responsibilities; however, the distance-mode training required much more work on their part, particularly organizational skills and coordination of multiple calls. Trainers are critical to the learning experience, and evidence for this was provided in the journal notes; therefore it is recommended that trainers be recognized for the extra effort that they are making.

C.   The Technology

123.   **Hardware and Accessories.** As previously explained, sophisticated smartphones were not required to provide the communication features necessary for the training program; however, had more (and more effective) training been done, the teachers might have discovered additional benefits from the more advanced features of the phones. In other words, we cannot conclude that the multimedia features of the phones have *no added value* for the training process; we can only conclude that the training was effective even in their absence. An additional consideration is that even if training had been adequate in terms of using the phones, the local mobile phone infrastructure still lags behind the available mobile phone technology (for example, even if the phone can record a 10-minute video, the network can only send 8 to 10 seconds). Therefore, a great deal of research and pilot testing is needed in order to determine the minimum capabilities and compatibility of the phone and the phone network before embarking on such a project. The conference calling feature is one example of this; although we were told by both the phone service provider and the hardware vendor that conference calling was possible, in reality, it was only possible to connect three parties, but the quality of the audio

---

[30]   A similar finding was noted in the conclusions of the Nepal study, which introduced video recorders into teacher training. The participants overwhelmingly were in favor of the use of this technology because it made learning "fun" and exciting. Participants were excited and motivated, and interest was generated among neighboring communities that began to inquire about how to participate in the training themselves. See Appendix 10 of the RETA Final Report, the Nepal Country Report.

went down so dramatically when three people were connected, that the experience was abandoned.

124.   In terms of accessories, provision of spare batteries would have prevented the downtime caused by shortage of electricity for frequent recharging. Better management of the phones (i.e., by allowing them to remain with individuals in the evenings) would have also provided a way to ensure they were recharged as necessary. If possible, being able to attach an external speaker would be beneficial for group interaction with the trainer or with another school. The study considered whether adding local printers would be worthwhile, so that documents sent through the phones could be printed at the school level. However, although such technology does exist (phone-to-printer), it would not be practical in this setting due to the lack of electricity. Also, as mentioned above, there is not sufficient capability within the phone network to send documents by MMS, and the phones were not connected to an Internet (or e-mail) service for this purpose.[31]

125.   **Technology Added Value.** In many ways, technology has such a big reputation to live up to, one has the impression that it will have an impact whether it was designed to or not, simply because people have such high expectations of what it can do. The simple fact of participating in a program with a technology input convinces people that it is more serious (this was a conclusion that resonated strongly in the Nepal study component of this RETA [see footnote 30]) and that it will have results that are as dramatic and exciting as the technology itself.

126.   In fact, if anything, this study actually dispelled much of this mythology by showing that the technology was actually the least important aspect of the distance-mode training—the most important and significant change was the fact that the distance training mode allowed teachers to remain in their schools and with their families during the training period, which increased motivation to participate in the training while also allowing them to immediately apply what they had learned. The paper-based learning materials combined with the group discussion and examination of the training content were the most valuable and effective methods, according to the participants. In other words, the training probably could have taken place without the technology at all.

127.   In this case, the added value of the mobile communications technology is twofold. First, it gives the trainers confidence that the trainees will complete the training program effectively, because they have a way of providing regular follow-up and ensuring that the trainees stay on task. Second, the on-demand communication between trainees and trainers, as well as *among* trainees, helps to keep the trainees motivated and improves content understanding and application through question, answer, and debate. Research in distance learning indicates that feelings of isolation and difficulty with self-motivation can lead to dropout or failure,[32] and that "blended" learning environments that maintain some face-to-face contact are more effective.[33] The mobile phones are clearly a solution to this problem, where phone service is available and affordable.

---

[31]   We did not investigate whether or not this would be possible, since it was judged sufficient to simply use audio conferencing, SMS, and a pre-prepared printed package of learning materials.

[32]   Fozdar, Bharat Inder and Lalita Kumar. 2007. Mobile Learning and Student Retention. *The International Review of Research in Open and Distance Learning.* Vol. 8. Issue 2. Alberta. Available: http://www.irrodl.org/index.php/irrodl/article/view/345/916.

[33]   See, for example, Rovai, A. and H. Jordan. 2004. Blended learning and Sense of Community: A Comparative Analysis with Traditional and Fully Online Graduate Courses. *The International Review of Research in Open and Distance Learning.* Vol. 5. Issue 2. Alberta. Available: http://www.irrodl.org/index.php/irrodl/article/view/192/274.

128.   The added features of the technology, though not used for this study, should not be too quickly discarded as superfluous. As users (especially trainers) become more familiar with the technology, and if the initial orientation to the technology and processes is improved, then there are still many ways that alternative communication, including multimedia, could further optimize the training program. However, trainers must be the champions of the mobile phone use, allowing the trainees to focus on the course content and not the technology. Trainers should receive ongoing support for using the advanced features of the phones to send information to complement the curriculum, even if the trainees only respond with regular voice calls.

IX.   STUDY RECOMMENDATIONS

129.   It is important to recognize that the phones cannot be considered the primary method for course delivery in this context, given the current lack of infrastructure and individual capacity for using the technology. The phones are a supplementary tool for a distance learning curriculum based on pedagogically sound print-based materials and active, situated learning methods. Perhaps in the future, when schools are equipped with electricity, computers, and printers, it might be worthwhile to explore total document transfer through the mobile phones, but the advantage over simply printing the full course outline is questionable. However, as mentioned elsewhere, complementary audiovisual materials could be transferred over the phone network, but these should be considered as such—complementary, but not essential. With that in mind, this section provides some recommendations for future research and experimentation using mobile phones to support teacher training in Bangladesh. While the recommendations are specific to the Bangladesh context, they also highlight issues to consider for other countries and programs, such as choice of technology, appropriate design of training content and delivery methods, and improvements to the initial training.

A.   Need for Further Research

130.   It would be worthwhile to again compare long-term effectiveness of the training between the control schools (face-to-face) and study schools, by conducting classroom observations after 6 months or more to compare the extent to which the trainees of each learning method are implementing what they learned. The pre- and post-test results indicate that short-term learning retention was equal in both groups, but there is reason to believe that the study teachers will be more likely to implement the methods in the classroom, since they had experience doing this during the training period. The head teachers reported that they had observed trainees applying the new methods in their classroom; there is no possibility to verify this in face-to-face trainings because there is no direct follow-up or assessment in the classroom setting.

131.   Similarly, the conclusions section (Chapter VIII) suggested that the training program probably could have been carried out as effectively as a traditional distance-learning course, without the technology. Another future study could aim to understand the impact of the "excitement" and "motivation" that comes from using new technologies in the learning process, the importance of trainer feedback by phone, and any other added value of the technology. Such a study would compare the study schools (using the same equipment and curriculum) to a set of control schools that would use only the print-based learning materials.

132.   Finally, more research needs to be done on the didactic environment of the phones and phone features; perhaps comparing usage of the Sony Ericsson phones with a simpler model. Given the short training period and large learning curve, this study could not adequately assess the value of different features of the phone (synchronous and asynchronous voice, video, text)

for the learning experience, nor allow the study team to make a strong recommendation in favor of any particular device for this type of training experience. This recommendation is consistent with other international research that suggests that "usability issues should be tracked over a longer period, from initial use through to a state of relative experience with the technology."[34]

B. Improving the Training Program Design and Delivery

133. Several things might be done to improve the experience the next time this type of professional development is implemented. First of all, the initial orientation program needs to be improved. In addition to more effective training on the use of the phone features, there should also be a trainers' manual that specifically suggests how and when they might use the phones to prompt discussion, provoke reflection, assess progress, etc. The current curriculum materials do not specify anything except for the conference calling, but some brainstorming exercises with the trainers would no doubt come up with many other opportunities to use the phones. For this purpose, the orientation should make clear the benefits of SMS over phone conversations: for example, trainees can ask quick questions outside of school hours; trainers can send prompts and announcements easily to the whole group; short assessment exercises can be completed (see paragraph 88 for an example of how SMS was used for this study); and whether there are cost savings for short SMS versus voice phone calls.

134. Similarly, when trainers and trainees understand better how to use MMS, they might be able to think of important uses of this feature. It may not be realistic to think that a 10-second video could provide an accurate representation of teaching in practice. But trainers, as they gain more experience, might be able to prepare clips of model teaching examples that are very clear and short, or perhaps send photos of unique teaching aids and other learning materials or classroom configurations. The value of these "electronic assets" is that they can be easily reused in subsequent training; so although there might be a big time investment required for the first several training periods, this effort should go down as the trainer gains more experience. The multimedia can also help address the challenge that trainers face in monitoring trainee progress and assessing learning outcomes.[35] For example, math trainers were concerned about how to check the accuracy of formulas and figures; a video a few seconds long, or a still photo, might be one way to provide evidence of comprehension to the trainer. These are all experiences that should be considered in the future, if the smartphones are retained.

135. The emerging theoretical basis for using the phones for supplementary, multimedia prompting is found in "microlearning," which suggests that people learn more effectively if information is delivered in small units that are easy to understand and apply.[36] Complementing the complete, and perhaps intimidating, printed-course pack with these small multimedia experiences could help reinforce overall learning outcomes.

---

[34] Kukulska-Hulme, Agnes. 2007. Mobile Useability in Educational Contexts: What Have We Learnt*? The International Review of Research in Open and Distance Learning.* Vol. 8. Issue 2. Alberta. Available: http://www.irrodl.org/index.php/ irrodl/article/view/356/879.

[35] This problem is not unique to Bangladesh, but has been a concern in distance learning programs worldwide since their inception, because there is no way to know whether the person completing an assignment is actually the one who is receiving credit for the course.

[36] Habitzel, K., T.D. Märk, B. Stehno, and S. Prock. 2006. Microlearning: Emerging Concepts, Practices and Technologies After E-Learning. Proceedings of Microlearning 2005 Learning & Working in New Media. Cited in Fozdar, Bharat Inder and Lalita Kumar. 2007. Mobile Learning and Student Retention. *The International Review of Research in Open and Distance Learning.* Vol. 8. Issue 2. Alberta. Available: http://www.irrodl.org/index.php/ irrodl/article/view/345/916.

C.   Choosing the Right Technology

136.   As long as the project has phones with advanced features, it is worthwhile to investigate how to make the most of these features. However, that does not mean that the training could not be repeated—and scaled up significantly—if a simpler, more low-cost model were used. This includes using the trainees' own personal phones by finding a way to reimburse them for the cost of the calls that they make.

137.   It was difficult to determine the make and model of phone to purchase without being able to test all of the features in advance, and not knowing exactly which features were going to be the most important. The team considered going with a Nokia N73 model, but finally received a quote for the Sony Ericsson in which the company offered to provide a trainer at no charge (except travel expenses). This was the main reason for switching to the Ericsson model, although this may have been an error since the phone seemed to have *too many* features, many of which were not required for the study.

138.   Participants are overwhelmingly in favor of having one phone per person, rather than sharing. However, the outcomes were satisfactory when the phones were shared, and this will increase the cost-benefit ratio in the future. After this first experience, trainers and the TQI-SEP training providers will be able to make recommendations for how to more effectively manage sharing a phone (for example, alternating ownership of the phone every day, and letting trainees keep the phones during the evening hours). If a less expensive model is chosen, then it might be as worthwhile to have one phone per person. However, issues of responsible recycling should be taken into consideration when the project ends.

D.   Synthesis and Conclusions

139.   **Application of Findings to TQI-SEP.[37]** If this experience is continued through TQI-SEP, it would be worthwhile to continue in the same district, because the TTC has already had the experience. It is also a very rural and remote region, so the experience could also be applied at the teacher training institute level, in order to provide staff development opportunities for teacher trainers, or to continue providing support to improve the quality of supervision by head teachers. Information about the study should also be made available to schools so that they know that the training could be replicated in their schools using the innovation and development fund.

140.   It is also recommended that the trainers be the champions of the mobile phone use, allowing the trainees to focus on the course content and not the technology. Trainers should receive ongoing support for using the advanced features of the phones to send information to complement the curriculum, even if the trainees only respond with regular voice calls. Both trainers and trainees should also have more flexible access to the phones so that they can be used to contact each other after school hours, when much of the self-learning occurs. Current trainers can serve as a resource for using the phones; they should be encouraged to continue learning all the features of the phone, and be given resources to develop training materials or deliver training for future users (trainees and trainers).

141.   TQI-SEP staff members have indicated that they will recommend continuing the training through technology-supported distance learning. The choices will be whether they stay in the same schools, or select new schools; and whether they change subjects. The distance-learning

---

[37]   The Bangladesh Open University could also benefit from learning about the results of the study, and, if necessary, technical assistance to help devise a strategy for using mobile phones to connect to their students and provide more feedback, in an attempt to improve quality and student retention.

mode will contribute to helping TQI-SEP complete its quantitative responsibilities (i.e., providing in-service training to all teachers), but more importantly, it will respond to improving quality in remote areas. The comments indicate that this experience has been particularly beneficial for women, who are unmotivated to attend face-to-face training when it means that they must leave their schools to attend residential training for 2 weeks. Continuing this experience will produce a positive impact by attracting more female teachers because this program allows these women to stay with their families and communities while undergoing the distance training course. For women and men alike, the school-based distance-mode training reduces disruption for the classroom and school, especially in private secondary schools that will not hire substitute teachers when someone is away on training. Therefore this experience will have as much impact on quality of teacher training as quantity of teachers trained.

142.   TQI-SEP is also expected to "…build the capacity for and enhance the continuing training and support, provided through NAEM, for head teachers and administrators," as

> *they will play a key role in improving and maintaining of teaching quality, to be reflected in upgrading the existing courses to include aspects of innovative teaching and good education practices, and specifically the role of head teachers and administrators in encouraging and maintaining good teaching practice through monitoring and professional support. This role will help institutionalize quality control and assurance* (from page 5 of footnote 14).

This experience could also be applicable to this goal, since it demonstrated meaningful involvement of head teachers in monitoring training completion and effectiveness.

143.   **Contribution to Existing Knowledge Base.** The study builds on existing experiences in "mobile learning"[38] from other countries, to develop a case study on the use of mobile connectivity in support of distance education in a country with high population density and wide mobile communications coverage. The study findings and recommendations are more relevant to research in open and distance learning, rather than mobile learning; they contribute to existing research by providing lessons learned concerning:

- The advantage of school-based distance learning for in-service teacher professional development

- The possibility of telephone communication as a support for distance learning (particularly relevant in Bangladesh for the Bangladesh Open University, which enrolls over 200,000 students per year) or other formal learning situations involving a trainer and trainee.

- The feasibility of using advanced mobile phone features in place of desktop computers or other large multimedia projection equipment for delivering additional course content in a distance learning program.

144.   One of the most important findings that will contribute to existing knowledge on the subject of mobile learning concerns the learning curve encountered by the users of the smartphones. One of the study assumptions was that since all of the participants were experienced phone users and mobile phone owners, they would be able to adapt to and easily

---

[38] Mobile learning, or "m-learning," implies that the course content and delivery is based entirely on the mobile devices. This was not the case for this study, which simply used phone communication as a support for traditional distance learning with print-based self learning materials and active learning techniques. See Appendix 4 of this report for an overview of other experiences and research in mobile learning.

integrate the smartphone and its more advanced features into the training experience. However, this did not turn out to be the case, since the users did not readily use the advanced features of the phone, and they abandoned experimentation quickly, after the first failed attempts. Therefore, much more time and training will be required for the effective use of the smartphones in distance training. This is why it is important to concentrate training and advanced didactic use of the phones at the level of the trainers, since the trainees do not have time to effectively learn all of the phone features, nor would it be desirable to spend time training them for these limited purposes (unless they will be able to access this type of technology in the future).

145.   Likewise, although many current case studies in m-learning describe the mobile phone as the primary means of content delivery, this study does not recommend, at this time and in this context, that smartphones be the only mode of distance learning delivery. The blended mode, combining printed self-study materials with school-based peer group discussions and content application is important, and more suitable to the low-resource context. It is with this principle in mind that this study has also developed the idea of "learning communities" enabled by mobile technologies—that is, communities of practice among teachers in the same region or of the same subject matter who meet regularly and share knowledge and practical experiences. This is a concept to be explored further both within Bangladesh and elsewhere.

X.   REFERENCES

Asian Development Bank (ADB). 2002. *Project Performance Audit Report, Bangladesh Open University Project.* Manila.

ADB. 2004. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of Bangladesh for the Teaching Quality Improvement in Secondary Education Project.* RPB:BAN 26061. Manila.

ADB. 2007. *Key Indicators 2007.* Volume 38. Manila.

Ahmed M., et al. 2006. *Education Watch 2005: The State of Secondary Education: Progress and Challenges.* Campaign for Education (CAMPE). Dhaka.

Ali, Mohammad. 2003. *ICT Education Case Study: Asian South Pacific Bureau of Adult Education Research on Information and Communication Technology (Bangladesh).* Dhaka Ahsania Mission. Dhaka.

Bangladesh Bureau of Statistics (BBS). Undated. *Statistics for Monitoring Attainment of MDGs in Bangladesh.* Available: http://www.bbs.gov.bd/dataindex/MDGs%20in%20Bangladesh.doc.

BBS. 2006. *Statistics Bangladesh 2006.* Dhaka. Available: http://bbs.gov.bd/dataindex/ stat_bangladesh.pdf.

Bangladesh Telecommunication Regulatory Commission. 2007. *Mobile Phone Subscribers in Bangladesh.* Dhaka. Available: http://www.btrc.gov.bd/mobile_subscribers_may-july2007.htm.

Fozdar, Bharat Inder and Lalita Kumar. 2007. Mobile Learning and Student Retention. *The International Review of Research in Open and Distance Learning.* Vol. 8. Issue 2. Alberta. Available: http://www.irrodl.org/index.php/irrodl/article/view/345/916.

Habitzel, K., T.D. Märk, B. Stehno, and S. Prock. 2006. *Microlearning: Emerging Concepts, Practices and Technologies After E-Learning.* Proceedings of Microlearning 2005 Learning & Working in New Media.

Hoque, E., Sikder, A., and Alam, S. Undated. *Statistics for Monitoring Attainment of MDGs in Bangladesh.* Bangladesh Bureau of Statistics. Dhaka. Available: http://bbs.gov.bd/dataindex/ MDGs%20in%20Bangladesh.doc.

Kamal, M.A. and S.A. Sultana. Undated. *Barriers to Development in Open Learning and Distance Education.* Bangladesh.

Keegan, Desmond. 2002. *The Future of Learning: From eLearning to mLearning.* Zentrales Institut für Fernstudienforschung, FernUniversität: Hagen. Hagen.

Kukulska-Hulme, Agnes. 2007. Mobile Usability in Educational Contexts: What Have We Learnt? *The International Review of Research in Open and Distance Learning.* Vol. 8. Issue 2. Alberta. Available: http://www.irrodl.org/index.php/irrodl/article/view/356/879.

Loxley, William and Patrick Julien. 2004. Information and Communication Technologies in Education and Training in Asia and the Pacific. ADB. Manila.

Ministry of Education. 2004. *Development of Education: National Report of Bangladesh.* Dhaka.

Ministry of Primary and Mass Education. 2003. *Education for All: National Plan of Action II, 2003–2015 (Fourth Draft).* Dhaka.

Naismith, L., P. Lonsdale, G. Vavloula, and M. Sharples. 2006. *Literature Review in Mobile Technologies and Learning.* Futurelab series. Report 11. Futurelab. University of Birmingham. Bristol.

National Academy of Educational Management (NAEM). Undated. *About Bangladesh.* Available: http://www.naem.gov.bd/about_bd.php.

Pouezevara, Sarah and Binita Parajuli. 2007. *Old Technology or New? A Study of Video Recording as an Innovative Method for Primary School Teacher Training in Rural Nepal. Nepal Country Report.* RTI International. ADB TA6278-REG. Research Triangle Park.

Public Broadcasting System. 2005. *Dying to Compete: Inside Bangladesh's Garment Industry.* Available: http://www.pbs.org/frontlineworld/blog/2005/08/dying_to_compet_1.html.

Reddi, U.V., Sinha, V. 2003. Bangladesh: ICT Use in Education. In UNESCO. 2003. *Meta-Survey on the Use of Technologies in Education in Asia and the Pacific 2003-2004.* Bangkok.

Rovai, A. and Jordan, H. 2004. Blended Learning and Sense of Community: A Comparative Analysis with Traditional and Fully Online Graduate Courses. *The International Review of Research in Open and Distance Learning.* Vol. 5. Issue 2. Alberta. Available: http://www.irrodl.org/index.php/irrodl/article/view/192/274.

Seppälä, P., and H. Alamäki. 2003. Mobile Learning in Teacher Training. *Journal of Computer Assisted Learning.* Volume 19. 330–335.

Stead, G. 2005. *Moving Mobile into the Mainstream: A Paper for MLearn2005.* Available: http://www.mlearn.org.za/CD/papers/Stead.pdf.

United Nations Educational, Scientific and Cultural Organization (UNESCO). 2005. *Mobile Learning for Expanding Educational Opportunities: Workshop Report.* UNESCO Asia and Pacific Regional Bureau for Education. Bangkok.

Watson, Julian. 2007. *From Policy to Pupil: How Governments Encourage ICT in Education. Regional ICT Policy and Strategy Report.* RTI International. ADB TA6278-REG. Research Triangle Park.

Wikipedia. 2006. *World Population Aspects.* Available: http://en.wikipedia.org/wiki/List_of_ countries_by_ population#_note-unpop. A compilation based on country estimates and data from the United Nations population database.

World Bank. 2007. *ICT at a Glance.* Available: http://devdata.worldbank.org/ict/bgd_ict.pdf.

XI.   AUTHORS

146.   **Sarah Lucas Pouezevara** is a consultant in international education and development with more than 10 years of experience with the United Nations, multilateral and bilateral donors, nongovernmental organizations, universities, and foundations in the role of program evaluator, program manager, instructional designer, trainer, and technical writer. Ms. Lucas has worked on other projects involving large-scale teacher training improvement in Mongolia and Indonesia, and has extensive experience with the use of ICTs in education, including distance learning, mobile learning, and creating online communities of practice. She is a 2001 graduate of the Columbia University Teachers College (New York, USA) department of International and Transcultural Studies. She was born and raised in Denver, Colorado (USA), and is currently a resident of France.

147.   **Rubina Khan** is an Associate Professor in the Department of English, University of Dhaka. She has a master's degree from the University of Northern Iowa in teaching English to speakers of other languages, and a PhD in English language teaching from the University of Warwick, UK. Dr. Khan has published in journals and has presented at national and international conferences. Her areas of interest are testing, evaluation, and teacher education. She is the General Secretary of the Bangladesh English Language Teachers Association.

APPENDIX 1: MAP OF BANGLADESH, INDICATING STUDY AREA

Source: ADB

APPENDIX 2: SAMPLE UNIT FROM THE STUDY DISTANCE-LEARNING CURRICULUM

(Translation. Original document used for training was in Bangla)

Week 1, Unit 1

Teacher and the Teaching Profession

Outline:
A teacher should be aware of his duties and responsibilities. This unit covers the professional duties and responsibilities of a teacher, the teacher-student relationship, the ways to develop it, and how to identify as well as remedies of teachers' weak points.

Teaching materials:
Poster paper, marker, sign pen, board pin, gum, card.

Part 1 Discussion Questions:
- What are the professional duties and responsibilities of a teacher? How do you think that teaching-learning activities will be hampered if these duties and responsibilities are not implemented properly?
- What type of relationship as a teacher should have with the students? How can a friendly relationship be established between both of you and why should it be done?

Activity 1a (trainee and trainer)
1. The trainee will think deeply and reflect to know the answers of the above questions.
2. The trainee will study the supplementary reading materials of this unit to acquire an overall idea of the material as well as to understand teachers' professional duties and responsibilities and the ways to establish a friendly relationship with the students.
3. The trainer will make a query about the trainee's progress over the phone and instruct him/her to know the question answers by group discussion with the colleagues.
4. The trainee will ask the colleagues to reflect on the answers and also to study the supplementary reading materials.
5. The trainer will make phone calls, give assistance, and, if necessary, send SMS to find out the progress of the whole activities.
6. The trainee will arrange a discussion session according to the next activity—1b. He or she will ask for the assistance of the head teacher if needed. They will make phone calls to the trainer to inform about the whole plan. The trainer will give instructions.

Activity 1b (trainee and colleagues)
- At the beginning, the trainee will ask the colleague teachers to think deeply on and explain the meaning of the professional duties and responsibilities of a teacher.
- Divide the colleagues into two groups. There will be a reporter and a team leader in each group. Ask each team to make a list of a teacher's professional duties and responsibilities on a poster paper.
- Each team will present its respective report in the joined session. Make a checklist of teachers' professional duties and responsibilities and record it in the journal on the basis of team's presentation and colleagues' opinion. If necessary, moderate/enrich the reflections of your colleagues on the basis of the following information.

> The professional duties and responsibilities of a teacher are:
> - To gain an overall view of the curriculum of the subject
> - To acquire a complete idea of the respective subjects
> - To know students' nature very well
> - To make a suitable/appropriate teaching plan
> - To know teaching principles and the methods and techniques of teaching well
> - To realize the importance of own profession and to prepare to execute the duties properly
> - To possess scientific attitude
> - To show sympathy, affection, and perseverance toward the students.

- You and your colleagues reflect for a while, closing your eyes, on the effects of teaching-learning activity if they as teachers do not perform their professional duties properly. Do this in another session, if necessary.
- Each colleague will share a point on the basis of reflection. Finally the trainee will explain the effects after discussing with the colleagues.
- Ask the colleagues to think over the following two issues closing their eyes:
- How was your relationship with the teachers in your school?
- What is the relationship between you and your students in the present real classroom situation?
- Ask some of the colleagues to describe/share their past and present relationships.
- Tell your colleagues to do individual and pair reflection on the nature of student-teacher relationship in an ideal situation and then ask them to share/present their opinion in Mind Mapping method on the ways to establish a friendly teacher-student relationship.
- The colleagues will present their thoughts. The trainee will write the answers on the board and then discuss them.
- The trainee will record in a journal the results of above discussion as well as take still photographs and video clips to send to the trainer.

Trainer activities

The trainer will make phone calls or send SMS to find out whether the teacher trainee has completed the above activities, whether the colleagues have participated, and also the overall progress of the discussion.
1. The trainer will talk to the head teacher on phone, if necessary.
2. The trainer will make query about the learning points of the trainee in this unit, give instructions to keep the record of it, to apply the techniques regularly in classes, and to send the still photographs and video clips.

Part 2 Discussion Questions
- Why should we know about students' interests, attitudes, and personalities? What type of information will help students achieve good results?
- How can we know about our weak points as teachers while teaching? How can these be corrected and why should we do this?

Activity 2a (for trainee and trainer)
1. The trainee will deeply think and reflect on students' individual natures/instincts and difference, weak points of teaching, and the ways to overcome it.

2. The trainee will study the supplementary reading materials of this unit to get an overall idea and understand teachers' professional duties, responsibilities, and the ways to establish friendly relationships with students.
3. The trainer will inquire about the trainee's progress over the phone and instruct him/her to know the question answers by group discussion with the colleagues.
4. The trainee will ask the colleagues to reflect on the question answers and also to study the supplementary reading materials.
5. The trainer will make phone calls, give assistance, and, if necessary, send SMS to know the progress of the whole activities.
6. The trainee will arrange a discussion session according to the next activity—2b. He or she will ask for the assistance of the head teacher if needed. They will make phone calls to the trainer to inform about the whole plan. The trainer will give instructions.

Two to three important learning points of this topic (The teacher trainee will ask questions and the colleagues will answer orally)
1.
2.

Activity 2b (trainee and colleagues)

1. The teacher trainee will write the words *motivation/interest, attitude,* and *personality* on the board in large size. Colleagues will be asked to describe meaning of the words. If necessary, they will explain. Now ask the following questions:
   ● Do all of us have same motivation/interest, attitude, and personality? Why not?
   ● Is there any difference in students' motivation, attitude, and personality? If yes, mention two to three points.
   ● Do all students in a class learn in the same way or like to do it? If no, why?
2. How much will teaching be effective to you if a teacher teaches in his own way without considering students' motivation/interest, attitude, and personality?
3. After discussing fellow teachers' answers, make it clear that teachers should teach taking into consideration students' motivation, attitude, and personality. Otherwise teaching might not be effective.
4. Ask fellow teachers to reflect in pairs and share one point from each pair on types of information which will support students in producing good results.
5. The trainee will make a list of the points on board with the assistance of a fellow teacher as well as maintain the journal. Simultaneously he will explain its importance following information given in the box below.

The factors about which the teachers should have knowledge:
- Health condition
- Moral issues/side
- Physical defect/mental problem (if any)
- Socioeconomic condition
- Family condition
- Adaptability
- Present condition of knowledge, competency, and attitude

Possible sources are:
- Self-evaluation of teachers
- Evaluation by students
- Evaluation by fellow teachers
- Students' credit/exam result
- Evaluation by guardians
- Exchanging views with the concerned people (students' guardians, etc.)

6. In the same session, ask the fellow teachers to stand straight, eyes closed, and place hands on chest. Now tell them to think neutrally or do self-criticism on the following issues for a while—
   - How much am I performing duties successfully in classroom teaching?
   - In which sectors do I have possible weakness?
7. A few among the fellow teachers will present their thoughts/views in brief before others.
8. Now ask them to reflect and describe in pairs about the ways to identify their weaknesses in teaching.
9. Two to three pairs of them will present their own reflection before others. If there are any more apart from the presented/shared topics, ask them to share.
10. Ask the paired teachers to discuss and exchange views about the issues given in the following chart with the fellow teachers as well as write those on the poster paper.

In which sectors do teachers' competency needs to be developed?	How can teachers' competency be developed?
1. 2. 3. 4.	1. 2. 3. 4.

11. The fellow teachers will reflect deeply on the issue by exchanging their posters among others. The trainee with the assistance of participants will make a list of the sectors and means to develop teachers' competency.

Two important learning points of this unit (The teacher trainee will ask questions and the colleagues will answer orally)
1.
2.

- The teacher trainee will record the results of the above discussion in his own journal.
- The teacher trainee will send the still photographs and video clips of the above discussion and classroom teaching.

Trainer
1. The trainer will make phone calls or send SMS to find out whether the teacher trainee has completed the above activities, if the colleagues have participated, and also the overall progress of the discussion.
2. The trainer will talk to the head teacher on phone, if necessary.
3. The trainer will query about the learning points of the trainee in this unit, give instructions to keep the record of it, to apply the techniques regularly in classes, and to send the still photographs and video clips.

Mobile Conference—1
1. The trainer will call the teacher trainees to set up a conference schedule and also be informed about the preparation.
2. The trainee will inform as well as ask fellow teachers to participate. Everybody will be able to listen to the conference discussion through the loudspeaker of the smartphone.
3. The trainer will present a brief idea on the discussion questions to the teacher trainees.
4. The trainer will make inquiry about the knowledge constructed through peer discussion, ask questions, its classroom application, and give answers to the concerned questions.
5. The trainer (TTC teacher) will ask the trainees to identify the key learning points of the overall discussion as well as to record those in their journals.

Summary

Teachers have different types of professional duties and responsibilities. The standard of education has a direct relation with the implementation of these duties. But unfortunately, many of our secondary school teachers fail to perform these duties. The secondary school teachers must do their duties properly. Simultaneously, they should maintain a friendly relationship with the students. Students' personality, attitude, etc. should be considered with importance in teaching-learning activities. Additionally, teachers should conduct a self-evaluation to judge their capability to perform their professional duties and responsibilities and should take steps accordingly to increase professional competency on their own. By doing these, standard secondary teaching sector will be created.

_____

Teacher and the Teaching Profession

Teaching is a noble profession. The legend of honor of this profession is related with the performance of teacher's professional duties and responsibilities. Teaching mostly covers a teacher's duties and responsibilities. And teaching is a multidimensional subject. Teachers should possess some essential qualities, competencies, and techniques for effective teaching:
- Competency to identify confidence and morale for effective teaching
- Competency to identify professional behavior and attitude
- Competency to communicate, present, and ask questions
- Competency to plan for fruitful teaching and students' learning progress

- Competency to show initiative and creativity in selecting and preparing teaching materials
- Competency to take interviews and to develop interviewing skills to enhance communication in classroom and other professional sectors
- Competency to use evaluation process for self-improvement and the improvement of fellow teachers, as well as personal and shared reflection
- Skills in classroom management
- Competency to connect theory and practice in teaching
- Competency to question and apply evaluation technique through experience and observation, etc.

For any teacher, "Teacher Competency" means to gain the above described skills. Again to be successful as a professional teacher, it is essential to gain these professional competencies.

Besides this, teachers should have clear idea about some other related competencies in successful teaching. Some of them are given below—
- Content competency
- Method competency
- Communication competency
- Management competency
- Social competency
- Evaluation competency.

Teaching-learning activities should be conducted considering these competencies.
A teacher can reshape/represent himself as an ideal teacher through training. In this regard, the following qualities can be added to a teacher—
- A teacher will be the best example to the children for his personality and behavior.
- A teacher will observe a vow to perform duties considering students' future.
- Each teacher should realize the importance of receiving age-suitable training to perform his duties and responsibilities.
- Teachers' main/prime duty is to be acquainted with all questions in students' minds and to make attempt to collect proper answers from them by questioning. By this, teachers will easily be able to trace how students think.
- Teachers should not just be educated, rather they should have the competency to use their education in students' lives.
- No person can observe a vow of a noble profession like teaching without possessing necessary qualities.
- The most sacred duty of a teacher's life is to awaken mentally the learning habit forever.
- Actually a teacher is born with some teacher qualities which gets completeness later through training.
- A teacher should possess sufficient knowledge about the special significance of different teaching methods.
- Each teacher should realize correctly the importance of an individual philosophy of education/teaching.
- A teacher should account his profession with a competitive mentality.
- Teachers should always be ready to play changeable roles.
- Teachers should be able to manage the students so that students can enhance their learning ability from their experiences.

The interrelation between teachers and students is an important factor in teaching. Actually the quantity of teachable learning depends on the quantity of this relation.

On the basis of the above discussion, we can firmly say that teachers should have prior knowledge about students' mentality to administer their lives in a disciplined way. But to let the students go according to their natural mental tendency and demand doesn't mean to create indiscipline or chaos. As the nature of fish is to swim and birds to fly in the sky, human nature is to know, understand, and discover the unknown. There is no doubt that a normal child will have curiosity to know. So he or she will attempt to unveil the mystery of unknown. Teachers' prime duty is to assist this attempt.

_____

APPENDIX 3: SIX-WEEK DISTANCE TRAINING SCHEDULE

Week	Unit	Activities
Week 1	**Unit 1:** **The teacher and the teaching profession**	*Professional duties of a teacher; teacher-student relationship* ● Activities 1a (trainee independent reflection, reading background material, informal communication with trainer) ● Activities 1b (trainee facilitates discussion with colleagues, informal communication with trainer) *Teacher motivation* ● Activities 2a (trainee independent reflection, reading, communication with trainer) ● Activities 2b (trainee facilitates discussion, case study, role play with colleagues, communication with trainer) <u>Telephone conference 1</u>: trainer with trainee and colleagues
	Unit 2: **Lesson planning**	*Importance of lesson planning and preconditions* ● Activities 3a (trainee) ● Activities 3b (trainee + colleagues) *Behavioral objectives* ● Activities 4a (trainee) ● Activities 4b (trainee + colleagues) <u>Telephone conference 2</u>
Week 2	**Unit 1:** **Teaching techniques and styles**	*Teaching techniques currently in use* ● Activities 5a (trainee) ● Activities 5b (trainee + colleagues) *Selecting appropriate techniques* ● Activities 6a (trainee) ● Activities 6b (trainee + colleagues) <u>Telephone conference 3</u>
	Unit 2: **Classroom management**	*Importance of and techniques for classroom management* ● Activities 7a (trainee) ● Activities 7b (trainee + colleagues) *Managing large classrooms* ● Activities 8a (trainee) ● Activities 8b (trainee + colleagues) <u>Telephone conference 4</u>
Week 3	**Unit 1:** **Inclusive teaching**	*What is inclusive teaching?* ● Activities 9a (trainee) ● Activities 9b (trainee + colleagues) *How to do inclusive teaching* ● Activities 10a (trainee) ● Activities 10b (trainee + colleagues) <u>Telephone conference 5</u>
	Unit 2 **Participatory learning**	*What is participatory learning?* ● Activities 11a (trainee) ● Activities 11b (trainee + colleagues) *What are strategies for participatory learning?* ● Activities 12a (trainee) ● Activities 12b (trainee + colleagues) <u>Telephone conference 6</u>

Six-Week Distance Training Schedule, *continued*

Week	Unit	Activities
Week 4	**Unit 1** **Teaching materials**	*What are teaching aids (importance, types)?* ● Activities 13a (trainee) ● Activities 13b (trainee + colleagues) *How to use teaching aids* ● Activities 14a (trainee) ● Activities 14b (trainee + colleagues) Telephone conference 7
	Unit 2 **Teaching materials**	*Using locally available teaching aids* ● Activities 15a (trainee) ● Activities 15b (trainee + colleagues) *Preservation and reuse of teaching aids* ● Activities 16a (trainee) ● Activities 16b (trainee + colleagues) Telephone conference 8
Week 5	**Unit 1** **Question preparation–1**	*Importance of question development* ● Activities 17a (trainee) ● Activities 17b (trainee + colleagues) *Techniques for developing good questions* ● Activities 18a (trainee) ● Activities 18b (trainee + colleagues) Telephone conference 9
	Unit 2 **Question preparation–2**	*Types of questions* ● Activities 19a (trainee) ● Activities 19b (trainee + colleagues) *Encouraging students to ask questions* ● Activities 20a (trainee) ● Activities 20b (trainee + colleagues) Telephone conference 10
Week 6	**Unit 1** **School-based assessment–1**	*Aims and objectives of school-based assessment* ● Activities 21a (trainee) ● Activities 21b (trainee + colleagues) *Constructive assessment* ● Activities 22a (trainee) ● Activities 22b (trainee + colleagues) Telephone conference 11
	Unit 2 **School-based assessment–2**	*Handling assessment in large classrooms* ● Activities 23a (trainee) ● Activities 23b (trainee + colleagues) *Modern questions and problem solving* ● Activities 24a (trainee) ● Activities 24b (trainee + colleagues) Telephone conference 12

APPENDIX 4: LITERATURE REVIEW ON OTHER EXPERIENCES IN MOBILE LEARNING

1.   Mobile learning is a term used to describe learning through portable, handheld, electronic devices, generally with wireless communications capabilities. It is not limited to mobile phones, however, since it can also refer to the use of personal digital assistants, handheld computers, or mobile gaming devices. It implies learning while "on the move," outside of the classroom and outside of the home. Mobile learning means you can be learning while in your car, or riding the subway or walking. Understanding how mobile devices can be used to support learning is important to educators not only because of their pervasiveness in society,[1] but also because of their ability to create situated learning environments and facilitate communication and collaborative learning.

2.   Most projects reviewed for this study use handheld personal digital assistants (PDAs) as the tool, although there are a few examples of mobile phone use in education. One experience that focuses specifically on teacher training is at the University of Helsinki, Finland, which has been experimenting with the use of wireless phones in education since the late 1990s. The pilot in teacher education combined face-to-face, network-based, and mobile modes to instruct future teachers. The students used the mobile phones to share notes and pictures (taken with a separate device) while observing other trainees' lessons, or to seek additional information needed to prepare a lesson. Participants were positive about the experience, and particularly appreciated the convenience and immediacy that the mobile technology allowed. Short messaging service (SMS) was the most common means of communication, but also a great many photos were sent, showing lesson in progress, teaching techniques and teaching materials, which were particularly useful in the teacher training context.[2]

3.   Most other experiences use mobile phone technology to support "hard-to-reach" learners,[3] or adults in continuing education situations, including formal school leavers. Lessons from these projects indicate that this type of learning empowers and motivates learners, even after the initial novelty wears off; that learners are more comfortable engaging in personal subject areas using a mobile device that traditional methods (though this may be the effect of distance learning in general, not necessarily related to the phones); and that it can be a bridge/catalyst to the use of other ICT. Stead (footnote 3) confirms that mobile learning works best when combined with other media and activities, including group activities, paper-based learning materials, other technologies, and typical tutoring strategies—which the Bangladesh experience seems to confirm. Other experiences[4] indicate that SMS and other games can be useful for drill-and-practice exercises in a variety of subject areas, and particularly literacy or second language study. Short videos can also help language learners understand difficult idioms. An experience at the University of Wolverhampton in 2002–2003 used regular SMS interventions to minimize the risk of dropout and failure of students in a computer studies course. Messages were used for administrative reminders as well as study tips for exams.

---

[1]   In Bangladesh there are approximately 23 mobile subscribers per 100 people, and in one month (June 2007) there were more than 4 million new subscribers. (Source: Bangladesh Telecommunication Regulatory Commission. *Mobile Phone Subscribers in Bangladesh.* Available: http://www.btrc.gov.bd/ mobile_subscribers_may-july2007.htm.)

[2]   The following quote illustrates the importance of photos: "The use of still-pictures helped students and supervisors to see things that they did not notice in real situations. This was very helpful in supervising discussions between student and teacher when students analysed their own teaching methods and made notes in their portfolio". From Seppälä, P. and H. Alamäki. 2003. Mobile Learning in Teacher Training. In *Journal of Computer Assisted Learning.* Volume 19. 330–335. 334.

[3]   Stead, G. 2005. *Moving Mobile into the Mainstream: A Paper for MLearn2005.* Available: http://www.mlearn.org.za/ CD/papers/Stead.pdf.

[4]   Naismith, L., P. Lonsdale, G. Vavloula, and M Sharples. 2006. *Literature Review in Mobile Technologies and Learning.* Futurelab series, Report 11. Futurelab. University of Birmingham, Bristol, UK.

Students found the program worthwhile, and their final exam scores matched or exceeded those of students not being supported by SMS (footnote 4).

4.   Sony Ericsson has done some research on the use of their phones for mobile learning content delivery.[5] Learners used one of several Sony Ericsson "R" series phones in a *Wireless Application Protocol (WAP) Overview* course. After completing the course, they responded to a series of questions concerning the experience. Some notable results were that the majority found the phones easy to use, would take another mobile learning course in the future, and would recommend this mode to someone else. Concerning the effectiveness of mobile learning, 77% of participants agreed or strongly agreed that mobile learning increases the quality of e-learning and that course learning objectives can be met by mobile learning (others were undecided, but none disagreed). Concerning the ease of communicating with tutors, the majority of participants agreed or strongly agreed that it was easy; however, a small percentage (11%) felt that it was not easy. Curiously, a majority of participants were either uncertain or disagreed that mobile learning is convenient for communication with other course students. The findings of this study suggested the contrary—that trainees communicated more with trainees in other schools than they would have otherwise.

5.   One experience involving mobile technologies in for education administration[6] is in Spain, where student absenteeism is a major problem. The education ministry therefore provided teachers with handheld computers to monitor attendance and performance of students. With these devices, they could immediately send an e-mail or SMS to parents whose children were absent without a reason.

6.   In 2005, the Asian Development Bank Institute held a workshop on m-learning in the Asia-Pacific region, with the specific aim of helping country representatives to formulate action plans for implementing m-learning in their countries (footnote 6). The workshop highlighted several prerequisites for implementation of mobile learning programs, including:

- Establishment of proper infrastructure
- Expansion of ICT services
- Administration of innovative policies
- Development of curriculum and content
- Reorganization of school administration
- Implementation of teacher training.

7.   Workshop participants also noted that m-learning could be used, among other things, to increase access to educational opportunities by reaching out to underserved, rural populations where distance or other obstacles present a barrier to accessing formal learning centers and to enhance the quality of teaching by providing a mechanism for initial training, continued professional development, and connection with other teachers. The effectiveness of mobile-supported learning in these contexts was confirmed through this study.

---

[5]   Described in Keegan, Desmond. 2002. *The Future of Learning: From eLearning to mLearning.* Zentrales Institut fur Fernstudienforschung, FernUniversität Hagen. Hagen.
[6]   Cited in UNESCO. 2005. *Mobile Learning for Expanding Educational Opportunities: Workshop Report.* Bangkok.