Reports of UNESCO Projects on Using Mobile Technologies to Support Teachers Development

Key Issues, Lessons and Recommendations

- **Description of the four projects:**
  - Host country’s educational needs (rationale)
  - Target audience
  - Mobile learning solution
  - Content delivery
  - Teacher training
  - Monitoring and evaluation
  - Achievements and the way forward (including strengths and weaknesses of the project)

A project consultative meeting was organized by UNESCO to facilitate the country project teams to analyze the pressing needs in teachers’ development, assess the readiness in terms of telecommunication infrastructure and commonly used mobile devices. Based on the needs analysis and situational assessment, country project teams design the country project activities that are relevant to the needs and feasible for the local context.

**Project in Pakistan: Building Capacity for Rural Female Teachers in Early Childhood Education (ECE) Teaching Methodologies through Mobile Phones**

Early Childhood Caring and Education is the first of the six Education for All (EFA) goals and a number of publications clearly stress the importance for governments to notably “upgrade the ECE workforce, especially as regards qualifications, training and working conditions” (EFA GMR, 2007).

Pakistan, with 7.4 million children aged 3 to 5, has only 2.2 million children enrolled in Katchi class in pre-primary schools, leaving 70% of 3-5 years children out of school.

The Federal Government of Pakistan has launched several initiatives at the country level in promote the quality of ECE, including the development of a National Curriculum on ECE in 2007, the announcement of a Policy on ECE in 2009 and the advocacy efforts on the subject. But it’s difficult to make the curriculum accessible for those ECE teachers working in rural regions.

Meanwhile, 92% of the population of Pakistan is covered by a mobile cellular network (International Telecommunication Union, 2010) and Pakistan’s mobile teledensity is as high as 68%, mobile phones

“Early childhood is a time of remarkable transformation and extreme vulnerability. Programmes that support young children during the years before they go to primary school prove strong foundations for subsequent learning and development. Such programmes also compensate for disadvantage and exclusion, offering a way out of poverty”. (EFA GMR, 2007)
represent as affordable tools to enable rural female teachers’ access to the National Curriculum on ECE and continued supports for their professional development.

Goal and Objectives

The overall goal of the project in Pakistan was to leverage mobile technologies to increase the capacity of rural female teachers in ECE and improve the quality of early childhood education with the following specific objectives:

- Improve the ECE content knowledge of female teachers working in rural areas.
- Provide pedagogical training and guidance to ECE teachers.
- Improve students speaking, listening and writing skills.
- Introduce a new and affordable model of teacher development that, if successful, can be emulated in other regions in Pakistan and elsewhere.

Target audiences

150 female rural teachers working at junior model schools, part of the pre-primary education system aiming at children from age 3 to primary school entry, were selected in 75 different schools to participate to the project. The selected schools were distributed over four areas in Pakistan: Bhara Kahu, Nilore, Sihala and Tarnol, which are based on rural outskirts of Islamabad Capital Territory as shown in the map below:

Source:

Partners and respective roles
UNESCO Headquarters: has been responsible for the design of the overall project framework, monitoring of the implementation, the inter-country knowledge sharing, and project evaluation.

UNESCO Islamabad Office, as the local project management agency, established a multi-sectoral partnership to ensure the effective implementation of the project activities, including:

- **Local governmental agencies:** the Ministry of Capital Administration and Development Islamabad (CAD) was responsible for the project’s local supervision and coordination. Its agency, the Federal Directorate of Education, was in charge of content development and teacher training related activities.
- **Mobile phone and application providers:** Aside from being the main donor, Nokia also provided technical assistance on one of the mobile learning tool chosen for this project, the Nokia Education Delivery (NED) platform.
- **A telecommunications operator:** The operator Mobilink provided free internet data flow which enables the mobile phones to connect with the internet, to use free incoming and outgoing SMS. Mobilink also provided an operating software for sending MCQs to teachers.
- **A company for content development:** Midas Communications, a media firm, was responsible for digitization of the educational content developed by ECE experts.

A local implementation project team was set up in Pakistan in order to follow on a daily basis the progress of the project. This team included members of most of the partners listed above.

**Selected Mobile learning solution**

A mobile learning solution encompassing various tools was designed in order to respond to teachers’ training needs.

**Mobile**

**Content delivery** was ensured through a library in the cloud using the Nokia Education Delivery (NED) platform. The 20 videos on ECE developed in the context of this project were first uploaded by the implementation team on this platform. Teachers could then download them following the process below:

![Diagram](source: Nokia)

*Figure 1 - Using NED Platform (source: Nokia)*

The day a specific video had to be watched by the teachers was planned in advance. Accordingly, **multiple choice questions (MCQs)** were sent by the implementation team using a Mobilink's software to teachers’ mobile phone on the concerned video. Teachers had to answer MCQs within the day they received it. Once the deadline to answer MCQs was over they would receive the right answers. MCQs aimed at evaluating teachers’ understanding of the video content but also at motivating them to watch the videos.
Knowledge sharing among teachers was enabled through the setup of a Facebook page, on which teachers were able to upload their teaching related work such as videos and photos of activities they had been conducting in their classrooms based on the videos.

Figure 3 - Children watching one of the ECE videos

Figure 2 - Children being filmed while doing an ECE activity

Pedagogical content on ECE

20 videos on Early Childhood Education were designed in the context of this project. First the themes were chosen by the project committee based on Pakistan National Curriculum on ECE, 2007. ECE experts were then in charge of developing the videos scripts and outline, based on which Midas Communications designed storyboards and the final videos. A three day content development workshop and several technical meetings were held in order to get the 20 videos finalized as well as the MCQs and lesson plans to accompany them.

Among these 20 videos, 12 videos were designed to be shown and used in classroom with students for activities such as creative arts and basic mathematical concepts while the 8 remaining videos were lecture-based and targeting teachers only to improve their understanding of ECE.

<table>
<thead>
<tr>
<th>Themes of the 12 activity based videos</th>
<th>Themes of the 8 lecture based videos</th>
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<tbody>
<tr>
<td>• Health and Hygiene</td>
<td>• National Curriculum of Early Childhood Education 2007</td>
</tr>
<tr>
<td>• Creative arts</td>
<td>• National and international Commitments</td>
</tr>
<tr>
<td>• Basic Maths Concept 1</td>
<td>• Importance of Early Childhood Education</td>
</tr>
<tr>
<td>• Basic Maths Concept 2</td>
<td>• Low Cost and No Cost Materials</td>
</tr>
<tr>
<td>• Urdu Writing Skills</td>
<td>• Child Development</td>
</tr>
<tr>
<td>• Taj Muhammad</td>
<td>• Early Learning Development</td>
</tr>
<tr>
<td>• English Language Alphabets</td>
<td>• Facilities Services and Learning</td>
</tr>
<tr>
<td>• Crow Story</td>
<td>• Assessment techniques.</td>
</tr>
<tr>
<td>• The World Around Us</td>
<td></td>
</tr>
<tr>
<td>• Parents and Community Involvement</td>
<td></td>
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<tr>
<td>• Personal and Social Development</td>
<td></td>
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<tr>
<td>• Spiritual and Moral Development</td>
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</tbody>
</table>

Figure 3 - List of video themes

All the videos are in Urdu as early learning is most effective in the mother tongue. Furthermore, all these videos are Open Educational Resources under a Creative Common License, which means that they can be freely shared, adapted and modified as long as attributions are respected.
Mobile Learning Ecosystem

The schema below includes the target audience, partners and mobile learning solution and tools and aims thus at giving an overview of the mobile learning ecosystem that was put in place in the context of this project.

**Teacher training**

Teachers were organised in 5 batches of 30 teachers each. Each of these batches received a two-day training workshop on the mobile learning tools chosen for the project and on the way to use the 20 ECE videos. Training of the various batches did not start simultaneously but one week after the other in order to respect the capacity of the local implementation team and to ensure the same quality for all batches. However, after the training of the first batches, it appeared that teachers wanted more training on the technological tools and it was therefore decided to emphasize this component in order to create an interest among the participants to use mobile technologies instead of fear to use them.

The 2-day workshop was organised in various sessions. One of them was specifically dedicated to technologies but all the others were based on the video themes and included manipulation of the mobile phones. This 2-day workshop programme is available in Appendix X.

**Monitoring and evaluation**
Project progress report and activity reports were sent by the local implementation team to UNESCO Headquarters on a monthly basis in order to monitor the project progress but also to proactively react to any issue encountered. Examples of these reports are available in Appendix X.

An external evaluation was planned since the launch of the project, which included the collection of baseline data and project close data through questionnaires distributed to the participating teachers during the training workshop and at the end of the project. Data on the uptake and use of the mobile learning solution were also collected via the tools used: NED, Mobilink software and Facebook. More details on the evaluation methodology and its results are available in the external evaluation report "...".

Achievements and the way forward

Through this project, the project team successfully trained 150 rural female teachers to ECE. We could maybe include qualitative feedback from the teachers when we get them from Kelello. Furthermore since governmental commitment was ensured since the project launch and the open educational content that was developed can be easily shared and reused, there is potential for the project to be scaled to other region of Pakistan. However, on the down side, there was no institutional capacity building as the approach was top down. Indeed, teachers and teacher training institutions were not involved in the video development and a dynamic for content creation in the school community will still have to be created. Finally, due to the necessary number of partners needed in this type of project, it is very important to closely monitor the project and clearly define communication in order to avoid that small delays get amplified.
Project in Senegal: Enhancing Teaching and Learning in Mathematics and Science through the Use of Mobile Phones in Senegal

With more than 50 per cent of teachers without any professional qualification in public primary schools (CONFEMEN, 2007), and mitigated results in Mathematics from the PASEC test, there was a need in Senegal for a project that would help raise the professional level of teachers and improve the quality of learning for more results and performance in mathematics.

Furthermore, with 87.51% of Senegalese inhabitants having a mobile-cellular telephone subscriptions (ITU, 2012), there was also potential for mobiles in Senegal to help responding to the country’s educational needs.

Goal and Objectives

This UNESCO project was therefore designed to pilot test, in partnership with Nokia and the RESAFAD, the use of mobile technologies to enhance teaching and learning in Mathematics with the following specific objectives:

- Reinforce teachers’ skills in Mathematics and Sciences and increase their knowledge of the curriculum.
- Improve the student learning outcomes in Mathematics and Sciences and increase their engagement in the subjects.
- Improve communication within the school community.
- Reinforce the local implementation team’s ICT skills in mobile learning (institutional capacity building).
- Promote a model of a new type of teacher development to other teacher training institutions in Senegal and influence national/state policy making on teacher development.

Target audience

100 primary school teachers teaching in CE1 and CM2 level received mobile devices and training. The project reached 50 schools in total, 40 in Diourbel and 10 in Pikine in the suburbs of Dakar. There were two participating teachers per school, one of the two being a female. The remaining teachers of the 50 selected schools were offered the possibility of participating in the content creation.

Figure 5 - Senegal Map
Partners and respective roles

While UNESCO HQ was responsible for the overall execution of the project, its monitoring and evaluation, the organization worked with several key partners in the field. These partners were:

- **A local governmental institution**: RESAFAD (Réseau Africain de Formation à Distance/Distance Learning African network) was UNESCO’s primary partner for the Senegal project. RESAFAD was responsible for local management and implementation of the project. RESAFAD is part of the Senegalese Ministry of Education and was, thus, key in ensuring political commitment to the project. It belongs to the “Direction de l’enseignement moyen secondaire” (Direction of general middle secondary education). RESAFAD’s aim is to promote the integration of ICT in education in Senegal by building national expertise in the application of ICT in education and training.

- **A Teacher Training Institution**: CRFPE Dakar (Centre Régionale de Formation de Personnels de l’Éducation de Dakar/Dakar Regional Teacher Training Center) was supporting RESAFAD by conducting teacher training. CRFPE Dakar belongs to the same Direction as RESAFAD and is responsible for the certification of teachers for preschool, elementary and middle school and for the non-formal sector. It is also responsible for the training of administrative and technical education staff.

- **A communications and information technology corporation**: Aside from being one of the main donor, Nokia also provided technical assistance on the mobile learning tool chosen for this project, the Nokia Mobile Mathematics platform.

- **A telecommunications operator**: Orange-Sonatel that provided free connection to Nokia Mobile Mathematics for the selected teachers and students during the pilot phase of the project.

**Selected Mobile learning solution**

Nokia Mobile Mathematics was the tool selected to respond to Senegal educational needs. This platform can be accessed through any mobile phone with a data connection, or a computer with an internet connection. The service is browser based, so nothing needs to be installed on the phone to use it. The solution is free - the user faces only the data connection costs (from Nokia website).

While the front end of the mobile learning tool is a mobile interface, the backend administration platform uses Moodle. Moodle is a Course Management System (CMS), also known as a Learning Management System (LMS) or a Virtual Learning Environment (VLE). It is a Free web application that educators can use to create effective online learning sites.

Nokia Mobile Mathematics and its functionalities are explained in more details in the Tutor/Teacher and learner guides available in appendix X.
Pedagogical content on Mathematics and Science

Teachers of each of the pilot schools had to develop content based on the curriculum on mathematics for grades CE1 and CM2 under the supervision of their respective school director and inspector. The content, organized in lessons, was designed to be accessed through Nokia Mobile Mathematics platform according to the following categories: Theory, Examples, Exercises and Tests. Exercises and tests were based on series of multiple choice questions and open questions classified into three level of difficulty. After validation of the content by the local implementation team, which included inspectors and members of educational institutions in Senegal, the content was uploaded on Nokia Mobile Mathematics web-based platform by the RESAFAD.

<table>
<thead>
<tr>
<th>CE1 lessons in mathematics</th>
<th>CM2 lessons in mathematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 100, l’unité, la dizaine, la centaine.</td>
<td>• Les grands nombres</td>
</tr>
<tr>
<td>• Les nombres de 100 à 500, notion d’ordre, écritures additives</td>
<td>• Addition - sens et pratique</td>
</tr>
<tr>
<td>• Les nombres de 500 à 999 : notion d’ordre, écritures additives, multipicatives, mixtes.</td>
<td>• Addition - sens et pratique</td>
</tr>
<tr>
<td>• 1000, tableau de numération : unité, dizaine, centaine, unité de mille, dizaine de mille.</td>
<td>• Multiplication des fractions</td>
</tr>
<tr>
<td>• Les nombres de 1000 à 5000 : formation, écritures additives, multiplicatives, partage.</td>
<td>• Budget familial : gain, dépense, économie, dette.</td>
</tr>
<tr>
<td>• Multiplication, division : sens et technique</td>
<td>• Prix d’achat, prix de revient, prix de vente, perte, bénéfice, frais.</td>
</tr>
<tr>
<td>• Divisibilité par 2, par 5.</td>
<td>• Notion de pourcentage - Calcul d’un pourcentage</td>
</tr>
<tr>
<td>• Addition et soustraction : technique (avec ou sans retenue)</td>
<td>• Fractions ordinaires, fractions décimales, nombres fractionnaires</td>
</tr>
<tr>
<td>• Les nombres de 5 000 à 9 999 : notion d’ordre, écritures additives.</td>
<td>• Calcule le capital placé</td>
</tr>
<tr>
<td>• 5 000 à 9 999-techniques opératoires</td>
<td></td>
</tr>
<tr>
<td>• La multiplication</td>
<td></td>
</tr>
<tr>
<td>• La division</td>
<td></td>
</tr>
<tr>
<td>• Tableau de numération : unité, dizaine, centaine, unité de mille, dizaine de mille.</td>
<td></td>
</tr>
<tr>
<td>• Le carré</td>
<td></td>
</tr>
<tr>
<td>• Le rectangle</td>
<td></td>
</tr>
</tbody>
</table>

Figure 7 - Examples of lessons developed in mathematics
Mobile Learning Ecosystem

The Figure below represents the ecosystem that was put in place in the context of this project, which includes all the stakeholders participating in the project as well as a description of the mobile learning solution and the way it was applied in the formal educational environment.

Teacher training

Nokia Mobile Mathematics was first used in Finland and South Africa to improve grade 10, 11 and 12 students learning outcomes in mathematics. In South Africa, 50,000 learners from 200 schools have used the platform so far, which has led to a 14 per cent improvement in maths scores (Nokia, 2013). In both countries the content was created by local content partners. In this project though, the primary target of the training were the teachers and a project based learning approach was adopted as teachers had to create content in the first place, allowing them to reflect upon and master the curriculum, and to familiarize themselves with digital content development.

While all teachers from the selected pilot schools could participate in content creation, two teachers per school were selected in particular to pilot test the platform with their students during school hours. Each of these teachers received a mobile phone and face to face training. There was a total of five teacher training workshops of twenty teachers each and two additional content development workshop with the teachers of Pikine as they were the first to test the mobile learning solution in class. Pilot schools were provided with five additional phones to be used by students under these teachers’ supervision.

Monitoring and evaluation
Achievements and the way forward

Through this project, partners were able to create sustainable content creation dynamics. Using the existing structure and usual channel of communication for the validation of the content created by the teachers, the project team ensured the quality of the content uploaded to the platform but also the training of teachers and its recognition. Indeed inspectors were aware of the work done by teachers on this project as they were the ones collecting it. Furthermore, there was a knowledge transfer to the RESAFAD and the CRFPE Dakar that enabled to build local institutional capacity. Therefore, with the telecom operator Orange-Sonatel financing data connection, the project will last till March 2014 at least and will probably be scaled up to other grades, schools and regions.
Project in Mexico: Mobile Learning Technologies to Enhance Teaching Practices in the Area of Language – High Quality Professional Development for Bilingual Teachers of Indigenous Children

Until the late nineties, official educational policy mandated that all children be instructed in Spanish. The Indigenous people on their part claimed for the preservation of their original languages, in turn a vital component of their identities, cultures and heritage.

Linguists, anthropologists and master teachers have generated enough evidence to support the fact that children, who were forced into Spanish, tended to lose their mother tongue and had lower possibilities of mastering the Spanish language when compared to children who were gradually familiarized with Spanish.

A number of teaching methods for bilingual children have been developed and utilized while a purposeful effort to preserve the Indigenous languages of the country is currently in process.

There are a number of substantive obstacles to comply with legal modifications approved in the early years of the XXIst Century whereby Indian children have the right to be taught in their own language and in Spanish. Although the bilingual and multicultural pedagogical approach has been soundly developed and teaching materials in the most important languages are produced and distributed, teachers who serve these populations, most of them of Indian descent themselves, lack the competencies to address the proposed curricular contents and suggested methodologies to successfully lead their students towards bilingualism.

Although Federal and State level programs to support Indian teachers have been in place for well over a decade, the fact that student results are stagnated and in some areas tend to worsen (high school Math’s and Language), reveal that Professional development initiatives have been erratic and ineffectual.

Didactic guides and other support materials are not well distributed thus leaving the remote and most precarious communities without real access. Moreover, there is evidence that when these materials are in fact in Indian schools, the teaching communities give limited use to them as they lack mentorship and guidance.

The value added afforded by mobile technologies lies in their potential to stimulate individual reflection and sharing through the structured collective learning implied in the multicultural and bilingual pedagogical model adopted by the Federal government. In turn, this perspective has been utilized to develop available materials which contain a vast array of suggestions and exercises designed to enhance practice and further develop competencies.

In sum, the Indian populations tend to be severely marginalized and continue to feature the lowest socioeconomic indicators. Student results in standardized tests are consistently lower than those obtained by their urban and rural non Indian peers.

Low achievement and high drop-out rates are the norm among the Indian children thus perpetuating the circle of poverty and marginality that they have suffered historically. Moreover, their lack of higher order competencies in reading, writing and the social use of Spanish operate in detriment of their integration into quality employment over their lifetimes.
Goal and Objectives

The project in Mexico sought to help develop the Spanish language skills and pedagogical practice of multi-grade primary school teachers working in areas where indigenous languages were dominant. Specifically, the project aimed to:

- Create educational resources that are easily and effectively disseminated via mobile phones. The resources emphasize the social practice of language are aligned with formal curricula.
- Strengthen the use and knowledge of Spanish as a second language for teachers working with indigenous and minority-language students.
- Promote dialogue between experts and participating teachers to improve Spanish language pedagogy.
- Encourage exchanges between teachers and build communities of practice.
- Develop a new and cost effective model for teacher development that can be replicated in other areas of Mexico.

Target Audience

59 bilingual teachers of Indian children in multigrade elementary schools in rural areas received mobile devices and training.

The project reached 9 schools in total, 6 in Tlacotepec de Benito Juárez and 3 in Tehuacán.

Partners and respective roles

While UNESCO HQ was responsible for the overall execution of the project, its monitoring and evaluation, the organization worked with several key partners in the field. These partners were:
A local governmental institution: The centrally located State of Puebla was hosting the project under the auspices of the Secretary of Public Education (Secretaria de Educacion Publica, SEP) and funded part of the project.

A Teacher Training Institution: The National Pedagogical University (UPN) in Mexico City was responsible for local management of the project and coordination of implementation. UPN is a public research University with over 35 years of experience in the area of teacher professional development. The University has recently emphasized the use of technology in education. Over the past few years, members of the UPN have also provided support to teachers in the Sierra Negra-Valle de Tehuacan Nahualtl region through workshops on topics related to teaching strategies, social use of languages and cognitive development.

A communications and information technology corporation: Aside from being one of the main donors, Nokia also provided technical assistance on the mobile learning tool chosen for this project, the Nokia Education Delivery (NED) platform.

Selected Mobile learning solution

The project was using:

- For distribution of media material: Nokia Education Delivery (NED) as for the project in Pakistan.
- For feedback, comments and knowledge sharing: a blog (www.lenguajemovil.org)

These two tools were complemented with the use of computers when possible and necessary.

Pedagogical content

Ten lessons for the teachers were uploaded on the blog and NED during the first phase of the project. Each lesson included specific objectives and several activities for the selected teachers.

This pilot project was based on the existing plans and curricula of basic education, so that the ten lessons within this project adhered to the current curriculum: Current Curriculum for teaching Spanish in Basic Education established social practices of language, the uses that people make of the spoken or written language in different fields of social life, as an object of study (SEP, 2011). Therefore, each lesson was a teaching sequence that focuses on one of the social practices of the language identified in the curriculum. In short, the teaching strategies of this project intended to develop social practices of the language in various contexts, with different communicative purposes and using authentic texts.

Eight of these lessons were then adapted to be used by the teachers with their students in the classroom during the second phase of the project.
Mobile Learning Ecosystem

Teacher Training

In September 2012, during the first two day training meeting, 5 local tutors and the three teachers selected as local leaders, were trained on the technology use and the handling of the contents, as well as in the recording of observations. The training was provided by the content developers as well as by the technical team specialized on mobile technology.

During the same month, the 59 participating local teachers were invited to a two-days meeting to ensure that they fully understand and feel comfortable with the process. During the sessions, mutual obligations, targets and a time table were agreed upon. The first day focused on the use of NED, the applications and the Blog. Phones were distributed by the project team to the teachers. Participating
teachers were grouped into 5 groups to work with one of the five tutors/linguists. The second day, the teachers reflected on the social practices of language as object of study and worked on the first lesson.

Two tutorial visits were made by the local implementation team in the San Marcos Tlacoyalo et Tehuacan Puebla regions in October and November with the purpose of seeing the progress of teachers, and reflecting on the problems and solutions for the implementation of the pilot project.

The first evaluation meeting was held in January 2013. The project team analysed the progress and achievements of the participating teachers. It was noted that approximately 60% of teachers studied the ten lessons and although it was intended to study one lesson per week, it was increased to three weeks. This delay was largely due to the teachers’ workload and connectivity problems in pilot schools. However spaces were sought to facilitate access to WiFi networks. For these reasons, activity in the Blog was continued till February 2013.

Implications for the second stage (agreed upon during this meeting) included the following:

- For the second stage of the project, it was agreed to conduct the training with the 35 teachers who chose to continue participating.
- It was decided that the work of teachers with their students would be reduced from 10 to 8 lessons, based on the time that each lesson requires to do the activities.
- It was determined to continue with using both mobiles and computers based on the conditions and context of the six schools that continue to participate.
- The lessons of this second phase will be adjusted to the work to be followed by the students.

Achievements and the way forward

10 lessons have been developed during phase 1, 8 of which have been adapted by the Knowledge team over the month of February and March 2013 to be used in the classroom during phase 2. As the teachers involved in the project taught in different grades of primary education, adjustments were made so that the didactic sequences could be used in any of the six grades.

The direct target beneficiaries were bilingual teachers working in remote communities who taught Spanish to students speaking an indigenous language at home. And the secondary beneficiaries were the participating teachers’ students who were learning indigenous language as mother tongue and Spanish as working language.

The project further broke down the national curriculum for bilingual teachers into semi-structured lesson units, and the lesson units have been re-purposed for being used on mobile phones. The lessons provided teachers with suggested teaching pathways and learning activities, but requested teachers to use mobile phones to take videos or pictures to create teacher-generated teaching materials that were more relevant to local context.

This project received great feedback from teachers and the local government of Puebla is considering scaling it up to other schools.
Project in Nigeria: Building the Capacity of English Language Primary School Teachers

Nigeria faces serious challenges in the education sector. Currently, about 42% of primary-age children, or roughly 10.5 million children, are out of school, and the children who do attend school are struggling to learn basic literacy and numeracy. This has resulted in one of the highest adult illiteracy rates in the world. According to the latest UNESCO figures, close to 40% of the adult population cannot read or write. Making matters more complicated, these problems are unevenly distributed, with the North confronting the most severe deficits. Today, the percentage of children out of school in the North East is 30 times greater than the percentage in the South East. In addition to access, educational quality also breaks along geographic lines. More than two-thirds of children who complete sixth grade in the North are unable to read, a rate far higher than in the South. Gender disparities are also pronounced in the North, due largely to early marriage as well as cultural norms that privilege the education of boys and men over women and girls.

The official language of Nigeria is English, but many people learn to speak a local/tribal language first. Research indicates that students who develop English language proficiency at an early age are more likely to become literate and develop a strong command of the language—both written and spoken. Nigeria needs to dramatically improve the English language instruction being provided to primary school students. In many Nigerian States a majority of school pupils, despite three years of formal instruction, failed to master foundational reading skills in English. This problem traces to numerous factors, including high teacher to student ratios and insufficient teacher training. Across Nigeria the average student/teacher ratio is 40:1, but for English language instruction the ratio soars to 1:302. And, this problem of numbers is compounded by the fact that English language teachers have rarely been trained how to teach language effectively, especially to large groups of students.

In this context, the need to build the capacity of English language primary school teachers is urgent. Traditional routes to train working teachers through seminars or face-to-face workshops is expensive, time consuming and often takes teachers away from their classrooms. Mobile technologies, by contrast, offer a useful and cost-effective portal to professional development. Teachers also typically own and know how to use mobile technology, generally in the form of mobile phones. The aim of the project is, therefore, to provide professional development to help primary school English language instructors teach large classes more effectively.

Goal and Objectives

The primary objective of the UNESCO project is to build the capacity of English language primary school teachers and give them concrete ideas for working with large classes. The new service also seeks to help create communities of practice among teachers. UNESCO has intentionally organized teachers participating in the project into small groups. Teachers in each group are encouraged to share ideas, resources and experiences—both in person and in digital environments—In addition to accessing messages on mobile phones.

Another core goal of the project is to pioneer a new and cost-effective approach to teacher development. The model being piloted in Nigeria has particular applicability in developing countries where teachers generally have personal mobile devices.

Target Audience
Although the mobile service created for the project is available free of charge to anyone in Nigeria, the project launched with a pilot group of 52 primary school teachers from fifty different primary schools in the Federal Capital Territory of Nigeria. The participating teachers were given Nokia mobile phones with basic data plans. The phones provide teachers access to richly formatted messages that seek to help teachers improve their pedagogical practice.

Five master teachers oversee the fifty teachers. These master teachers access the service as well and encourage the teachers under their supervision to apply the pedagogical strategies they learn.

UNESCO, in cooperation with local partners, continues to promote the service to instructors outside the pilot group and as of September 2013, over 20,000 people are regularly accessing the mobile content.

**Partners and respective roles**

Nokia sponsors the project and developed the NokiaLife+ platform that delivers messages to teachers’ phones using minimal data. The carrier fees to use the service in Abuja, Nigeria do not typically exceed 1USD per month.

The National Teachers Institute has partnered with UNESCO to implement the project on the ground and organize trainings and other informational and collaborative meetings with participating teachers.

The British Council developed the content for the English Teacher mobile service in collaboration with Nokia. The content, tailored for use on mobile devices, is based on a comprehensive teacher training course that is specific for teachers working in sub-Saharan Africa.

UNESCO oversees and coordinates the entire project in collaboration with its field office in Abuja.

**Selected Mobile learning solution**

Unlike previous education initiatives that relied on computers, the UNESCO/Nokia project leverages a technology that is already owned and used by a majority of Nigerian educators, making it easier and less expensive to implement. Additionally, because over 90% of the Nigerian population is blanketed by a mobile network, the service is accessible to most people, including teachers in rural communities. Fixed-line internet connectivity is still unavailable, unreliable, or prohibitively expensive in many parts of Nigeria. For this reason UNESCO and Nokia decided to develop a resource that would make use of existing infrastructure and benefit educators working in hard-to-reach areas, such as the Northern states where educational needs are most urgent.

**Pedagogical content**

The mobile content is accessible to anyone in Nigeria and is hosted on a platform called Nokia Life+ which offers an extensive menu of informational content, covering topics as diverse as education, health, agriculture, and entrepreneurship. When teachers sign up for the service they have access to messages designed to improve and support their instruction. The content was tailored for ease-of-use on mobile devices. The messages, posted once per day, are thematically-organized across sequential modules, generally broken across one or two week periods. Some of the messages are
dynamic, asking teachers to, for example, answer a question; others are purely informational. They are usually accompanied by images and other graphics.

To ensure the service is engaging as well as instructive, there are a variety of different types of messages. These include messages labelled: “information,” “resources,” “hands on activities,” “review,” “summary,” “quote,” or “reflection.” Holistically the messages promote strategies to encourage learner independence, cultivate different learning preferences, and reflect on teaching practices, while providing links to relevant outside resources. From start to finish the content runs for 52 weeks and begins whenever a user signs up for the service.

An example of the content that appears is below. The messages are viewed by teachers in the second week they use the service:

<table>
<thead>
<tr>
<th>WEEK 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Week 2/day 8 – HOW WE LEARN – Message 1 – INFORMATION</strong></td>
</tr>
<tr>
<td><strong>We are all unique</strong></td>
</tr>
<tr>
<td>Each of us is unique and we all learn differently. The more we understand about how our students learn then the better we can help them.</td>
</tr>
<tr>
<td>We all teach in different ways and our own learning style and what we believe about learning affects the way we teach.</td>
</tr>
<tr>
<td>We are going to look at two areas that affect learning; learning style and motivation. Learning style is the way in which we take in, process, absorb and retain new information. Motivation is the desire or willingness to learn the language. Think of a time you were motivated to learn as a child and as an adult. What motivated you?</td>
</tr>
</tbody>
</table>

<p>| <strong>Week 2/day 9 – HOW WE LEARN – Message 2 – INFORMATION</strong> |
| <strong>What is motivation?</strong> |
| Was what motivated you as an adult different to what motivated you as a child? We begin our lives doing things because we are intrinsically motivated – that is motivated to do things because it makes us feel happy and fulfilled. Later we become extrinsically motivated by rewards such as money or holidays etc. Intrinsic motivation provides the best long term performance. We need to motivate our learners so that they enjoy learning English and build a life-long enjoyment of the |</p>
<table>
<thead>
<tr>
<th>Week 2/day 10 – HOW WE LEARN – Message 3 – RESOURCES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How can we motivate?</strong></td>
</tr>
<tr>
<td>As individuals our students are motivated in different ways. How can we motivate?</td>
</tr>
<tr>
<td>RELATIONSHIPS - get to know your learners as individuals and help them to get to know you!</td>
</tr>
<tr>
<td>ENGAGE - make them curious, plug into their interests and be sure what you are doing is relevant.</td>
</tr>
<tr>
<td>CHOICE - let learners choose what to learn and lead the learning, so developing their autonomy.</td>
</tr>
<tr>
<td>CHALLENGE – set tasks which make them think</td>
</tr>
<tr>
<td>ENCOURAGE – make sure you look for small things to praise</td>
</tr>
<tr>
<td>ACTIVE – make your lessons interactive and move the learners around. Variety is the spice of life.</td>
</tr>
<tr>
<td>Be motivated yourself.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Week 2/day 11 – HOW WE LEARN – Message 4 – HANDS ON</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Get Active, Action it!</strong></td>
</tr>
<tr>
<td>Do a mini action research project with your class. You can find information about action research at TINYURL2 Choose twenty-one new items of vocabulary linked to the topic you are studying. Each day teach seven new items using a different five to ten minute activity. Each activity should address a different multisensory learning style: visual, auditory and kinaesthetic. Your action research question is – Do multisensory activities help a range of learners to remember vocabulary better? You will be finding out more about these learning styles over the next week.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Week 2/day 12 – HOW WE LEARN – Message 5 – REVIEW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What have we learned so far?</strong></td>
</tr>
</tbody>
</table>
Our students are motivated in different ways and by different things. Motivation is more sustainable if it is intrinsic. We can help our learners develop motivation towards language learners through the way we teach and the enthusiasm we show for the language.

Week 2/day 13 – HOW WE LEARN – Message 6 – SUMMARY

In order for to learn your students need to be motivated. That motivation is best if it is intrinsic and comes from within. You cannot give or show them how to have intrinsic motivation but you can help them to get it through providing interesting, stimulating and challenging lessons which appeal to a range of learning styles. To do this you need to get to know your learners as individuals, their needs and their interests. Have some fun learning English and the motivation will automatically develop.

Week 2/day 14 – HOW WE LEARN – Message 7 – QUOTE

Tell me and I will forget. Show me and I may remember. Involve me and I will understand. -Confucius BC 450

Mobile Learning Ecosystem

The diagram below visually illustrates how project partners work together to build a mobile service that seeks to improve the pedagogical practice and knowledge of English language primary school teachers in Nigeria.
Teacher Training

UNESCO and Nokia, in collaboration with the National Teachers Institute and the British Council, organized a training seminar for all teachers participating in the pilot project in early May 2013. The teachers were given Nokia headsets with pre-loaded SIM cards and received training on how to access and use the service.

Teacher in the pilot group were organized into five groups, each overseen by a master teacher. Master teachers speak regularly to teachers in their respective groups and provide on-going support—both technical and pedagogical. Teachers in each group also provide support to one and other and met regularly to discuss how they are applying concepts the pedagogical concepts they learn. The teachers also give feedback about the service to their respective master teacher who, in turn, reports back to UNESCO. UNESCO then consolidates this feedback to improve the service, ensuring it meets teacher needs and remains useful and engaging for end-users. In this way, training is a loop: UNESCO and its partners train teachers to use a nascent service, working teachers provide feedback on the service, and, as a final step, UNESCO uses this feedback to make the service more effective.

In addition to the initial training completed in May 2013, three additional meetings were held with educators in the pilot group. These meetings allowed teachers to voice questions, troubleshoot technical issues, critique the mobile service, and share examples of how they translated pedagogical tips into classroom practices. Teachers continue to receive support from project partners and master teachers.
Achievements and the way forward

The number of people using the UNESCO/Nokia English Teacher mobile service grew from just over 50 users to over 20,000 in the four months since it was launched. Future growth is expected. The rapid uptake of the service demonstrates that there is strong demand for mobile-based educational content.

UNESCO has conducted initial evaluations of the project and results have been positive. In surveys and interviews instructors report that the service is improving their pedagogical knowledge and classroom practice. There have also been promising spill-over benefits: teachers are becoming more familiar with the educational applications of information and communication technology (ICT) and using mobile phones to collaborate and communicate with other educators. A sense community has grown up around the digital service, providing teachers who often feel isolated a network where they can seek support and advice.

A systematic reporting process has been put in place to ensure constant feedback from the pilot group teachers. Teachers say the messages they read are relevant and help them positively impact learning in classrooms. The messages provide concrete ideas for developing lessons and improving instructional techniques. Since subscribing to the service teachers have reported that their students are making gains in English language, particularly in the areas of vocabulary, pronunciation and spelling.

By monitoring and evaluating the English Teacher service, UNESCO and Nokia are regularly gauging how the service is being used and how to improve it to better meet the needs of teachers. Already the project organizers have adjusted the project based on participant feedback to provide teachers additional training on how to use touch-screen mobile phones. They have also incorporated a feature into the service that allows users to access content from multiple phones or SIM cards and still receive messages in a sequential and structured way.

UNESCO continues to receive input about the project and the mobile service that undergirds it. The Organization is working to improve the usefulness of the messages and promote its use beyond instructors in the pilot group.

Challenges

The UNESCO/Nokia project has, like virtually all interventions in the field, faced hurdles. Most challenges were articulated directly by the teacher end-users through the regular system of reporting established by the project. The teachers indicated challenges in several domains. They include issues related to content, technical issues, training, mobile phone credit, connectivity, and hardware. These challenges are described in the subsections below.

Content

Some teachers said they would prefer to receive longer (or combined) messages three days a week rather than shorter messages seven days a week. While some teachers seem to have no problems checking messages on a daily basis, others indicate that they would access the service two or three times and read multiple messages. Ultimately, this seems to be a matter of taste as much as substance.
Teachers report universally reported that they preferred messages that gave them concrete ideas for lessons, rather than more abstract pedagogical advice. They also preferred messages that were dynamic as opposed to merely informational. Teachers, for example, enjoyed answering questions contained within messages. UNESCO and its partners have worked to incorporate these requests into the service.

**Technical**

Several teachers expressed a desire that all participating teachers receive the same message on the same day. As the service is currently structured, teachers receive messages in a sequential message based on the day they begin. So a teacher who initiates the service on, say, Jan. 1 will always be “one message ahead” of a teacher who initiated the service on Jan. 2. The rationale for sequential messages is that content can build on and reference previous content. However, educators involved in the project said that by sending the same message to all users on the same day would help establish a greater sense of community around the service. In summary, when large groups of cooperating teachers sign up for the service, they want to get the same messages at the same time.

About one month into the project teachers reported that they were receiving the same messages more than once. Working with Nokia, the issue was quickly traced to SIM cards. Teachers were regularly putting different SIM cards in their mobile phones. Because message sequence was tied to a SIM card, the change disrupted the order of messages received. When a teacher who was, say, two weeks into the service swapped his or her original SIM with a new SIM, the service began anew, with message number one. The problem was addressed by asking users to access the service using a username and password. This ensured message sequencing was determined by a unique username, not a SIM card. The solution fixed the service, allowing users of multiple SIMS to retrieve messages in an ordered way, but also created an additional step to retrieve messages, albeit small. (The log-in feature was built so that teachers only need to enter a username and password one time, after they change the SIM.) Because people in Africa regularly swap SIM cards, future mobile services should pre-emptively plan for this practice.

**Training**

While UNESCO and its partners invested significant resources training teachers how to Nokia provisioned mobile phones, additional technical training would have helped teachers better navigate the operating systems on their phones. Teachers who were unfamiliar with the features of more advanced mobile phones often had trouble accessing English Teacher messages, and using other communication features like text messaging. Informal training were arranged to help less technically savvy teachers become more comfortable with the phone, the teacher service and how to, for example, take and share photographs, use email, store contact information, and utilize third-party applications like WhatsApp (a free messaging service). These trainings, while sometimes slow going, have familiarized teachers with both the educational service and the phone that provides them access to this service.

**Credit**

Questions surrounding credit have proved somewhat tricky to navigate. Initially, UNESCO and Nokia provisioned teachers with SIM cards preloaded with a modest data plan. The plan provided...
sufficient credit to access the educational service for months, but no way of knowing how and for what purpose teachers actually used data. Unsurprisingly perhaps, many teachers exhausted their data plans quickly, probably by using data for reasons beyond retrieving educational content.

UNESCO and Nokia have signalled that free data credit will not be provided indefinitely and the organizers have stopped topping up the data plans of users in the pilot group. Fortunately, this has not, to date, resulted in a large drop-off of users. The service was developed and hosted in a way to minimize data fees, so accessing the service is affordable even for the most financially stretched teachers.

**Connectivity**

One of the most common project challenges cited is poor connectivity. This is frustrating because it is not, at least at first glance, something UNESCO or one of its project partners can easily fix. Some teachers report that they regularly lose their connection to mobile phone towers, making it impossible for them to access English Teacher content, sometimes for days at a time. Reports indicate that teachers have discovered various coping strategies—by identifying the places and times where the phones do get reception—but inconveniences abound. For the time being though, limited connectivity does not seem to threaten the viability of the overall project.

Related, because teachers have to “pull” messages from the service, they need to be aware when and where they have connectivity. If they move through a connected area (on a bus, for example), but do not realize they have connectivity, they are likely to “miss” the message. UNESCO has recognized that in situations where connectivity is a problem, “pushing” messages may be a better solution. By pushing messages, teachers are more likely get intended content when they move in and out of connected areas. While this may ameliorate some headaches associated with connectivity, it also makes the service more invasive. Currently, teachers retrieve messages, a process which is, of course, different than receiving message.

**Hardware**

There were some complaints that the batteries in the Nokia headsets are running down too quickly. Tests confirm that the batteries are working normally, and teachers experiencing battery drainage are likely using their newly provisioned phones on a regular basis (and probably more often than they used a previous phone). Some teachers have asked for spare batteries and this would no doubt be convenient, especially for teachers living in areas with irregular access to electricity. However budget constraints prevent UNESCO and Nokia from providing secondary batteries to power project provided headsets.

- **Crosscutting themes/issues** (max. 20p.)
  - Pre-conditions for mobile learning for teachers
    - Assessing the educational needs
    - Assessing the ICT context, including ICT skills and teachers perceptions towards ICT and mobile learning
- Advocacy and sensitisation to mobile learning
  - Building a mobile learning ecosystem (stakeholders and partnerships)
  - Mapping mobile learning solutions to the specific context (to be linked to the mobile learning toolkit)
  - The pedagogy of mobile learning
  - Planning, monitoring and evaluation
  - Content creation, delivery and quality assessment
  - Teacher training (design and implementation of the training programme)
  - Beyond teachers: Impact on students, schools and communities
  - Sustainability and scalability
  - Limitations and challenges

Recommendations will be included in each of these sections. Each part will be illustrated by evidences and examples taken from the pilot projects.

- Lessons learned and final recommendations (max. 2p.)

Lessons learnt should be supported by evidences from the projects.

This report will be 30 to 40 pages.