Low Cost Mobile Phones for Large Scale Teacher Professional Development in Bangladesh

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ABSTRACT
Education has the power to transform societies and contribute to social and economic development. In this paper we present the mobile technologies used for teacher professional development (TPD) and communicative language teaching in English in Action (EIA). The project aims to assist 25 million people access greater social and economic opportunities through English language teaching and TPD. EIA, in partnership with the Government of Bangladesh, will work with 80,000 teachers through a work-based programme of TPD using audio and visual resources on low cost mobile phones. With access to over 700 audio files aligned with the national textbook *English for Today* and professional development films that explain and then illustrate successful student-centred English teaching and learning, the project has already documented significant improvement in teachers' and pupils' English language competency. This paper provides an account of, and rationale for, the changes in the technologies used across two phases of the project, from the iPod Nano and Touch used in the pilot study with 690 teachers (2009-2010) to the low cost Nokia C1-01 mobile phone with a micro secure digital (SD) being used in upscaling to 12,500 teachers (2012-2014). We argue the low cost alphanumeric mobile phone with micro SD cards provides unprecedented opportunities to both deliver TPD and improve teachers' and students' communicative English language skills. The paper considers the unique suitability mobile phones present for resource constrained education systems in developing countries. Simultaneously we highlight the need for further application and research into the use of mobile technologies, not only for large-scale TPD projects, but for a diversity of international development projects and programmes which aim to achieve sustainable change at scale.

Author Keywords
English in Action (EIA), large scale teacher professional development, mobile phones, Bangladesh, international development

INTRODUCTION

The People's Republic of Bangladesh is one of the most densely populated countries in the world (UNPD, 2007) and largely monolingual. Bengali or Bangla is the language of 95% of the population (BANBEIS, 2003) and this is largely due to the circumstances that led to the Bengali Language Movement, which later foreshadowed the Bengali nationalist movements and the Bangladesh Liberation War in 1971. It was not until 1990 that English became a compulsory subject from class one of primary schooling (Hoque, 2009). As a result, many primary and secondary teachers struggle with communicative English and have not been exposed to communicative language teaching (CLT) approaches.

Examples of mobile phones enhancing teachers' and pupils' English language proficiency in developing economies like Bangladesh, is uncommon. This paper reports on how English in Action (EIA), a project designed to contribute to the growth of Bangladesh by providing English language as a tool for better access to the world economy, first used MP3 players in a large-scale TPD initiative, then re-designed their technology kit using low-cost mobile phones. We present findings that demonstrate significant changes in classroom practices through the use of mobile technologies as part of a work-based TPD program. We argue that incorporating mobile phones as a teaching and learning tool presents new opportunities for teachers and pupils to acquire English to levels that enable them to participate more fully in economic and social activities.

EIA's work is closely aligned with the democratic government of Bangladesh's Prime Minister's Office's philosophy of 'Digital Bangladesh' and 'Vision 2021'. EIA's approach demonstrates how mobile phones, as a tool, challenges current assumptions around the use of mobile phones within large-scale international development projects. Significant successful findings emerge from classroom-based research, monitoring and evaluation (RME) across urban, suburban

and remote rural areas. This robust RME demonstrates the success and potential of using audio and film resources on mobile devices—particularly mobile phones—with lightweight portable rechargeable speakers to provide TPD at scale while simultaneously providing teachers with an unprecedented tool to both improve their classroom teaching and English language proficiency.

English in Action (EIA) is a 9-year project beginning May 2008 and running through to 2017. EIA was designed to assist 25 million people in Bangladesh improve their English language skills. The Government of Bangladesh requested the project and it was then funded by the United Kingdom's Department for International development (DFID). The project is an international partnership, led and managed by BMB Mott McDonald, with The Open University (UK) and The British Broadcast Corporation (BBC) Media Action. Locally, EIA works collaboratively with organizations including the Underprivileged Children's Educational Programme (UCEP) and Friends in Village Development Bangladesh (FIVDB).

EIA's primary purpose is to raise Bangladesh's economic and social profile by providing English language as a tool for the population to access global opportunities. In this paper we describe how EIA is centred around targeted mobile phone-based TPD and the use of audio and visual learning materials on mobile phones with micro SD cards and portable rechargeable speakers. These materials are aligned with the country's English language curriculum and textbooks used in all government schools. The learning resources (print, audio & visual) were developed to improve 12 million pupils listening and speaking skills by providing audio, audio transcripts and visual resources to reflect content in the textbooks. Through face-to-face TPD and self-learning modules in print and on mobile phones, teachers learn how to use these resources in their individual classroom contexts.

'DIGITAL BANGLADESH' AND 'VISION 2021'

EIA is not a development project that works on people. Rather it works with people, particularly teachers to build their capacity to become better teachers and more proficient in their ability to teach and use communicative English. EIA, also works within existing government initiatives and is closely and intentionally aligned with two of Bangladesh's Prime Ministers' Office initiatives: '*Digital Bangladesh*' and '*Vision 2021*'.

'Digital Bangladesh'

The philosophy of 'Digital Bangladesh' is an attempt to ensure the citizens of Bangladesh's democracy and rights. It aims to be transparent, accountable, establish justice and ensure the delivery of government services through the widespread use of technology to improve the lives of Bangladeshis regardless of class or social status. The government has emphasized the four elements of the 'Digital Bangladesh' vision as human resource development; people involvement; civil services; and use of information technology.

Government 'Vision 2021'

The Government of Bangladesh is committed to building a country whose citizens are able to live prosperous and happy lives by the year 2021, which marks the golden jubilee of Bangladesh's independence.

> For the Government's vision to be realized, the potentials of ICT sector will also need to be realized and software industries and IT services will need to be developed with an digital infrastructure to support digitally-savvy entrepreneurs, young people and citizens. The Prime Minister's Office's A2I regards it as a "remarkably pro-poor manifesto" that "represents a modern day translation of the vision of a "Sonar Bangla", or golden Bengal, promised by the Father of the Nation Bangabandhu Sheikh Mujibur Rahman" (A2I, 2011, p. 3).

Not ignoring these government initiatives, EIA sought to leverage technology currently available to help ensure these ideals are made a reality, or more precisely model how technology could be leveraged within a cyclical work-based programme of TPD to bring about real change in localised classroom contexts. EIA's model aims to be sustainable and is currently forging partnerships with national and local partners, including teacher-training institutes, to embed EIA materials and student-centered pedagogy into these institutionalised programmes.

The programme is now in its third phase (2011-2014), having completed a pilot phase during which 231 primary and 115 secondary schools participated and 753 English teachers and teacher facilitators (trainers) were trained using the programmes' resources on MP3 players with portable rechargeable speakers. The lessons learnt from this phase formed the basis for revision of materials, technology kit, teacher training and support mechanisms. The model which is being used to support changes in classroom practice in shown in Fig. 1. Teacher participation in classroom activities is at the heart of teachers' professional development in EIA and considered to be the primary driver for transforming both their professional knowledge and practice. There are two layers of support provided to teachers, to enable their participation. The first layer of support is always 'on hand' to the teacher while they are in their school; such support includes teaching resources such as posters, flash cards, to be used directly within the new classroom activities, and professional development resources, made accessible through use of mobile technologies, for teachers to engage with in preparation for, or reflection upon, carrying out the new classroom activities.

Mobile devices have played a key role in the teacher support model described above and as the programme has progressed, the technological requirements and devices deemed appropriate have also changed. The remaining part of this paper will examine these changes and the impact achieved.
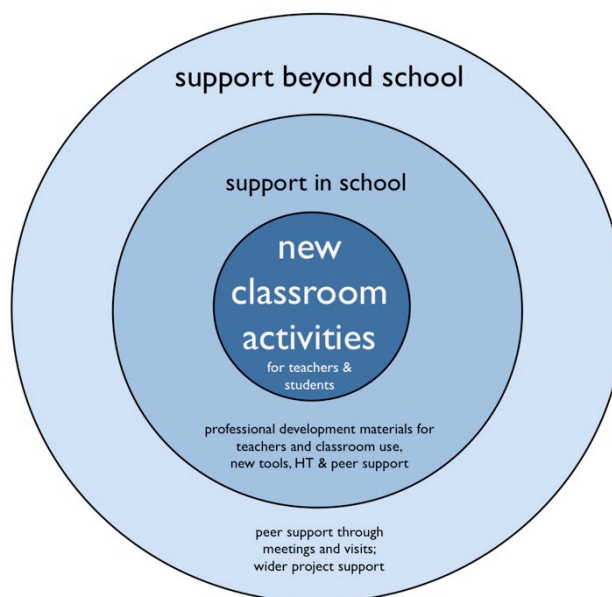
Figure. 1 EIA's work based model to support changes in classroom practice

PROFESSIONAL DEVELOPMENT AND CLASSROOM RESOURCES ON MP3 PLAYERS

During the pilot phase of the project (2008-2011) the teachers were provided with professional development resources preloaded on the Apple iPod Nano (for primary teachers) and Touch (for secondary teachers) and portable rechargeable speakers. This 'trainer in your pocket' (Walsh, 2011) included 18 film clips and 4 audio recordings for primary teachers that exemplify a range of correct and incorrect English CLT classroom practices. Figure 2 is an example of the 'trainer in your pocket', an ICT-enhanced TPD film entitled, 'Doing pair-work' developed by The Open University. It was designed for teachers' self study and exemplifies the incorrect (red x in the lower right hand corner) and correct (green check in the lower right hand corner) ways to introduce and implement pair work in an English communicative language teaching (CLT) classroom. The secondary teachers were supplied with 46 audio files and podcasts enhanced with synchronised text and images. This was the core of their ICT-enhanced TPD materials. Secondary teachers also received a print-based TPD package entitled, *English for Today in Action*, that presents 12 CLT modules (Active listening, predictive listening, using visual aids, creative writing, etc.) that they can adapt and use to teach communicative English.

Prior to going to scale the use of the mobile technologies described above were piloted in 15 schools. To assess the initial impact after six months, twelve teachers were interviewed. Data from the interviews concluded the use of mobile technologies within a work-based programme of TPD was "shown to facilitate access to learning, as well as improving the quality of teacher education and training...and to bring about changes in classroom practice" (Shohel, 2010, p.213). Teachers reported a change in their practice as a result of having access to resources on the mobile devices:

> Previously, *I used to teach them using text books … Now I can teach* the students using a new method instead of traditional methods by *selecting from a set of methods* given in the iPod. It's also helping the students to *increase their listening skill significantly*. (Shohel, 2010, p.206)

> That [iPod Materials] *helps me to learn the language and use it in the classroom context. I did not know the language earlier in this way. I knew, but not in this way. I did not even think of taking these to students. I could not think of teaching English of this level to the students! Even we did never learn in this way! We never got tips!* (Shohel, 2010, p.206)

The teachers despite demonstrating a positive attitude and indicating changes as a result of using the mobile technologies also indicated significant challenges. These included the difficulties inherent charging multiple devices in suburban and rural areas that lack a reliable source of electricity in some and the chosen speakers not being loud enough for all students to hear the audio recordings aligned with the national textbook.

The pilot phase with 690 teachers then commenced across the country and both internal and external evaluation provided encouraging results in terms of improvements in classroom practices and English language competencies of teachers and students (discussed in greater detail below). However the project needed to rethink the mobile technology to be used for the current upscaling phase which aims to reach 12,500 teachers by 2014. The research indicated the iPod Nano, Touch and portable rechargeable speakers provided teachers with TPD resources that enabled them to change their teaching practices while also providing students with near native examples of English speaking related to their textbooks. But project budget constraints and going to scale first with 12,500 teachers, then an additional 67,500 (through 2017) required a cheaper technology kit, with low-cost components, that could potentially be part of institutionalised

programmes. This led to testing and trialling various technologies including alphanumeric mobile phones and micro SD cards.

Figure 2: ICT-enhanced Teacher Professional Development on the iPod Touch

PROFESSIONAL DEVELOPMENT AND CLASSROOM RESOURCES ON LOW COST MOBILE PHONES

Using mobile phones for TPD in emerging economies, like Bangladesh, is a promising field whose applications are context specific and largely absent from the literature. Studies exist that exemplify the importance of this technology, but they remain largely outside education and almost completely outside TPD. Yet, EIA believed mobile phones would not only be suitable to deliver the professional development materials, but could also be used to help teachers reflect on and document the changes in their classroom practice. This lead EIA to field-test a number of mobile phones and portable rechargeable speakers with teaching and professional development resources on micro SD cards in rural contexts with limited and/or no electricity. EIA's goal was to assemble kits for distribution to teachers across the country, some with limited and/or no electricity. Importantly, after 2014, the project budget will not allow us to provide the additional 67,500 teachers with mobile phones, but it is likely the project can provide them with micro SD cards (or a similar mobile technology not yet available) that they can use in their own phones.

EIA identified the Nokia C1-01 mobile phone (£38), with 2GB micro SD cards (£1) preloaded with all of EIA's audio and film materials and portable rechargeable amplifiers (£25) as the best technology 'kit' to achieve EIA's goals in line with 'Digital Bangladesh' and 'Vision 2021'. These Kits have been distributed to 5000 teachers across the country (2012) and will eventually be provided to 12,500 teachers in total by 2014. The mobile phone field test indicated the Nokia C1-01 best met project needs as mobile phones saturation among teachers is nearly 100% and is an essential tool in their daily lives.

Communicative English Language Teaching Resources on the Nokia C1-01

Drawing on the success of the pilot studies, EIA redesigned its professional development materials for use on mobile phones and repackaged all of the audio files aligned with the national textbook for use on the Nokia C1-01. For teachers, principal teaching resources are now the series of audio materials on the Nokia C1-01 (Figure 3). They include dramatisations, songs, stories and a cast of characters from a fictional school. In some ways, the audio resources are similar to those that might be used in Interactive Radio Instruction (IRI), but with much greater emphasis on teacher and pupil agency, creativity and independence than typical IRI materials, being preceded and followed by recommended activities that do not rely on the audio file. For secondary teachers, the main teaching resources on the SD cards are also audio files, representing all of the English readings within the national textbook series, and enhanced by additional stories, songs and other materials; the secondary materials bear no resemblance to traditional IRI materials, and are simply resources for teachers to use in classroom activities.

Figure 3: Communicative English Language Teaching Resources on the Nokia C1-01

For primary and secondary teachers, the professional development materials on the Nokia C1-01 are audio and film files stored on the micro SD cards. These were designed to accompany 8 discrete print-based modules (different for primary and secondary teachers) that cover listening, speaking, reading and writing communicative teaching practices, games, grammar, and approaches to teaching in a socially inclusive way. The films begin with a narrator who explains in Bangla

and/or English what the modules is about and types of communicative language teaching practices (Figure 4) that will be demonstrated. Then the teachers watch a film that illustrates the practice or approach presented by the talking head (Figure 5). Afterwards, the narrator returns to help the teachers make sense of what they viewed on the mobile phone and how they might try something similar in their own classroom. Importantly, because these TPD resources are stored on the teachers' mobile phones, they can watch them at any time and revisit them in tandem with the pedagogical content presented within the print-based modules (Figure 6). The films are authentic and were produced using teachers who had participated in EIA's programme and learned how to use EIA's materials on the iPod Touch and Nano in the pilot phase. The films illustrate how these teachers have carried out the suggested activities in the modules, making explicit possible approaches to classroom teaching, management and organisation. They also provide real-life examples of techniques being carried out effectively for teachers to see and discuss during their participation in the cyclical work-based programme of teacher professional illustrated in Figure 1.

Figure 4:

Figure 5: Illustration of Classroom Practice

Figure 6: Teacher viewing the professional development materials on the Nokia C1-01

IMPROVED ENGLISH LANGUAGE PROFICIENCY

At the end of the pilot phase, EIA conducted two large-scale quantitative studies to indicate the extent of change observed in the classroom practices of teachers participating in EIA after 1 year. One lesson from 350 Primary teachers and 141 of the Secondary teachers in the project were observed. The results were compared to those observed in a 2009 baseline study, 'An observation study of English lessons in primary and secondary schools in Bangladesh' (EIA, 2009) prior to the project's intervention. The study focused upon the use of English by teachers and pupils, the extent of teacher and pupil talk time, the nature of the teachers' talk, as well as the nature of the classroom activities that pupils took part in. A feature of improved English language teaching was the increase in the amount of pupil talk in lessons, as well as an increase in the use of English by both teachers and pupils. We describe both the primary and secondary findings below

In the first study, observations of primary classrooms indicate a change in teachers' pedagogical practices. This was indicated by the decrease in overall percentage of teacher talk time during the lesson (34%) and an increase in the overall percentage of pupil talk time (27%). When the primary teachers were speaking, they used English the majority of the time (71%). This indicates a significant increase as a result of the their participation in EIA. Earlier only 27% of teachers spoke in English more than they did in Bangla. When Primary pupils were speaking, they also used English most of the time (88%). This was also an increase from EIA's baseline study, which identified few occasions (2-4%) when individual pupils or groups were encouraged to speak in English. Finding were similar for secondary classrooms which also report an increase in teachers embodying English CLT practices and using English 86% of the time.

In the second study, primary (98%) and secondary (98%) teachers reported on interview that they enjoyed taking part in EIA and believed their communicative English language proficiency improved. As a result of their familiarity and experience including using the mobile audio technologies, most teachers (96% Primary; 86% Secondary) felt more confident in using and modeling spoken English in the classroom. More important findings indicate the majority of teachers (86% Primary; 92% Secondary) have changed their pedagogical practices to focus on communication, with

grammar being explained in context; 91% primary and 90% Secondary of secondary teachers report often designing activities to have pupils interact in English; and all secondary teachers and 93% of primary teachers report improved pupil motivation as a result in changes to classroom practice. The second study indicated that both primary and secondary pupils reported that teachers used English most of the time in lessons and that they often participated in English CLT practices (activities such as group and pair work, dialogue, and listening activities with mobile audio). Primary and secondary pupils also indicated that they preferred these new communicative classroom activities to more 'traditional' pedagogical practices which can generally be characterised as the 'grammar translation' method of teaching English. Using this method, teachers often only translate the English into Bangla, not providing students with the opportunity to actually use English for communicative purposes.

In addition, Trinity College externally evaluated teachers' and students' English language proficiency using the Trinity Graded Examinations in Spoken English. Each interviewee's spoken English was evaluated against the criteria of the 12-point Trinity College English Language scale. Grade 1 represents very little spoken English competence and grade 12 indicates complete competence. The grades are sub divided in four stages: initial (1-3); elementary (4-6); intermediate (7-9); and advanced (10-12). In 2010, independent assessors interviewed 367 primary and 176 Secondary teachers before the EIA intervention. Then in 2011, they interviewed 209 primary teachers and 87 secondary teachers who participated in EIA's TPD programme. The assessments were carried out by individual diagnostic interviews, assessing competence in English against the Trinity 'Graded Examinations in Spoken English' (GESE) scale .The GESE scale maps against the Common European Framework (CEF); CEF level A1=GESE level 2; CEF A2=GESE 3-4; CEF B1=GESE 5. Trinity's RME shows a statistical improvement of primary (Figure 7) and secondary teachers' (Figure 8) English language competence.
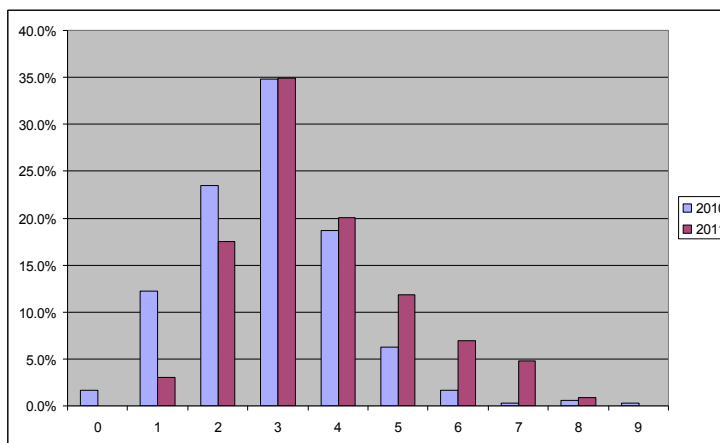

Figure 7: English language competence (Trinity grade) of primary teachers in 2010 and 2011
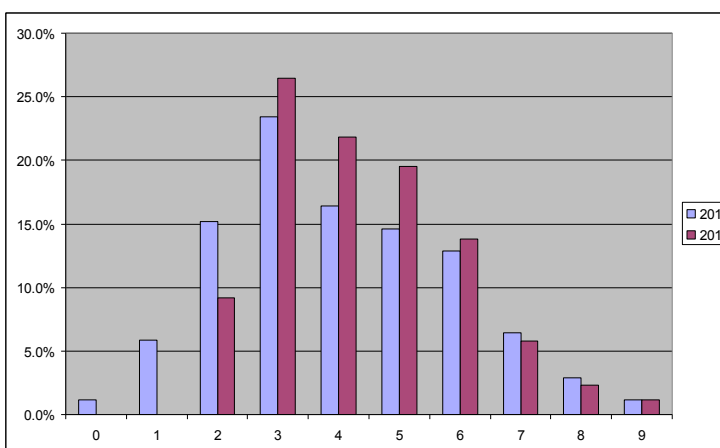

Figure 8: English language competence (Trinity grade) of secondary teachers in 2010 and 2011

From Figure 7, it can be seen that the percentages of primary teachers scoring in the lower GESE levels (0,1,2) fell by approximately 20% in the post-test samples, whereas the percentages of teachers scoring higher levels (4,5,6,7) rose by a similar amount, with increases being spread across the range of higher levels. The pattern for secondary teachers (Figure 8) is similar. In each phase, a general improvement in teachers' English language competence scores can be seen, almost irrespective of the teachers' starting point: there is a general shift of the distribution curves to the higher levels of the GESE assessment.

In 2010, Trinity assessors carried out diagnostic interviews to assess 4630 primary and 2609 secondary pupils' English language competence before their teachers participated in EIA's TPD programme. Then in 2011, Trinity assessed 786 primary and 318 secondary pupils from the 2010 cohort. For primary pupils, prior to EIA, 64.3 % of pupils failed to pass the Trinity's graded examination (Figure 9). In 2011, that number dropped to 49.9%, a substantial decrease. In 2010 35.4% of the pupils scored initial levels (passing) levels of English language competency and this number rose to 50.1% in 2011, a substantial increase (Figure 9).
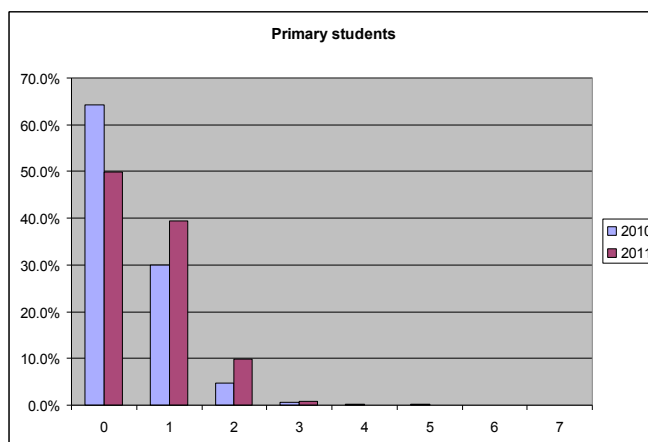

Figure 9: primary pupil English language competency (Trinity grade) in 2010 and 2011

In secondary while the proportion of pupils who failed (below grade 1) dropped from 28.9% to 10.4 % in 2011, the number of pupils who passed at the initial levels (grades 1-3) rose from 61.9% to 66.6 %. Pupils passing at the elementary level (grade 4-6) rose from 9.2% to 22.4 % another considerable increase (Figure 10).
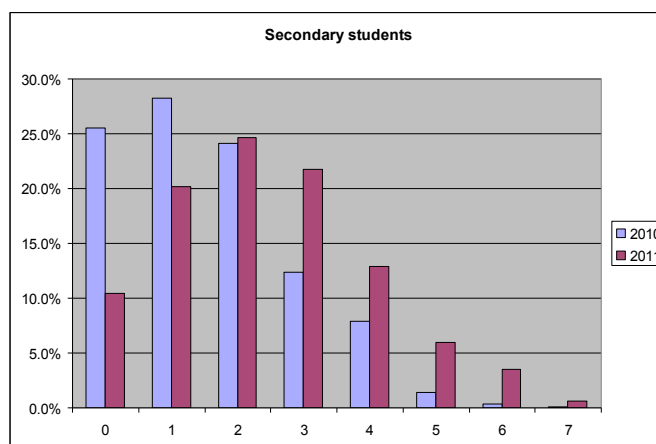

Figure 10: secondary pupil English language competency (Trinity grade) in 2010 and 2011

EIA's TPD model, through this evaluation, has proven to be successful at encouraging higher percentages of teachers and pupils to speak English in the classroom. Additionally, the Trinity research indicates that teachers and pupils have acquired higher levels of communicative (speaking and listening) English language competency after participating in the project for one year.

CONCLUSION

EIA's new model of TPD—which uses mobile devices as tools for delivering professional development and classroom materials—is assisting teachers to learn and apply their communicative English language learning in the classrooms, schools and communities where they work—at scale. Through supported school-based Open and Distance Learning (ODL) using mobile phones and portable rechargeable speakers with all of EIA materials and resources contained on micro SD cards, RME suggests EIA project classrooms are being transformed into vibrant sites of communicative learning where both teachers and students are acquiring higher levels of English language competency.

EIA's TPD programme will support 80,000 teachers in working collaboratively to initiate, trial and reflect upon new English communicative language teaching practices with the goal of adapting and embodying these strategies in their professional practice. They will continue to be supported in this by their peers (in school, and in local networks inside and beyond their school), and through the materials (print, audio & visual) and tools (mobile phones) provided. This is because it is not a model of TPD that is delivered through traditional ODL (self study), nor is it traditional teacher training in which the training and support is offered at a centre that is physically and conceptually 'distant' from the teachers' context of practice—their classroom. Rather it is dynamic, generative and leverages teachers' use of their

mobile phones by providing a rich bank of audio and film resources that can be used for self-study and English classroom teaching regardless of time, place or location.

EIA's TPD encourages continuous self and supported learning using low-cost Nokia C1-01 alphanumeric mobile phones that support micro SD cards. Drawing on Government of Bangladesh's Prime Mister's Office's 'Digital Bangladesh' and 'Vision 2021', EIA's goal is to develop a sustainable model of providing English language as a tool for better access to the world economy. We argue incorporating mobile phones within a robust TPD programme presents new opportunities for teachers and pupils to acquire English to levels that enable them to participate more fully in economic and social opportunities. We have observed successful and existing classroom contexts in remote areas that demonstrate the potential of using EIA's resources on mobile devices with lightweight portable speakers. This highlights how mobile phones, as a tool, can change learning and even individuals' livelihoods.

Importantly, EIA is not relying on the internet or the network aspect of mobile phones, but rather that possibilities of incorporating them into large scale targeted TPD with complementary audio and visual resources to improve English classroom teaching and learning in a developing economy. All of EIA's resources fit onto a 4GB micro SD card that currently costs about £1. In 2015 when the project begins to embed in the final phase, the cost of this technology will be even cheaper. It is anticipated that in this phase EIA will design a flexible and institutionalised model that will enable the Government of Bangladesh to be in control and implement EIA's innovative model by themselves and on a continuous basis.

However in order to gather stronger evidence of the impact of use of such technologies in often resource constrained education systems in developing countries and when used as part of a blended approach to TPD, there is clearly a need for further research. EIA will continue to actively design and conduct such research studies as part of its RME Strategy in order to contribute to this often under researched area.

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