

iSTEP 2011 Uruguay

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Abstract

The TechBridgeWorld iSTEP (innovative Student Technology ExPerience) internship program provides Carnegie Mellon students and recent graduates with the opportunity to work in a multidisciplinary and globally distributed team to develop needs-based technology solutions in collaboration with developing communities. This iSTEP 2011 final report provides a detailed account of the 2011 internship, the research projects, key findings, and the team's work and overall personal experiences. The iSTEP 2011 internship partnered with Administración Nacional de Educación Pública (ANEP) in Montevideo, Uruguay to research three projects. The first project created an English literacy practice tool that was accessible on the One Laptop Per Child XO laptops. The second project created a motivating game for students to practice their English literacy skills on Facebook, an online social media site. The third project enabled teachers and other experts to create and manage literacy content that could be used by students on the One Laptop Per Child XO laptops.



iSTEP 2011 Final Report: URUGUAY



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Executive Summary

The innovative Student Technology ExPerience (iSTEP) is an internship program of TechBridgeWorld, a research group based in the Robotics Institute at Carnegie Mellon University. Introduced in 2009, iSTEP is a unique internship program that provides Carnegie Mellon students with the opportunity to conduct technology research projects in developing communities.

Seven Carnegie Mellon students from the Pittsburgh, USA and Doha, Qatar campuses were selected for the iSTEP 2011 program. The ethnically diverse team was a mixture of graduate and undergraduate students with computer science, information systems, and public policy backgrounds. Two of the interns were also native Spanish speakers.

In 2011, the iSTEP team collaborated with Administración Nacional de Educación Pública (National Administration of Public Education, or “ANEP”), the government agency in charge of the public education system in Uruguay. With ANEP, the team focused on developing three technology tools to improve English literacy teaching and learning in public secondary schools in Montevideo. The team also partnered with Liceo 39, a local public secondary school, to conduct needs assessment and field testing..

The three projects consisted of: (1) a One Laptop Per Child Tool (OCT), (2) a Facebook Tool (FBT), and (3) a Content Authoring Tool (CAT).

The OCT project created an English literacy practice tool that was accessible on the One Laptop Per Child XO laptops. The FBT created a motivating game for students to practice their English literacy skills on Facebook, an online social media site. The CAT project enabled teachers and other experts to create and manage literacy content that could be used by students on the OCT.

The team engaged in preparatory work during the spring semester prior to the internship, which included a mini course and an independent study. TechBridgeWorld Founder and Director, M. Bernardine Dias, and Associate Director, Yonina Cooper, taught the mini and advised the independent study. As a result, the team developed reports and plans to prepare for the internship.

Over 10 weeks during the summer, the team was globally distributed with four interns stationed in Montevideo, two in Pittsburgh, and one in Doha. The iSTEP and TechBridgeWorld teams worked with ANEP and Liceo 39 to assess the needs of the community, develop and test the technology tools, and evaluate the projects’ sustainability in the community.

The iSTEP 2011 program was a unique experience for the interns and for the program itself. It was the first time TechBridgeWorld partnered with a government agency for iSTEP, which allowed the team to create resources to potentially influence educational programs in Uruguay and other countries in the future.

Acknowledgments

iSTEP 2011 would not have been possible without the support of many people. First to the TechBridgeWorld core team – M. Bernardine Dias, Yonina Cooper, M. Freddie Dias, Sarah Belousov, and Ermine Teves – thank you very much for all of the time and effort you have put into this program. Since January you all have helped us in so many different ways and we appreciate the constant support and guidance provided during the semester and summer portions of this internship.

We would also like to thank the iSTEP 2011 advisors who have helped out in various ways throughout this internship. We would like to thank Hatem Alismail, David Dausey, Bea Dias, Erik Helin, Jen Horwitz, Chris Labash, Brian Manalastas, Saquib Razak, Matt Richards, and Aysha Siddique for always being available to help when needed and for working with the team to make the internship even better. A special thank you is due to two of our advisors, Silvia Pessoa and Erik Helin, for their hard work in helping to coordinate and connect the team with people in Uruguay. As a native of Uruguay, Silvia was integral in establishing the connections that made the iSTEP 2011 program possible and for helping to introduce and integrate the team with Uruguayan culture.

The iSTEP 2011 team is very appreciative of our many partners on the ground who were instrumental in making our projects and research a success. Laura Motta and Edith Moraes, from CODICEN, ANEP's national executive council, helped make our work in Uruguay a reality. Gabriela Kaplan and Graciela Bilat helped us learn about Uruguay's educational system. We are especially grateful to Viviana Piñeiro and Cecilia Juri from the ANEP – CFE team (Consejo de Formación en Educación), who organized the preparations for the team's stay in Uruguay.

Shirley Romano, who oversees the English language curriculum for the country, was imperative for our research and lent the team some of her class time. Rosario Estrada served as the liaison with Instituto de Profesores Artigas (IPA) and was helpful working with IPA students. Ingrid Hack, director of Instituto Normal de Enseñanza Técnica, (INET) served as the liaison with INET and provided the team's workspace. Special thanks to Rosa Ines Angelo, who served as the liaison with Plan Ceibal, and provided 52 XO laptops for the team to use and for teachers and students to test the tools. Claudia Brovotto from Plan Ceibal was also instrumental in the entire process. We would also like to thank Tessy Turiella, Elena Acosta, Marcela Scudroni, Camila D'Angiolillo, Marianne Fernandes Antures, Florencia Scarpa and Valentina Arismendi from IPA for designing the content in the tools and for taking their time to test the tools. Thanks to the INET student teachers that participated in the focus groups, as their insight was influential in the design and implementation of the projects.

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We would also like to thank our sponsors who made the 2011 iSTEP internship possible. Several individual donors, 100@100 donors, the Qatar Foundation, and Student Affairs at Carnegie Mellon University in Qatar contributed to our internship and we greatly appreciate your support.

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1. Introduction

The innovative Student Technology ExPerience (iSTEP) internship program run by TechBridgeWorld provides Carnegie Mellon University students and recent alumni with a unique summer internship to apply skills learned in the classroom to benefit underserved communities around the world. Students who have participated in iSTEP have exhibited tremendous personal and professional growth as a result of their real-world experiences conducting technology research in developing community settings.

1.1 TechBridgeWorld

TechBridgeWorld is a research group based in the Robotics Institute at Carnegie Mellon University, that develops and field tests sustainable technology solutions to meet development needs around the world. Founded in 2004 by Robotics Associate Research Professor Dr. M. Bernardine Dias, TechBridgeWorld pioneers research in the field of Information and Communication Technology for Development (ICTD).



Fig 1: TechBridgeWorld logo

Since 2004, TechBridgeWorld has been developing strong bonds with partners in developing communities while enhancing the role of technology globally. Focusing on two main principles, sharing expertise to create innovative and locally suitable solutions and empowering local populations to create sustainable solutions, TechBridgeWorld creates accessible and relevant technology.

TechBridgeWorld works closely with the community to address long-term challenges and to develop sustainable solutions. Through the knowledge and creativity of Carnegie Mellon faculty, staff, and students, TechBridgeWorld uses its technical expertise to help realize the community's vision of development.

1.2 iSTEP Program

Launched by TechBridgeWorld in 2009, the iSTEP internship program aims to give Carnegie Mellon students and recent graduates real-world experience in the ICTD sector, as well as develop needs-based solutions in collaboration with developing communities. The iSTEP internship is designed so that the team works closely with local partners in developing communities and contributes technical expertise by inventing new tools and customizing existing technology.



Fig 2: iSTEP logo

The program is open to graduate, undergraduate, and recent alumni of Carnegie Mellon's Pittsburgh and Doha campuses. Students undergo an interview process in the fall semester and selected interns participate in a mini course and independent study in the spring semester to prepare for their summer work.

The paid portion of the internship consists of 10 weeks during the summer when the team works in the field or remotely from Doha and/or Pittsburgh. Past iSTEP locations include Dar es Salaam, Tanzania in 2009 and Chittagong, Bangladesh in 2010. Upon arriving at the iSTEP location, the team assesses the needs of the target audience in order to develop a comprehensive understanding of what technology solutions would be useful for the community. Based on these results, the iSTEP and TechBridgeWorld teams design and develop technology tools to meet the partner community's needs. The tools are then field tested and evaluated and the results are shared with the partner in order to determine sustainability.

1.2.1 2011 iSTEP

The iSTEP 2011 location was Montevideo, Uruguay and the iSTEP 2011 team worked with the Administración Nacional de Educación Pública (National Administration of Public Education, or "ANEP"), the government agency in charge of public education in Uruguay, and Liceo 39, a local public secondary school. Through these partnerships, the iSTEP and TechBridgeWorld teams and ANEP worked together on developing three technology projects to improve English literacy teaching and learning in Montevideo, Uruguay.

Seven iSTEP interns participated in the internship. Four of the interns were based in Montevideo while two worked in Pittsburgh and one worked in Doha.



Fig 3: Liceo 39

During the spring 2011 semester, the iSTEP team took a mini course in the first half of the semester. The purpose of this mini was to teach students practical skills necessary to conduct field research in the area of ICTD and to show how computing technology address needs and challenges in developing communities. The course introduced the team to the location of the internship and to the partners in Uruguay. The team worked within a multidisciplinary setting to understand specific challenges in the Uruguayan community and prepared three reports for the upcoming internship – a country background report (which is incorporated in this report), a media plan (sanitized version can be found in Appendix A – iSTEP 2011 Media Plan), and a team plan (sanitized version can be found in Appendix B – iSTEP 2011 Team Plan).

In addition to the mini course, the team participated in an independent study during the second half of the spring semester to focus more on their individual roles and to begin initial preparations for the summer travel. The team met weekly to share their work and attended preparation sessions which covered topics ranging from travel to research compliance. They met with TechBridgeWorld team members and iSTEP advisors to develop plans for conducting the projects in Uruguay. In addition, the team obtained approval for the iSTEP 2011 projects from Carnegie Mellon's Institutional Review Board, which reviews all research involving human subjects.

At the end of the semester, the team presented their research at Meeting of the Minds (Appendix C – Meeting of the Minds Poster), Carnegie Mellon's undergraduate research

symposium, in Doha and Pittsburgh. The team received the IBM Undergraduate “Smarter Planet” Award at the Pittsburgh symposium.

1.2.2 Technology Projects

The team worked on three separate projects during the internship: (1) a One Laptop Per Child (OLPC) Tool (OCT), a Facebook Tool (FBT), and a Content Authoring Tool (CAT)



Fig 4: OLPC logo

schools in Uruguay.

The OCT focused on creating a culturally relevant English literacy tool accessible on the OLPC XO laptops. The OCT explored means of enhancing the use of the XO laptop to complement the current English literacy curriculum of secondary school students (ages 12-15) enrolled in public

The FBT capitalized on the popularity of Facebook among secondary school students. An application created specifically for Facebook was developed as an additional platform to engage students to practice English literacy content.



Fig 5: Facebook logo

The CAT, first developed in iSTEP 2009 and expanded in 2010, built on previous work to create an interface customized to the needs of English literacy experts in Uruguay. The tool allows experts in Uruguay to create and update English literacy content that can be downloaded to the OCT.

2. Team

The iSTEP internship program consists of several parties. The iSTEP interns are students from the Pittsburgh and Doha campuses of Carnegie Mellon University. The TechBridgeWorld core team members organize the program and assist the interns throughout the internship. These two groups also coordinate with local community partners and iSTEP advisors to ensure the success of the iSTEP program.

2.1 iSTEP 2011 Interns

The iSTEP 2011 team brought together seven students attending Carnegie Mellon University both in Pittsburgh and Doha to work in a multidisciplinary team to develop sustainable technology solutions to improve English literacy in Uruguay. Three interns were graduate students at Heinz College while the four undergraduates represented the School of Computer Science, Humanities and Social Sciences, and the Mellon College of Science. In addition, the international team hailed from Mexico, Morocco, Pakistan, Sudan, and the United States. Two of the interns were also native Spanish speakers.

2.1.1 Afnan Fahim



Afnan is a sophomore Computer Science student at Carnegie Mellon University in Qatar. Apart from being deeply fascinated by technology, his interests also include management and global development, specifically involving sustainable growth. These passions have inspired him to take on important leadership roles on campus, like those in Development Solutions Organization, a student-run organization focused on raising awareness about and finding sustainable solutions for problems faced by underprivileged communities. He was also one of the organizing members of TEDxCarnegieMellonQatar, a conference themed around global development programs initiated in the Middle East.

Afnan was the Technical Lead for the Facebook Tool (FBT) and was stationed in Montevideo. He took the lead on all technical development and testing for the FBT.

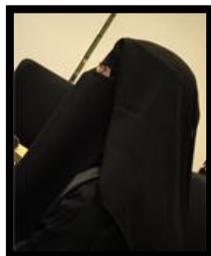
2.1.2 Elise Gonzales



Elise is a junior Computer Science major with a minor in Chinese Studies at Carnegie Mellon University in Pittsburgh. On campus, she is Vice President Judicial for the Panhellenic Council. She is also Women@SCS's Creative Technical Night's Undergraduate Coordinator, working to promote Computer Science and problem solving among young girls. In her free time, she enjoys retraining her off-the-track thoroughbred horse, Tiny.

Elise was the Technical Lead for the OLPC Tool project (OCT) and was stationed in Montevideo. She took the lead on all technical development and testing for the OCT.

2.1.3 Asma Hamid



Asma is a junior Information Systems major pursuing a minor in Business Administration and a content area in Technology at Carnegie Mellon University in Qatar (CMU-Q). Her areas of interest consist of web design and learning and teaching technology. Asma interned at Brown Lloyd James, a public relations agency, where she built a database of media contacts. At CMU-Q, she worked as a Programming Tutor at the Academic Resources Center and served as Teaching Assistant for the Application Design and Development class.

Asma was the team's Technical Floater. She was stationed in Doha and supported her teammates in Montevideo and Pittsburgh with technology development of all projects.

2.1.4 Meghan Nahass



Meghan is a junior Policy & Management and Biology dual degree with a minor in Hispanic Studies at Carnegie Mellon University in Pittsburgh. She is involved in student government, having served as a Senator as well as on an executive committee to help govern student organizations on campus. She has also worked extensively with the Modern Languages Department, serving as the Student Advisory Council's president for two years. Her professional interests include pursuing a career in medicine and combining her interests of science and policy with a focus on the Hispanic community.

Meghan was the Dissemination and Marketing Strategy Lead based in Pittsburgh. She led the team's dissemination efforts and developed a marketing plan to be implemented in Montevideo.

2.1.5 Roberto Ponce Lopez



Roberto is pursuing a master's degree in Public Policy and Management at Carnegie Mellon University's Heinz College in Pittsburgh. Roberto has experience in public opinion, political campaigns and Geographic Information Systems. Roberto has a bachelor's degree in Political Science from ITAM in Mexico City. After graduation, he worked for the Public Opinion Bureau, at the Office of the President in Mexico, evaluating government's public policies through surveys and focus groups.

Roberto was the Team Leader and the Needs Assessment and Evaluation Lead stationed in Montevideo. He took the lead on needs assessment and evaluation of the three projects and assisted with necessary field testing. In addition, Roberto was selected as TechBridgeWorld's 100@100 Fellow. This position is sponsored by the 100@100

fundraising campaign started in fall 2010 as a grassroots effort to support the iSTEP program.

2.1.6 Hanae Timoulali



Hanae is pursuing a master's degree in Information Systems Management at Carnegie Mellon University's Heinz College in Pittsburgh. Hanae graduated from al Akhawayn University in Morocco with a bachelor's degree in Computer Science and a minor in Business Administration where she developed an interest for education and global development. After graduation, she served as a volunteer at a local association where she used technology to teach various school subjects such as mathematics and French. Hanae also worked for a start-up located in San Diego, California where she learned to collaborate with globally distributed and diverse teams.

Hanae was the Technical Lead for the Content Authoring Tool Project (CAT) stationed in Pittsburgh. She took the lead on the technical development and testing for the CAT.

2.1.7 Vanessa Vázquez



Vanessa is pursuing a master's degree in Public Policy and Management at Carnegie Mellon University's Heinz College in Pittsburgh and Washington D.C., where she focuses on International Development and Immigration Policy. In 2006, Vanessa graduated with a double major in Political Science and Peace & Justice Studies from Tufts University. For four years prior to graduate school, Vanessa worked with immigrant families in Northern California on community transformation. She also worked on many social and academic development projects with youth involving many community partners. Vanessa interned as a research assistant for a start-up non-profit organization, called Talk – The New Sex Ed, which is located in Pittsburgh.

Vanessa was the iSTEP 2011 Partnership, Coordination and Marketing Implementation Lead based in Montevideo. She led the team's partnership and coordination efforts and implemented the team's marketing plan in Montevideo.

2.2 TechBridgeWorld Team

The core members of the TechBridgeWorld research group organized, prepared, and ran the iSTEP program. They provided feedback and advice on projects and group work during the mini course, independent study and summer internship. In addition, they met regularly with iSTEP interns to brainstorm ideas and to work with the interns on all aspects of the internship.

2.2.1 M. Bernardine Dias



M. Bernardine Dias, Founder and Director, is an Associate Research Professor in the Robotics Institute at Carnegie Mellon University's School of Computer Science and a member of the Computer Science faculty at Carnegie Mellon University Qatar. Her research experience is in technology for developing communities, assistive technology, technology education, autonomous team coordination, and automated planning and navigation. Dr. Dias is a native of Sri Lanka. Her career goal is innovating means of developing and disseminating suitable and sustainable technology for empowering developing communities. She is a strong supporter and mentor for women in science and technology.

2.2.2 Yonina S. Cooper



Yonina S. Cooper, Associate Director, is an Associate Teaching Professor in the School of Computer Science at Carnegie Mellon University in Qatar. She co-teaches the Technology and Global Development course at Carnegie Mellon Qatar with M. Bernardine Dias and is a Qatar faculty advisor for the iSTEP program. Her research interests are in the areas of education and technology: ICT in education in developing countries, identifying technology that is accessible and relevant to the needs of a developing community, and adapting Alice (Educational Software) with culturally relevant icons for Middle East schools. She received her Ph.D. from New Mexico State University in Las Cruces, New Mexico. She taught computer science and mathematics at The University of Kansas, University of Wisconsin, University of Texas and University of Nevada, Las Vegas.

2.2.3 Sarah M. Belousov



Sarah M. Belousov, Project Manager, is based in the Robotics Institute at Carnegie Mellon University's School of Computer Science. Her primary responsibilities involve extending the activities of the TechBridgeWorld research group at Carnegie Mellon University's campuses in Doha and Pittsburgh through strategic planning, fundraising, logistical coordination and administrative duties. She earned her bachelor's degree in International Studies and French at Johns Hopkins University and l'Institut d'Études Politiques in Paris. Prior to joining TechBridgeWorld, Ms. Belousov worked at the World Affairs Council of Pittsburgh and she recently completed her master's degree in Public Policy and Management at Carnegie Mellon's Heinz College.

2.2.4 M. Freddie Dias



M. Freddie Dias, Research Engineer, is based in the Robotics Institute at Carnegie Mellon University's School of Computer Science. He assists with robotics research in the Field Robotics Center, supporting projects related to multi-robot coordination. He also serves as a technical consultant for projects related to technology and development under TechBridgeWorld.

His work in both categories bridges Carnegie Mellon University's campuses in Doha and Pittsburgh. Originally from Sri Lanka, he graduated from Hamilton College in New York with a double major in physics and computer science.

2.2.5 Ermine A. Teves



Ermine A. Teves, Project Assistant, is an alumna of Carnegie Mellon University. She graduated in May of 2008 with a B.S. in Business Administration with a concentration in Marketing. Her responsibilities include expanding TechBridgeWorld's programs, marketing, and fundraising efforts. Ermine became interested in technology for sustainable development while interning for TechBridgeWorld during her undergraduate studies. She took a TechBridgeWorld course, Technology and Global Development, and in Summer 2008, she spent 10 weeks in Bangalore, India working with Microsoft Research India and the Mathru School for the Blind as part of the Technology Consulting in the Global Community program. Ermine is a native of the Philippines and hopes to facilitate future TechBridgeWorld projects and programs in her home country.

2.3 Internship Advisors

Table 1 lists the people who advised the iSTEP 2011 team during the internship.

Table 1: iSTEP 2011 advisors

Name	Affiliation	Expertise
Hatem Alismail	iSTEP 2009 participant	Content Authoring Tool, Mobile Phone Tool
David Dausey	Faculty, Heinz College	Evaluation
M. Beatrice Dias	iSTEP 2009 participant	Needs Assessment, Evaluation
Erik Helin	Faculty, Carnegie Mellon University in Qatar	Spanish language, Uruguay
Jen Horwitz	iSTEP 2010 participant	Needs Assessment
Chris Labash	Faculty, Heinz College	Marketing
Brian Manalastas	iSTEP 2010 participant	Marketing
Silvia Pessoa	Faculty, Carnegie Mellon University in Qatar	Spanish language, Uruguay, English literacy tools, language teaching, English as a Foreign Language
Saquib Razak	Faculty, Carnegie Mellon University in Qatar	Mobile Phone Tool
Matt Richards	TechBridgeWorld videographer	Documentation
Aysha Siddique	iSTEP 2010 participant	Content Authoring Tool

3. Country Overview

Uruguay is a small country with a rich history and a promising future. The iSTEP team researched information that would be important for traveling, working and living in Uruguay during the internship.

3.1 Uruguay

The Oriental Republic of Uruguay is a small (176,220 sq. km.) constitutional republic, located in South America.ⁱ Located between South America's two largest countries, Argentina and Brazil, and the southern Atlantic Ocean, it is the second smallest country on the continent. Its west border with Argentina is the Uruguay River and to the south is the Rio de la Plata (River Plate), which spills into the Atlantic Ocean. Most of the terrain consists of plains and a fertile coastal land. There are no large mountains so the temperature is prone to rapid changes and high winds. It is considered a temperate climate and experiences four seasons throughout the year. Its summer goes from December through March while its winter runs from June to August. The iSTEP 2011 team was in Uruguay during the winter months and had to prepare appropriately for their time there. While on the ground, the team was glad they had brought their jackets and scarves as temperatures dropped to 32 F (0 C)!



Fig 6: Uruguay

Uruguay is split into 19 different states, called “departamentos.” Its most populous departamento, with nearly a third of the country’s population, is Montevideo, the nation’s capital. The iSTEP interns joined the 1.3 million Uruguayans in Montevideo and had the opportunity to experience the city’s lifestyle.ⁱⁱ The majority of the Uruguayan population is of European descent, around 90%, with nearly 25% being of Italian heritage. The rest is a mixture of African descent, or “Mestizo,” with less than 0.5% of the population being of indigenous descent.ⁱⁱⁱ

While the majority of the population is nominally Roman Catholic or non-Catholic Christian, many do not attend church regularly and there is a strict separation of church and state.^{iv}

Some important statistics about the Uruguayan population are that the median age of the population is 35.1 years with an expected life around 76.6 years. Approximately 22.4% of the total population is under the age of 15. Another important statistic to consider is the school life expectancy (SLE), which as defined by the CIA World Factbook is the “expected number of years of schooling that will be completed (from primary to tertiary schooling), including years spent repeating one or more grades”.^v In Uruguay, the SLE is 15 years for males and 17 years for females. Among those aged 15 and older, there is a 98% literacy rate, meaning they can both read and write Spanish. The public expenditure on education amounts to 2.9% of the total gross domestic product (GDP).

The official language in Uruguay is Spanish; however there is a growing use of English within the business world and Portuguese along the border with Brazil. Near the Brazilian

border, a language called “Portunol,” which mixes Portuguese and Spanish is also spoken.^{vi} Due to the European ancestry of the citizens, the Spanish in Uruguay has been influenced by other romance languages, especially Italian. Furthermore, spoken Spanish in Uruguay and Argentina varies from other Spanish speakers because it employs both voseo and yeísmo. Voseo is the



Fig 7: Ad showing voseo

Team members practiced their Spanish and became more comfortable with Uruguayan Spanish.

use of “vos” instead of “tú” when addressing the second person singular (you). There is a slightly different verb conjugation in the present and in the command form when employing vos as well. Yeísmo is where words that contain “ll”, such as calle (street) or silla (chair), have the “ll” pronounced like a “y”. In media, both “voseo” and “yeísmo” are common although in some cases the formal “usted” is used. The advertisement pictured in Fig 7 for the telephone

provider Claro show the “vos” conjugation of the verb “hacer” (to do), “querer” (to want), and “venir” (to come). The two native Spanish speakers on the team noticed the different accent when they arrived in Montevideo. They provided the primary communication between partners and the team and grew accustomed to the distinctive accent. The other team members practiced their Spanish and became more comfortable with the Uruguayan Spanish style.

Due to its temperate climate and arable lands, 9% of the Uruguayan work force is based in the agriculture sector, which accounts for about 9% of the national GDP and 70% of the country’s exports. Beef, wool, and rice are three of the main products and exports. The team ate a lot of beef while in Montevideo at Uruguayan barbecues called “asados”. Industries such as food processing, electrical machinery and leather make up 14% of the GDP. Most of Uruguay’s exports go to Brazil, then China and Argentina. The top importers into Uruguay are Argentina, Brazil, China and the USA. Crude petroleum and petroleum products, machinery and chemicals are the most imported commodities.^{vii}

As can be seen by the close economic relationship with Argentina and Brazil, the economic situation in Uruguay has traditionally been tied to their neighbor’s economies although Uruguay has taken steps to reduce this dependence in recent years because of the economic crisis in 2002. In that year, exports to Brazil fell and Argentines withdrew their money from banks in Uruguay. As a result, in August 2002, four of their most important private banks declared bankruptcy, the GDP fell 17% and inflation peaked at 50%.^{viii} In 2003, the unemployment rate was 17%.^{ix} People were upset with the government and in the 2004 elections, both traditional political parties, “Partido Colorado” and the “Partido Blanco,” were defeated. For the first time in Uruguay’s history, a coalition of leftist forces, led by Tabare Vázquez, came to power. In 2009, Jose Mujica, the candidate of the “Frente Amplio,” won the election, again putting the coalition that had taken the government in 2004 back in power for another term.^x Today, the economy is stronger with GDP growth rates over 5% since 2004 and 9% in 2008. Even in 2009, during the worse effects of the global financial crisis Uruguay’s economy grew 2.9%. Today, the unemployment rate is 7.30%, more on par with pre-2002 levels.^{xi}

3.2 Education in Uruguay

Education in Uruguay is public and free, from elementary school through university. An autonomous public entity, the Administración Nacional de Educación Pública (National Administration of Public Education, or “ANEP”) is responsible for overseeing education in Uruguay. Neither the president nor the executive branch of government has direct control over education, which is different than other countries.^{xii}

Historically, Uruguay has performed well on education evaluations. The literacy rate has been above 94% since 1972, a very high percentage when compared with other Latin American countries for those years, and reached 98% in 2010.^{xiii} Other evaluations, such as the Program for International Student Assessment (PISA), rank Uruguay above its Latin American counterparts (except Chile) but below average when compared to the member countries of the Organization for Economic Co-Operation and Development (OECD). In fact, in 2009 PISA reported, Uruguay ranked 48th in math and 48th in science out of 65 countries. For comparison, in these two categories Uruguay ranked 42nd out of 57 countries in 2006 and 34th and 36th out of 40 countries measured in 2003.^{xiv} In comparison, the USA ranked 25th in math and 17th in science in 2009, respectively.^{xv}

PISA demonstrates that the quality of education in Uruguay is better compared with other countries in the region (except Chile), but it is not as good when compared to the most developed economies. A deeper analysis of PISA’s results in 2006 and 2009 revealed a high variance in the results. In other words, some students did very well, while others did poorly. This variance was mainly explained by the different social contexts of the schools.

Identified issues in the educational system:

- 1) *Social context of schools*
- 2) *Grade repetition*
- 3) *Private vs. public schools*

In this case, social context means the level of poverty and marginalization in the student’s home and school neighborhood. On average, students from schools with a favorable context (low poverty levels in the neighborhood) did better on the evaluation tests than those from contexts of poverty.^{xvi}

Another problem in the education system is the repetition of grades. Between 2000 and 2008, the repetition rate in Uruguayan primary schools (7-8%) was higher than the rates in Argentina and Chile, 6% and 2% respectively. In secondary schools, the difference is even more pronounced where 13% of Uruguayan student repeat a grade, which is similar to Argentina but much higher than Chile’s 3% repetition rate.^{xvii}

A third distinction in the system is the difference between public and private schools. Families who can afford it, send their children to private schools as they are thought to provide students with a better education. In 2009, 84% of students at secondary level attended public schools, while 16% attended private ones.^{xviii} Students that attend private school typically do not repeat grades, have a more favorable social context (less poverty), and do better in school.^{xix}

Uruguay’s public education system is currently undergoing many reforms to work on these problems. With a USD \$48 million loan from the Inter-American Development Bank (IDB)

and Uruguay's pledge of USD \$66.5 million over a 25-year term, Uruguay intends to overhaul all aspects of its public education, especially its secondary education, the population which the iSTEP 2011 team primarily worked with.^{xx} While Uruguay's education system has historically led Latin America in terms of literacy rates and access to education, its highest reported enrollment of secondary school aged children was in 1985. These numbers have fallen in recent years and dropout rates are increasing, with 12% of students dropping out after primary school and 26% not completing secondary school at all in 2008.^{xxi}

One way Uruguay is trying to improve its educational system is by embracing the One Laptop Per Child (OLPC) program. In October 2007, it became the first country to begin giving XO laptops (the laptops created and provided by OLPC) to its students. 100,000 XO laptops were delivered to school children between the ages of 6 and 12 as the first step in Uruguay's "Plan Ceibal." The goal of Plan Ceibal is to provide a laptop for educational purposes to every child enrolled in the public school system. In 2011, this goal was eventually realized with nearly 400,000 Uruguayan students having their own XO laptop.^{xxii} Prior to that, around 70% of the students did not have access to a computer at home. Now, 85% of Uruguayan children access the internet on a regular basis.^{xxiii} This was a major impetus for Plan Ceibal as Uruguay seeks to produce technologically competent students that will be well suited for the competitive global marketplace.^{xxiv}

Nearly 400,000 students have their own XO laptop and 85% of children access the internet regularly

One challenge with this initiative is that Uruguay's 18,000 teachers have needed to adapt their teaching methods and styles to accommodate the XO laptops. Although all teachers went through training as part of Plan Ceibal, research by Uruguay's Education Department indicates that some teachers have not been integrating computer-related work into their classrooms. This suggests that the long-term goals of Plan Ceibal could be undermined by teachers' inability to tailor lesson plans to the new technology and use the laptops to enhance learning.^{xxv}



Fig 8: Plan Ceibal headquarters

Another point of difficulty has been the program costs of Plan Ceibal. Although OLPC originally intended to sell the XO laptops for a unit cost of USD \$100, unforeseen costs in producing them have necessitated an increased price. In addition to the cost of the laptops themselves, Uruguay has had to develop the infrastructure to support the program, spending on maintenance and equipment repairs for the laptops, training for the teachers, and increasing internet connection in parts of Uruguay. A total of USD \$100 million was invested into purchasing, servicing, and delivering the 380,000 laptops and according to a TEDxBuenosAires talk given by Miguel Brechner of Plan Ceibal, the cost was "worth it."^{xxvi} All in all, the estimated cost of Plan Ceibal is about USD \$260 per child with the projected annual cost of

maintenance being USD \$21 per child, which amounts to less than 5% of the total education budget in Uruguay.ⁱⁱ

The next step forward for Plan Ceibal is to keep the schools connected. Uruguay has been very proactive about upgrading their internet technology and Plan Ceibal is committed to increasing internet connectivity.^{xxvii} Many schools in rural areas still do not have access to the internet and internet access is very expensive even in urban areas. Further discussion of internet access and connectivity is discussed in the following section.

Foreign language study in Uruguay is also becoming increasingly important, as evidenced by the launch of the “Programa de Segundas Lenguas” (Second Language Program) in 2008. Its main goal is to have a bilingual population by 2030 (Spanish and either English or Portuguese). The biggest challenge for ANEP is to have a large and well-trained body of English teachers as soon as possible.^{xxviii} ANEP is concentrating its efforts in three areas: training new English teachers, re-training the current teachers and adapting school programs for teaching English. It is likely that these changes will have a large impact on English literacy in a decade, but the government needs assistance to achieve their goals.^{xxix}

3.3 Technology Infrastructure

The Information and Communications Technology (ICT) sector in Uruguay has evolved in the last few years and has favorably positioned the country in comparison to some of the most technologically advanced countries in Latin America in terms of infrastructure. In 2010, Uruguay’s infrastructure index was 0.318, which was higher than the region’s average of 0.260.^{xxx} This index is a weighted average computed based on six primary indices: mobile phones/1000 persons, internet users/1000 persons, online population, PCs /1000 persons, telephone lines/1000 persons, and TVs/1000 persons.

Antel (Administración Nacional de Telecomunicaciones, or National Administration for Telecommunications) is the main internet service provider (ISP) in Uruguay that provides digital subscriber line (DSL) connections. It is owned by the government and has a monopoly on land lines in Uruguay, so private cable companies are unable to offer data services such as internet access.^{xxxi} Antel charges around USD \$50 per month for access, which is more expensive than DSL services in other parts of South America and often is too expensive for the majority of citizens to afford.^{xxxii} Private companies are allowed to offer connection via radio, but not land lines. However, the government levies very expensive taxes on the radio spectrum, forcing companies to raise their rates so this is neither a viable nor affordable option for citizens.

There are several popular DSL providers, including Antel, Netgate, a broadband internet service provider called Dedicado, and several wireless modem internet providers, including Netgate, Claro and Movistar.^{xxxiii} The speed of connection in Uruguay is relatively slow because it lacks the cable networks present in more developed nations. Internet costs are also high, explaining why many Uruguayans cannot afford internet at home.

Cyber cafes are very popular but also expensive, costing USD \$1.25 an hour. Public schools now have wireless access and the government is trying to offer broadband to private

homes via a new asymmetrical digital service line (ADSL) service on all landlines.^{xxxiv} While these services are commonly available in Montevideo, service is limited in more rural areas.^{xxxv} The team noted that the wireless provided in the schools often crashes because the network cannot support the number of students accessing it with their XO laptops.

Despite these drawbacks, there has been wide internet penetration and computer usage in Uruguay. People use the internet for gathering information, communicating, e-shopping or performing financial transactions. In 2009, Uruguay had approximately 1.41 million internet users. With a population of 3.51 million, this amounts to about 40% of Uruguayans having access to the internet with most users being in Montevideo because of its population and technology, according to the Instituto Nacional de Estadísticas (INE) (National Institute of Statistics).^{xxxvi}

Fig 9 shows the increasing number of internet users between 2001 and 2009 with noticeable increases in the years 2005 and 2007. These increases are justified by the investments in infrastructure and the support of two main organizations. Red CLARA (Red de Cooperación Latino Americana de Redes Avanzadas, or Latin American Cooperation of Advanced Networks) provides connectivity at 155 Mbps in a topology linking national research and education networks of Argentina, Brazil, Chile, Panama and Mexico. This high speed network is also linked to Europe via a 622 Mbps link between Sao Paulo and Madrid. On the other hand, the EVC (Espacio Virtual de Cooperación, or Virtual Space for Cooperation) connects national and international research centers with high speed connections thanks to a EUR 500,000 investment by the European Union.^{xxxvii}

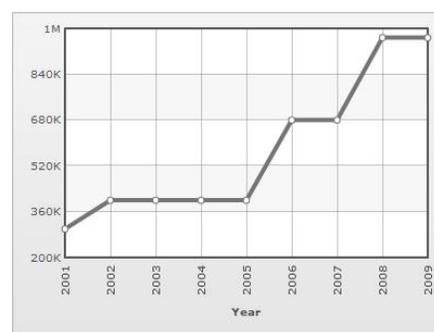


Fig 9: Uruguayan internet users

3.4 Travel Guidelines

Prior to sending students abroad, the TechBridgeWorld team verifies the safety and security of the iSTEP location with colleagues at Carnegie Mellon. Uruguay is considered to be a safe destination to travel to with basic, common sense precautions being recommended, especially since Montevideo is an urban city. Some of these tips include walking in larger groups and not traveling late at night, especially in unfamiliar neighborhoods. Nonviolent crimes, petty theft, and muggings have occurred and foreigners have been targeted so it is important to be aware of surroundings and to keep a tight hold on possessions. Protests have occurred and it is important to not engage or become involved with the protesters.^{xxxviii}



Fig 10: Uruguayan flag

Certain travel logistics such as electricity and the time differences between Montevideo, Pittsburgh, and Doha were considered to ensure a smooth transit for the team living in Uruguay. Electricity is 220-240 volts, the same as in Qatar but different than in the USA, so an adapter from the 110 to 120 volts was needed for some team members.^{xxxix} After

daylight saving time, Montevideo was one hour ahead of Pittsburgh and six hours behind Doha.^{xi} The team had to work with this time difference in order to schedule meetings and testing of the tools.

Prior to travel to Uruguay, the team had to make sure they had the proper vaccinations. In general, they needed influenza, chickenpox (or varicella), polio, MMR, and DPT while for Uruguay in particular they needed Hepatitis A, Hepatitis B, and Typhoid vaccines. The team also brought insect repellent containing DEET to help prevent insect bites because in that area of the world, insects spread diseases such as dengue fever and malaria.^{xli} For their health and safety, TechBridgeWorld provided a health kit for the team in Montevideo that they stored in their apartment.



Fig 11: Uruguayan pesos

While in Uruguay, the team used the Uruguayan peso (UYU) which had an exchange rate of around UYU \$20 to USD \$1. They obtained cash through either ATMs or through a “casa de cambios” exchange. The team used both methods when getting money. Throughout this report, the team uses \$ to represent USD unless otherwise specified. Some other important travel guidelines the team learned while in Montevideo included being able to drink the water safely in the city. However, they were warned to be careful if they traveled to more rural areas. The team also visited many local restaurants and cafes. In general, they found that a 10% tip was considered appropriate.

Public holidays include May 18 (Battle of Las Piedras), June 19 (Birth of General Artigás), and July 18 (Constitution Day).^{xlii} On holidays, the office where the iSTEP team worked was closed and many businesses were not open.^{xliii} During these holidays, on weekends or during their free time, the team visited other areas of interest in the region. Some members took trips to Buenos Aires, the capital of Argentina, which is a three hour ferry ride away from Montevideo. Others visited vineyards in Uruguay, called “bodegas,” and Punta del Diablo, a small beach town. The team also witnessed Uruguay’s win of the Copa America and were excited to shout “Vamos la celeste” with other Uruguayans when celebrating the championship. They even had a chance to see the Uruguayan national football team play when they attended a match between Uruguay and Mexico!

4. Partners and Community

One year before the iSTEP interns arrived in Montevideo, TechBridgeWorld engaged in conversations with professors at Carnegie Mellon University in Qatar about the iSTEP 2011 program. Professors Silvia Pessoa and Erik Helin, from Carnegie Mellon's Qatar campus, were integral in connecting TechBridgeWorld with Montevideo partners ANEP and Liceo 39, a public secondary school of which Pessoa is an alumna. Discussions between ANEP and TechBridgeWorld resulted in identifying three projects which would increase the impact of Uruguay's Plan Ceibal. Weekly calls between ANEP and TechBridgeWorld colleagues took place during the months leading up to the internship and during the internship itself to finalize logistics and address any challenges. ANEP also hosted weekly meetings with the iSTEP 2011 interns in Montevideo during the internship. The interns scheduled additional meetings with other local organizations as needed.

4.1 Administración Nacional de Educación Pública (ANEP)

Uruguay was the first nation in the Americas to implement universal, free, secular and compulsory primary education. The Law of Common Education, passed in 1877, was inspired by the writings of José Pedro Varela. By the late 1950s, all three branches of the education system – primary, secondary and university – had established administrative autonomy, including complete control over their budgets.^{xliv}

Congressional reforms and reforms to the General Law of Education (GLE), first in 1972 and then in 1985, created ANEP as a new entity of public interest.



ADMINISTRACIÓN NACIONAL
DE EDUCACIÓN PÚBLICA

Fig 12: ANEP logo

Article 53 in the GLE established ANEP as an autonomous organization, in charge of the creation and implementation of education policies throughout the country. ANEP is governed by the Central Directive Council (CODICEN), which is chaired by a board of five directors, three of which are nominated by the President of Uruguay with the choices ratified by the Senate. The remaining members are elected by ANEP's staff faculty.^{xlv} As the governmental organization responsible for the planning, execution and administration of the educational system in Uruguay, ANEP oversees preschool, primary, middle, technical and tertiary teacher training throughout Uruguay. The public education system is an autonomous entity administratively and technically, but not financially. In addition to the public education system, ANEP also oversees private education. The Universidad de la Republica (University of the Republic) is an autonomous entity in charge of the country's college education.^{xlvi} An organizational chart of this structure can be found in Appendix D – Partners Chart. Through ANEP, the iSTEP 2011 team worked with a variety of contacts and agencies, primarily in coordination with contacts at the Consejo de Formación

Education is "a process that should lead to the development of every human being's capacity."

- ANEP

en Educación (CFE).

While ANEP was created to give individual schools and the populations they serve autonomy, in practice this system has been problematic because ANEP manages and distributes all teaching resources including chalk and books used in different academic subjects.^{xlvi} On the other hand, this deeply centralized system does not participate in teacher allocation. In order to give teachers greater autonomy, they are able to choose the schools in which they would like to teach, with the most senior teachers getting first pick. Therefore, it follows that those with the most experience, should they wish, teach in schools with a “favorable context,” measured by high academic achievement and socioeconomic factors. This has created a system of inequality in the system with high teacher turnover in schools with an “unfavorable context.”^{xlvi}

Education, as defined by ANEP in their strategic educational plan, Plan de Educación 2010-2030, is “a process that should lead to the development of every human being’s capacity, which should reach every human being and be extended throughout one’s lifetime.”^{xlix} This is one of the driving factors behind ANEP’s desire to partner with iSTEP and TechBridgeWorld to achieve their goal of improving English literacy in Uruguay.

In order to address the needs of the teachers and secondary schools more holistically, ANEP requested that the iSTEP 2011 team work closely with student teachers from two of their institutes. Since student teachers have both practical and theoretical insight on the Uruguayan education system and the challenges faced by both teachers and students alike, they were crucial to our research. Not only did they participate in the research process, via the needs assessment focus groups, they also helped to create the content for the technology tools.

4.1.1 Instituto de Profesores Artigas (IPA)



Fig 13: IPA logo

Founded in 1949 by Dr. Antonio M. Grompone, the Instituto de Profesores Artigas (IPA), or Artigas Professor’s Institute, is dedicated to the development of secondary school teachers. IPA, associated with ANEP, is based on both pedagogical and philosophical pillars. Teachers are educated via technical courses, seminars, a culturally relevant pedagogy, and finally an internship in their fourth and final year. Moreover, it is considered vital that research related to education is conducted, published and correlated to other branches of education. The curriculum at IPA centers on didactic development and an internship that aims at “a practical pathway for teaching a specific subject.”¹

Within IPA, the iSTEP 2011 team worked specifically with eight students, in their final year, studying to become English teachers. These student teachers were referred by ANEP since they have direct experience teaching English in secondary schools. Thus they were able to provide valuable insight regarding the content and goals to be included in the tools.

4.1.2 Instituto Normal de Enseñanza Técnica (INET)

La Comunidad Educativa del Instituto Normal de Enseñanza Técnica (the Institute of Technical Education, or “INET”), which is associated with ANEP, is dedicated to the

development of technical, vocational and computer teachers. The program, which generally takes about four years, is only offered in Montevideo, but it is currently undergoing change as it extends its course of study to other cities. Because INET will be able to serve more aspiring teachers, this extension should help to address their needs and to increase and improve productivity and professionalism. This process aims at finding the nexus of technology and the development of educators, paying special attention to the potential that this relationship will have in the country in the near future. INET operates according to the philosophy that “doing-thinking-redoing-rethinking” generates the opportunities for research that, in the educational arena, promotes the vision of an integrative and integrated system that broadens typical academic activities.^{li}

Within INET, the iSTEP 2011 team worked with 12 student teachers in their final year of study. This group was chosen by ANEP because they also have practical experience, as they all work in secondary and/or vocational schools already. The INET cohort was especially helpful during the research process, via the needs assessment focus groups, and the testing process.

4.2 Liceo 39

Liceo 39 is a high school located in a marginalized community called Piedras Blancas (White Rocks) on the outskirts of Montevideo. The school has over 1,000 students that attend morning, afternoon and evening shifts in order to accommodate the large number of students. All Uruguayan secondary students have to pass 5 of the 13 subjects they study in order to move on to the next school year. English is one of the subjects, which students take four times a week for 45 minutes each session. At Liceo 39, there are six English teachers and a mentor who oversees the English curriculum at this and 10 other secondary schools.



Fig 14: Liceo 39

Since 2009, students at Liceo 39 have been receiving their XO laptops through Plan Ceibal. However, there have been some problems with the laptops. As the team learned during our needs assessment interviews and focus groups (explained in the next section of this report), only half of the students have a functioning XO laptop and very few teachers have had formal training on how to integrate it into the curriculum. Additional challenges include unreliable internet and only one electrical outlet per classroom. This makes charging the laptops, which have a two hour battery life, difficult during school hours. Lastly, since teachers are not well prepared to use the XO laptop during their lessons, the laptop is often regarded as a distraction as the students mainly use it for social reasons. These are the challenges iSTEP considered in designing and developing the three technology projects, especially the OCT.¹

¹ Information gathered through needs assessment and interview processes.

4.3 Continuation After Internship Ends

The end of the iSTEP internship signifies changes in the relationship between partners. Before and during the internship, communication between the partners was more structured, and post-internship the communication will occur as needed. For example, before and during the internship, TechBridgeWorld and ANEP partners communicated weekly, and sometimes daily, to discuss progress and updates regarding the planning and implementation of the projects. The iSTEP team met weekly with ANEP to discuss their ongoing work and any project needs. Post-internship, the interns are no longer involved, but communication avenues remain open between contacts from TechBridgeWorld and ANEP. Based on the outcomes of the iSTEP 2011 team's work, TechBridgeWorld and ANEP will determine what next steps are possible to continue the projects.

5. Needs Assessment

This internship was intended to develop tools specially tailored to the needs of students and teachers in Uruguay. The team initiated the needs assessment phase when they arrived in Montevideo to gain firsthand knowledge of what was necessary to improve English literacy in Uruguay for the targeted communities.

The main focus of this phase was to determine the challenges and problems facing ANEP, teachers, and students in three distinct areas: (1) overall education in Uruguay, (2) English literacy, and (3) ICTD. These results helped to shape the design and development of the three technology projects.

5.1 Methodology

The iSTEP team conducted field research to identify the needs of the different stakeholders. The techniques used were more qualitative than quantitative as focus groups and interviews were heavily utilized. A total of nine focus groups and three interviews were conducted, mostly concentrating on teachers and administrators.

Through the interviews and focus groups, the team sought information on education in Uruguay, English literacy, the use of technology and Plan Ceibal.



Fig 15: Liceo 39 students taking the survey

In addition, the team surveyed 52 students enrolled in Liceo 39 to discover more about their technology usage, including mobile phones, computers and the internet. The surveys were filled out voluntarily by the students. The sample was not randomly selected and thus, the results cannot be extended to all students at the secondary level across Uruguay. However, they can provide good information about the habits and trends of students at Liceo 39.

5.2 Participants Description

Research participants represented one of five different groups:

- 1) Students from Liceo 39
- 2) English teachers at Liceo 39
- 3) English student teachers from IPA
- 4) Informatics student teachers from INET
- 5) Officials from ANEP

The students of Liceo 39 were in the 3rd level in secondary school, which is equivalent to 8th grade in the USA school system. They ranged from 14 to 18 years old, with most between

14 to 15 years old. Four mixed gender focus groups with 19 total participants and two single-gendered focus groups with a total of eight students were conducted. A total of 27 students took part in the focus groups. Those same 27 students plus an additional 25 students (52 in total) completed a survey about their technology habits. The survey population was neither randomly selected nor representative of all the 3rd grade students of secondary school from Uruguay; however it still provided insight for the iSTEP team to understand the technology patterns of the target population.

Three 3rd grade English teachers at Liceo 39 were interviewed and eight representatives from the IPA student teacher group participated in a focus group. The IPA student teachers were in their last year of a program that combines their studies with teaching English at the secondary level in Montevideo. Interviews were conducted with the secondary school teachers and student teachers to learn how they teach English and any challenges they encounter as teachers. A total of 12 INET student teachers participated in two focus groups. The INET student teachers were in their last year and they combined their studies with teaching information technology at primary and secondary schools.

The team also carried out two interviews with ANEP officials. The first one was with the supervisor of the English curriculum for the secondary level in Uruguay. The second interview was with the supervisor of the English teachers for eleven schools in Montevideo, including Liceo 39. These interviews helped to establish and clarify ANEP's goals for both the English teaching curriculum and the potential role of the technology tools.

Overall, the team conducted one survey, nine focus groups and five interviews during the ten week internship.

5.3 Findings

This section focuses on reporting the situation found by the team in the field. It describes the situation from the point of view of the students, English teachers and officials that define and supervise the English curriculum. It comprises of three general topics: English literacy, use of technology in and outside of the classroom, and students' free time.

The first issue includes a lack of motivation among students and insufficient training for English teachers. Second, the choices the teachers of Liceo 39 make in organizing their time and classes are discussed. Finally, a description of what students like to do in their free time, as determined by a survey, is included. Their favorite video games, main uses of their XO's and mobile phones, and what websites they visit are also highlighted.

5.3.1 Lack of Motivation

Students in secondary school have 13 different subjects as part of their curriculum. Each class lasts for 45 minutes and the frequency depends on the subject. Officials from ANEP mentioned that one challenge in the secondary school is that students receive information from many sources because they have 13 subjects and each one is taught by a different teacher. Some students find it difficult to transition from primary school, with lessons taught by only one teacher, to secondary school where they have 13 different teachers. The

consequences are negative impacts on the attention that the students pay to the teachers, and on the motivation to learn and go to school.

ANEP officials and teachers mentioned that the main problem they face every day is students' lack of motivation. Teachers have a hard time trying to motivate the students to learn and to do better and students rarely see the connection between education and social and financial well-being. In addition, each class averages 40 students so it is hard for teachers to engage with all of them. Teachers feel classes should be smaller, especially for teaching English, with no more than 25 students per class.



Fig 16: Desks in crowded classroom

Another important aspect regarding the motivation of students is the teacher's pedagogical skill in front of the class. Students like or dislike a subject based on the teacher's personality and skills to motivate students, and not necessarily based on the curriculum. Therefore, the teacher's attitude helps to shape the student's motivation to work.

Another indicator of the lack of motivation among students is the significant difference in the number of hours that students commit each day to homework. Some students spend three hours per day, while others spend only 10 minutes. Basically, it is up to the students to decide how hard they want to work. This problem is amplified by the lack of coordination among teachers. For instance, the three English teachers for 3rd grade do not establish a plan at the beginning of the year to decide on what material to use, a schedule for teaching the students, or the lessons to teach. This creates an imbalance since the students do not study the same materials and are evaluated on different criteria. The iSTEP team is not sure if this is a common practice for all the subjects or only among the English teachers.

5.3.2 Teachers Want More Training

During the first three years of secondary school, students study English lessons for 45 minutes a day, four times a week. In the last three years, students have English class only three times a week.

Due to large class size, the education system has not been able to keep up with the increasing demand for math and English teachers. A priority for ANEP is to train more teachers for the future but the current plan is to increase the workload for the English teachers. For instance, each of the English teachers at Liceo 39 taught on average seven classes, each class with 40 students, equating to 280 students per teacher.

A problem with this high demand is that not all of the English teachers are prepared to teach and some do not even have a teacher training degree. English teachers often lack pedagogical and English language skills. Even those with a degree rarely receive additional training from ANEP. There are workshops and seminars organized for English teachers but few attend because of the high cost.

In an attempt to fix the deficiency of English taught in the schools, and to guarantee a minimum standard for all the students, ANEP created a new position in 2008 called Professor Articulador Departamental (Teacher Mentor Program, or “PAD”). PADs are mentors for the English teachers. Each PAD supervises the English departments in approximately 10 secondary schools. One of their responsibilities includes at least one classroom observation per teacher each year. After the review, the PAD makes suggestions to help the English teacher improve. Furthermore, most of the suggestions are related to pedagogical capabilities and not with language skills.

5.3.3 English Curriculum Adaptability

The Uruguayan teachers we worked with said the English curriculum is flexible and they have a high degree of freedom to modify and adapt it based on student need. The core curriculum is based on the book “Uruguayan Focus,” which includes a textbook, a CD for listening activities used by the teachers, and an exercise workbook. While teachers are required to use it they can also create their own materials depending on the class.

However, the iSTEP team found a great discrepancy in the frequency of use of these materials by the teachers. For example, one English teacher used it 70% of the time in class but another teacher only used it 30% of the time. Some of the outside materials Liceo 39 teachers bring into the classroom include popular songs, videos, and their own exercises for reading comprehension and fill-in-the-blanks. They do not need any authorization when deciding which materials to teach.

The teachers mentioned that they make the decision of which materials to use based on the needs of the classroom and the English level of the students. The iSTEP team realized that this divergence was found even in two different classrooms taught by the same teacher.

5.3.4 The Chalkboard Plays an Important Role in the Classroom

Another common practice is to write exercises on the chalkboard. The students copy these exercises into their notebooks and answer them during the class. Sometimes, the teacher collects the work to grade them at home.

Given the large number of students that each English teacher works with, it is very difficult for the teacher to collect the class exercises and take them home to grade. Thus, it is common that the teacher walks by and checks a student’s notebooks directly. As a result, the teacher spends time grading exercises during class.



Fig 17: Student workbooks

In the interviews, the Liceo 39 teachers mentioned that they would save time if they could distribute those exercises as photocopies. However, they do not receive free photocopying; if they want to make photocopies, they have to pay for it. When giving tests, teachers ask the students if they can afford to pay for the photocopies or not. If the students cannot afford the photocopies, then the teachers pay for the photocopies from their own pocket. The teachers affirmed that this is a common practice at public schools in Uruguay.

5.3.5 Large Class Size and Heavy Work Load

As mentioned previously, English teachers have many students and it is very difficult to prepare and grade homework daily for all 280 students. Teachers mentioned that they assign homework on average two or three times per week. The students pointed out that the English homework is easy to do and does not take longer than 15 minutes. The iSTEP team thinks that given the hard conditions teachers face each day, it is difficult for them to prepare long and challenging assignments because it is infeasible for teachers to both prepare and grade assignments.

Two other consequences of the large number of students per classroom are the limited opportunities to practice and speak English. Students have fewer opportunities to practice because teachers do not have time to grade 280 essays. Also, it is difficult to arrange speaking activities in front of a class of 40 students since some students are too shy to speak in front of their classmates. To motivate the students to speak in English, teachers organize a few activities where the students present a song or describe celebrities in front of the class. Otherwise, the most common method is that the teacher mostly speaks in English. The students usually address the teacher in Spanish.

Students practice English reading comprehension, writing and listening more than speaking. According to Liceo 39 teachers, students have the hardest time in writing, speaking, listening, and reading, in that order.

Students are weak in speaking English not only because they lack practice, but also because they are not used to listening to native speakers. The English teachers are not native speakers and most of them usually have an accent when speaking English. It is also common for non-native speakers to also make mistakes when they speak. Furthermore, English teachers hardly have opportunity to practice their English in other areas outside of the classroom. Teachers tend to repeat the same mistakes over the years and are usually the ones reading paragraphs for in-class listening activities. This limits the exposure students have to hearing native English speakers and impedes their ability to understand spoken English. In addition, the English teachers do not speak solely in English during class time and even when they do, some students have a hard time understanding them.

5.3.6 XO Laptops are Not Integrated

The XO laptop is not integrated as a tool in daily classroom activities for two main reasons: teachers do not ask their students to bring their laptops to the school and students do not bring their laptops on their own. Many students choose not to bring them because of the slow internet speed, lack of electrical outlets, or because they are broken.

The main problem for teachers is the lack of support and training from ANEP on how to incorporate the laptops into the curriculum. In general, ANEP officials and teachers agree that teachers are not prepared to work with the computers and cannot be forced to do so. Also, teachers do not have XO laptops and do not know how to use them, further limiting their ability to integrate the laptops with the curriculum. As part of Plan Ceibal, primary school teachers are now receiving XOs. Nonetheless, secondary school teachers still lack XO

laptops. According to Plan Ceibal, secondary teachers should receive the laptops in the near future.

Students at Liceo 39 mentioned that the network of Plan Ceibal, which provides internet access to the XO laptops at the school, can only connect up to 40 computers. If more users try to connect, the network crashes and internet connection is lost. Fig 18 shows the main uses of the computers by the students. Students primarily use their XO laptops for accessing the internet (61% of respondents). The second most popular use is to listen to music (52%). Therefore, some students choose not to bring their laptops to school because they cannot connect to the internet and they are not permitted to listen to music in the classroom.

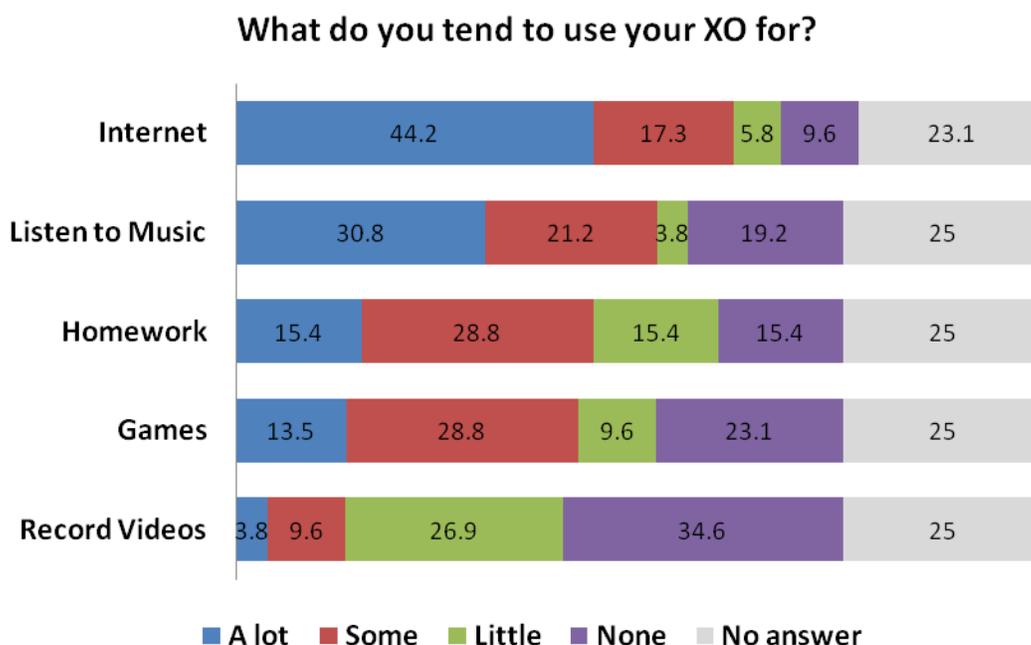


Fig 18: Student use of XO laptops

In addition to the slow internet speed, there is only one power outlet per classroom, which makes it difficult to charge all of the students' laptops. The XO laptop's battery life is about two hours and at Liceo 39, the students must share the outlet. Normally, students who bring their laptop to school have charged the battery in advance. They stop using it when their battery runs out because they cannot recharge.

Other students do not take the laptops to school because they are broken or blocked. A security measure established by Plan Ceibal to avoid laptop theft involves logging into the Plan Ceibal network at least once per month. If this is not done, the laptop is blocked and cannot be used. In order to unblock the laptop, the user has to access Plan Ceibal from another computer, download a file with a list of the laptops reported as robbed, and install that file, which makes sure that the computer IP address was not reported as stolen. This time consuming process is challenging for students to complete and results in laptops staying blocked and unusable.

As established by Plan Ceibal, every primary and secondary student should have an XO laptop. However, from the focus groups and interviews, the iSTEP 2011 team realized that this is not the case at Liceo 39. For instance, according to the Informatics teacher of Liceo 39 and the students of INET, in a classroom of 40 students, on average only 15 have functioning laptops; the rest are broken or blocked. The most common failures of the XO laptops are broken chargers and damaged screens. Furthermore, many XO laptops at Liceo 39 are blocked.

As a result, students rarely use their laptops in the classroom for educational purposes and many teachers do not permit them in their classroom. For those English teachers who have tried to integrate the laptops, they have only asked students to write short essays or search for information online. When completing these tasks in groups of two or three, the teacher walks around and checks the work on the screens.

5.3.7 Students on the Internet

As shown in Fig 19 below, the most visited website is Facebook (69% of respondents). In addition, 88% of those respondents had a Facebook account.

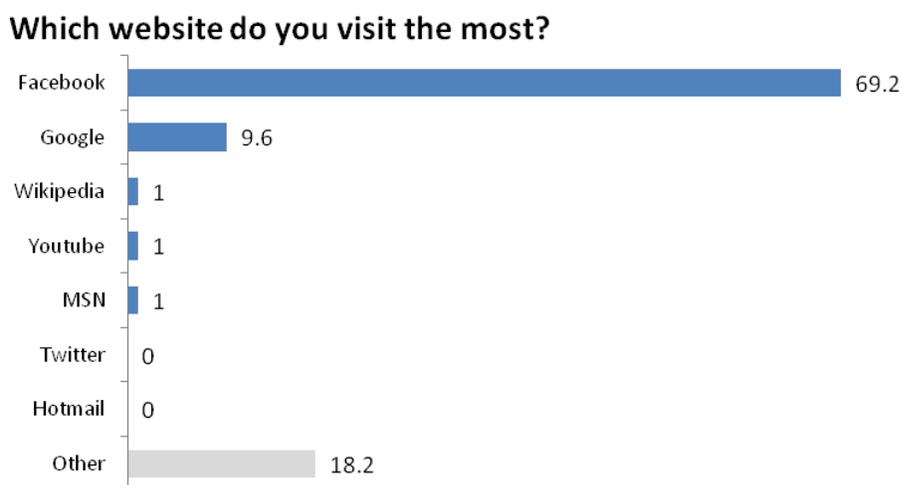


Fig 19: Most popular website

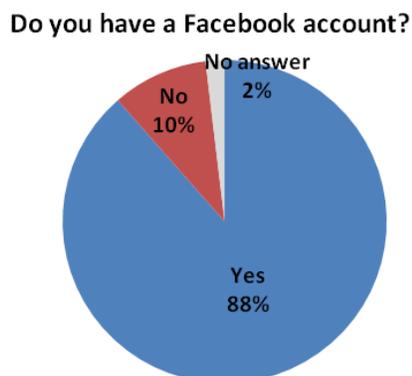


Fig 20: Facebook account holders

56% of the surveyed students log on to Facebook every day and 25% log on three to four times a week. In the focus groups, the students mentioned that they spend one to four hours each day on Facebook. They log on mainly to chat, upload pictures and to play games such as CityVille. Furthermore, Liceo 39 students have five minutes between each class and like to check Facebook or emails during their break between classes.

5.3.8 Student Gaming Habits

During their free time, students mentioned they liked to watch TV, surf the internet, chat with other friends and play football. When asked about video games, they distinguished between games on the computer and games on PlayStation or Xbox. Their favorite computer games were the Sims and Counter-Strike. The Sims is a reality based 3D game which allows users to form characters and take control of their daily lives. Counter-Strike is a first-person shooter game which is a battle of two teams, one of terrorists and one of counter-terrorists. The students even suggested that a tool similar to the Sims would be a fun way to practice English. Their favorite console games were Need for Speed, a popular car racing game, and Pro Soccer Evolution, a football game where players can choose teams and play in matches and tournaments.

The iSTEP team asked the respondents about their mobile phone use. Most of the students have a mobile phone, but they rarely use it for gaming. Fig 21 shows students' main uses of mobile phones. The students surveyed primarily use their mobile phones for texting or listening to music. They only play games on the mobile phone when they are bored. Furthermore, they preferred to play high end games.

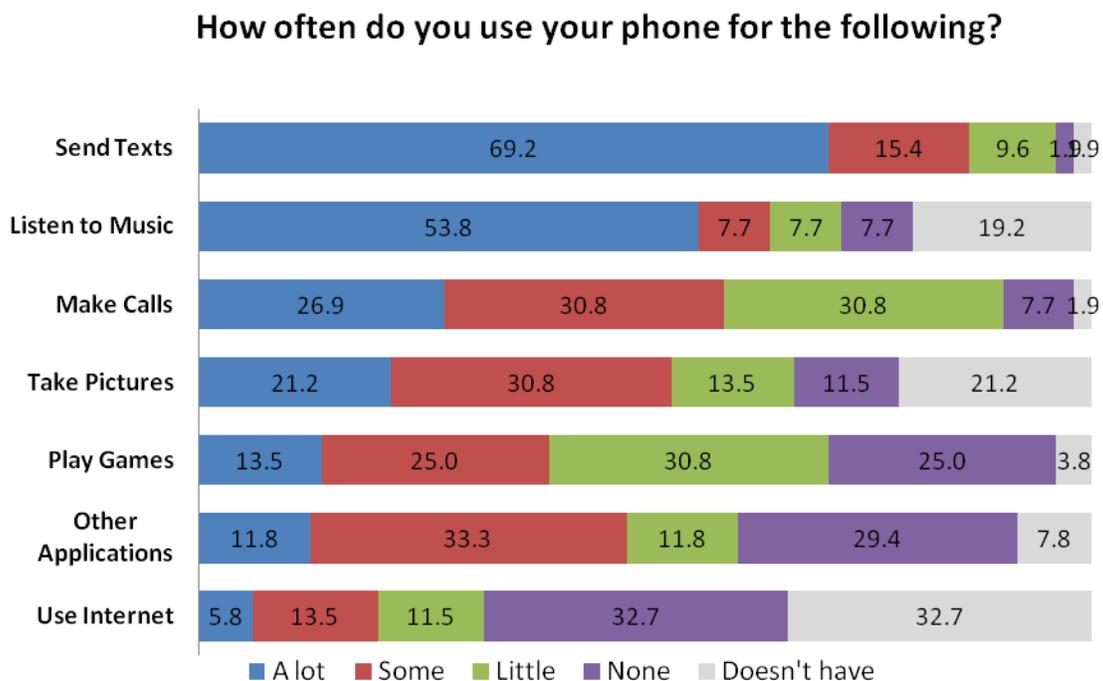


Fig 21: Student use of mobile phones

5.4 Needs Assessment Conclusion

In general, the iSTEP 2011 team believes there is a vast potential for the XO laptops to be used for academic purposes. Some problems, like the lack of power outlets and slow internet speed, are already being addressed by authorities and will eventually be solved. However, problems such as shortage of English language teachers and the large number of students per classroom are difficult to solve in the short term. Therefore, the challenge of the tools developed by the iSTEP team is to confront these problems from a different perspective and provide tools that will allow teachers to give more personalized attention to students while also making their workload manageable.

Regarding the students' free time, the iSTEP team realized that the majority of students do not play games very often on mobile phones. They prefer to play games on the computer and on consoles such as Microsoft's Xbox and Sony's PlayStation.

Furthermore, the vast majority of students have an XO laptop, even if they do not bring it to class, and use it to log on the internet, mainly to visit Facebook. The students who have a Facebook account spend on average between one to four hours every time they log on. They like to chat, upload pictures, write status updates, and sometimes play games.

Based on the information gathered from the needs assessment, the iSTEP 2011 team, in collaboration with ANEP, adapted the three technological tools that TechBridgeWorld had previously agreed upon with ANEP, to improve English literacy at the secondary level. The team learned that Facebook represented an opportunity to engage students in learning English. The purposes of the technological tools were to provide incentives for students to practice their English, reduce the workload of the teachers, better manage class time and personalize the content based on a student's English ability. A priority for ANEP was to increase the use of the XO laptops in the classroom for academic purposes. Another important feature was ensuring the tools support audio files in order to provide students with the opportunity to hear native English speakers talking.

In order to address these problems, the team recognized the critical need for appropriate and correct content for the tools. The team worked with IPA student teachers and the Liceo 39 English teachers to define the thematic units, types of exercises and content for those exercises. The teachers decided to work on two thematic units: sports and nutrition. The iSTEP 2011 team met three times with the Liceo 39 English teachers and IPA student teachers to create the content for those units. In total, they organized the exercises by difficulty level (easy, intermediate and difficult) and created a pool of English exercises for the tools.

6. One Laptop Per Child Tool

The goal of the One Laptop Per Child (OLPC) Tool (OCT) was to create an English literacy tool that could be used on the OLPC. In addition to the OLPC, relevant technologies include internet accessibility and the availability of personal and public computers.

6.1 Background Information

The OCT provides an interface for students to complete assignments and receive feedback on their OLPC XO laptops. Students are able to receive assignments created by teachers, complete those assignments, view their results, see how their answers compare with the correct answers, and submit the completed assignment to the teacher.

The OCT was designed to eliminate the time-consuming task of distributing assignments to students and to provide several innovative question types to help develop English literacy skills. As teachers mentioned in their interviews, they spend a lot of time writing assignments and questions on the chalkboard for students to copy. They also spend a lot of time grading each assignment. With the OCT, teachers can create one assignment using the CAT which each student can then import to their computer, complete, and export back to the teacher. The OCT also grades the assignment, saving the teacher time. The OCT and CAT provide several question types, including listening comprehension, to allow for more interactive learning and practice.

6.2 Literature Review

A literature review of similar projects was performed to learn about other educational tools. Unlike the other projects for the XO laptops, the OCT aims to provide an interface for completing assignments provided by teachers. Research showed most applications for XOs are games for learning, whereas the OCT is not meant to be a game but a mechanism for students to complete assignments created by teachers. As this assignment completion requirement has not been done before, the OCT fills a unique curriculum gap for ANEP and the Uruguayan school system.

6.2.1 Game Authoring Tool: Gatelock Project ^{lii}

Gatelock is a game authoring tool for educational learning that can be played on OLPC. The tool was implemented and tested in Malaysia as part of the major efforts that Malaysia's Ministry of Education is spending in integrating the modern technology in teaching. Gatelock was designed to help children aged between 9 and 12 learn programming in schools. The tool design was based on three contexts: programming context, computer game context, and game design context. The programming context aims to shape the children's programming thinking by learning skills related to mechanisms and behaviors. In the computer game context children will learn about the game topic and rules while they are creating the game. In the game design context children use the basic elements of project management such as planning, designing, building, testing and redesigning the game.

The tool was tested for usability and fun evaluation and testing was conducted with five children from different schools. The students were aged between 9 and 12, three boys and two girls. The test aimed to measure the effectiveness, efficiency and satisfaction of children. The results of the test indicated several usability problems that were used to redesign the tool. The following were the high-ranked usability problems:

1. The children did not pay attention to navigation buttons, so the buttons need to be more prominent.
2. The children were confused by different modes of operations (object-action-object model).
3. The children frequently clicked on objects and expected something to happen.
4. The labels, iconic layout and interface design have to be clearer for a better understanding.



Fig 22: Gatelock game designed by a nine year old child

6.2.2 eToy: a Collaborative Environment through OLPC's activity Sharing^{liii}

eToy is a collaboration and communication medium for OLPC. Squeak eToy is a modern, open source implementation for the SmallTalk programming language. Squeak environment is a simple framework for the easy development and debugging of new educational software such as multimedia applications, educational platforms and commercial Web applications. The framework is OS and hardware independent, provided with a portable cross-platform code. To allow collaboration and communication between OLPCs, eToy uses the peer-to-peer mesh network available on OLPCs.

eToy's environment enables the user to access two tabs: (1) the navigation tab used to manage files and (2) the supplies tab to manage base objects that the user can start the development with. Programming in eToys is based on the drag and drop method. The supplies tab has options for tools that can be applied to objects such as copy, debug, pick color, move, resize and rotate.

eToy activity sharing architecture is based on the OLPC network feature and it can be separated into two basic categories; programming tools that are offered by Sugar (the OS of OLPC) and networking of OLPC.

The following educational software is used with eToy.

Numeric Crossword

The numerical crossword (mathematics) is educational software designed for students to learn the basic numerical operations between integers. The crossword game is shown in Fig 23. It consists of numbers, operations and empty spaces. The students have to solve the horizontal and vertical equations by filling all the empty spaces with the correct answers. The crossword game helps students to improve their skills on mathematics while the teacher can test the weaknesses of the students on specific operations. The application can be more effective by supporting more operations while numbers can be even decimal fractions.

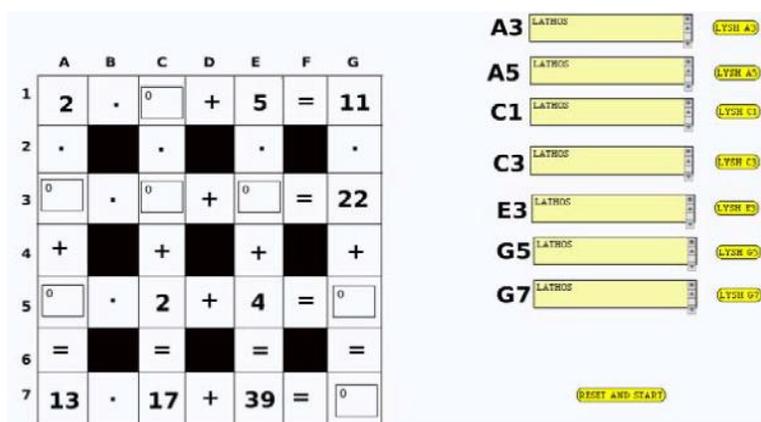


Fig 23: Numeric Crossword

Pressure and Temperature

The Pressure and Temperature (physics) is educational software that simulates the correlation between temperature and pressure that can be observed to the molecules that are closed in a bottle. This experiment is usually done in laboratories, but since some schools do not have one due to lack of rooms or materials, it can be replaced through computers. As shown in Fig 24, the software shows the movement of the air molecules within a closed bottle when we modify the pressure or the temperature inside it.

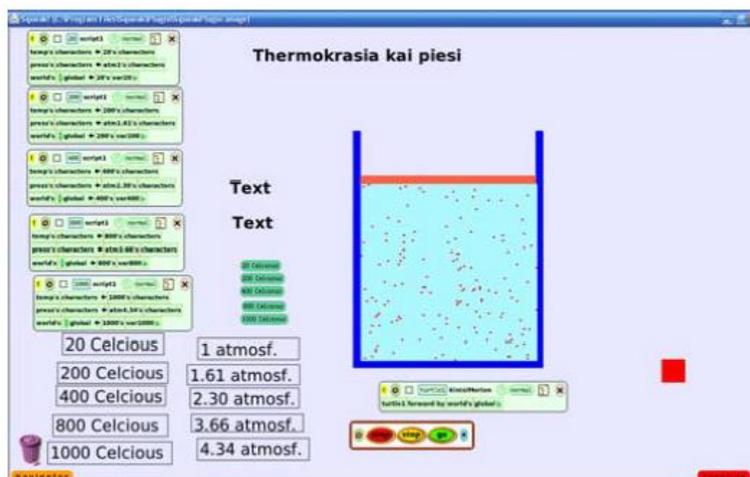


Fig 24: Pressure and Temperature

Chemistry Tetris

Chemistry Tetris is a software game that helps students to learn some elements of chemistry and more specifically the state of some chemical combinations. As shown in Fig 25, the combinations of elements are falling on the screen while the student has to decide if the combination is in liquid or gas form while being in ordinary condition. This game can be further enhanced by supporting a series of chemical combinations as the basic application that is created supports three chemical combinations.

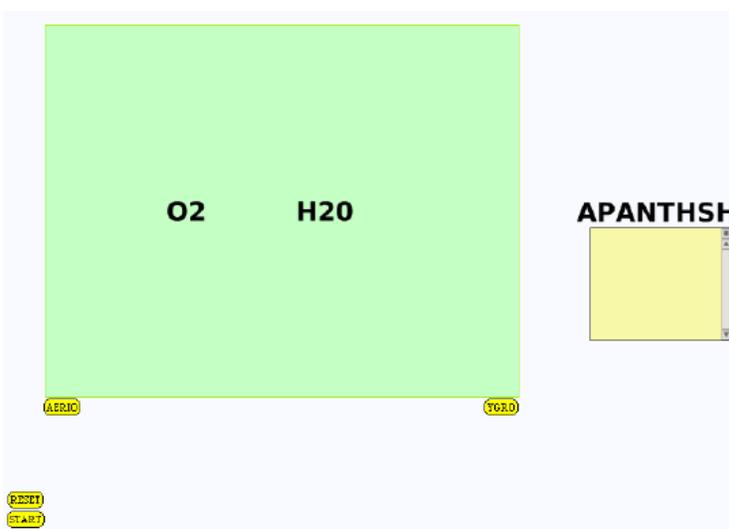


Fig 25: Chemistry Tetris

6.2.3 Simulations, Games, and Learning^{liv}

Games can be very effective in learning, but the right game has to be selected for the right curriculum or educational content. Some common categories of games are:

1. Adventure games (where the player moves through a virtual world)
2. Puzzle games (such as Tetris)

3. Role-playing games (where the player assumes the role of a person or creature, such as Dungeons and Dragons)
4. Strategy games (such as The Sims, where a player's strategy drives the game.
5. Sports games: such as golf or football)
6. First-person shooter games

Games have many attributes that are associated with how people learn. The details of each attribute of games are listed below:

1. Social. Games are social environments that involve large distributed communities. The social life around the game carries the game's meaning, its value, and its social and cultural impact.
2. Research. Once the player enters the game, he/she must immediately recall prior learning, decide what new information is needed, and apply it to the new situation.
3. Problem solving. Knowing what information or techniques to apply in which situations.
4. Transfer. Games require transfer of learning from life, school, and other games. Connecting and transferring existing learning to a unique situation is an important part of the game.
5. Experiential. Games are experimental. Players engage in multiple senses. For each action, there is a reaction. Feedback is swift. Hypotheses are tested, and users learn from the results.

Before integrating games into the curriculum, it's important to understand what types of games help get the desired learning outcome. For example:

1. Card games (help to promote memorization, concept matching, and pattern recognition)
2. Jeopardy-style games (help to encourage quick mobilization of facts, labels, and concrete concepts)
3. Arcade-style games (are good for improving speed of response, automaticity, and visual processing)
4. Adventure games (are useful for promoting hypothesis testing and problem solving)

6.2.4 Student Modeling Engaging OLPC Gaming: Hangman Game^{lv}

A visual representation of the Hangman game was designed and implemented as an educational game to assist student's comprehension on a given topic. The game was developed in Python-PyGTK of the sugar environment for the OLPC and it accepts multiple players. The game was designed for Elementary and Secondary level education with two different approaches with student Models. The student Model theory is illustrated in Fig 26. As shown in the model below the learner's knowledge at any point is considered as a subset of an expert's knowledge. The game aims to make students acquire an additional part of knowledge till eventually they reach the desired result, which is the expert's knowledge. This theory is used to evaluate the students' progress as they play the game and it uses the history of the player's scores and attempts stored in his/her profile.

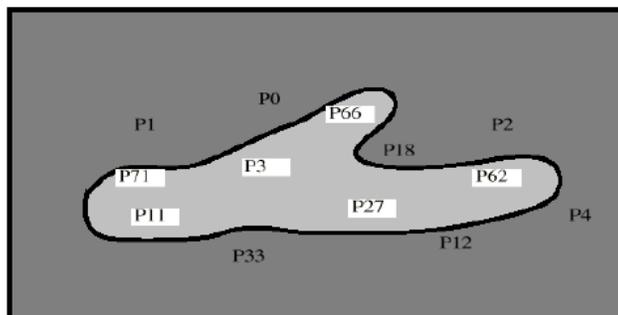


Fig 26: Student Model

To start the “Hangman” game, the player has to choose a thematic category (i.e Geography) from which a “winging word” is selected. Then, the player will try to guess the word (e.g. Himalaya). The number of letters of the word is represented by dashes. The game offers an additional aid for the player, which is the description of the word concept. If a correct letter is entered, then the dashes will be replaced by the letter. The player has six attempts and if he/she used all of them without identifying the word, then the game will end unsuccessfully and a full sketch of a hanged man is drawn. The game is shown in Fig 27.



Fig 27: Start screen of Hangman game

6.2.5 CPXO: Classroom Presenter for the OLPC XO-1 Laptop^{lvi}

The CPXO is educational software that enables teachers to more easily integrate the XO laptop into their existing curricula. The CPXO project aims enhance the educational value of the XO in the classroom context. It allows teachers to distribute and collect information in a classroom context using several XO laptops using the XO’s built-in peer-to-peer mesh network. The project is designed as an “activity” and the collaborative features are supported by the XO’s Sugar operating system.

Consider the following scenario of use of CPXO software in a classroom with one instructor and many students, each of whom has an XO laptop. The instructor uses CPXO to create a presentation (slide show) that has the educational material. Then, the instructor loads the presentation and distributes it to each student's XO in the classroom. After receiving the presentation slides, the student can add individual notes and annotations, called "ink". After adding notes, a student can send the file back to the instructor to review it and add some notes then send them back to the student. This scenario is illustrated in Fig 28.

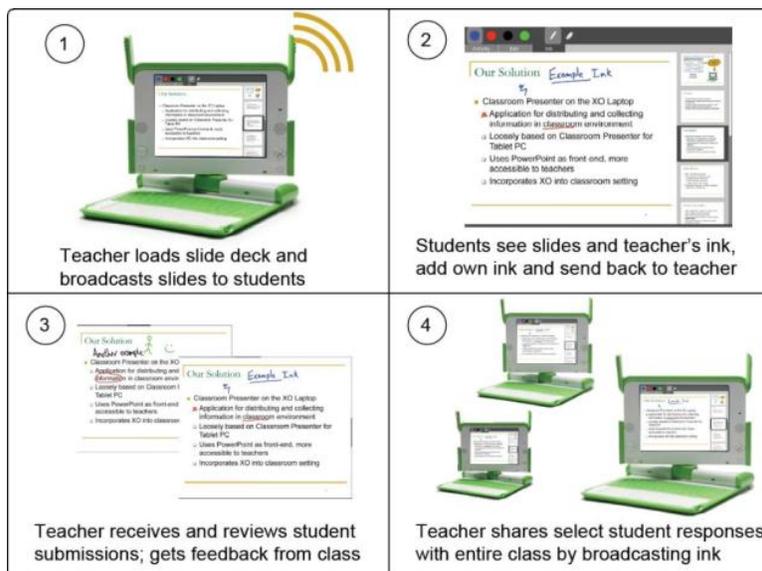


Fig 28: Example scenario of CPXO

6.2.6 Physics Simulation Game: Educational Software for the XO Computer for Use in Nepal

The members of OLPC Nepal have expressed interest in an open source physics simulation game to help students gain an intuitive understanding of basic physics. The project aimed to create the game for children to use on the laptop.

Bridge Builder is a simple bridge simulator. The player must create a bridge to get a train from one side to the other given a budget and a gap. The player can test the design by running the train over the bridge. The bridge will break if the strain put on the beams is beyond a specific threshold. The player is given multiple attempts to get the train to the other side and complete the level. The user can also view the stress on individual beams and thus observe the distribution of the load. This gives the user a decent qualitative view of how structures should behave. This scenario is illustrated in Fig 29 below.

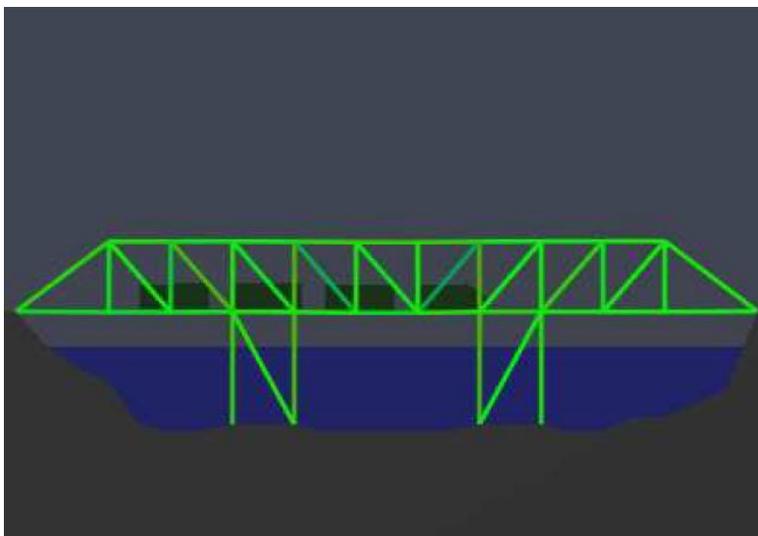


Fig 29: An example Bridge Builder activity

Armadillo Run is a more complex physics simulation game. The goal of the game is to get an armadillo from one point to another point on the field of play on a budget. The game increases the variety of play changing the start and end positions over the field of play. For example, the armadillo may start at the bottom and end at the top of the field of play. The player must overcome the pull of gravity and stop at the top. The game also provides a variety of realistic materials with different respective prices and physical attributes. Some of the materials can even be placed under variable compression or be set to break after a user defined time delay. This increases the variety of possible solutions and encourages individual experimentation for an optimal solution. This scenario is illustrated in Fig 30.

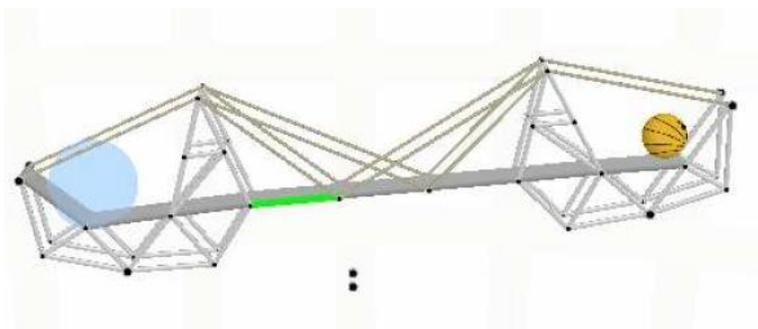


Fig 30: An Armadillo Run activity

6.2.7 Mine Risk Education Game for OLPC^{lviii}

The Mine Risk Education (MRE) game was designed for the OLPC platform to teach Cambodian children the indicators of mine and unexploded ordnance (UXO) contamination through interactive play. The MRE game is a result of the partnership between the Golden West Humanitarian Foundation and Michigan State University M.I.N.D. Lab.

6.3 Technology Used

The OCT was designed as a native application for the Sugar operating system on the OLPC XO laptops. The OCT was designed this way so the tool can function with or without the internet. This was a crucial point for development because internet in both the schools and at a student's home may not be reliable so students must be able to do work in both situations.

The OCT has several components that make it useful for students on the XO laptops. It can import files from and export files to anywhere on the XO laptop. This feature allows file transfers from USB drives and from internet sources. A second benefit of the OCT is that its interface allows students to complete assignments and view their scores. The communication protocol allows assignments produced by the CAT, another iSTEP tool, to be read by the OCT. As a result, compatibility between both tools is ensured. The final component of the tool is a single-user database that stores all assignments, scores, and questions. Students can keep track of his or her progress using this feature and can work on assignments over a longer period of time if needed.

The interface was designed using PyGTK, which is a set of Python graphical user interface classes. The backend is built using Python to access a SQLite database, which stores all the questions and assignments for the student.

6.4 Implementation

The main features of the OCT are importing and exporting assignments, assignment completion and grading, and supporting question types from the CAT. The main feature of the OCT is assignment completion and all steps that are involved in that process, as outlined below.

6.4.1 Assignment Screen

The first screen the student encounters in the assignment completion section is the assignment screen. It lists their available incomplete assignments and complete assignments. It also allows the student to import a new assignment, review old assignments, view grades, and complete an assignment (Fig 31).

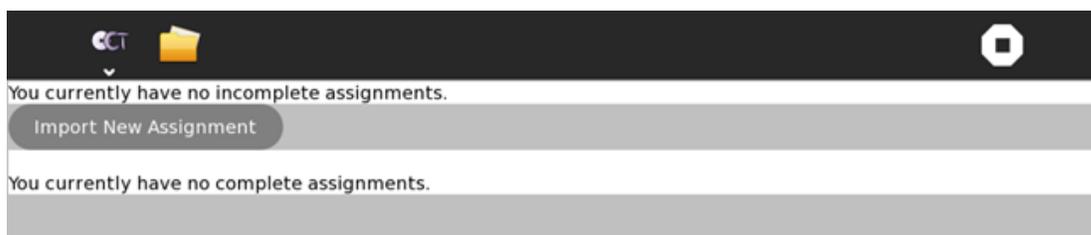


Fig 31: OCT assignment screen with no assignments

6.4.2 Importing/Exporting Assignments and Assignment Format

Importing an assignment is the first step a student will take in completing an assignment. Selection of a file to import was implemented using a PyGTK widget for file selection; it allows for importing an assignment from anywhere on the computer, including a USB drive.

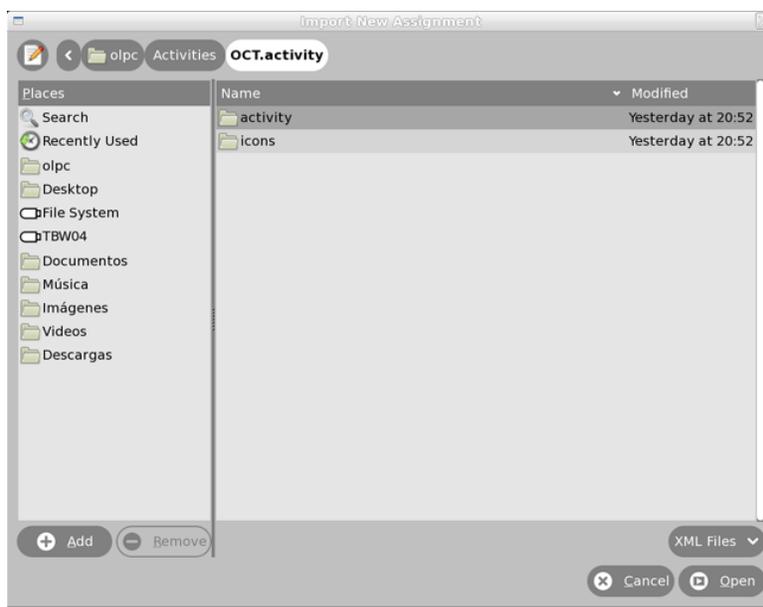


Fig 32: File import screen

The application asks the student to select a file. All assignment files from the CAT are produced in XML form which has specific tags to specify different questions and how they should be interpreted by the OCT. When an assignment is imported, the application reads through the XML file.

Using the Python xml.dom library the application parses the file. When it encounters an image or sound file, the OCT assumes it is in the same folder as the assignment XML document. It imports this file to the root activity directory for future use by the application.

All questions are read into a class, either `Mult_Choice_Question()` or `Fill_Blank_Question()`. All fields, namely level, theme, skill, question, answer, answer options, image, and sound are populated. Then this class is entered into the question table, where each question is stored along with an assignment ID, to identify from which assignment this question came.

Table 2: Structure of the OCT database and tables

Table Name	Description	Table Structure
assns	Assignments	id (integer, primary key) – <i>assignment id</i> name (text) – <i>assignment name</i> complete (integer) – <i>integer (0/1) to represent if the assignment is finished</i> total_qs (integer) – <i>total number of questions in the assignment</i> qs_right (integer) – <i>number of questions answered correctly by student</i>
mqs	Multiple choice Questions	id (integer, primary key) – <i>question id</i>

		assnid (integer) – <i>id of the assignment this question belongs to</i> qs (text) – <i>question text</i> answer (varchar) – <i>question answer</i> response (varchar) – <i>student response to question</i> level (text) – <i>question level</i> theme (text) – <i>question theme</i> skill (text) – <i>question skill</i> opt1 (varchar) – <i>answer option 1</i> opt2 (varchar) – <i>answer option 2</i> opt3 (varchar) – <i>answer option 3</i> opt4 (varchar) – <i>answer option 4</i> opt5 (varchar) – <i>answer option 5</i> opt6 (varchar) – <i>answer option 6</i> img (text) – <i>image file name</i> sound (text) – <i>sound file name</i>
fbs	Fill in the blank Questions	id (integer, primary key) – <i>question id</i> assnid (integer) – <i>id of the assignment this question belongs to</i> qs (text) – <i>question text</i> answer (varchar) – <i>question answer</i> response (varchar) – <i>student response to question</i> level (text) – <i>question level</i> theme (text) – <i>question theme</i> skill (text) – <i>question skill</i> img (text) – <i>image file name</i> sound (text) – <i>sound file name</i>

After importing a file is complete, the OCT returns to the assignment screen. However, the new assignment is now listed and available for the student to complete.

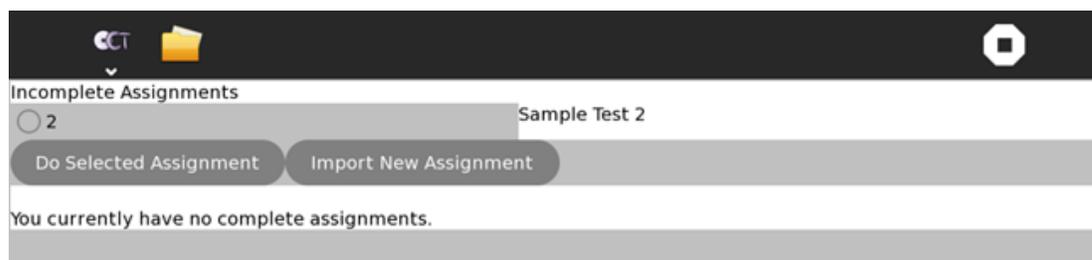


Fig 33: OCT Assignments Screen with one assignment

For exporting a file, the first step is the student chooses an assignment to export and a folder to which to export. The screen to choose a folder uses the same PyGTK FileChooserWidget that the import screen used, except it only allows for folder selection, not XML file selection. Once the student has selected a folder, all questions with the assignment ID to be exported are retrieved from the database.

Once the questions have been retrieved from the database, they are looped through one-by-one and put into an XML document. The name of this document is specified by the name of the computer followed by “_” followed by the assignment ID. In addition to the questions that are part of the assignment, this XML document also includes the student’s responses to each question. The XML document is saved in the location specified by the student. The OCT also adds to this XML document the number of questions the student answered

correctly and the name of the student's computer. Table 3 shows the tags added by the OCT and their descriptions.

Table 3: Tags added by the OCT

Tag Name	Description	Location in XML document
student-name	Name of the computer	Under the XML root item
questions-correct	Number of questions the student answered correctly	Under the XML root item
questiontype-resp	The response for each question the student gave	Under each individual question

6.4.3 Assignment Completion

Once a student has imported an assignment, it is available in the database. When the student selects the assignment to be completed, a new screen appears with all the questions from that assignment.

To select an assignment to complete, the student must click on the radio button next to that assignment and then click on the "Do Selected Assignment" button. A global variable is used to keep track of which radio button was selected. When the student finally clicks "Do Selected Assignment," whichever ID was last stored in that global variable is the ID used to figure out which questions need to be displayed.

Once the ID of the assignment is given, all multiple choice and fill in the blank questions associated with that assignment are retrieved from the database. Starting with multiple choice questions, each question is displayed, including any relevant media. Images are displayed using the PyGTK Image widget. Sounds are played via GTK buttons and using the MP3 decoder from the PyGST library. All questions are displayed with the PyGTK TextView widget. After displaying a question, a horizontal separator is displayed using the PyGTK HSeparator widget.

Multiple choice questions are displayed with radio buttons. When an answer is toggled by the student for a question, a global cache of answers is changed. Essentially each radio button has a callback function which changes a global dictionary. This dictionary associates multiple choice question IDs with the toggled answer. Each time a different answer is toggled, the answer associated with that question ID is changed.

Fill in the blank questions are displayed using the PyGTK Entry widget. Whenever a fill in the blank question is to be displayed, a new Entry widget is made. Then, a reference to this widget is stored in another global cache with the fill in the blank question ID as the dictionary ID. Whenever the assignment is completed, the application will retrieve the content from each Entry widget associated with a fill in the blank question and save that as the student's response to the question.



Fig 34: An example assignment displayed by the OCT

To complete an assignment, the student answers each question (or does not answer it, if they do not want to) and presses the “Finish Assignment” button at the bottom of the assignment screen. When this button is pressed, all answers are written in the response field of each question in the database. Finally, the assignment is marked as complete in the database and therefore cannot be changed again.

6.4.4 Assignment Grading and Review

After an assignment is complete, it is graded by the OCT and made available for review by the student. To grade the assignment once it is marked finished by the student, the OCT compares each student response to the correct answer initially provided for the question. Then, the tool stores the total number of questions in the assignment and the total number of questions with a correct response. The number of questions correct out of total number of questions is the grade for the assignment.

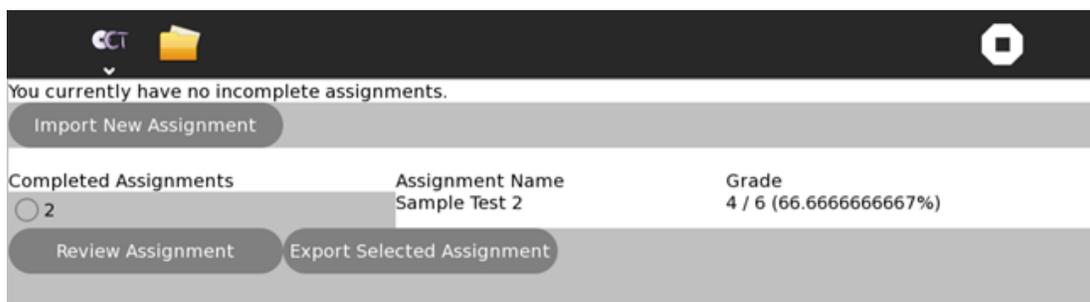


Fig 35: An example of an assignment with a grade

All complete assignments are then available for review by the student. The completed assignments have a radio button which can be toggled and that changes a global variable specifying which complete assignment can be exported or reviewed (the variable stores the ID of the assignment).

Once the student clicks the “Review Assignment” button, all questions associated with that assignment ID are pulled from the database again. The review displays the questions as they were displayed to complete the assignment. Instead of listing answer options, however, the review uses the PyGTK TextView widget to display the correct answer and the student response, so the student may compare his/her answer to the correct one. The review also displays the text “Correct!” in green or “Incorrect” in red, depending on whether the question was answered correctly or not. The review also displays all media associate with the question and the question text to ensure the student can fully understand each question and its answer.



Fig 36: An example of an OCT assignment review

Once the student has finished the review, he can click the “Finish Review” button at the bottom of the review and will be returned to the assignments screen.

6.4.5 Support for CAT Question Types

This feature ensures that the teacher tool (CAT) and the student tool (OCT) can communicate effectively. The question types currently support by the OCT are as follows:

1. Multiple choice (with/without images, with/without sound). There is one question in which the student selects from several answers.
2. Fill in the blank (with/without images, with/without sound). The student must complete a sentence with a word to make the sentence correct. Unlike a multiple choice question, there are no answers to choose from.

6.5 Results

Two testing days with students of Liceo 39 for the OCT were held a week apart. Each day had 2 sessions with 14 students in the first and 21 in the second. In total there were 4 sessions with 35 students.

The testing sessions were generally intended to establish that the OCT could function on all students' laptops and did not have any major failures. The first session tested the process of installing the OCT on the XO laptops, importing an assignment from a USB drive, completing that assignment, and exporting that assignment to a USB drive. The second day ensured grading was correct and students could view their score. Therefore, each student installed the OCT again on their XO laptops, imported an assignment from a USB drive, completed the assignment, and viewed the grade. The testing days also worked to guarantee all questions could be displayed properly and the design of the graphical user interface was intuitive and pleasing to students.

The only failures during the testing sessions occurred on the first day. The first failure was loading the images from the USB drive and the second was exporting the file to the USB drive. Overall, the functionality worked well and all students could complete the task at hand, which was completing an assignment. However, minor bugs were revealed:

1. Students could name their laptops with characters that were not viable file names.
2. The tool could not import the assignment if the folder had a space in the name.

Students were then asked to complete a survey regarding their opinion of the OCT. They were asked questions such as whether they liked the interface and how they liked doing an assignment on the computer, and to rate how easy or hard the OCT was to use.

Overall, most of the students liked completing the assignments on the computer more than doing them on paper. Only two students preferred paper. Students listed reasons such as it was faster and easier on the computer. Students, however, suggested the following changes to the tool:

1. More color, sounds, and a larger font.
2. More detailed instructions with how to complete each type of question.
3. Ability to review an assignment.

Part of the first (sound) and the third suggestions were addressed after the testing sessions and included in the implementation of the OCT. Listening comprehension questions were added to the types of questions supported by the OCT. Colors, however, will have to be added in with future versions. Being able to review an assignment with the student's answers and the correct answer was also added. Previously, there had been no ability to

review or view how well the student did on an assignment. Font size and the second suggestion have not been addressed but could be in further development of the tool.

To view the OCT user manual, see Appendix E – OCT User Manual.

6.6 Future Developments and Changes

There are several ways to extend the functionality of the OCT and make it more effective and interesting for the students and teachers. Here are few possible areas to continue working on in the future.

One of the recommended features to be added to OCT is to make students practice questions from completed assignments via a practice mode. The second feature is to show graphs of the student performance over time in a progress section, based on different types of questions. The third feature is to allow teachers to exchange files between several XO laptops using the built-in peer-to-peer mesh network. The last recommended feature is to add more question types, specifically: reading questions, essay questions and speaking questions.

7. Facebook Tool

The aim of the Facebook Tool (FBT) was to create an engaging tool for students to practice English literacy skills. The tool is targeted toward secondary school students enrolled in schools around Uruguay who are learning or have already achieved some very basic knowledge of the English language. These students are interested in practicing their English language skills. The application is set up on the social networking platform, Facebook, which is very popular amongst the students of this age group.^{lix} The application is designed to utilize the power of and interest in social networking among students to encourage them to practice their literacy skills in an informal setting, without the required on-site assistance of a teacher.

The FBT allows students to practice their literacy skills using their Facebook accounts. Teachers, on the other hand, have the ability to log into a separate portal where they can specify questions for the different topics that are a part of their curriculum. The application also allows students to form different groups, and features a centralized score board that will display rankings of top scoring students and top scoring teams. This provides a collaborative setting for students to form teams and achieve high scores, while also providing a competitive environment so students remain motivated to practice.

7.1 Background Information

Mobile phones are a very common commodity in Uruguay, and are especially popular amongst secondary students. For this reason, it was originally proposed that in order to motivate school children to practice their English language skills in an informal setting, creating an application for mobile phones should be considered. It was originally hoped that reaching students using popular modes of technology other than the XO laptops, in the setting of a game, would encourage students to practice their English language skills.

The iSTEP team wanted to explore if such tools could be built for mobile phones to encourage students to practice their English language skills and achieve this in an engaging manner. Thus the team carried out focus groups, interviews, and surveys to determine if a mobile phone tool would address the needs of the students and their community.

However, during the needs assessment, it was observed that even though the students at Liceo 39 did possess mobile phones, they were generally not in favor of playing games on their devices. Moreover, they were not in favor of practicing literacy skills on their mobile phones. Reasons included having mobile phones with limited capabilities to support games and that the games available were neither captivating nor stimulating. Information collected during the needs assessment phase of the internship showed that playing games was not a popular choice for students when using their mobile phones.



Fig 37: Previous iSTEP mobile phone tool

Similarly, these students were accustomed to playing games on more technically-capable devices, like their XO laptops, PCs, and even certain gaming consoles such as PlayStation 2 and Nintendo Wii. Another issue was the variety of phones amongst students with different operating systems that supported varying application development frameworks depending on the manufacturer. Information collected from students during the needs assessment phase of the internship showed that there was no clear mobile phone platform that would support the mobile phones for a majority of the students, due to the large diversity in types of mobile phones.

The needs assessment also revealed the students' fascination with Facebook. It was the primary platform students used to communicate and stay in touch with each other. Many students also used Facebook applications and games. Hence, the team considered developing a Facebook application.

However a Facebook application was not without challenges. A stable internet connection was not frequently available to students at schools because Plan Ceibal's network was facing problems. This was a challenge because the only way to access a Facebook application hosted online is with internet connection. Another possible problem was the fact that some of the teachers viewed Facebook as a distraction in general, and would discourage students from using it at school.

Thus the iSTEP team proposed two possible directions to ANEP and outlined the pros and cons of pursuing either a mobile phone or Facebook application. ANEP eventually reached the decision to pursue the Facebook application because they were primarily interested in encouraging use of the XO laptops. As for the issue with internet, the iSTEP team learned that Plan Ceibal was working on implementing a fiber optic network to connect the public schools of Uruguay with internet. Once that is functioning, such challenges with internet access should be significantly reduced.

In order to meet the goal of the FBT, the design of the application features some elements of online social networking and collaborative gaming that are intended to provide motivation and encouragement to the students in a social context.

7.2 Related Work

Facebook is the most popular social networking platform in the world. It has over 750 million users across the globe with 70% of them outside of the US.^{lx} One of the most popular features on the site are the applications that outside developers have created to be used in conjunction with the site. As of May 2010, over 550,000 applications are in use.^{lxi} While some of the most popular apps are games such as CityVille and FarmVille, with 80

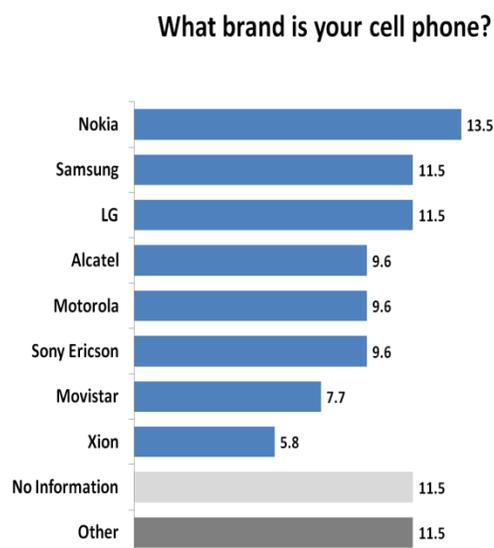


Fig 38: Mobile phone brands

million and 37 million users respectively, many apps can also serve an education purpose.^{lxii}

Applications were researched to see if other tools existed that provided similar functionality as the proposed FBT. These were then investigated to see if the technologies could be used or integrated with the FBT. Some apps reviewed were SlideShare, CourseFeed, Udutu and Blackboard. A feature on Facebook, Groups, has also been used by educators to help teach students.

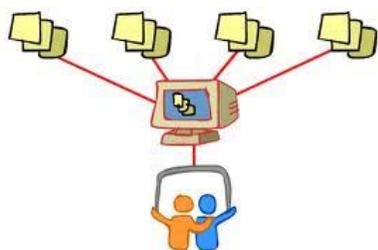


Fig 39: SlideShare schematic

SlideShare is an application that allows users to share presentations, documents or professional videos. While it has its own website as well, it has been converted into use for easy access and distribution to Facebook users. Through the SlideShare app, teachers can create presentations and directly share them with the students that have this application.

CourseFeed provides lessons from some of the top universities across the country. Many of the courses are free with the option of signing up for certificates or training. Through its integration with Facebook, CourseFeed has expanded its network and allowed its users to connect through the course they watch and to form discussions and to ask questions of others watching the same videos.^{lxiii}

Udutu Teach and Udutu Learn are content authoring tools that allow professors to create full courses that students can use via a Facebook plug in. Through the app, students can access their assignments and material online.^{lxiv}

The popular course management software Blackboard is also available for Facebook. It provides all the functionalities of course management through its Facebook application, but like Udutu, it does not include motivational features. It also would require time and resources to implement the actual Blackboard software for class at all the schools using the FBT.

In addition to these apps which are all developed and created by outside sources, Facebook offers its own options for teachers. Through its “group” pages, teachers can create a page for their students, as was done by Penn State Associate Professor Brian Smith. For his class, Smith “created a group on Facebook.com that includes him, his teaching assistant, and students enrolled in the class.”^{lxv} Through this group he posted assignments and helped to run discussions. The main page was open to the Facebook community but the discussions were limited to those in the class.

These technologies provide teachers with the option of authoring content online and assigning them to students via Facebook. Most applications seem to try to integrate their product into the framework of the site for more exposure and easier access by targeted students. However they lack the motivational capabilities and do not give teachers as much control to follow students’ progress.

Facebook can be used to help promote education but there does not seem to be an application that allows teachers to effectively use the platform. The FBT aims to create a fun tool that capitalizes on Facebook's popularity to actively engage and motivate students to practice their English literacy skills while also allowing teachers to customize the learning content. This fact influenced the decision to create an application tailored for ANEP as a pilot program at Liceo 39.

7.3 Technology Used

The design of the FBT indicated that in order to build it, the following features were needed in the development platform.

- Since students were familiar with high end games, the platform should provide support for building web applications with user interactivity features that engage the students.
- Since students were interested in advancing through levels and playing in teams, a database feature was needed to store questions and student records.
- Students are intrigued by colors and graphics, as indicated by their interest in avatars, so basic graphical capabilities were required to provide this functionality.
- For the application to communicate with Facebook and be able to make use of Facebook's Graph API to store and information about users, libraries to integrate the application with the Facebook API were also required.
- Good developer support including descriptive API's, tutorials and active channels of developer community support was also required so that the implementation of the tool could be carried out in the limited amount of time available.

With these features in mind, the team surveyed web application development technologies that could be used for the implementation of the FBT. Three technologies, Adobe Flash with Action Script, PHP and Django, were considered.

1. **Adobe Flash with Action Script.** This is a technology that uses propriety software from Adobe. It provides a very rich environment for producing graphically intense applications with lots of interactivity that is enabled by the use of Action Script.
2. **PHP.** PHP is the most commonly used technology for developing Facebook applications. It has many libraries that provide great capabilities in terms of implementing interactivity and database support using open source software.
3. **Django.** This is a relatively new Python-based web development framework written with speed of development in mind. It is built with many levels of abstraction, great developer resources and full integration support of all Python libraries so that applications with databases at their back-end can be built rapidly, and at the same time, providing the rich capabilities offered by Python's own libraries.

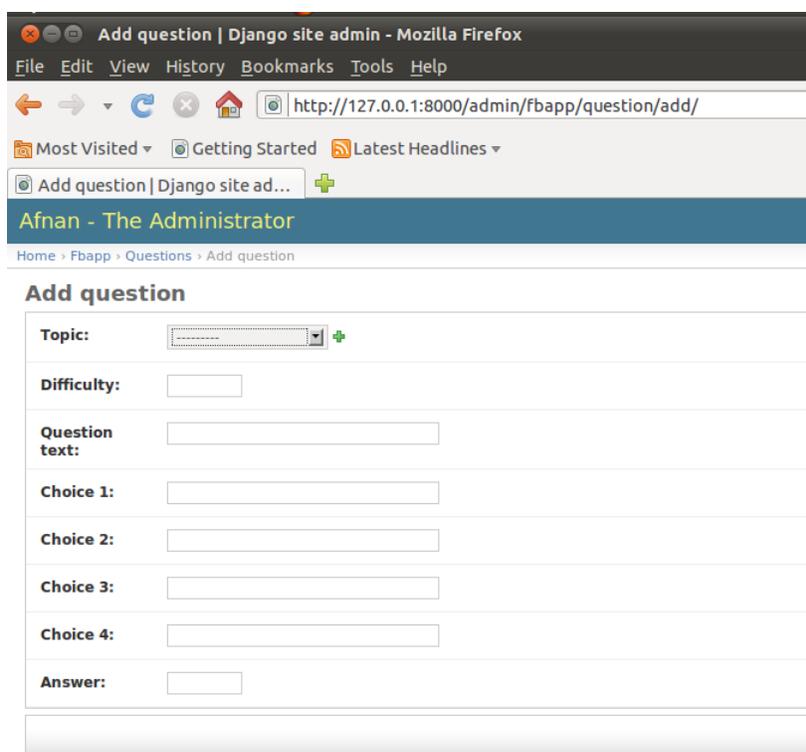
From these three options, it was determined that Django was the best choice for the FBT. It provided all the capabilities required for building the application, and had the added advantage of rapid development. The team also had some prior experience in Python, and so with the time constraint in mind (three weeks of development), it was thus decided to go ahead and initiate development using the Django platform.

The following three frameworks and packages were used for the development of the FBT: Python version 2.6.6,^{lxvi} Django Official Release – Version 1.3^{lxvii} and Fandjango version 3.7.1.^{lxviii}

7.4 Implementation

The application will be named “Torneo de Ingles” which means English Tournament when translated from Spanish, and will be accessible through Facebook search, once it is made public. The application’s purpose is to help students practice their English language skills in a collaborative yet competitive environment. Students must have a Facebook account to login to the application.

The application allows teachers to upload questions through an interface that is available to them online, as can be seen in Fig 40.



The screenshot shows a web browser window titled "Add question | Django site admin - Mozilla Firefox". The address bar shows the URL "http://127.0.0.1:8000/admin/fbapp/question/add/". The browser's navigation bar includes "Most Visited", "Getting Started", and "Latest Headlines". The user is logged in as "Afnan - The Administrator". The breadcrumb trail is "Home > Fbapp > Questions > Add question".

The main content area is titled "Add question" and contains a form with the following fields:

- Topic:** A dropdown menu with a plus sign to the right.
- Difficulty:** A text input field.
- Question text:** A large text area.
- Choice 1:** A text input field.
- Choice 2:** A text input field.
- Choice 3:** A text input field.
- Choice 4:** A text input field.
- Answer:** A text input field.

Fig 40: Online interface for teachers to upload questions

Through this interface, teachers can specify questions according to different topics in English language learning, which also are specified by them. Along with this, teachers can define the difficulty level of the questions. The application currently only supports multiple choice questions.

Another feature that this online interface provides teachers is the ability to assign students to different teams so that team membership conflicts can be resolved. It should be noted that this teacher interface is not accessible through the facebook platform and is only accessible to teachers via a separate online portal.

On the main page of the application, there is a score board that displays the top performing teams and top performing students as can be seen in Fig 41.

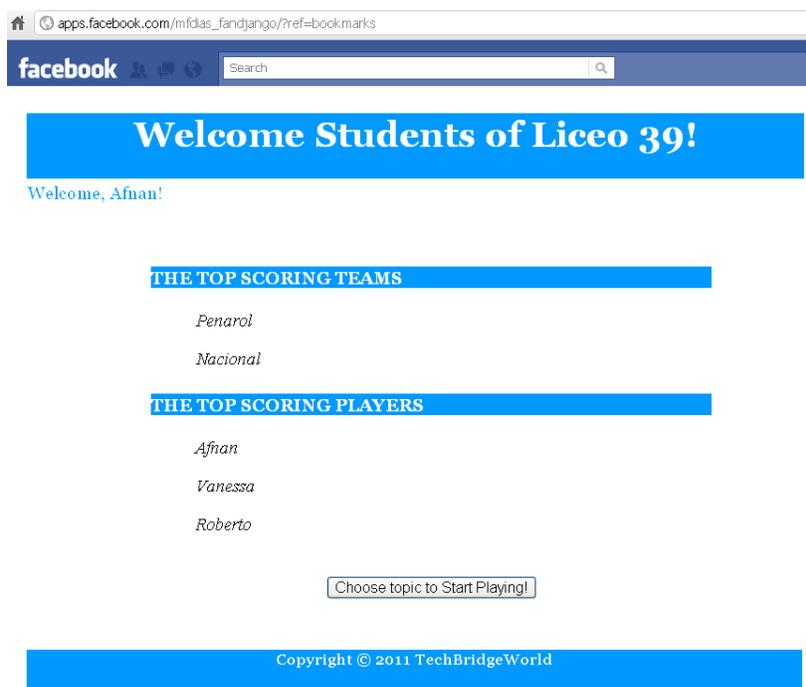


Fig 41: Top scores screen on FBT

In order to practice their literacy skills, students can choose from a list of topics as specified by their teachers, for practice. Once students choose their topic, they are given questions from the application's database, based on their current difficulty level.

When the students submit their responses, the application informs them of the questions they answered correctly, and if they answered incorrectly, it also provides the correct answer. Based on how well the students do on a particular set of questions, students are awarded points. These points count towards the standing of the students and the teams on the scoreboard.

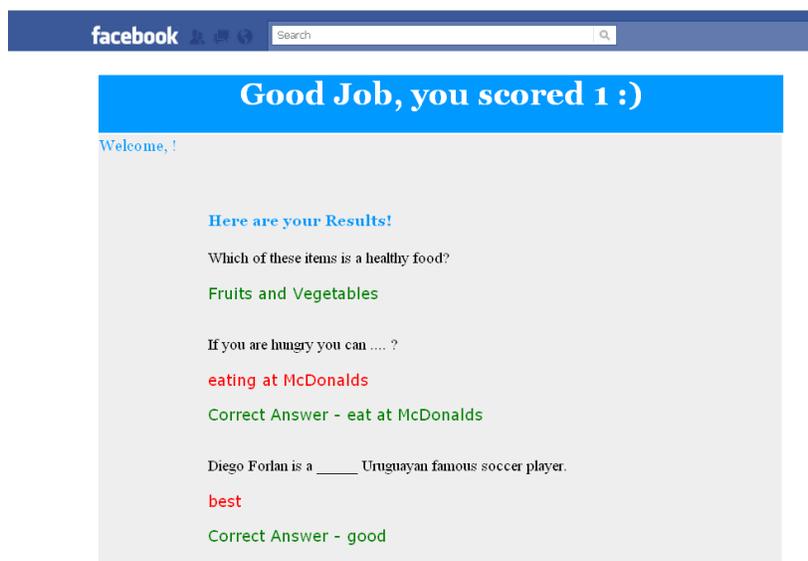


Fig 42: Results screen

7.5 Educational Features

The FBT offers multiple features for teachers and students to customize the experience and learning. Both the topics of the game and the difficulty level can be customized.

7.5.1 Motivational Features

The FBT was also created with several features that would encourage students to participate. These include the ability to form a team and having a public scoreboard. Further development of the tool is to include status updates, a customizable avatar, and the ability to customize the team.

The application allows students to form teams and name them. This provides students with the opportunity to asynchronously collaborate with each other to improve the standing of the team on the score board. Students are able to specify the team they want to support, choose their names, and then work with each other to achieve high scores.

The home page of the application contains a scoreboard on which the top performing teams and top performing individuals are listed. This was intended to provide students with motivation to perform better. If the students perform well and work collaboratively as a team, they are able to see that their team is doing well on the scoreboard and thus would be more motivated to practice their literacy skills.

7.6 Results

The iSTEP team conducted testing for the FBT with two groups of students at Liceo 39. In total, 30 students tested the FBT, 7 in the first group and 23 in the second.

The purpose of the testing sessions was to determine that the FBT functioned when accessed by a group of users all at the same time via Facebook. Features that were tested included accessing the application directly through Facebook, creating user accounts to be stored in the database, and assigning appropriate questions based on the student's skill level. The team also checked that the questions were graded correctly and informed students of their mistakes. Any score changes that were needed were also made.

Students displayed a lot of interest during the testing. When the team asked students to log into Facebook at the start of testing, they were very excited. Overall, students were eager to learn about competing against their fellow classmates on Facebook while at the same time practicing their English language skills.

After the testing sessions, the team talked with the students to gather their feedback and opinion on the tools, and to solicit suggestions regarding further development of the tool. The students suggested the following to render the FBT more appealing:

- 1) Support for listening activities that would involve, for example, listening to a song and then answering questions about it.
- 2) Having a graphics within the interface of the application that showed their progress levels within the different topics they practiced.
- 3) Having a tournament system in the application so that the teams could compete against each other to win a complete tournament.
- 4) Creating a game in the application that would progress to different levels of difficulty based on how much practice they had carried out on the application.

The FBT did not face any major failures during the testing sessions. Only two minor glitches occurred. When the application was accessed from Facebook, it directed the students to another URL, which needed to be changed in order for the students to access the actual application. The second problem was the third question in the application was systematically graded incorrectly.

The first failure was corrected by changing the URL settings of the application, while the second error was corrected by debugging the code and fixing the bug to make sure all questions were graded correctly.

To view the FBT user manual, see Appendix F – FBT User Manual.

7.7 Future Developments and Changes

There are several ways to extend the functionality of the FBT and make it more effective and interesting for the students and teachers. Here are few possible areas to continue working on in the future.

7.7.1 Uploading Questions Using the CAT

Ultimately the plan is to allow teachers to upload multiple choice questions directly from the CAT into the database of the FBT. This would involve the teachers selecting a list of questions and then instructing the CAT to export them to the FBT. The CAT would generate

an SQL database file and place it into a space on the server on which the FBT is hosted, into a folder which is named after the current week. The FBT would access this space weekly, read from the files in the current week's folder, and then add the questions into its own database. Thus the new questions will be integrated into the practice sessions that the students carry out on the FBT.

7.7.2 Status Updates

Students at Liceo 39 are interested in sharing updates about their daily lives and achievements on Facebook, and updating their statuses. With this in mind, the implementation of the Facebook application could add functionality such that if the students achieve a high score or proceed to the next difficulty level in a particular topic, they could share this on their Facebook page. This is meant to provide them with additional motivation to achieve more in their practice activities on the FBT .

7.7.3 Avatar Selection

In order to give students a more personalized feel for their Facebook application, students could have the choice of creating avatars for their accounts on the application. In this way students would be able to get personalized graphical images. The motivational factor behind this feature is that as students progress through the application and achieve high scores or reach higher difficulty levels, they would be able to customize their avatars using a larger selection of options.

7.7.4 Team Customization

This feature would allow the students to specify colors for their respective team. Thus, when students log into the application, the application would take the colors of the team as its background and text colors. This would provide students with a much more personalized feel when using the application.

8. Content Authoring Tool

The goal of the Content Authoring Tool (CAT) is to provide teachers and ANEP with a platform to create and update content for the OCT and the FBT. The solution is designed to assist teachers in creating custom questions and answers for their students. It also allows them to track their students' progress and tailor the content they create to the individual student. The primary components of the CAT are the user interface, the content management system behind it, and the communication protocol that allows the interaction with the OCT and FBT.

8.1 Background Information

Uruguay is considered to be one of the most active English language learning countries in Latin America. Having a “reasonable knowledge of a second language” is considered a key to integrating the global community. Uruguay has developed a project of “Plurilingual” education called Uruguay Plurilingual 2030. To achieve this goal, Uruguay has been expanding English as a Foreign Language (EFL) courses and has doubled the number of graduate teachers per year since 1999. However, the number of teachers is still deemed insufficient to expand the plan to primary school, which stalled the expansion of the plan in general.^{lxi}

To address this, CODICEN, an Uruguayan government council charged with technical, professional and teacher training across all sectors, started providing more EFL training courses for aspiring teachers. Another important factor besides a sufficient number of qualified teachers is the quality of the English curriculum.

According to the iSTEP team's needs assessment results, the English curriculum in Uruguay is flexible and teachers “have a high degree of freedom to modify and adapt it based on student need.”² However, class sizes, different levels of students, and teachers' workload all proved to be major obstacles that prevent teachers from taking advantage of the flexibility of the system. This combined with other factors such as a lack of coordination among teachers and lack of motivation among students have created weaknesses in the students' English skills despite the instructors' best efforts. According to the interviewed teachers, the most common weaknesses are in speaking, writing and listening. As a result, there is a great need for strategies and tools that will allow the students to improve their English skills while providing the teachers with new ways to prepare and assign homework and practice with their students.

The English curriculum is flexible but class sizes, different levels of students, and teachers' workload all prevent teachers from using the flexibility.

² iSTEP 2011 needs assessment

8.2 Related Works

A multitude of technological initiatives have been designed to support content authoring tools not only for English literacy but for other subjects, such as mathematics and physics. The design and development phases for the CAT were preceded by a literature review phase that included looking for related projects and exploring the various approaches adopted by each one.

An important content authoring system funded by the U.S. Department of Education, National Science Foundation and the Office of Naval Research grants was jointly developed and researched by Worcester Polytechnic



Fig 43: ASSISTment logo

Institute and Carnegie Mellon University. The ASSISTment project is a free “web-based tutoring system that includes web-based authoring tools that allow researchers to easily design, build, and then compare different ways to teach mathematics.”^{lxx} The ASSISTment System aims to assist the students in learning while providing their teachers with an easy way to assess their progress. Teachers can create problems, associate them with the required skills to solve them, and assign them in a specific sequence. They are also able to assess student performance using real-time reports provided by the system and then utilize these reports to improve students’ work over time. This system is primarily aimed at helping the students learn the skills necessary for the Massachusetts Comprehensive Assessment System (MCAS). In 2009, over 3000 middle and high school students and 50 teachers used the system as a part of their regular math class.^{lxxi}

Another important project that tackled content authoring for teachers with low computer proficiency is the Cloze project. It is an authoring framework that enables teachers to create content for Computer Aided Learning (CAL) applications. CAL applications, very popular in schools in India, are self-paced and use multimedia elements to guide students through different topics without the need for a teacher’s intervention. Although very popular because of their modular approach to teaching subjects, CAL applications tend to leave the teachers out as teachers often have limited access to the CAL content. This impedes the teachers’ willingness to trust CAL applications as valuable teaching and learning tools. The goal of Cloze is to provide low computer proficient teachers with the ability to create content for CAL applications. The tool, built upon related work on teacher content creation and authoring tools for learning, took into consideration teachers’ level of comfort with computers and the time they are willing to spend preparing content. The application was designed to have a simple and intuitive interface, require little of the teacher’s time, and integrate curricula materials. After a series of iterations and usability tests with teachers, the final prototype supported four types of activities: labeling, matching, identifying and quizzes.^{lxxii}

Like the ASSISTment system and the Cloze project, the iSTEP 2011 Content Authoring Tool aims to help students learn better while allowing instructors to create content and track their students’ progress using a simple interface. Unlike the Cloze project, the CAT is designed to act as a support and extension to the teaching material used in Uruguayan

schools and not as a substitute. The tool is meant to act as a bridge between the OCT and the teachers allowing them to easily create content and better manage students' learning.

8.3 Technology Used

The CAT was designed as a browser-based application to be used from any computer equipped with any W3C standards compliant browser although it is best viewed with Firefox and Chrome. The decision to develop the tool as a web application instead of exclusively an XO laptop activity was to allow teachers to use it on more commonly available computers. However, since teachers are going to be using XO laptops to access the application at times, further plans to optimize the application for XO laptops are included in the future works section.

The CAT has four main components:

- 1) An interface that allows teachers to manage English literacy content. This includes creating, and viewing questions to be included in assignments, practices or games on the OCT and/or FBT.
- 2) A communication protocol that will allow CAT to interact with the OCT and FBT. This was designed to be an XML-based protocol through which questions, answers and results will be exchanged between the tools.
- 3) The content management system behind the CAT that takes care of managing the data entered by the teachers and the data exchanged with the OCT and FBT and organizing the data into storable and easily retrievable formats.

The CAT's user interface was developed using JavaScript and jQuery Javascript. The back-end was developed using an open source stack XAMPP that provides the main elements necessary to develop a web application: Apache, MySQL, and PHP. The communication protocol was developed using XML.

8.4 Implementation

Instead of creating an entirely new tool, the team determined that reusing the code of the English Literacy Tool developed by the iSTEP 2010 interns for the Asian University for Women's Access Academy would be appropriate mainly because of the overlap of the functionalities between the two tools. However, the team highlighted some differences between the tools. The 2010 CAT included not only question and performance management but also a practice mode for students. The 2011 CAT, on the other hand, does not have a practice component but is required to communicate with external tools such as OCT and FBT using an XML based communication protocol via file exchanges: uploads and downloads. After analyzing the needs assessment's results, the team concluded that internet connectivity in Liceo 39 was unreliable. This conclusion pushed the team to think about alternatives to exchanging files containing questions and answers using a stable internet connection. The solution was



Fig 44: Previous iSTEP CAT homepage

chosen to allow the teachers using CAT to download the assignments created on CAT to a file, store this file on a USB drive and upload it to the different tool that interact with students. Using a USB drive as a transport medium was a basic solution that allowed the team to overcome the issue of not being able to connect the tools and exchange information between them.

8.4.1 Database Backend

Fig 45 illustrates the relationship between the different components in the CAT database. The tables were designed to make storing and retrieving information easy with minimum manipulations.

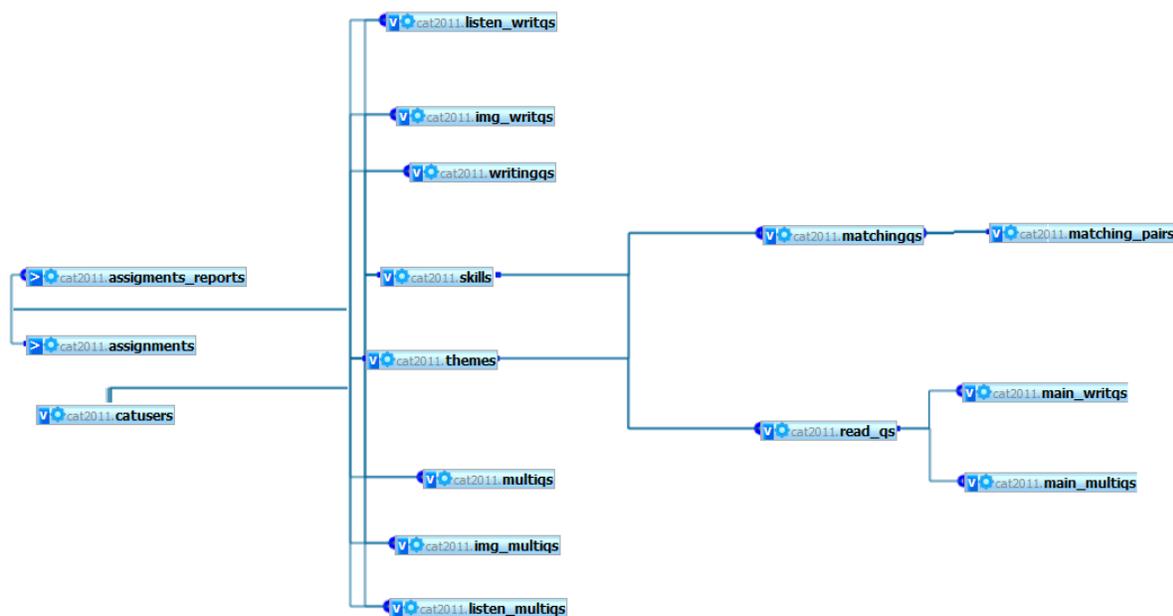


Fig 45: Diagram showing the relationships between the components of the CAT database

Table 4 provides descriptions for the tables contained in the CAT database. These tables are also linked to generic information about the questions' level, theme and skills.

Table 4: Description of the CAT database tables

Tables	Descriptions
Catusers	Contains information about the users of the tool.
Themes	Contains the list of themes that could be associated with questions.
Skills	Contains the list of skills that could be associated with questions.
Multiqs*	Contains information about simple multiple choice questions: question, correct answer and answer options.
listen_multiqs*	Contains information about multiple choice questions with listening passages attached: question, listening passage reference, correct answer and answer options.
img_multiqs*	Contains information about multiple choice questions with an image attached: question, image reference, correct answer and answer options.
main_multiqs	Contains information specific to multiple choice questions in addition to a reference to reading question from read_qs table. This information was separated as each reading question can have up to three multiple choice questions.

writingqs*	Contains information about fill in the blanks question with one blank: question and answer.
listen_writqs*	Contains information about fill in the blanks questions with listening passages attached: question, listening passage reference and correct answer.
img_writqs*	Contains information about fill in the blanks questions with an image attached: question, image reference and correct answer.
main_writqs	Contains information specific to fill in the blanks questions with a reading passage attached: question, passage, and correct answer.
matchingqs	Contains information about matching questions: question and reference to pairs from matching_pairs table.
matching_pairs	Contains information about the pairs to be linked to matching questions.
assignments	Contains information about assignments: id, name, number of questions and questions references.
assignments_reports	Contains information about assignments grades: assignment ids, student names and grades. This table is used to store the information necessary to track the performance of students.

8.4.2 Questions Management

This feature allows users to create, and view questions of specific types. Three different question types were developed – multiple choice, fill in the blanks, and matching:

1) Multiple choice

- One question with multiple possible answers and one correct answer.
- True or False [Yes or No] questions fall under this category.

Example:

Cook is _____ today for being one of Britain's most famous explorers.

a) recommended b) reminded c) recognized d) remembered

2) Fill in the blank

- A sentence or passage with blanks for students to fill in by typing in the answers.

Example:

How _____ you today?

3) Matching

- Two same size sets of words or expressions that the students match in response to a question.

Example: Antonyms

Fat	Old
Young	Tall
Dangerous	Thin
Short	Safe

Multiple choices and fill in the blanks questions are organized into four subtypes: a simple question, a question with a reading passage, a question with a listening passage or a question with an image attached. This kind of structure makes it easy for teachers to create questions consistently using a single form without the need to customize the form depending on the type of question they want to create. Matching questions have no specific subcategories as it represents a single question type.

All the question types have some common details that help the teachers track student progress and create assignments targeted to specific levels of English proficiency. The level of difficulty, skills involved, and topics/themes can be tailored for the individual students. The following describes each area:

- Level of difficulty: includes easy, intermediate, hard.
- Skills: prepositions, synonyms, definitions, vocabulary, grammar, writing, listening, reading. These are the skills that will allow the teachers to track the progress of their students not only in terms of levels but also in terms of skills acquired. The CAT allows teachers to select one skill per single question and to expand the list of skills in the future.
- Topics/themes: sports and nutrition. These were added by the request of the educators and allow them to group questions based on the themes addressed in them and make it easier to create a one themed assignment or practice and to track how students are learning about the specific topics. “Sports” and “Nutrition” were chosen by the project partners to be the only theme options available for the iSTEP 2011 CAT prototype. Similar to skills, teachers have the option to specify new themes or expand on the existing ones in the future.

To create questions, the teachers have access to a simple navigation system organized by question types and subtypes. For example, “multiple choice” is a question type whereas “simple”, “with reading”, “with listening”, and “with image” are all subtypes. To create a question, teachers must first choose which subtype they want to create. Based on their choice, they will be presented with the corresponding form that is organized as follows:

- Required fields: fields such as level, theme, skill, question and answer are all required. No question can be created without having these fields entered by the teachers. In the case of multiple choice questions, at least two additional answers have to be provided.
- Optional fields: some questions might have extra information that the teachers can choose to enter such as three extra answers for the multiple choice questions.
- A submit button that first triggers a validation script to make sure that all required fields are entered and that the answers for the multiple choice questions are not the same. In addition, the script will verify whether or not the image uploaded has a valid type and size in the case of questions with attached images.

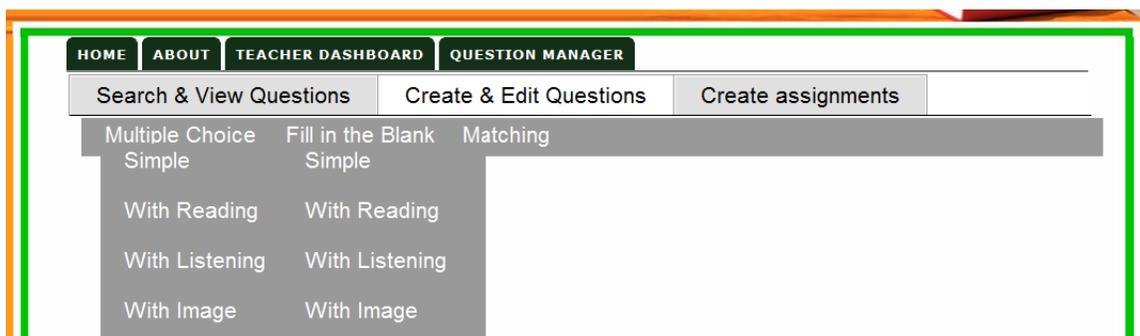


Fig 46: Questions navigation menu

The section below describes the forms that allow users to create the different types of questions.

Multiple Choice Questions

To create a simple multiple choice question the teacher must specify the required fields, a question, the correct answer, and at least three and at most five other answer options. To allow the teachers to perform minimum manipulations when creating the question, the multiple choice question form provides the required and optional fields at once. The information collected in the form is stored in the multiqs table of the CAT database.

Create New Multiple Choice Question

Skills:

Levels:

Themes:

Question:

Answer Option 1 (*correct answer*):

Answer Option 2:

Answer Option 3:

Answer Option 4 (*optional*):

Answer Option 5 (*optional*):

Answer Option 6 (*optional*):

Fig 47: Simple multiple choice question entry form

Other types of multiple choice questions are created using the forms in the figures below.

The screenshot shows a web interface for creating a multiple choice question with a reading passage. At the top, there are navigation tabs: HOME, ABOUT, CREATE ASSIGNMENTS, and QUESTION MANAGER. Below these are two buttons: 'Search & View Questions' and 'Create New Questions'. A sub-menu bar contains 'Multiple Choice', 'Fill in the Blank', and 'Matching'. The main heading is 'Create New Multiple Choice Question with a reading passage attached'. The form includes dropdown menus for 'Skills' (Prepositions), 'Levels' (Easy), and 'Themes' (Sports). A large text area is labeled 'Reading Passage:'. Below this are input fields for 'Question:', 'Answer Option 1: (correct answer)', 'Answer Option 2:', 'Answer Option 3:', 'Answer Option 4: (optional)', 'Answer Option 5: (optional)', and 'Answer Option 6: (optional)'.

Fig 48: Multiple choice question with a reading passage attached entry form

Each reading passage can have one multiple choice question with up to six answer options.

The screenshot shows a web interface for creating a multiple choice question with a listening passage. At the top, there are navigation tabs: HOME, ABOUT, CREATE ASSIGNMENTS, and QUESTION MANAGER. Below these are two buttons: 'Search & View Questions' and 'Create New Questions'. A sub-menu bar contains 'Multiple Choice', 'Fill in the Blank', and 'Matching'. The main heading is 'Create New Multiple Choice Question with a listening passage attached'. The form includes dropdown menus for 'Skill' (Prepositions), 'Level' (Easy), and 'Themes' (Sports). There is an 'Audio File: (mp3 or wav)' field with a 'Browse...' button. Below this are input fields for 'Question:', 'Answer Option 1: (correct answer)', 'Answer Option 2:', 'Answer Option 3:', 'Answer Option 4: (optional)', 'Answer Option 5: (optional)', and 'Answer Option 6: (optional)'.

Fig 49: Multiple question with a listening passage attached entry form

Questions with a listening passage require teachers to upload an audio file with the passage. The uploaded file is stored along with the rest of the question information in the listen_multiqs table. To create a listening question, teachers must upload an audio file.

Fig 50: Multiple question with an image attached entry form

To create a multiple choice with an image attached, teachers have to upload an image as part of the question required information. The image must be less than 2MB in size and has to be of type: gif or jpg, or jpeg or pjpeg.

Fill in the Blank Questions

The fill in the blank question type allows the teachers to create questions with one blank in addition to a reading passage, listening passage or an image. After entering the question, teachers can either manually add the blank or click on the “Insert Blank” button to insert a placeholder (“__”) in the text box.

Fig 51: Simple fill in the blanks question entry form

Other types of fill in the blanks questions are created using the forms in the figures below.

Create New Fill in the Blank Question with a reading passage attached

Skills:

Levels:

Themes:

Reading Passage:

Type your question in the text box below. To insert a blank, click the "Insert Blank" button. This will insert a placeholder for the blank.
NOTE: Only one blank is allowed.

Correct answer for blank:

Fig 52: Fill in the blanks question with a reading passage attached entry form

To create a fill in the blank question with a reading attached, teachers have to paste a text in the reading passage text box in addition to the fill in the blank required information.

Create New Fill in the Blank Question with a listening passage attached

Skills:

Levels:

Themes:

Upload an Audio File (mp3 or wav):

Type your question in the text box below. To insert a blank, click the "Insert Blank" button. This will insert a placeholder for the blank.
NOTE: Only one blank is allowed.

Correct answer for blank:

Fig 53: Fill in the blanks question with a listening passage attached entry form

Create New Fill in the Blank Question with an image attached

Skills:

Levels:

Themes:

Upload an Image File:

Type your question in the text box below. To insert a blank, click the "Insert Blank" button. This will insert a placeholder for the blank.
NOTE: Only one blank is allowed.

Correct answer for blank:

Fig 54: Fill in the blanks question with an image attached entry form

Matching Question

To create a matching question, teachers have to enter a question specifying the matching instructions and four pairs of words/expressions. The matching question entry form allows entering the pairs under two lists: list one and list two and requires the teachers to enter the pair at the same level in the different lists: item one in list one is paired with item one in list two, item two in list one is paired with item two in list two and so on.

Create New Matching Question

Skills:

Levels:

Themes:

Question:

List 1

Item One:

Item Two:

Item Three:

Item Four:

List 2

Item One:

Item Two:

Item Three:

Item Four:

Fig 55: Matching question entry form

Teachers can view questions and filter them based on type and difficulty level. The form for the view functionality is represented in Fig 56.

Fig 56: Questions search and view form

Teachers can create assignments using the create assignments form. Each assignment must have a name and an id. Teachers can choose as many questions as they want from the list they are provided, which corresponds to the questions they had previously created.

Fig 57: Create assignments form

After submitting the form, the teachers are presented with an assignment file that they need to download.

As mentioned in the beginning of the implementation section, XML files are used as the medium with which teachers can upload or download questions. Downloads are where teachers are able to download questions to an XML file.

The XML file has been designed to be parsed by both CAT and OCT. Each file represents one assignment with a name, an id and a set of questions chosen by the teachers. Each question is enclosed between tags named after the question type such as <m1qs> or <wqs> representing simple multiple choice and simple fill in the blanks questions respectively. Each piece of information about the question such as level or theme is also enclosed

between two tags with appropriate names, for example <level> or <theme>. An example of a multiple choice question from a downloaded XML file is shown in Fig 58.

```
<list>
  <assn-id>2</assn-id>
  <assn-name>Official Test</assn-name>
  <m1qslist>
    <m1qs>
      <level>easy</level>
      <theme>soccer</theme>
      <skill>prepositions</skill>
      <m1-qs>Diego Forlan is _____ Uruguayan famous soccer player.</m1-qs>
      <m1-ans>an</m1-ans>
      <m1-resp>a</m1-resp>
      <m1-opt>a</m1-opt>
      <m1-opt>an</m1-opt>
      <m1-opt>the</m1-opt>
      <m1-opt>one of</m1-opt>
      <m1-opt/>
      <m1-opt/>
    </m1qs>
  </m1qslist>
```

Fig 58: Simple multiple choice question from downloaded XML file

If teachers chose to include more than one question per type, all questions of the same type will be enclosed between two tags named after the question type plus the word “list” such as <m1qslist> for list of simple multiple choice questions.

8.5 Results

Testing sessions were conducted with INET and IPA student teachers. During this phase of the project, the team was planning to also include Liceo 39 teachers in the testing sessions. However, due to their heavy workload and busy schedules, Liceo 39 teachers were not able to test the tool during the scheduled time slots. Also, the team faced unexpected challenges with planning a session with INET students, which caused the number of INET participants to drop from six to one. However, despite the challenges the team was able to test CAT with a small group of nine users: eight student teachers and one English teacher from IPA. While the number was small, the testing session proved very useful and provided important feedback about the tool from an end user perspective.

The team in Montevideo conducted the testing session guided by a testing plan containing some general and specific guidelines about the functionalities to be tested and how to run the session. The main goal of the session was to collect feedback about the content creation component of the CAT, the navigation system and the user interface. Key feedback received from the session included a desire for the interface to have more colors and images and for the tool to have a help option. In addition, optimization of the CAT’s user interface for the XO laptop was also mentioned during the session. On the other hand, the CAT was described as “easy and user friendly” and easier to use than a word processor. Users mentioned that the different options and the organizational structure were clear and easy to figure out.

To view the CAT user manual, see Appendix G – CAT User Manual.

8.6 Future Developments/Changes

The CAT was designed around the concept of providing teachers the ability to both download content files from the CAT and also upload progress reports from the students to the CAT. Due to time restrictions, the CAT prototype currently only provides the option to download content. In the future, the CAT could be modified to allow teachers to upload completed assignments from the students and view/monitor individual student's progress.

There are several additional ways to extend the functionality of the CAT project and make it more effective in creating the content for the other tools. A few possible areas are suggested here. The first recommended feature is to have more variety of question types and ask teachers to classify the questions under a category (spelling, grammar, vocabulary), and provide a hint for the questions. The second recommendation is to use the tool to create content for different subjects and make the required changes to support that functionality. The third feature is to allow teachers to exchange XML files between several XO laptops using the built-in peer-to-peer mesh network in addition to the USB drive. The XML communication protocol should remain the same even when using mesh networking versus USB to transfer files. The last recommendation is to allow the FBT and CAT to exchange files using a known location on the server on which they are hosted. Both tools would know the name of the location and the names of the files to expect as agreed upon in the design. CAT would deposit files containing questions (either XML files or SQL file) in the server location in agreed upon periods (bi-weekly, weekly). FBT would know when to check for the files and upload them to get the new content.

9. Marketing Outreach

The team developed a media plan during the mini course to serve as a guide to the iSTEP 2011 and TechBridgeWorld teams during the three distinct, yet overlapping phases of the program. The first phase outlined the media plan prior to the start of the internship, from February to mid-May. The second phase outlined activities to be done during the internship, from end of May to end of July. The final phase provides media recommendations for the TechBridgeWorld team to carry out after the internship. This media plan can be found in Appendix A – iSTEP 2011 Media Plan.

9.1 Logistics

Marketing the iSTEP 2011 internship was a full team job with all members taking part as needed. All team members participated in posting entries to the blog a few times over the summer, taking photos, and filming videos. The team worked together to ensure that the deliverables of the marketing plan were met.

In order to coordinate the internship's marketing activities, Meghan, the Dissemination and Marketing Strategy Lead and Vanessa, the Partnership, Coordination and Marketing Implementation lead met regularly with Ermine, TechBridgeWorld's Project Assistant. Weekly meetings between Meghan and Ermine involved development of marketing ideas, progress on publicizing the work and ways to continue to promote iSTEP. Bi-weekly meetings between Vanessa, Meghan and Ermine occurred to coordinate implementation in Montevideo of the marketing strategies developed during Meghan and Ermine's weekly meetings. These meetings helped to ensure that the team was on track and completing the tasks necessary to showcase the work.

9.2 Media Kit and Updates

Some major objectives for marketing outreach included communicating the team's work to appropriate audiences and promoting the projects. To promote the iSTEP 2011 internship, the interns created a media kit, which contained a fact sheet, multiple press releases, a poster, photos, and a quote sheet. These materials can be seen in Appendix H – iSTEP 2011 Media Kit. During the internship, these materials were posted to the website and were also emailed to those who requested more information. They also helped to serve as reference material for the team when preparing reports, presentations and outreach activities.

Over the course of the internship, five press releases coming from TechBridgeWorld, were developed and sent out to various media outlets. Different versions of the press release were drafted based on the intended audience and what was to be featured by Carnegie Mellon University and Carnegie Mellon University in Qatar. Two were sent out prior to the start of the internship while three were sent out in the middle of the internship. In addition, two of the press releases were translated to Spanish and submitted to news outlets in Uruguay.

In addition, the team updated interested parties from the Carnegie Mellon community (in Pittsburgh and Doha), advisors, and families and friends of interns about the progress made throughout the internship. Bi-weekly update emails were sent out to advisors, family and friends. Two emails were also sent to important campus administrators, one in the middle of the internship and one at the end. Fifteen administrators responded with interest and encouraging words for the team's work, including Dr. Jared Cohon, President of Carnegie Mellon University.

9.3 Social Media

This year, the iSTEP 2011 and TechBridgeWorld teams decided to transition all social media channels to the same username. Instead of maintaining separate usernames for the different iSTEP internship years, all social media channels are now under the name "iSTEPtbw." This username will be available for use by future iSTEP programs to ensure interested parties remain connected and are not lost during the transition between years. In addition to these social media sites, a general iSTEPtbw Gmail account was created in order to provide a central location for all iSTEP material from the 2011 internship and beyond.

During the iSTEP 2011 internship, the team maintained a website, WordPress blog, Facebook page, Twitter feed, YouTube video site and Flickr photo page. All sites were actively maintained and material was often cross-referenced between the different sites. The team posted to the blog three times a week, with interns rotating posts each week. Post topics ranged from working in the lab in Doha to learning about the culture in Uruguay. Each time a blog entry was posted, the Facebook and Twitter pages were updated.

The iSTEP 2011 website maintained links and highlights of all other social media sites. It served as the reference site for all other social media sites and for people (including press) who wanted to learn more information. It contained details about the iSTEP 2011 internship, team, projects, and acknowledgements. In addition, the website featured the most recent blog posts and tweets as well as

media features on the home page. The projects page was updated bi-weekly during the internship with information on how the individual projects were progressing.



Fig 59: iSTEP website



Fig 60: iSTEP YouTube channel

YouTube videos were uploaded throughout the internship. More videos were created toward the end of the internship due to filming of the user testing with partners. Each time a video was uploaded, it was also posted on Facebook and Twitter.

Pictures were uploaded to both Flickr and Facebook multiple times a week to showcase the work being done. Pictures in Uruguay included the team's meetings with ANEP, interacting

with Liceo 39 students and exploring the culinary offerings of Montevideo. Pictures of the teams working in both Pittsburgh and Doha were also included.

Furthermore, some of these pictures were entered into photo competitions for CNN iReporter and ConvoZine. The team submitted photos to both sites' weekly and monthly photo competitions. Each time a picture was entered into one of those competitions, a link to the iSTEP 2011 website was included to encourage viewers to visit the website. The ConvoZine photo was viewed over 10 times, exposing a different audience to the work done by the iSTEP team. Even though the team did not win any of the contests, it increased awareness of iSTEP 2011 work. These new outlets have connected iSTEP more broadly and have exposed the program to more interested parties. Entering photo competitions was one way the iSTEP 2011 team expanded their media outreach that was not originally outlined in their marketing plan.



Fig 61: Working in the Pittsburgh (left) at Doha (right) labs

9.4 Results

The marketing efforts of the team resulted in large increases of traffic to the iSTEP social media sites. The team finished the internship with over 100 followers on Twitter, 400 likes on Facebook, over 1,500 views on the 40 blog entries posted and around 100 views on seven videos posted to YouTube. These results all show the increasing interest and following that iSTEP is gathering.



A MISM student @HeinzCollege navigating through her summer internship! - wp.me/p1tQpk-2v

20 Jun via web

☆ Favorite ↩ Reply 🗑 Delete

Retweeted by HeinzCollege and 1 other

Fig 62: Retweeted Heinz Tweet

On Twitter, the team would specifically tweet certain parties that would be interested in a specific blog post, picture or video. In total, the team was re-tweeted five times, and each time, there was a significant increase in people checking the blog. The highest number of visitors on one day, 123, was when Heinz College re-tweeted a blog post written by Hanae, the Technical Lead for the Content Authoring Tool Project, about her work.

The blog received 15 comments from readers during the summer from a variety of people, including family, friends, partners, and even some people who the team did not know but were interested in the work. Over 300 of the visitors to the blog were directed there from an outside website (i.e. a specific link shared via a 3rd party). Facebook and Twitter were the most popular sites that redirected people to the blog. Search engines, such as Google or Yahoo!, also helped to direct people to different iSTEP social media sites. For example, when people searched certain terms, such as “great learning experience internship” or “expectation and reality,” the iSTEP 2011 blog was one of the links people could access.

The team also had great success in marketing the internship apart from social media. As a result of the press releases drafted, the team received several features through Carnegie

Mellon including the Robotics Institute homepage, School of Computer Science home page, and Carnegie Mellon University in Qatar homepage. Furthermore, the Carnegie Mellon press release was linked in the News and Events section of the Carnegie Mellon home page. Externally, the internship was featured on the Pittsburgh Business Times, the OLPC blog and Twitter, and THE Journal, a publication reporting on changing education through technology. Furthermore, links to these media features were posted to the iSTEP Facebook and Twitter pages.

In Doha, Afnan and Asma were interviewed by the Qatar Foundation Telegraph and were featured in an article they published. In Montevideo, the Spanish versions of the press releases were submitted to our partners at ANEP and the team was also interviewed by a local news station. The interview aired on the station “Subrayado” on July 29, 2011 during the 8:00PM news.

9.5 Marketing Wrap Up

The iSTEP team engaged in multiple activities to ensure a smooth transition to the post-internship marketing phase. Goodbye videos from each work location were recorded and posted to YouTube and Facebook. Messages announcing the end of the internship were posted to all social media sites as they would no longer be actively updated by the team. All social media login information was organized and turned over to the TechBridgeWorld team. Final update emails were sent to interested parties, including family, friends, advisors, and campus administrators. A final email thanking the partners in Uruguay was also sent out. All pictures and videos from the internship were categorized and labeled for future use by the TechBridgeWorld team. The top 15 pictures and best three video clips from the internship were identified to be used in future TechBridgeWorld marketing activities. These steps were taken to ensure a smooth transition of marketing from the iSTEP team to the TechBridgeWorld team. The iSTEP team plans to participate in any follow up media requests on a volunteer basis, but will no longer be in charge of marketing and publicizing the internship or the project results.

9.6 Final Report and Presentation

As a closing to the internship, the iSTEP 2011 interns prepared a final presentation that the Montevideo team presented to their partners. ANEP organized the event and it took place in the INET building where the interns worked. A diverse audience of about 25-30 people the team had worked with in various capacities were present. The sheer diversity of the attendees made the presentation a success in the eyes of the interns. For example, the two directors of CFE, Edith Moraes and Laura Motta, were present and spoke at the opening and closing of the presentation. Their remarks



Fig 63: iSTEP 2011 final presentation in Montevideo

were heartening and showed the team how much faith and appreciation the CFE team had in them and their projects. In particular they spoke about the rich cultural exchange that took place throughout the planning and implementation of iSTEP 2011.

Cecilia Juri, also from ANEP and the Linguistics Policy Plan, who has been supportive of the projects since the very beginning, was also present and helped to document the event. Liaisons with the different community organizations the team worked with, as well as students from Liceo 39 attended. They were all enthusiastic about seeing the finished products. After the presentation, which was conducted in Spanish and English, the team invited the audience members to test the tools on three XOs that the team had set up. The interest the participants showed in the tools added to the celebratory feel of the event. At the end of the affair, and with much sadness, the team said their goodbyes to the majority of the partners that they would not see again. For this reason, the occasion was bittersweet, but it was also a clear demonstration of the team's accomplishments, which are the products and relationships they left behind.

9.7 Recommendations

For future iSTEP teams, it is important to remember that it is never too early to start planning. Ensuring that the team is aware of what is expected of them and when it is due is extremely important. Sending out reminder emails and copying appropriate TechBridgeWorld team member can also ensure that the task is accomplished at the specified time.

Getting an early start is also import when planning long term projects that will encompass most of the internship, such as the final report. Making sure people have enough time to write, prepare, and edit multiple drafts of the report ensures that a quality product will be produced. Figuring out common themes, such as size, font, how figures will be inserted, citations, etc. are important to clarify and identify at the beginning so time is not wasted later on.

During the internship, someone on the team should always have a camera. Taking appropriate videos and photos is extremely important for documentation and all team members should understand what kinds of photos should be taken (i.e. working with the technology tools, being able to see the interns' faces, etc.). Different ways of uploading photos and videos should be explored because it can be challenging to transfer them to the different work locations because of internet connection. The iSTEP 2011 team utilized DropBox, Flickr, and Facebook to upload videos and photos. It is recommended for future teams to create a DropBox account because it makes sharing files of all types much easier.

For marketing iSTEP in general, it is important to look for unique and different ways of connecting with people who may be interested in the program and the work being done. It is for this reason that the iSTEP 2011 team joined new sites and posted pictures and comments to get the iSTEP name out there. Looking for different means of promoting the iSTEP program while also connecting with viewers requires time investigating different sites and mediums.

It is also important to be as inclusive as possible in any social media posts. In particular, it is important to tweet and tag a wide variety of people in all posts, especially when there is a direct connection. For example, the iSTEP 2011 team captured a video of students working with their XO laptops and a Taylor Swift song was playing. The iSTEP team tweeted Taylor Swift about their experience. While the team did not get a response from the singer, it exposed the iSTEP program to different audiences.

10. Team Experience

10.1 Experience in Montevideo



Fig 64: Famous meat from Uruguay

throughout their first week of local orientation where they received a warm welcome from ANEP officials from CFE, IPA, and INET as well as from parents, teachers and students at Liceo 39. The excitement and enthusiasm that the partners demonstrated made living and working in a foreign country feel natural. Moreover, the team enjoyed tremendous hospitality in Uruguay and found that Uruguayans, in general, were extremely welcoming to foreigners and very proud of everything their country has to offer – especially their food!

For the Montevideo contingency in particular, there were many unexpected challenges that needed to be overcome for the sake of the projects, partners and team. One such challenge was the lack of internet in the apartment, although this led to the team's leaving the apartment more often and getting to know the local cafés with Wi-Fi. Another surprise was how cold Montevideo could get. Although they were aware of the fact that it was winter in the southern hemisphere, they imagined the winter would be much milder than it actually was. However, coming from Qatar, Afnan was excited to see rain and experience a real winter for the first time.

“Working in the field” certainly has its surprises, both pleasant and challenging. The most pleasant surprises the team experienced revolved around the attention and thoughtfulness of the team's partners on the ground, namely ANEP and Liceo 39. Contacts from both organizations went out of their way to make the iSTEP 2011 team members in Montevideo feel welcomed and appreciated. The partners' gratitude and attentiveness was especially evident

“The most fascinating thing about this internship is the opportunity to be here and witness Uruguay's non-traditional efforts at improving its educational system. They are jumping 20 years ahead to compete with developed countries and to distinguish themselves from other developing countries. It sounds easy, but being on the ground I can see how challenging it is to coordinate all the logistics so that each child throughout the country has access to the technology necessary to compete in the 21st century.”

*--Roberto Ponce Lopez
iSTEP 2011 Team Leader
Needs Assessment and Evaluation Lead*

It was also shocking to find that the cost of living was very high throughout Uruguay and that commodities, especially eating out, was very expensive, even compared to U.S. prices. Similarly, the team did not expect to find that most Uruguayans have internet access at home, about 60% according to our research, as well as data plans on their mobile phones. Due to this high cost of living, we found that many Uruguayans felt the need to work two and sometimes three jobs.



Fig 65: iSTEP Montevideo team

The one aspect of their work that all interns agreed upon as unexpected was the fact that 10 weeks flew by in the blink of an eye!

10.2 Remote Team Experiences

The team members working in Pittsburgh and Doha also had a very enjoyable summer and had some great experiences.

For the contingency that remained in Pittsburgh, they enjoyed exploring and learning more about what Pittsburgh has to offer. They were able to have experiences such as visiting the Carnegie Science Center, seeing the midnight screening of the last Harry Potter movie and going to a casting call for “Magnus Rex” – the code name for a movie filmed in Pittsburgh in summer 2011.

In Doha, Asma worked in the Qri8 Robotics lab at Carnegie Mellon University in Qatar with other interns and had fun shopping with them in local malls. She also enjoyed being close by to her family and having the opportunity to spend time with them during the summer months.

10.3 Lessons Learned

Every practical internship brings with it lessons that would not be acquired otherwise. However the iSTEP internship, with its globally distributed team, multidisciplinary focus and multiculturalism, provided the interns with unique lessons altogether. Due to the globally-distributed nature of the internship, the team had to learn to communicate in new and creative ways in order to keep each other updated on each other’s progress. While communication was challenging, it created opportunities for the interns to work together using new resources. For example, Skype, Google Documents and G-chat were used regularly. Thus, the interns learned that when working in a globally distributed team, it is imperative to keep multiple avenues of communication open at all times.

Similarly, the team learned to deal with the challenge of differing time zones. It was not always easy, especially when working with Asma in Doha, who was seven and eight hours ahead of the Pittsburgh and Montevideo contingencies, respectively. Since she worked

closely with interns in both locations, they had to be especially conscious about meeting deadlines and managing each other's time accordingly. However, all the interns attest to the fact that time management was very important for this 10-week internship.

The team also learned to be creative in terms of marketing. The team maintained multiple social media sites and they learned firsthand how rewarding it was when their efforts were recognized. Although it was their first time using social media and writing press releases, the team learned that with much effort, their hard work was rewarded. Overall, they learned that social media is a team effort and everyone in the team contributed to iSTEP 2011's success in its marketing campaigns.

Furthermore, the interns learned the importance of always having a plan and even contingency plans. Changes in the plan will undoubtedly occur, but it was much easier to work around them when there was a plan in place. Being able to be flexible and adapt to those unexpected changes was also vital for the success of the team. The ability to adapt was not only necessary for the team on the ground, but for all interns as they represented a wide range of cultures, countries, and skills. Both in communication and working styles, it was imperative to be flexible and understanding of one another. Consequently, the team learned the importance of clear deadlines and accountability and will take these lessons and skills with them into their future professions.

The Montevideo-based interns learned about an entirely new culture of professional, as well as communication styles. While some of the interns had to adjust to these new approaches, others felt perfectly at home. However, all gained insight as to what they would like to work in the future and how to adjust to new cultures. On the ground, interns were able to see firsthand how a country-wide policy is implemented and all the challenges that go along with it. One valuable lesson they took with them was the contrast between the ideality and the reality of a policy. The interns now understand that the execution of country-wide policies needs to be well thought out in order for the policy to achieve its goal. For example, Plan Ceibal has a grand aim, but has specific logistical and technological planning and systems that need to be in place for its success. For the public policy students on the team, this was an invaluable lesson for their future careers.

By and large, the team learned that having healthy working relationships, with each other and especially with the local partners, not only facilitates the success of such projects, but also contributes to the overall experience. Interns learned to pay special attention to the specific characteristics of communities and to avoid generalization of the needs and resources of that community. While the tasks at hand sometimes seemed daunting, the team learned that working with the community and focusing on how the projects would contribute to that community was an incredible motivational factor. As Afnan states, "nothing is truly as 'global' as technology," since it was the iSTEP 2011 technology projects that brought the team together to work with communities from a different part of the world and experience different cultures.

11. Conclusion

By the end of the iSTEP 2011 internship, the team completed their primary goals of developing three tools to help improve English learning at the secondary level in Uruguay. This was accomplished by developing strong relationships with all the partners on the ground, including those at ANEP, Liceo 39, IPA and INET. It is hoped that this partnership between TechBridgeWorld and ANEP will continue and the tools will eventually be available to more students in Uruguay.

As a result, the iSTEP 2011 team developed the following technology tools:

- 1) **Content Authoring Tool (CAT)**. The CAT, which was first developed in iSTEP 2009 and expanded in iSTEP 2010, is a tool for teachers to create and update English literacy content. The iSTEP 2011 CAT builds on previous work and allows teachers to group questions based on theme (sports and nutrition). Furthermore, the CAT now has functionality to export content to be used on any tool that can understand the XML protocol. The CAT was tested with student teachers affiliated with our partner, the Administración Nacional de Educación Pública. These student teachers liked the tool's interface and would prefer using the CAT to a word processor to design English literacy content for students.
- 2) **One Laptop Per Child (OCT)**. The OCT was designed so that students could complete English assignments, which were created by their teacher using the CAT. The OCT's interface allows students to view assignments, complete and review the assignment, and then export the assignment for grading. Student responses from two user testing sessions at Liceo 39 were positive and many students liked the idea of completing homework on their XO laptop.
- 3) **Facebook Tool (FBT)**. The FBT is a Facebook application designed for students to practice their English literacy skills by answering questions, created by their teacher. To motivate students, the FBT showcases the highest scorers (both individual and team scorers) on the front page of the application. The FBT was tested with Liceo 39 students, who were very motivated to use the tool because of their interest in Facebook.

Overall, students, student teachers, and secondary school teachers' responses to the different tools were positive and they look forward to continued use of the tools. Teachers would like to add in more content while students want to make sure the games are fun and enjoyable.

The iSTEP 2011 team had a fantastic experience participating in this internship. They learned a lot about working with a community to develop technology that will address their specific needs. They also learned that tailoring the projects to the schools in Uruguay, and taking into account their preferences and desires, will help to ensure success of the project. The iSTEP team is excited to transfer the work over to the TechBridgeWorld team for the long-term development of the projects and are also excited to stay involved and informed of what is developed.

Appendix A – iSTEP 2011 Media Plan

Introduction

This media plan will serve as a guide to the iSTEP 2011 team and TechBridgeWorld during three distinct yet overlapping phases. The first is pre-departure plans from February to the middle of May. The second part is during the internship, while on the ground in Uruguay from the end of May through July. The final phase is after the team returns from Uruguay in August. As the internship officially ends when the team returns home, much of the post-internship marketing plan consists of recommendations for TechBridgeWorld.

Some of the major objectives for this media plan include communicating the team's work to appropriate audiences and promoting the projects. In addition, the team would like to promote the project and engage the community, both within our campuses and within the local area, using a variety of ideas listed in the outline below. It is hoped that these outreach efforts will engage current CMU students, faculty, staff, alumni and administration of the Pittsburgh and Doha campuses. Other potential audiences include the Administración Nacional de Educación Pública (ANEP) in Uruguay, TechBridgeWorld staff and partners, and community members in Pittsburgh, Doha, and Montevideo.

A media kit will be created for this project. Some of the things included in the media kit include a cover sheet, a fact sheet, brochure about the project, press release, posters/photos, and a quote sheet. This media kit will be distributed to appropriate media outlets in our three target locations (Pittsburgh, Doha, and Montevideo) and will serve as background reference material for additional presentations and outreach activities.

The material that is created will be distributed in a variety of ways, including in newspapers, magazines, on websites, through emails, and on social media sites (such as Facebook, Twitter, Flickr, and YouTube). It will also be presented to the campus community through presentations and information sessions.

The rest of this document consists of the outline for the overall media strategy and how the media plan will be assessed.

Outline

1. **Pre-Internship (February – May).** *During this phase of the internship, the team will work to begin several initiatives that will serve as the framework for the overall media and marketing strategy for the internship.*
 - a. **Develop team communication strategy.** *This will help to improve cohesion and unity within the team so a united front can be presented to others.*
 - i. Create a joint email account:
 1. Created [istep.uruguay@gmail](mailto:istep.uruguay@gmail.com) account to provide a central location for the team to have a calendar and to send out official emails

- ii. Devise a schedule for sending in drafts/reports:
- iii. Hold pre-interviews about the internship
 - 1. Ask questions related to expectations, what looking forward to, etc.
 - 2. Gain experience recording with the video camera, editing footage, and uploading.
- b. Create a media kit.** *This will allow the team to have official documents that can be sent out to third parties.*
 - i. Write and send press releases:
 - 1. Send specific press releases will be sent to Pittsburgh Post-Gazette and local hometowns.
 - 2. Send to Carnegie Mellon Today magazine and Carnegie Mellon University (CMU) website
 - ii. Design flyers to garner interest
 - iii. Create a quote/message sheet
 - iv. Create a fact sheet/one-pager with information relevant to the team, the projects, and the internship program.
- c. Begin garnering interest using social media.** *This will allow interested parties, whether advisors, parents, or others to stay updated with information on the progression on the iSTEP internship.*
 - i. Join the iSTEP Facebook page and the Twitter Feed
 - ii. Create a Flickr account, a group blog, and a YouTube account
 - iii. Look into developing a separate iSTEP 2011 website
- d. Raise awareness in the university community.** *This will help to alert other students about the internship and to create initial interesting the projects.*
 - i. At CMU-Pittsburgh (CMU-P)
 - 1. Hang up posters around campus
 - ii. At CMU-Qatar (CMU-Q)
 - 1. Present about the trip/project at the TEDx CMU-Q event
 - 2. Present iSTEP team's work at 3rd Student Research Fair in Doha in May 2011
 - 3. Include posters in digital signage around campus
- e. Raise awareness within the community and potential sponsors**
 - i. Contact local Pittsburgh high school as possible partner school
 - 1. Make connections between the school and the iSTEP team so while on the ground the team can reconnect with the students and promote cross-cultural understanding with both an American and an Uruguyan school. Develop possible pen pal system.
 - ii. Contact CMU TV and KDKA TV Stations
 - iii. Create a d-list for updating interesting parties
- f. Initiate contact with Uruguyan partners.** *This will help to ensure that partners get acquainted with the team prior to arrival in Uruguay.*
 - i. Reach out to officials/administrators for more information
 - ii. Send an initial press release to the newspapers (El Pais, El Observador, Ultimas Noticias), which are also available online

2. During the Internship (end of May – end of July)

a. Record the iSTEP internship

- i. Take photos and video of on-site locations and travels
- ii. Record interactions/stories of locals
 - 1. Interview locals about their perceptions of the project
 - a. Obtain consent forms
 - b. Save and label
 - 2. Interview team members about experiences

b. Update social media channels

- i. Facebook
 - 1. Update 2x a week
- ii. Twitter
 - 1. Update 5x a week
- iii. Blog
 - 1. Maintained by all team members,
 - 2. Update 2x a week
 - a. One technical, one non-technical
 - b. Translate blog posts into Spanish and/or Arabic once a week.
- iv. Flickr
 - 1. Update as needed (1x a week minimum)
- v. YouTube
 - 1. Update as needed (when video edited/compiled)
 - a. Recorded by team in Uruguay

c. Maintain communications established prior to internship. *This will ensure interested parties are up to date on the activities and progress of the iSTEP 2011 team*

- i. Maintain the website
- ii. Send out emails to the d-list of interested parties
- iii. Send out press releases to newspapers/CMU publications announcing updates on project
- iv. Develop high school partner program and possibly implement a pen pal like system

d. Have media outreach with local partners/community centers and embassies. *This will help to establish a personal connection with the local community to ensure a smooth integration of the team.*

- i. Connect with US Embassy:
 - 1. Upload videos and publish information about activities in Uruguay and USA
- ii. Work with ANEP for publication about internship
 - 1. Write article for Infodeducar (monthly publication)
 - a. Written in Spanish and translated to English
- iii. Host events with local school
 - 1. Run a soccer match
 - 2. Host a mate gathering or an asado

3. Post Internship (August – Future). *While the internship is concluded at this point in time, these are recommendation to the TechBridgeWorld team about possible media outreaches. Some of these activities could also include working with the iSTEP 2011 students for the promotion of the project and the internship.*

a. Update and finalize social media and interested parties

- i. Maintain Facebook, Twitter – done by TechBridgeWorld
- ii. Finish blog, YouTube, Flickr, website
- iii. Final emails to d-list
- iv. Final press releases to newspapers and magazines

b. Create final documentations

- i. Finish and submit final report
- ii. Finish and upload final video and picture slide show
- iii. Create a final presentation to be used as needed

c. Help promotion of iSTEP and future internships. *This will help to educate the campus community and the campus administration about the iSTEP program and what was accomplished during the internship.*

- i. Host a wrap up session for involved students
- ii. Prepare presentations about project for the campus community
 1. Presentation to Qatar Foundation
 2. Presentation to President Cohon and other university administrators
- iii. TechBridgeWorld Interactive (Pittsburgh)
- iv. International Festival (Pittsburgh)
- v. iSTEP Information Session (Pittsburgh and Doha)
- vi. Study/Work Abroad Fair (Pittsburgh and Doha)
- vii. Global Opportunities Fair (Doha)
 1. Share information with students about the iSTEP experience along with other study abroad experiences
- viii. Participate in Doha Tweetups (Doha)
 1. Meet-up of social network users from around Doha to discuss activities

d. Finalize media outreach in Uruguay

- i. Submit final report to ANEP
- ii. Submit final press release to newspapers/journals

Assessing Effectiveness

Effective media planning is essential to successful advertising. Any project that is to be promoted effectively needs a platform to allow for the greatest degree of impact for its goals, objectives and messages in general. To do this, we must plan ahead and assess the results. This assessment will primarily be for the end of the pre-internship period and the end of the actual internship.

1. At the end of the pre-internship period. *The main purpose behind this step is to evaluate the success of the media efforts that take place before the start of the project.*

a. Who has been reached and how were they reached

- i. Check who joined Facebook, following on Twitter, read the blog, number of people on d-list

2. End of the Internship

- a. **Digital Media** (number of blog visitors, Facebook group members/likes, Twitter tweets or re-tweets)
 - i. Will be used to help evaluate:
 - 1. How well the project is known in the three locations: Pittsburgh, Montevideo and Doha.
 - 2. Who are the people who know about the project: students, faculty, local communities, media ...
- b. **Send surveys to followers on digital media asking for response**
 - i. How heard about the project: campus outreach, social networks, newspapers, etc.
 - ii. Did they have enough information
 - iii. Could they stay up-to date
- c. **What was the most effective/least effective media tool, why and where?**
 - i. Team evaluations
 - ii. Looking at digital media results
- d. **Physical media: presence in newspapers, brochures and flyers...**
- e. **What could be done better? Success/failures?**
 - i. Team self-evaluation
 - ii. Partners evaluation
 - iii. TechBridgeWorld evaluation
- f. **Compare the results of the before and during media campaign.**
 - i. Outreach to people
 - ii. Knowledge about the project
 - iii. Most effective tools
 - iv. Least effective tools

Appendix B – iSTEP 2011 Team Plan

Introduction

This document contains the team plan for the iSTEP 2011 internship.³ With eight team members three continents fulfilling both technical and non-technical roles, there are certain responsibilities each person has. These individual duties are described by their position, first covering the non-technical roles, then the technical leads, and finally the technical floaters. Following these individual paragraphs is our team's integration plan. For this multi-faceted internship, there are many areas of collaboration where multiple team members will join forces. This section details areas we will all be working on.

Non-technical Roles

Needs Assessment and Evaluation Lead (Roberto Ponce Lopez)

I will be in charge of assessing the needs of the communities we will be working with, as well as evaluating the outcomes of all three projects. Depending of the resources available to our team when we arrive in Montevideo, I will figure out the best way to accomplish the created needs assessment and evaluation plans; I will modify them as needed.

Pre-Internship Preparation

I will be working closely with the course instructors and the technical leads to develop a needs assessment plan and an evaluation plan. I will do this during the independent study. In addition, I will be compiling the technical leads' questions to include them into the two plans. I will contact Matt Richards to be trained in recording and editing video. I will be responsible for one camera we will be using in Uruguay to record the interviews and focus groups we will carry out. I will conduct Spanish Lessons for all team members interested in improving their communication abilities in Spanish.

Working with Advisors

I will seek the advice of Beatrice Dias for defining the needs assessment and evaluation plan. As starting point, I will take as reference the framework developed by Beatrice to evaluate ICTD projects. Then, I will request further insight from her experience. I will also keep contact with her during the internship, in case we need to adapt our plans if logistics are not as planned.

I will be consulting with Silvia Pessoa regarding all publishable documents written in Spanish, for instance press releases, or other academic articles that could be published at ANEPs journals. We also plan to invite Silvia to join our Spanish lessons if she wants to.

³ Prior to the start of the internship, the iSTEP 2011 team consisted of eight team members. One team member departed the team for personal health reasons and the team redistributed roles (as seen in Section 2.1 of this report. This version outlines the original team plan with eight team members.

Individual Roles during the Field Work

I will prioritize to find answers to the technical lead's questions, so that they have accurate information to start working on their projects as soon as possible. In general, to accomplish research according to the plans, I will be implementing three tools: focus groups, interviews and tests. Below I explain the different tasks involved with each one.

The plan is to conduct focus groups with students, and with their parents and teachers; interviews with experts in education, teachers, and students; and the achievement tests with students. The purpose of the tests will be to measure students' academic progress before and after they use the tools developed by our team. Depending on the conditions and opportunities we will find, we will define how many interviews and focus groups will be conducted. The profile for the focus groups and interview participants will be defined based on our plan and our partner's needs. In this part, I will be working closely with Vanessa and partners.

I will conduct and moderate the focus groups. Before each session, I will prepare topics to direct discussion toward the plan's objectives, with input from the team. After each session, I will make a report with the main findings to present to the iSTEP and TechBridgeWorld teams.

The work dynamic for the interviews will be similar. I will prepare a questionnaire or a guide of topics to be sure that the session will address the relevant aspects of the plan, with input from the team, especially the technical leads. After the interview, I will prepare a report with the main findings, and support it with video recorded material if available, and present findings to the iSTEP and TechBridgeWorld teams.

Regarding the English Literacy test, I will coordinate with Vanessa to determine with our partners which test is better to use and when and where to implement it. Once the test is completed, I will build a database with the test results. At the end, I will prepare a report with the accomplishment results and present findings to the iSTEP and TechBridgeWorld teams.

Interaction with other team members

All team members will be welcome to join the focus groups, interviews and the implementation of the test to observe how students interact with the tools they have developed. As well, I will recompile their questions or concerns to direct further research.

To ensure that the focus groups, interviews, tests and in-class observations are carried out properly, I will ask for Vanessa for support in coordinating the logistics, for example, scheduling the sessions, finding a proper place, gathering the participants, getting the permit from the scholar authorities, seeking our partners' advice. As well, we will be working together to obtain consent from participants as is necessary to fulfill the requirements of the IRB protocols.

I will require Vanessa's help to seek advice with our partners to identify potential candidates to be interviewed and requesting their contact information. I will also require

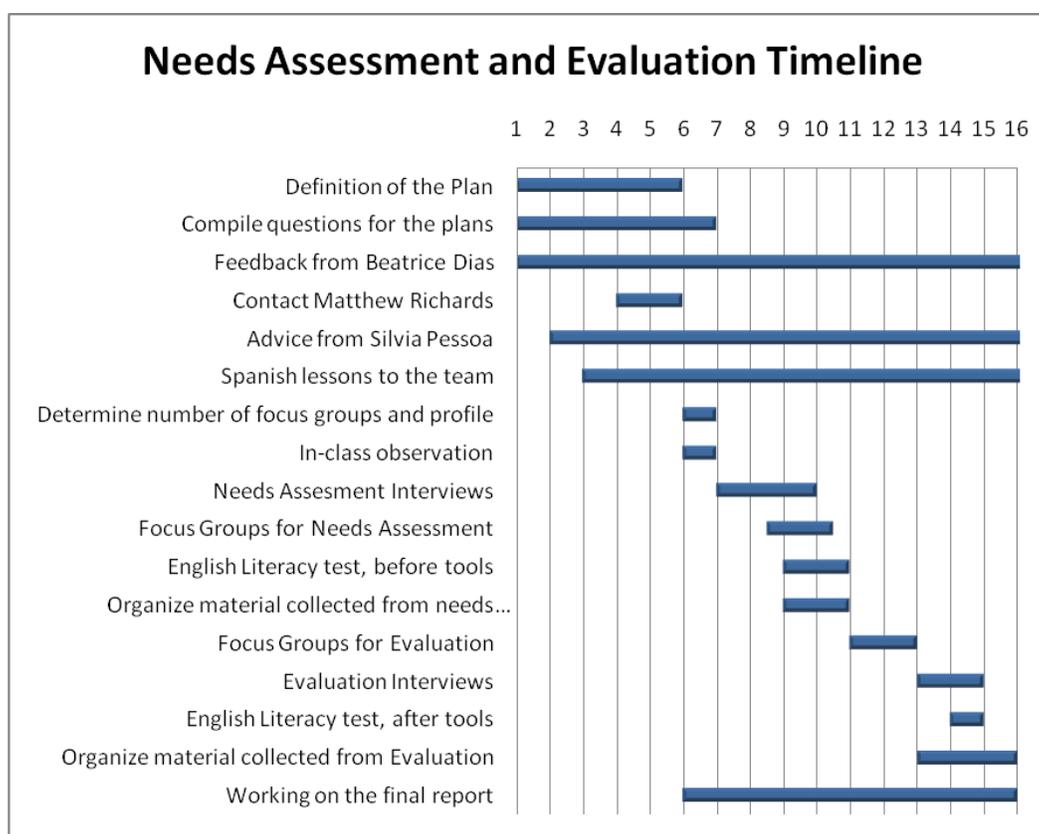
support from Jon, Elise, Vanessa and Afnan to video record the focus groups and to conduct the tests among students. Depending on who is available at the time, I will ask for their help. For the interviews, I can record them on my own.

Additionally, I will teach key Spanish phrases to the other team members traveling to Uruguay and provide any needed support when translating to or from English (such as travel arrangements, shopping, currency exchange, etc.). If a press release or article will be published in Spanish, I will ensure the information is accurate and well-written. Before we get something published, I will coordinate with Vanessa to get the partners' approval.

Moreover, I will be sending a weekly submission in Spanish for the blog iSTEP 2011. Finally, I will be pending of the team meetings at Skype once a week. As well as sending to Meghan weekly updates for the final report.

Timeline

Below is the timeline I am planning to conduct the activities I have related before. The numbers at the top indicate the number of weeks, from six weeks before the internship to the ten weeks the internship comprise.



Partnership, Coordination and Marketing Implementation Lead (Vanessa Vázquez)

As the Partnership, Coordination and Marketing Implementation lead I will be working with all of our iSTEP team members and serve as the key liaison between our team and

local partners. This includes making and maintaining connections with these partners, including but not limited to those at ANEP and in the local school system. I will be responsible for coordinating meetings amongst ourselves, and any meetings that need to occur with our various partners. I will also be responsible for relaying information between our partners and our iSTEP team.

Pre-Internship Preparation

During this phase of our internship, I will be gathering as much information as possible regarding our partners and our team. I will be working closely with Meghan to help the team get to know each other and to establish a good working relationship. I will seek the advice of Silvia Pessoa, a course advisor born in Uruguay, regarding how to interact with our partners and what the business culture is like in Uruguay and in the education sector specifically. In order to ensure we are prepared, I will meet biweekly with Sarah Belousov, one of our course assistants, to discuss the progress and hear her feedback regarding the partnership. She will introduce me via email and I will make sure to CC her on all future emails with partners in order to make sure she is kept abreast on all progress. I also intend to establish, at least, a preliminary working plan with our partners in Uruguay and have already begun compiling a list of questions that we all have for our partners in Uruguay.

Prior to departing, I will also try to meet with as many professors on the Carnegie Mellon – Pittsburgh campus that have experience with using technology for development. One such person that I will contact to interview is Matthew Kam, an Assistant Professor with the Learning Sciences group in the Human-Computer Interaction Institute at Carnegie Mellon University. His recent Ph.D. dissertation investigates how e-learning games on cell phones can be designed to extend literacy and second language learning among children in rural areas and the urban slums in the developing world. We have planned that our team will try to meet with him to hear his perspectives and insights regarding this kind of research.

Lastly, I will also aid in teaching Spanish lessons amongst our team. We will begin meeting once a week a month prior to departing and I will make sure to share some colloquial phrases with the team. I will also coordinate at least one dinner, to a Peruvian restaurant, so that we can continue to build our relationships and get to know each other. I will also be attending the camera workshop with the team.

Individual Roles during Fieldwork

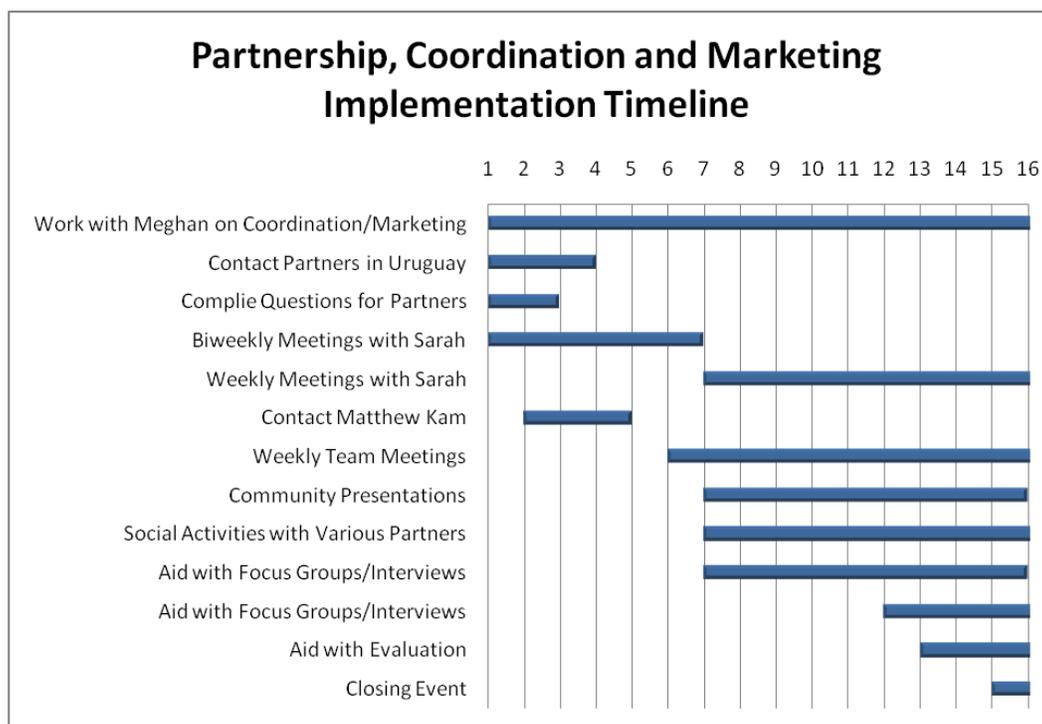
While in the field, my role will become still more critical as our team will now be dispersed among three continents. I will still serve as the liaison between our team, partners, as well as the TechBridgeWorld team here in Pittsburgh. In order to keep the contingency in Pittsburgh abreast on the happenings on the ground, I will coordinate weekly meetings via Skype for the entire team, course instructors and assistants. I will continue to meet with Sarah, this time weekly, to discuss our progress with partners.

I will work closely with Roberto to help organize focus groups, needs assessments, project evaluation and disseminating the information we gather. While all team members will engage in this part of the project, I will coordinate the logistics as well as the IRB consent procedure for participants. Moreover, I will help translate our interview and focus group

findings. Further, I will be in charge of developing and organizing presentations to the community (including students and their parents). These presentations include introducing our team and projects to the school administration and families prior to our projects being implemented in order to inform them of what we hope to achieve. This would be a wonderful way to engage the community and get to know them better. Along these lines, I would also like to organize some purely social activities between our team and our partners. This includes our colleagues, those working at the school/administration, as well as the youth and their families. This would not only serve to help us understand the population better, but will also likely build trust, making our work a little bit easier and a lot more pleasant. Some of these ideas could include drinking mate together or putting together a soccer game. I will make sure that I manage our partners' expectations well, however, and make sure they know that the process will be lengthy and that if the project shows promise, TechBridgeWorld will work to continue them.

Another important role I will have will be to coordinate with our team members who are not in Montevideo, this includes implementing the marketing strategies developed in Pittsburgh. My role in this sense would be to organize teleconferences amongst our dispersed team, to send out press releases to local TV, radio and newspapers and to implement any other ideas Meghan and I come up with. I will also help to coordinate the connection between a Pittsburgh high school and one in Montevideo. I will also make sure that the team members in Uruguay document the entire process so that we could use this to promote our work and projects. Lastly, before we depart, I will organize a culminating event to close our program.

Timeline



Marketing, Coordination and Dissemination Lead (Meghan Nahass)

As the Marketing, Coordination, and Dissemination leader one of the most important roles I have is to coordinate the teams located on three continents with TechBridgeWorld. Some of these responsibilities include scheduling meetings and ensuring there are open lines of communications between all involved so issues and concerns can be addressed. Another part of this role includes preparing any final material related to the iSTEP internship for the project, i.e. final presentations, reports, manuals, etc. These will need to be completed in a timely fashion and be of the highest quality. A third part of this role involves developing a marketing strategy to help promote iSTEP and the team's projects to the university community, to locals, to sponsors, and to TechBridgeWorld. The marketing plan related to Uruguay will be implemented by Vanessa. One final role of this position is to represent iSTEP as needed during the summer internship in Pittsburgh.

Pre-Internship Preparation

Prior to the team's departure for this internship, I will be working to establish close communication ties between all team members to ensure the team gets to know each other and to learn how to work as a team. One way to improve relationships includes organizing social events outside of the internship, such as getting coffee or alfajores from the Tango Café or going to dinner at a Peruvian restaurant. This will help to improve team cohesion and unity. Another way is to try to establish meeting times that are convenient for all of our team members across the globe. We will also try to engage in other activities such as Skyping and chatting online to get to know each other better. To help ensure smooth communication, I created a contact sheet and a joint Gmail account. These will both help the team stay connected and help to coordinate projects as needed.

Another important thing to accomplish is to create and begin to implement our marketing strategy. For my role, this includes helping to develop and refine some of the initial marketing ideas that we have thought of, including outreach efforts to the community. One initiative that I will be taking point on will be connecting with a local high school Spanish class to try and create a partner class for the students in Uruguay with whom the team will be working. I will work with the head of the Modern Languages department to see if this is a feasible idea and if so, with which teacher's class it would work out the best. The hope is that this will turn into a partner school for the Uruguayan students and could help promote iSTEP's work in the area.

In order to create and accomplish the many goals we have outlined, I also plan to meet certain advisors, including Chris Labash and Matt Richards, to discuss the media plan and learn about using a camera/editing film. I also plan on having meetings with our course advisors and assistants to keep them updated and to seek their advice on the projects the team is working on. In particular I plan on meeting with Ermine to discuss the media plan and marketing.

Also, prior to the internship beginning, I would like to have set schedules for the team to follow about submitting materials for the final projects during the time in Uruguay.

Establishing these dates early and beginning to work on the final report and presentations as soon as possible are important to ensuring the team produces the highest quality report.

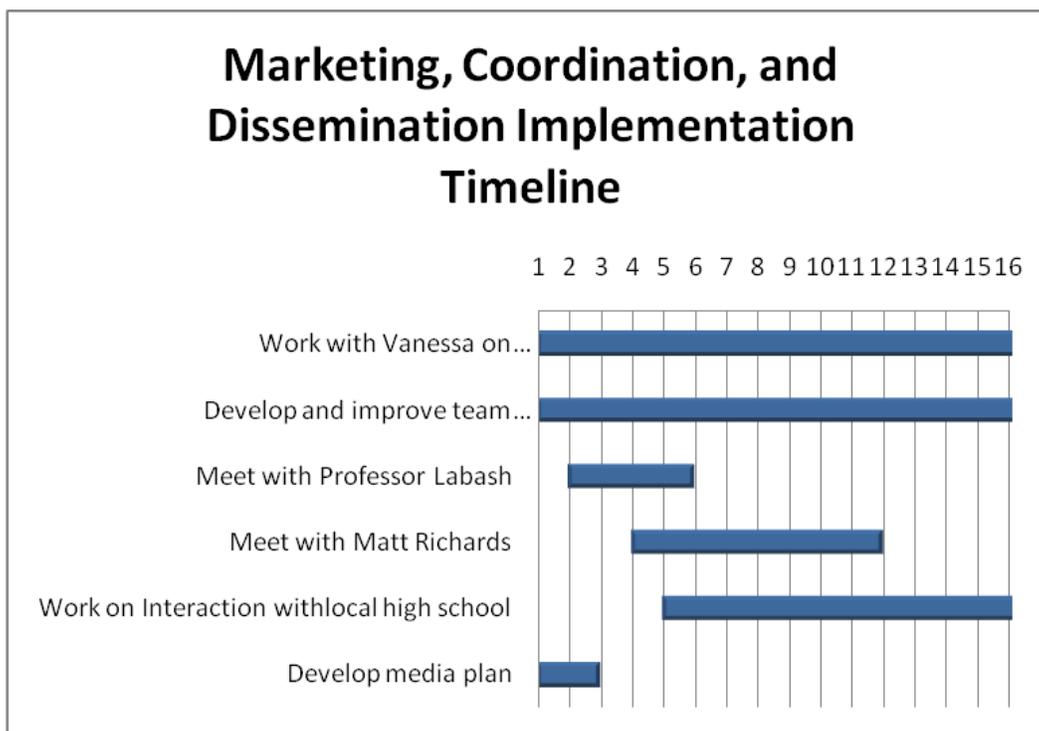
Individual Roles during Fieldwork

During the internship I will continue to work on the marketing plan and media outreach while supporting the implementation of it on the ground in Montevideo. I will work with Vanessa to ensure the team members in all locations are communicating and knowledgeable about the progress being made. I will also be sure to keep TechBridgeWorld up-to-date as well and meet with them as needed in Pittsburgh. As one of two members on the team remaining in Pittsburgh, I will also be responsible for helping to promote iSTEP as needed at any presentations or functions and will be in charge of developing the related promotional material.

I will also maintain contact and continue to meet with our course advisors and assistants to receive their feedback on the team's work. Related to this will be meeting with other advisors (such as Chris Labash and Matt Richards) and working with them as needed to ensure our project can proceed as smoothly as possible. Similar to prior to departure, I will be the point person for helping to connect the Spanish class in the Pittsburgh high school with the students in Uruguay. It is my hope that these two school will be able to make a connection and work together to help improve the foreign language skills of both sets of students.

With the team I will be helping to maintain the social media networks that we have established as well as being the point person on continuing to update interested parties in Pittsburgh. As mentioned before, I will also be in charge of collecting, organizing, and editing material for the final report and will be establishing deadlines and sections to be completed. It is my hope to have 2 drafts of the final report prior to the final one being submitted. I also will be creating a final presentation that can be used as needed during presentations to the campus community upon return from the trip.

Timeline



Technical Roles

[One Laptop Per Child Tool \(OCT\) Technical Lead \(prepared by Jonathan Beebe\)](#)

Pre-Internship Preparation

As the Technical Lead for the One Laptop Per Child Computer (OLPC) Tool (OCT) project, there is a lot of work for me to do before the iSTEP team travels to Uruguay. As I will be designing the OCT to be compatible with the OLPC XO laptop, I will learn how to develop applications for the XO laptop and the Sugar desktop environment. This will involve learning the Python language, as that is the language that is used to develop applications in the Sugar environment. I will also need to familiarize myself with the Sugar API and then gain practice developing applications for the XO laptop. Also, I will need to contact our partners in order to determine what versions of the XO laptop we will be working with in Uruguay. Once I have done all of these things, I can begin developing a preliminary version of the OCT, just to get an idea of the capabilities of the language and environment.

Individual Roles During Field Work

Once in Uruguay, the initial phase of the OCT plan will consist of assisting the Needs Assessment Lead with evaluating the factors relevant to the development of the OCT. This will include researching Uruguayan culture and attitudes toward learning, inside and outside of the classroom. Determining the role of the XO laptop in students' lives and understanding how they use the laptops will be extremely important in deciding what the OCT will actually consist of, whether it is in the form of an educational video game or a

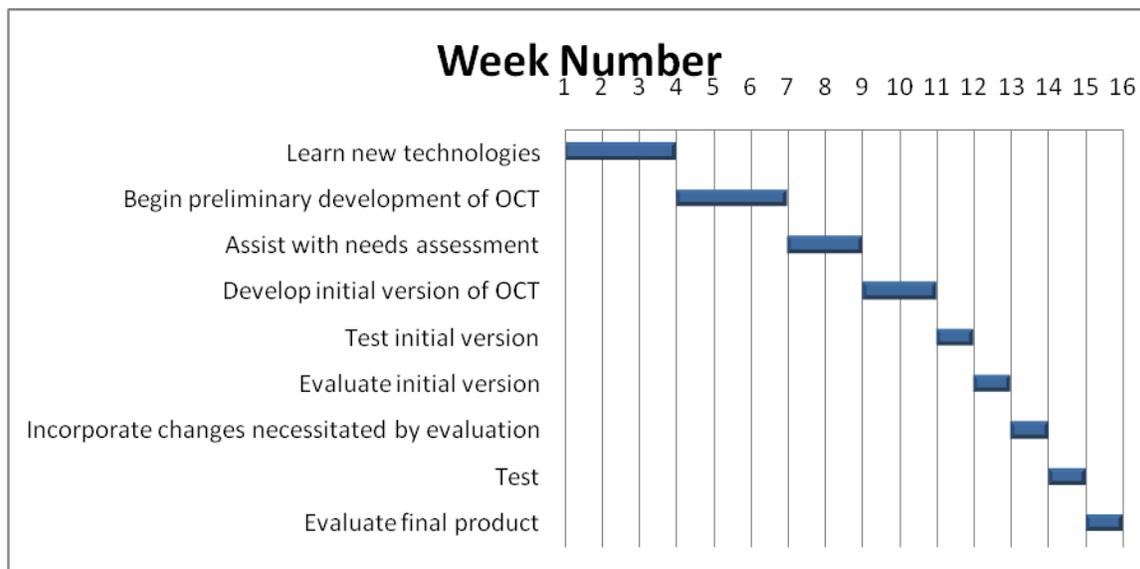
more straightforward educational tool. This will be accomplished through the use of focus groups with teachers and parents of students and interviews with our partners, teachers, and students. Constant and clear communication with the Needs Assessment lead and the rest of the iSTEP team will be crucial for this phase of the project. Also, vigilance in helping the Needs Assessment lead with the development of questions and aiding in the assessment process itself is very important in ensuring that a clear, cohesive vision for the final product is developed.

Due to the nature of needs assessment, the development of the OCT will be a very fluid process. There are bound to be unforeseen obstacles and challenges that the team will not initially be able to plan for, so it is very important to keep all team members on the same page to ensure that the project will be able to adapt to new constraints as smoothly as possible. With this in mind, the next phase of the OCT plan is to begin the actual development of the software for the OCT, in conjunction with the technical floaters. It will be vital to ensure that the technical floaters remain in the loop of communication with the needs assessment lead, so that all parties will be up to date on the current project conditions that will dictate the development of the OCT. To do so, I will have a weekly Skype conference with all of the technical floaters, in addition to the weekly Skype conference that we will have involving the entire iSTEP team. In addition, we will upload all relevant documents such as meeting minutes and design specifications onto Google Docs so all the technical floaters will have access to all of the information. Also, email and instant messaging will be heavily utilized to ensure the technical members of the team are always in contact.

As for the actual development itself, I will implement an iterative testing process that will incorporate the use of unit testing to ensure the OCT has all of the intended functionality. I will also document all of my code exhaustively to ensure that it is very clear how each version differs from another, and that the final version of the OCT will have an intuitive and extensively detailed user manual. In order to evaluate the effectiveness of the OCT, I will assist the Needs Assessment Lead in creating a test that will assess the student's English literacy ability as a baseline. We will then test the same students after they have worked with the OCT for a period of time to determine how much they are learning from the OCT, and make changes to the OCT accordingly.

These activities will represent the bulk of my duties, but there will be many other various tasks I will complete. As part of the iSTEP team, I am committed to doing everything I can to help other members of the team with their tasks. Specifically, I am committed to learning how to record and edit video, to assist with the interviews that will take place as part of needs assessment. I am also taking on the role of maintaining the official iSTEP 2011 Twitter feed as part of the overall iSTEP media plan. In addition, I am committed to re-learning Spanish to my previously attained level of being conversationally fluent to enhance my overall communication skills with our partners in Uruguay. I will accomplish this through the use of a Spanish literacy computer program as well as workshops with the entire iSTEP team.

Timeline



Mobile Phone Tool (MPT) Technical Lead (Afnan Fahim)

Pre-Internship Preparation

In the time after the culmination of the iSTEP course and before the start of the fieldwork in Monte Video, I will be focusing on two main objectives: Utilizing contacts and sources to form a better picture of the needs of the MPT and the infrastructure available in Uruguay for the development of the MPT, and once that has been achieved to a significant degree, learning about the proposed platform and practicing development so that once the actual development of the MPT commences, we won't have to focus that much on learning how to implement but would have time to think about what to implement.

For the first objective, I would get in touch with Silvia Pessoa, a Uruguayan born CMU professor, to get contact details of internet service providers, mobile phone vendors, telecommunications authorities and school administrations to figure out the market share of mobile phones based on their platforms for our target audience. Also, I will look into the legal issues and feasibility of distributing mobile applications using online portals.

Along with the above mentioned research, I would also get in touch with Freddie, the technical advisor, to obtain access to the JAR files and source code of the previous MPT implementation. Once this has been accomplished, I will spend time understanding the workings of the MPT and use tutorials to practice and learn more about mobile application development.

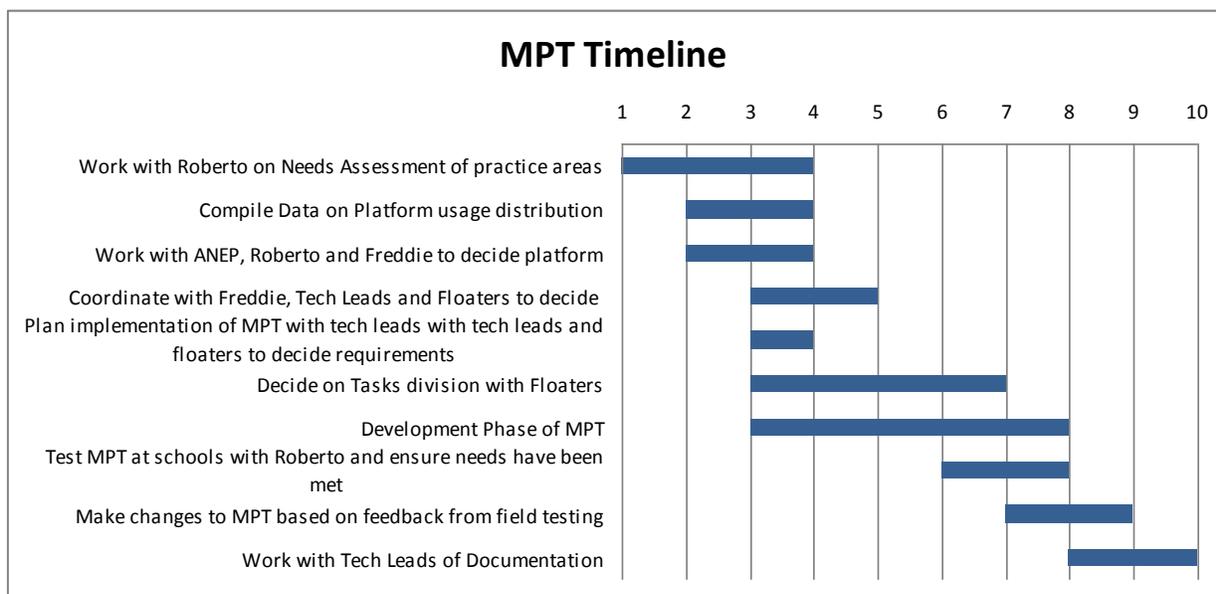
Individual Roles during Fieldwork

As the technical lead for the Mobile Phone Tool (MPT), I will be leading the development of the MPT. This will start by coordinating heavily with the Needs Assessment Team to learn

as much as possible and relevant about the required features and properties of the MPT, followed by working with the tech floaters, technical leads and technical advisors to decide the outcomes of the MPT project, which in turn would lead to planning the development of the tool. The design and planning phase will be followed by an in-depth collaboration with the technical floaters and technical advisors in order to complete the development of the tool. During this process, I will be involved in breaking bigger tasks into smaller deliverables and then meeting with the tech floaters to decide the division of tasks, and also in fixing deadlines to ensure that the project can reach culmination on time. Once the development phase has been completed, I will get together with the tech leads and advisors to decide on how to test the tool, and then eventually pair up with the partners to ensure that the tool meets the requirements of the partners. During this whole process I will also be making efforts to provide opinions and contribute to the decision making processes of the other projects within the iSTEP team, and working with the rest of the team to ensure that the manuals that we create for each of the tools are consistent and informative.

Apart from the development of the MPT, I will also be contributing to some of the other team tasks. This will include collaborating with the other interns to produce video blogs to give our followers a better visual sense of our experiences. Also, along with the other technical interns, I will be writing technical blogs periodically about the different parts of the MPT that I am working on, challenges I faced, and hopefully, how I overcame them.

Timeline



Content Authoring Tool (CAT) Technical Lead (Elise Gonzales)

Pre-Internship Preparation

Before travelling to Uruguay, I have several projects and expectations to complete. Specifically, I have several pre-needs assessment questions to be answered, a protocol to develop, research to do, and plans to make for software development.

My pre-needs assessment questions are about content and computers for teachers. I need to know, or at least have a general idea of, who will be providing the content. Is ANEP going to provide all the content? Are the teachers going to provide all the content? Will both be providing content? Will ANEP be making general content rules (categories, etc) and teachers will be providing actual questions? Getting a good idea of how this will work before I develop plans will be extremely beneficial because it can give me a good base audience for my application. I also want to know, if teachers will be using the application, what kind of computers they have. I have not yet been able to find documentation online on whether or not they receive XO Laptops as well. If they do not, I would like a general overview of the type of computer they have.

The protocol I want to develop will be the biggest part of my independent study. This will involve all technical persons, Jon, Afnan, Hanae, and Asma. The protocol will be the basis of most of our work and will need to be thorough, adaptable and expandable. It needs to be able to designate all types of questions and be able to expand to new types of questions as well. It also needs to be written in such a way that if some tool does not understand a specific question, that question can be skipped and ignored. Using a protocol amongst all projects will allow the Content Authoring Tool to provide customized content for both the Mobile Phone Tool and the One Laptop Per Child Tool. This is an important feature because then whoever is editing the content will not have to use two separate tools or files for each of the devices to which they want to provide content.

I also want to do research into current OLPC and ICTD projects. There are a lot of people in the world working on projects and I want to see their progress. I want to see if there are any content authoring tools under ICTD and their research into the area. I also want to see different OLPC projects, how they transfer data and how they store data. Storing data is an interesting problem because in the current CAT, it is stored in a MySQL database. However, this may not be a viable solution for the OLPC so this is where the protocol comes in and the protocol file would be the storage.

Finally, I have several plans I want to develop before I get to Uruguay. They are contingent upon questions being answered when we get to Uruguay, so I want to have several plans already in place based on their answers to the questions. I would like a plan for a CAT with and without internet. These would be based on the answers to my questions above. The plans should be robust but not too specific so that I do not get too ahead of myself and make too many assumptions. I think the plans should include a programming language and general outline of how it should work. This would all be documented and I would want Freddie to review the plans.

Individual Roles during Fieldwork

My role during the fieldwork will be to assist during interviews and research, to have my Needs Assessment questions answered; to update the iSTEP 2011 Facebook; to develop, test, and implement the Content Authoring Tool; and create a user manual for it. On paper, this does not sound like a lot but it will be a hefty amount of development and testing.

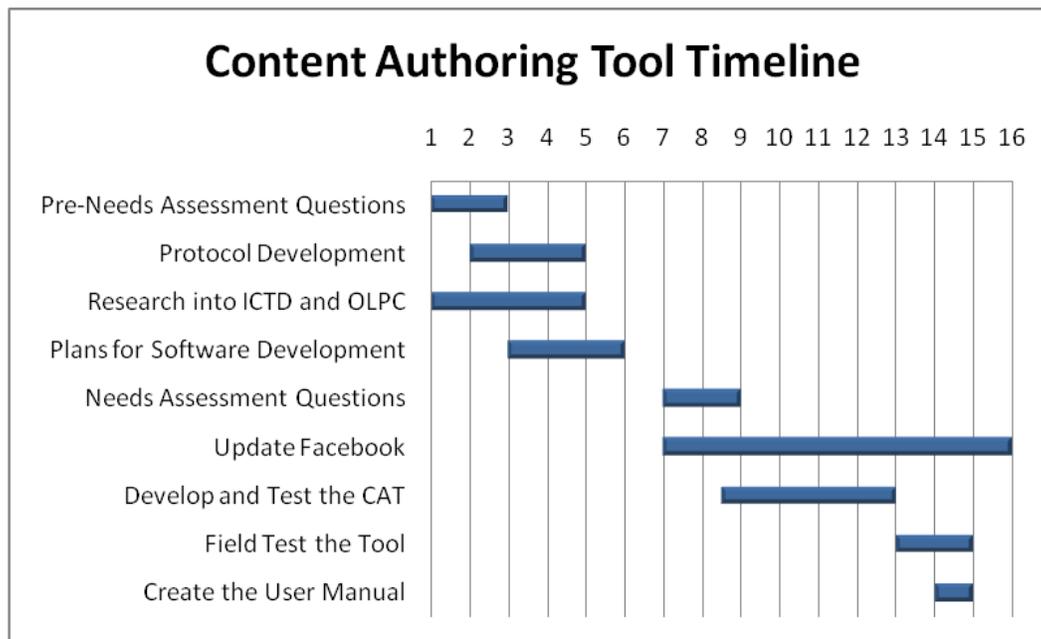
My assistance in interviews and research will be on an as-needed basis by the Needs Assessment Lead. He will be able to tell me when he does and does not need assistance from me and I will provide it during the time I have at the beginning. He will also be able to have my Needs Assessment questions answered. These are how and where does the content editor use their computer and more specifically, where will they use the Content Authoring Tool? If they want to edit content from home and they do not have internet, the tool will need to work without the internet. If they only work at school or in the office and have no interest in working without the internet, the tool can remain web-based. This is a very important question for the Content Authoring Tool because it will be the basis for the entire tool and how the tool will be used.

Throughout fieldwork in Uruguay, I will be helping Hanae to update the Facebook account. Facebook will be a good way to reach friends, family, TechBridgeWorld fans and potential investors. They will be able to see what we are doing and when. The updates will be professional and on a daily or every other day schedule. We will also have “guest updaters” who can talk about what they are doing for iSTEP and we can upload pictures of real progress and what we are doing.

Finally, my most important role is to develop the Content Authoring Tool. This is the main bulk of my internship and will start after the second week, when I hope all my questions will be answered. My development will include the front and backend after figuring out exactly how the tool will best suit its audience in Uruguay. I will assess what they want and need and how they will use it and use that information to develop my application. From the plans in my independent study and their answers, I will have a good basis for beginning production. During production, I will also have a means of testing using, preferably, some sort of unit tests. I will develop the unit tests before I start writing the Content Authoring Tool to give myself a basis and standard to reach. This is important because I will be able to prove to myself and to my superiors the tool works and has all the important functionality needed. After I have finished developing and testing the tool with help from the Technical Floaters, I will then have teachers test and evaluate how they like the tool. If they want any changes, this will be done in weeks seven and eight.

After I have the tool finalized, I will use the ninth week to develop a user manual. My last internship was in technical writing and instruction development so I will be able to use a lot of what I learned from that to make the user manual as helpful as possible. It will include instructions on everything from set up to editing questions to publishing the questions on the different devices. The instructions will be step-by-step with helpful screen shots to assist the user. I can also get assistance from the team members who speak Spanish to help translate the user manual if this is needed.

Timeline



Technical Floater (Hanae Timoulali)

Pre-internship preparation

To prepare for the internship, I am researching different areas relevant to the projects. I am trying to build on our research assignments and understand the needs and conditions of Uruguay in general and our target communities in particular. For instance, we need to figure out the types of platforms used in schools, how much access students and teachers have to computers and mobile phones and their level of expertise as well as any other information that could inform our decisions making process.

In addition to this, I am researching relevant technologies that will be used for the different projects. Based on the presentations for the different projects and the suggestions of the team lead, there is a big support for using Java as a main language for development. However, to be better prepared for uncertainties and the possibility of having to deal with different languages, I am trying to not restrict myself to Java. The main idea is to find a technology that is portable, flexible, well documented and sustainable. First, portability is important because we are not sure about the types of platforms used by the target communities, so we need to come up with a solution with minimum interoperability issues. Flexibility and documentation are also crucial because of the short duration of the internship and the need to come up with a functional solution responding to the needs of the communities. Also, the technology that will be considered should be sustainable. The objective is to produce tools that could be maintained and sustained by the communities for years to come. Thus, even though Java seems to be a good choice, it is very important for me to explore other options in collaboration with the Technical Leads.

Another important area that I am researching is whether we could utilize platforms already available with TechBridgeWorld or build new tools for the projects. To answer this question, I will have to meet with Freddie and Ermine and see how much of the existing tools we could use and how much access we have to them. This is also an important research area as it can save the team time and effort in terms of software development and allow us to spend more time doing needs assessment and evaluation. In order to achieve this, I will have to look at the previous projects' requirements and outcomes and consult with the course advisors and the Technical Leads and decide on how much they could reuse in their individual projects and the advantages and disadvantage of doing so.

Because I am going to be involved in three projects at the same time, I am preparing a plan on how to communicate with the different team members, especially the technical leads and technical floater, and how to organize the data exchange process during the internship period. My previous professional and academic experiences have both been focused on working on one project at a time, so one of my goals is to take advantage of the previous technical floaters' experience. The main areas that I am interested in are: the problems that they encountered during the internship and the best practices that they came up with, if any, to improve the efficiency and effectiveness of the workflow.

Individual roles during field work

One of my responsibilities as a technical floater is to provide support on development and troubleshooting for the three projects. During the internship period, I will be supporting the development of the three tools while at the same time researching relevant technologies that might not have been covered before. The main challenge will be learning and using new technologies, if needed, while keeping the same work momentum due to the short duration of the internship. I will also be working along with Asma on maintaining the iSTEP 2011 website, blog and other tools needed such as databases and social networking pages.

Along with developing and maintaining software solutions, I will also be involved in documenting the work process and producing the final report. Each project will have its own set of documents: requirements, design, unit testing, bugs... More specifically, each team member will have its own documents and it is very crucial that we define a standardized method for handling the same type of data. One option would be:

- Google documents to be communicated by mail and backed up on different computers in Uruguay, Pittsburgh and Doha for all the common tasks such as: status reports, meeting minutes, needs assessment, partners' questions and answers and every other information that will pertain to all the team members and contribute in one way or another to their projects.
- Skype or any other conferencing tools for team meetings.
- Flickr or any other online picture repository for photo exchange. This data needs to be accessible to team members in Pittsburgh and Doha for marketing and communication purposes.
- Bugzilla or any other bug management tool for unit testing.

During the internship period, I will work closely with Asma to support the three projects. We will need to have daily conversations using Skype or chatting tools such as Gtalk or AIM to exchange information and progress reports. One important factor that will need to work with is time difference. Given my previous long distance work experience, I know that there could be some challenges and that the best way to overcome them is constant communication and updates. Whereas we both come from a technical background, we would try using our strengths. Asma, for instance has experience in web design whereas most my experiences are on the backend side of the projects. We will need to support each other and exchange tips and best practices from our past experiences and research. Hence, when there is a new task we will follow a protocol:

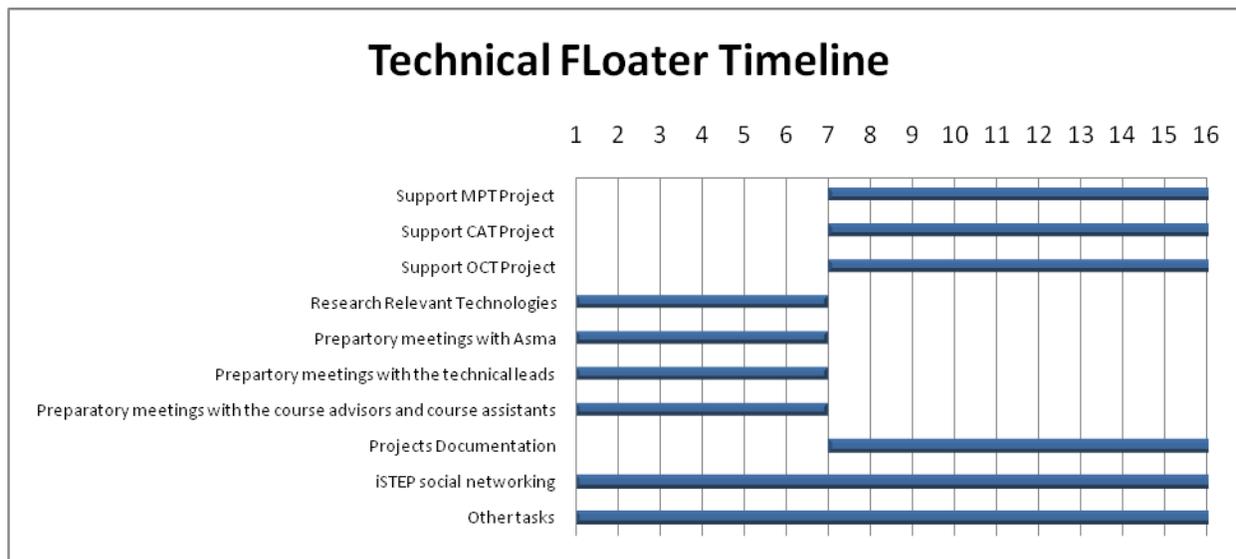
1. Discuss the task at hand
2. Define the type of work to be done
3. Evaluate the amount of work and time necessary
4. Split the task based on current workload on each side and expertise
5. Set deadlines for milestone checks
6. Inform the technical leads about the work plan
7. At each milestone:
 - a. Discuss progress made
 - b. Expose possible problems or obstacles
 - c. Contact the technical lead in charge, if needed
 - d. Re-evaluate the workload based on the new data
 - e. Re-dispatch the task, if necessary

This protocol is tentative but summarizes how each new task should be handled between the two technical floaters while involving technical leads or any other relevant team member. As far as taking the lead on projects, as mentioned above it will not only be based on taking advantage of our strengths, past experiences and research but also on the amount of work in hand in both sides. Also, one of my strengths lies in testing, finding bugs and fixing them, and I will try to use it as much as I can.

In addition to the general methods mentioned above for managing documents and data relevant to the projects, I will define individual communication methods to communicate with each technical lead, if needed. Something that we agreed on is to have project meetings on different days between the leads and the floaters. While it is very important to keep a steady communication flow, we have to ensure that each project is getting the right amount of attention. Having meetings for all the projects on the same day is going to be detrimental to us. Both technical floaters will have conference calls with each technical lead on a rotation basis during the week. In these small meetings, they will be able to discuss the progress of the projects and major issues or problems. This will also be supported with email exchange and chat conversations.

Finally, I will participate in promotional opportunities in Pittsburgh along with Meghan. This will consist of presentations on and off campus, if needed and promotion of the projects during the summer.

Timeline



Technical Floater (Asma Hamid)

As a technical floater I will mainly be involved in the technology development of the three projects. To do that, I will be collaborating and supporting the technology leads and the rest of the team in several aspects such as needs assessment. My role also includes literature review for relevant work, research relevant technologies and documenting the process and outcomes of the team's work. The technical floater is also responsible for designing, implementing, and maintaining the iSTEP 2011 website, blog, and databases. Finally, I will be involved in promoting the iSTEP 2011 internship opportunity at the Doha campus.

Pre-Internship Preparation

To prepare for the internship I have to do a literature review to know more about the relevant technology, literacy tools and OLPC environment. This information will help me and the technical leads make critical decisions about the three projects regarding the language and the platforms to be used. To do that, I will be working with the three tech leads Elise (Technical Lead for the CAT), Afnan (Technical Lead for the MPT) and Jonathan (Technical Lead for the OCT). After taking a decision with the team I will start practicing and exploring the most likely language and platform.

Another task that is closely related to the literature review is being involved in needs assessment of the three projects. To do that, I will be working with Roberto the Needs Assessment and Evaluation Lead and the rest of the team to make sure we base our technical decisions on strong evidence and facts. As a preparation for the internship, we will all be working on specifying what information is required, where can we find it and get the information we need that is accessible now. My work with the needs assessment will be limited to the analysis of the information once the team arrives to the Uruguay due to the fact that I will be stationed in Doha.

Also as part of my preparations, I will be working with the advisors to prepare for my role. I met Freddie and we started setting a plan for the independent study. The next step is that I will finalize the plan and get his feedback then start working on it. As part of the plan, I will create and start working on the iSTEP 2011 website during the independent study.

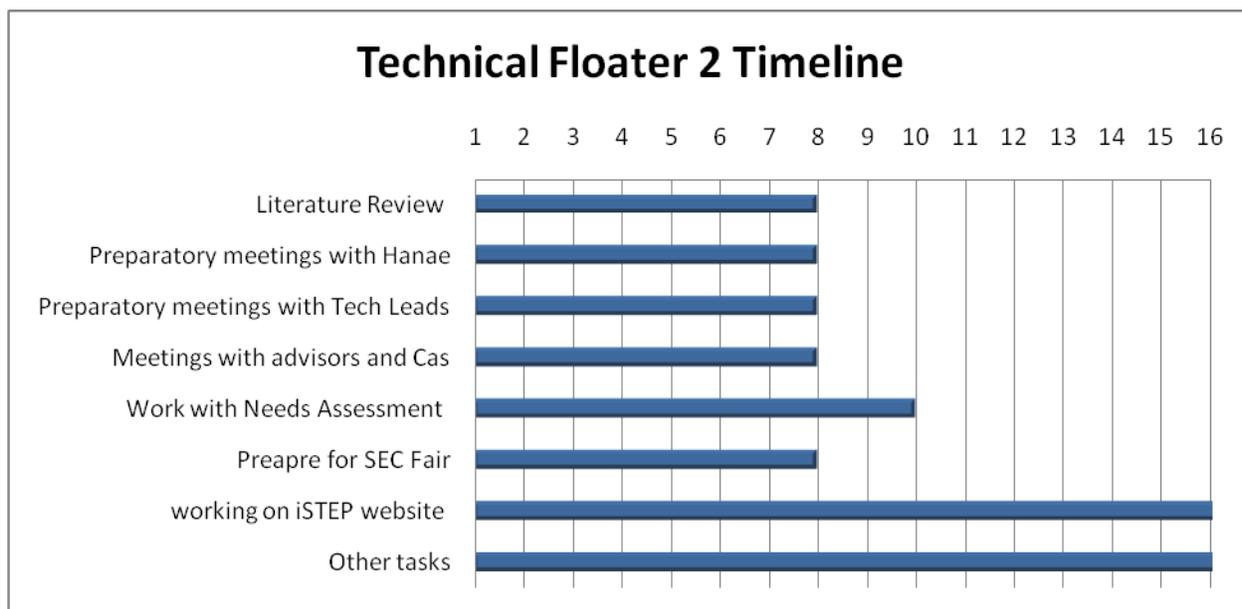
Individual Roles during Fieldwork

During the internship it's very critical that I keep a good communication with the team, Technical Leads and Hanae the other Technical Floater specifically. Weekly meetings with the Technical Leads and Technical Floater will be set before traveling to the Uruguay. During the meetings, I will be updated about the team work progress, update the team with the tasks that was assigned to me and discuss the next tasks that have to be done.

Based on the updates during the team meetings and the communication between me and the team, I will be updating the iSTEP 2011 website, blog and Facebook. I will also keep a weekly communication with the advisors so they can provide us with their advice and recommendations.

Finally, I will be involved in promoting the iSTEP 2011 in Doha Campus by presenting the iSTEP work in National Fair of Student Research 2010-2011 organized by the Supreme Education Council (SEC) in Qatar during May 13th -15th 2011. After the internship Afnan and I will be presenting iSTEP 2011 work in an information session for CMUQ students, Global Opportunities Fair hosted by the Office of International Education and Qatar Foundation.

Timeline



Technical Floater Shared Plan

As technical floaters, we are going to be involved in all the projects and tasks. Besides development and documentation support during the project, we are planning to prepare for the projects by:

- Researching and learning relevant technologies that could be used in the projects: Python, Java, PHP...
- Researching relevant resources and identifying common traits with our projects such as reusable technology, known pitfalls...
- Prepare the projects web-presence: iSTEP 2011 website, blog and social networking profiles.
- Preparing different development environment for the different projects in anticipation for the needs' assessment outcomes.

These are some of the major tasks that we will both be performing during our independent study.

To increase our efficiency especially in doing research and documentation, we are planning to assign each technical floater to a different project and specific tasks. The person assigned will be mostly responsible for doing the research relevant to the specific project and sharing it with the other technical floater. Also, documentation will be better handled this way to have a centralized depository of reports and notes. As such, Asma will be leading the OCT project and Hanae will be responsible for the CAT project. Due to our lack of experience in mobile technology we decided to share responsibility for the MPT project. Additionally, Asma will be leading front end work while Hanae will be handling the back end. This is just a way or use to divide and conquer and have an appointed person to contact for the project, if needed. This said, both technical floaters will be collaborating in all tasks along with the rest of the team.

Integrated Team Plan for iSTEP 2011

Having identified the individual team roles, we need to highlight the tasks that will need to be shared by the team members or by different subgroups within the team. While coming up with the common team tasks, we tried to foster individual strengths and learning abilities:

- We recognized the need to learn basic Spanish for non-speakers of the language. For this, we will organize sessions where team members can hold conversations in Spanish and improve their Spanish language skills. These sessions will be led by Roberto and Vanessa and scheduled once a week starting one month before the start of the internship. They will be held in Pittsburgh and team members in Doha will be able to join via Skype. Also, we are planning to ask our advisor Silvia Pessoa if she can lead a Spanish conversation session from Doha. Her input as a Uruguayan will be highly valuable to detect the specificities of the spoken Uruguayan Spanish, common expressions and culturally relevant differences.

- In an effort to learn more about the projects and the communities, all team members will coordinate with Vanessa who will be in charge of the partnerships and direct concerns and requests to her during team meetings or using the different communication tools described below.
- An important part of projects' documentation will consist of audio and video. For this, we decided to seek help from TechBridgeWorld Videographer, Matt Richards, to learn more about filming and video editing. All team members are interested, but there will be a need to dedicate a subgroup to be in charge of multimedia related tasks. In Uruguay, Roberto will be in charge of the different pieces of equipment such as video cameras, recorders, tripods... Other team members in Uruguay will also be using the equipment, if needed, but they will need to coordinate with Roberto.
- All team members agreed initially about a set of tools and methods that will be used for reporting information within the team and to TechBridgeWorld during the internship period:
 - Weekly all team meetings will be held once a week on Mondays using Skype. They could be more frequent depending on the amount of information flowing between the team members across all locations. The timing of these meetings would be set to be convenient to all team members as much as possible. If at any occasion, some of the team members in Uruguay or anywhere else are experiencing difficulties joining the Skype call due to a bandwidth issue, for instance, they could still be updated using the chat functionality or detailed meeting notes.
 - During each team meeting, two of the team members will be appointed to take elaborate notes and share them with the team and TechBridgeWorld afterwards. The assignments will be rotation based across all three locations.
 - In addition to weekly meetings, team members will be sending daily status updates to each other and keeping in touch throughout the day, when possible using chat applications such as Aim or Gtalk.
- Updating the iSTEP blog is a major part of documenting the process. We decided that it will be appropriate to rotate the task between the team members to allow each person to have their own input and make the process more fun and diversified. The blog will be managed as follow:
 - One blog per week with one extra blog to report special events such as promotional activities in any of the locations or outings.
 - Roberto in charge of Spanish blogs; Asma and Hanae in charge of a blog in Arabic
 - Each week two team members will be assigned to blogging by rotation: one will be in charge of writing the blog and one will be a backup in case the appointed is not available at their assigned time.
 - The blogs will be about the team's internship experience, special events or encounters. They will be a way to expose the world to what the team and TechBridgeWorld is doing in a narrative subjective way.
- One major organizational task is respecting deadlines. We agreed to use a Google calendar to manage the different deadlines for the tasks to be accomplished before

and during the internship period. All team members would have access to it and will be able to import it to their personal calendars. This calendar will be managed by Meghan and shared with TechBridgeWorld members during the second half of the semester.

- Producing the final report is also a crucial part of the internship. To ensure a continuous progress on the final report, we are in process of defining weekdays in which the different team members will need to send reports for the milestones and days in which they will receive feedback from the person in charge of putting the report together and TechBridgeWorld members. Also, we will be creating different presentation templates during the second half of the semester and sharing them with TechBridgeWorld members and our advisors to get their feedback.
- Marketing and promotional tasks will be assigned to subgroups of the team depending on their location: Pittsburgh, Doha and Montevideo. Those categories will need to devise targeted plans to their location.
- Contact Chris Labash and Brian Manalastas to make use of their expertise in media, marketing and communication. Plan for different subgroups of the team to meet with them and discuss ways to promote our projects in the three different locations.
- Some expressed an interest in promoting iSTEP in social media platforms such as Facebook, Twitter, and MySpace...This task will be managed according to the media plan.

Appendix C – Meeting of the Minds Poster



ISTEP 2011: English Literacy Technology Development in Montevideo, Uruguay



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Department of Computer Science, Carnegie Mellon University

Introduction

What is ISTEP?

- Innovative Student Technology Experience
- Internship program run by TechBridgeWorld research group at Carnegie Mellon
- 10-week summer internship plus a Mini Course and Independent Study in the Spring semester
- Apply classroom skills to benefit underserved communities around the world
- Past interns have exhibited tremendous personal and professional growth



Semester Research Overview

- In Spring 2011, the team's research included
 - Creating country review, needs assessment plan
 - Investigating Uruguayan history, culture, and technology infrastructure
 - Developing evaluation plans to measure effectiveness and media plan to promote ISTEP
 - Conducting literature reviews comparing different platforms for the three technology projects
 - Testing open-source projects.

Much of this research was done to help prepare for creating and implementing three technology projects in Montevideo:

- One-laptop-per-child/Online Content Tool (OCT)
- Content Authoring Tool (CAT)
- Mobile Phone Tool (MPT)



The results of this research will be carried out and continued during the summer 2011 in Uruguay.

Results

Prior to traveling to Uruguay, the team researched the background of the country. Some of the main country population facts are shown in Table 1.

Fact	Data
Capital	Montevideo
Language	Spanish (official), Portuguese and English (business)
Area	176,354 sq km 68,091 sq miles
Total Population	3.5 million
Population Density	19.9/km ² , 51.4/mile ²
Population Religion	Roman Catholic
Median Age	35.1
Life Expectancy	76.6
Literacy Rate	87%
Public Expenditure on Education	2.5%
Schools at Public Schools	484

Table 1. Uruguayan Population Statistics

In recent years, the government of Uruguay has initiated new reforms in their education system.

- Required study of English for all students
- Adopted the One Laptop Per Child (OLPC) program
- Distributed XO laptops to all students

The team is looking to work on policies that will help to integrate the XO laptop into the curriculum by developing technologies used by the three projects to help improve English literacy that can be integrated with the curriculum.

OCT

- Researched how to create applications and content for the specific XO laptop.
- Planned initial content for the OCT tool



Fig. 2. The OLPC give a laptop, get a laptop, change the world mission.

CAT

- Updated code for the mobile phone CAT used by the Vodaphone project in Qatar
- Added XML file support to the 2010 MPT to create a standard protocol

MPT

- Developed applications using the J2WE platform (most common phone platform)
- Field tested past versions of the English learning game in Dolha with migrant workers phones. Found 50% were compatible

A preliminary needs assessment of the region was conducted. One of the findings was the high variability of student English. The Second Regional Comparative and Evaluative Study identified two variables that explained the variation between students:

1. Socio cultural context of the students
2. Number of grades repeated by the student.



Fig. 3. Uruguayan Students

Private school students from better social contexts tend to do better than public school students from urban/low income areas. Figure 2a below details the percentage of students who repeated grades in Argentina and Chile between 2000-2008. Figure 2b represents the data for secondary schools.

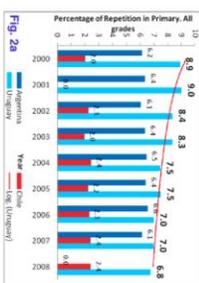


Fig. 2a. Repetition rates for Primary Schools, 2000-2008.

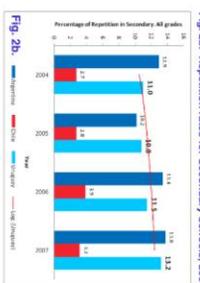


Fig. 2b. Repetition rates for Secondary Schools, 2000-2008.

It can be seen that Uruguay has the largest percentage of repeated grades of the countries and that this is sharply increased in the secondary schools. Reasons for this and how it affects student's learning are still being investigated

In addition to these educational needs, the habits of Uruguayans in terms of their internet and mobile phone use were investigated. Key findings include:

- 105,2700 people have mobile phone subscriptions
- 39% of the population has access to computers
- ~1 in 3 uses the internet (1.4 million)
- All primary and secondary schools have broadband connections

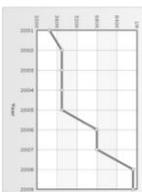


Fig. 3. Internet users in Uruguay

A full marketing plan to publicize and showcase the results from this internship has also been created, including a media kit with a fact sheet, quote sheet, flyers, press releases, and video. Also, a possible peripat program is currently being worked on to connect Spanish learners in a local Pittsburgh high school with English learners in a school in Montevideo.

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- Reportorial:360LF. Language:es:es:BN. Topic:es:es:Photo Credit: Silvia Pessoa. CMU-Q Faculty.

Acknowledgments

We thank our course advisors, Vorina Cooper and M. Bernhardt Datz, as well as our course assistants Sarah Behoum and Emma Torres, for their support and guidance in developing the program. We also thank the students in the design of our goals and helping us to share. We look forward to continuing this partnership during the summer internship.

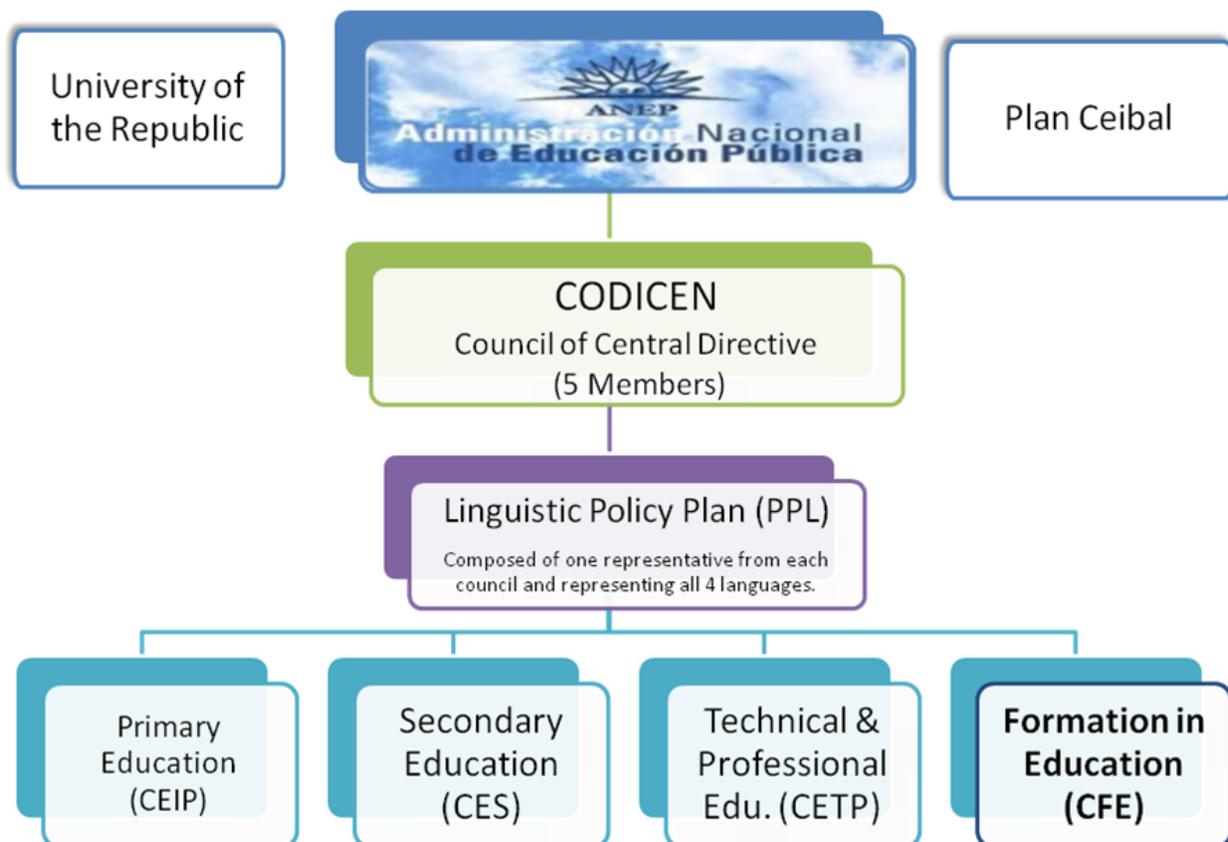


Follow the Journey

- Facebook: www.facebook.com/ISTEP11
- Twitter: www.twitter.com/ISTEP11
- YouTube: www.youtube.com/ISTEP11
- Website: www.techbridgeworld.org/istep
- Email: ISTEP11@cmu.edu

Appendix D – Partners Chart

The team worked with different partners over the course of the internship. The following chart shows the organization of ANEP and other relevant groups connected to the iSTEP projects. Founded in 2008 by Laura Motta, the Linguistic Policy Plan (PPL) oversees linguistic policy in all four councils and generates projects for all four councils to meet the aim of a plurilingual Uruguay. Most of our contacts at PPL also work in another council.



Appendix E – OCT User Manual

The OLPC Tool (OCT) is an application written for the Sugar operating system on XO Laptops, version 1.5. The goal of the OCT is to provide an interface on which students can complete assignments written by teachers. All instructions contained in this user manual are meant to instruct a student on how to complete an assignment, start to finish, with the OCT. This manual assumes that the user has basic knowledge of the XO laptop and features of the OCT.

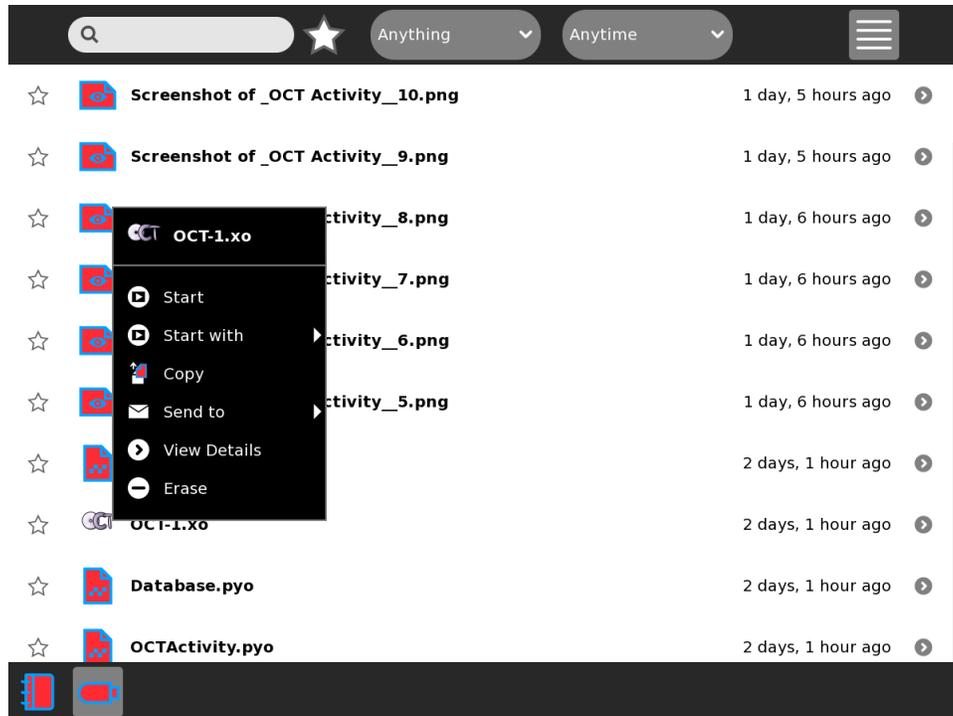
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Install the OCT from a USB Drive

Installing the OCT requires an XO laptop, version 1.5, and a USB drive with the OCT application on it.

1. Put the USB drive into the XO laptop.
2. Open the **Journal** activity.
3. On the bottom of the screen, select the USB drive.
4. Find the file called **OCT-1.xo**.



5. Click the icon of **OCT-1.xo** to open the activity.

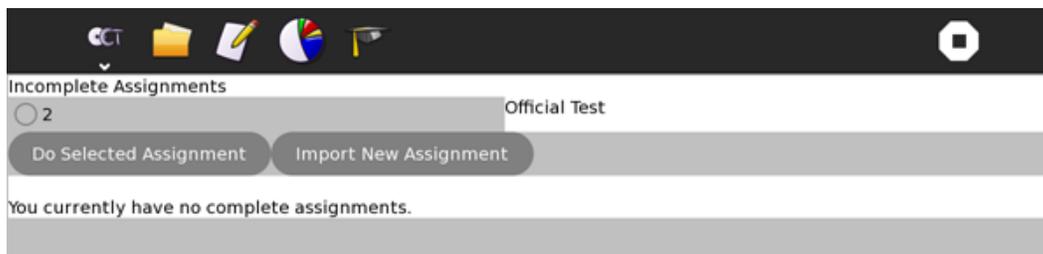
Import an Assignment

Importing an assignment to the OCT can be done by pulling a file from anywhere on the laptop.

1. Open the **OCT** activity.
2. In the activity toolbar, click the **Assignments**  icon.
3. Click the **Import New Assignment** button.
4. From the **File Chooser**, find and select your assignment file.

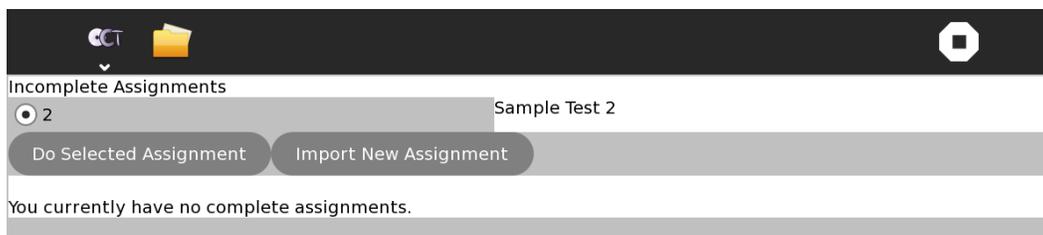


5. Click **Open** at the bottom of the File Chooser.

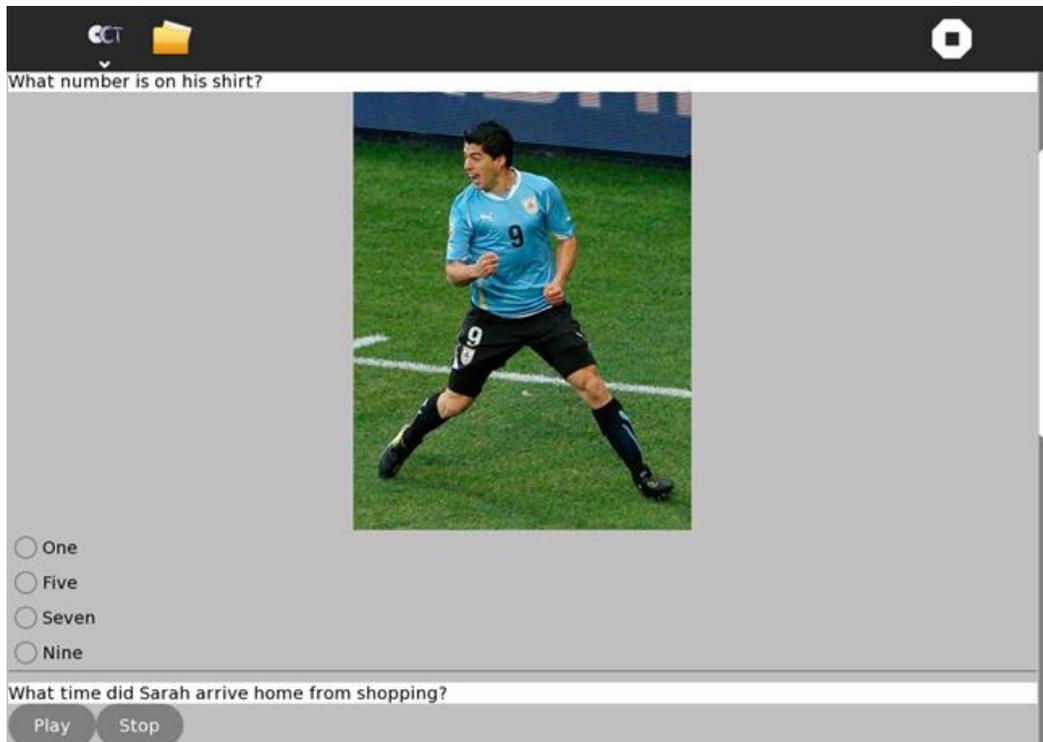


Complete an Assignment

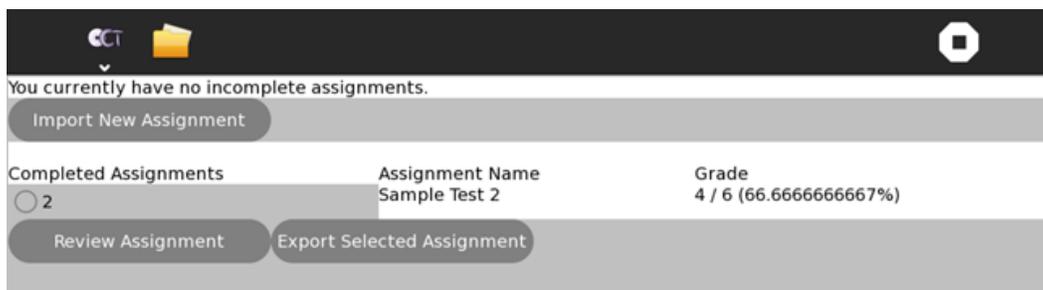
1. Open the **OCT** activity.
2. In the activity toolbar, click the **Assignments**  icon.
3. From the list of **Incomplete Assignments**, click the ID radio button corresponding to the assignment you want to complete.



4. Click the **Do Selected Assignment** button.
5. Answer the questions that appear.



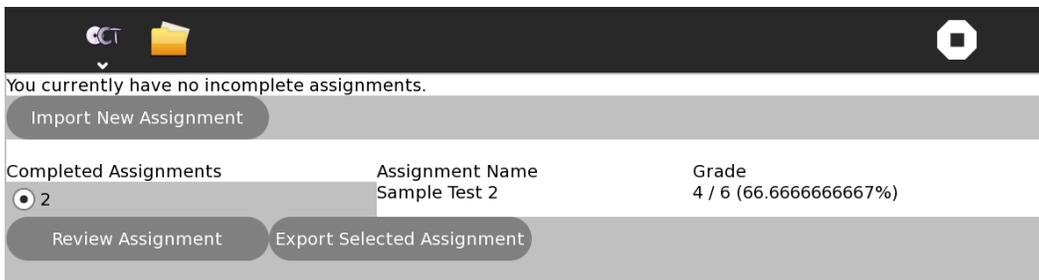
- At the bottom of the assignment, click the **Finish Assignment** button.



Review an Assignment

This feature allows you to see which questions you answered correctly and incorrectly in an assignment.

- Open the **OCT** activity.
- In the activity toolbar, click the **Assignments**  icon.
- From the list of **Complete Assignments**, click the ID radio button corresponding to the assignment you want to review.



4. Click the **Review Assignment** button.

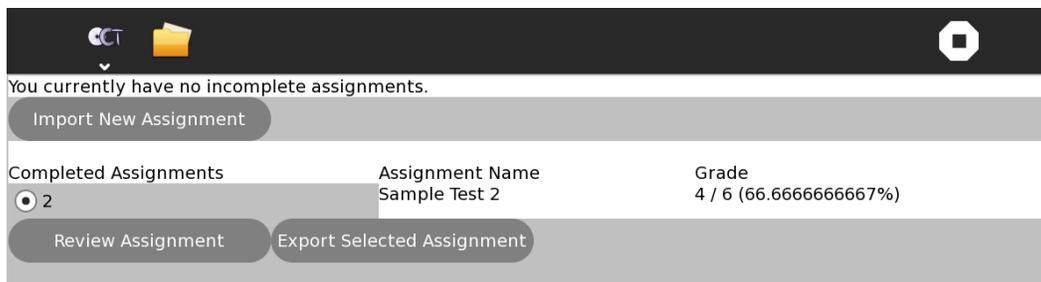


5. At the end of the review, click the **Finish Review** button.

Export an Assignment

Exporting an assignment can be done to any location on the XO laptop, including USB drives. It is used to return your answers to the teacher.

1. Open the **OCT** activity.
2. In the activity toolbar, click the **Assignments**  icon.
3. From the list of **Complete Assignments**, click the ID radio button corresponding to the assignment you want to export.



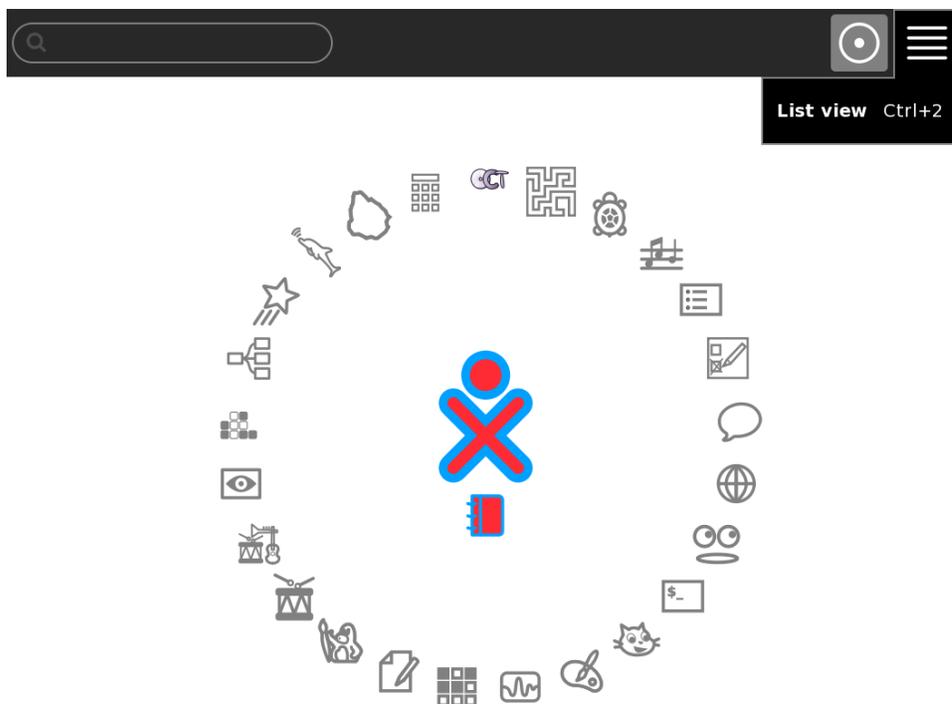
4. Click the **Export Selected Assignment** button.
5. Choose the folder into which to export the assignment.



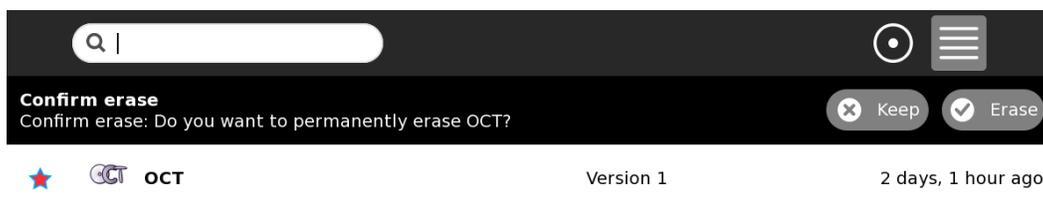
6. Click **Open**.

Uninstall the OCT

1. In the home screen, click the **List View** button in the top right corner.



2. Hover over the **OCT** icon.
3. Click **Erase**.



Appendix F – FBT User Manual

Introduction

The Facebook Tool (FBT) is a Facebook application developed by interns from Carnegie Mellon and TechBridgeWorld's innovative Student Technology ExPerience (iSTEP) program in the summer of 2011. In partnership with ANEP, the student teachers at IPA and INET, and the students and teachers of Liceo 39, the iSTEP interns worked to develop a tool that would motivate students in public schools of Montevideo to improve their English literacy skills.

Before You Start

Facebook Accounts

Please remember that in order to use this tool, a Facebook account is required. You can create one very quickly here: <http://www.facebook.com>.

Browser Requirements

The FBT has been tested to work on most commonly used browsers including Chrome, Opera, Firefox, and the built-in browser that comes with XO laptops.

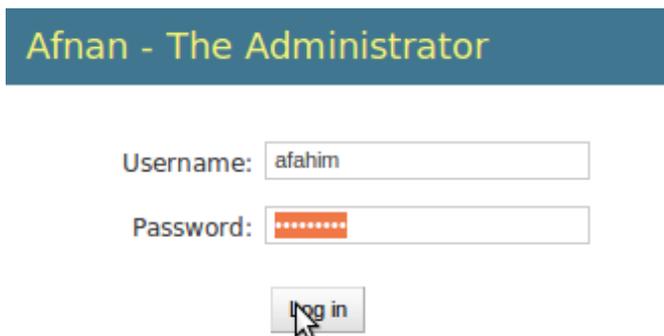
Admin Interface

If you are a teacher or an administrator, to manage student accounts and add questions to the database of the tool, you will need to access a separate interface using the link provided to the administration.

For Teachers and Administrators

Logging In

Once you are on the administration page of the FBT, you will see a login screen that will ask you to enter your Username and Password.



Afnan - The Administrator

Username:

Password:

Main Page

Once you are logged in to the application, you will see a screen that shows you the list of things that you can manage. This list of records includes (1) questions, (2) teams, (3) topics and (4) users.⁴

Afnan - The Administrator

Site administration

Auth	
Groups	Add Change
Users	Add Change

Fbapp

Questions	Add Change
Teams	Add Change
Topics	Add Change
Users	Add Change

Sites

Sites	Add Change
-------	--

Recent Actions

My Actions

- [Language](#) Topic
- [Roberto](#) User
- [Nacional](#) Team
- [Penerol](#) Team
- [Language Awareness](#) Topic
- [The answer is a](#) Question
- [The answer is a](#) Question
- [The answer is d](#) Question
- [The answer is c](#) Question
- [X](#) User

On the column on the right hand side, you can also see a list of changes that have recently been made to the database of the FBT.

Viewing Current Entries

To view the current entries that are stored in the database of the application for any of the four kinds of records, you just need to click on the name of the record and you will be able to see a list of all the entries that currently exist in the database. For example, if you want to see all the questions stored in the database then you can click on the “Questions” record on the main page and that would take you to a page like one shown in the figure below, where all of the questions currently stored in the database are listed.

Afnan - The Administrator

Home > Fbapp > Questions

Select question to change

Action: 0 of 4 selected

<input type="checkbox"/>	Question
<input type="checkbox"/>	The answer is d
<input type="checkbox"/>	The answer is c
<input type="checkbox"/>	The answer is b
<input type="checkbox"/>	The answer is a

4 questions

⁴ This interface screenshot was taken on the developer’s laptop with the site running locally.

Adding New Records

If you want to add a new entry to any of the four records mentioned above, you just go to that record on the main page and click on the “Add” button next to it. For example if you want to add a new question, then you click on the Add button next to the Questions record and you will see a screen, similar to the figure below.

The screenshot shows a web interface for adding a question. At the top, there is a blue header with the text "Afnan - The Administrator" and a breadcrumb trail: "Home > Fbapp > Questions > Add question". Below the header, the title "Add question" is displayed. The form consists of several input fields:

- Topic:** A dropdown menu with a plus sign to its right.
- Difficulty:** A small text input field.
- Question text:** A larger text input field.
- Choice 1:** A text input field.
- Choice 2:** A text input field.
- Choice 3:** A text input field.
- Choice 4:** A text input field.
- Answer:** A small text input field.

Here you can specify a topic by choosing from the drop down window, and specify other details. Once that is done, you can click “Save and Continue Editing” and the entry will be saved into the database.

Keep in mind that when specifying new questions, the difficulty levels are on a scale of 1-3, 1 being easiest and 3 being hardest. Also in the Answer field of Question entries, please just enter the choice number which is correct from the choices you have specified. For example if “Choice 3” is correct for a particular question, then you just type “3” in the Answer field for that question.

Changing Existing Records

If you want to change a current entry, you go to the main menu, click on the record name, and then from the list you get, select the entry you want to choose. Once you do that, you will be taken to a page where you can edit the information for that entry, as shown in the figure below.

Afnan - The Administrator

Home > Fbapp > Users > Roberto

Change user

Team:	<input type="text" value="Penarol"/> +
Id:	<input type="text" value="500"/>
Language:	<input type="text" value="Python"/>
Student name:	<input type="text" value="Roberto"/>
Language awareness level:	<input type="text" value="1"/>
Vocab level:	<input type="text" value="1"/>
Points:	<input type="text" value="50"/>

[✖ Delete](#)

Here, you can either delete the record by clicking on the “Delete” button on the lower left corner of the screen, or make changes and save the record by clicking “Save and continue editing” button.

Logging Off the Administration interface

If you want to leave the interface at any time, just click on the “logout” button on the upper right corner of the webpage and you will be logged out of the admin interface.

For Students

Once you are on the main page of the application, you will see a page like one shown below.

apps.facebook.com/mfidias_fandjango/?ref=bookmarks

facebook Search

Welcome Students of Liceo 39!

Welcome, Afnan!

THE TOP SCORING TEAMS

Penarol

Nacional

THE TOP SCORING PLAYERS

Afnan

Vanessa

Roberto

Copyright © 2011 TechBridgeWorld

Here you can see which teams are performing the best in the application, as well as the individual players that have been performing the best.

Choosing topics

If you want to practice English language skills, then click on the “Choose topic to Start Playing” button.

This will take you to a page where there is a list of topics from which you can choose. Click on the topic that you wish to practice and you will be directed to a page with questions pertaining to your interest and level of difficulty.

So, What Do You Want To Practice?!

Welcome, !

Please select which topic you want to practice from below:

[Vocabulary](#)

[Language Awareness](#)

Answering Questions and Getting Feedback

Once you are on the questions answering page, you will see a number of multiple choice questions with 4 choices below each of them. Select the choices that you prefer, and once you are done, click on the “Submit” button. You will see a page which will tell you your score on the top, and also identify which questions you got right, and which questions you got wrong, along with the correct answer.

The screenshot shows a Facebook search results page. At the top, there is a blue navigation bar with the Facebook logo and a search bar. Below the navigation bar, there is a blue banner that reads "Good Job, you scored 1 :)". Underneath the banner, the text "Welcome, !" is displayed. The main content area shows the results of a quiz. It starts with the heading "Here are your Results!". The first question is "Which of these items is a healthy food?". The selected answer is "Fruits and Vegetables", which is highlighted in green. The second question is "If you are hungry you can ?". The selected answer is "eating at McDonalds", which is highlighted in red. Below this, it says "Correct Answer - eat at McDonalds". The third question is "Diego Forlan is a _____ Uruguayan famous soccer player.". The selected answer is "best", which is highlighted in red. Below this, it says "Correct Answer - good".

Appendix G – CAT User Manual

The goal of the Content Authoring Tool (CAT) is to provide teachers and ANEP with a platform to create and update content for the One Laptop per Child tool. The solution is designed to assist teachers in creating custom questions and answers for their students. The primary components of the CAT are the user interface, the content management system behind it and the communication protocol that allow the interaction with the OCT. All instructions contained in this user manual are meant to instruct the user to create questions and assignments and export them to be used by the OCT

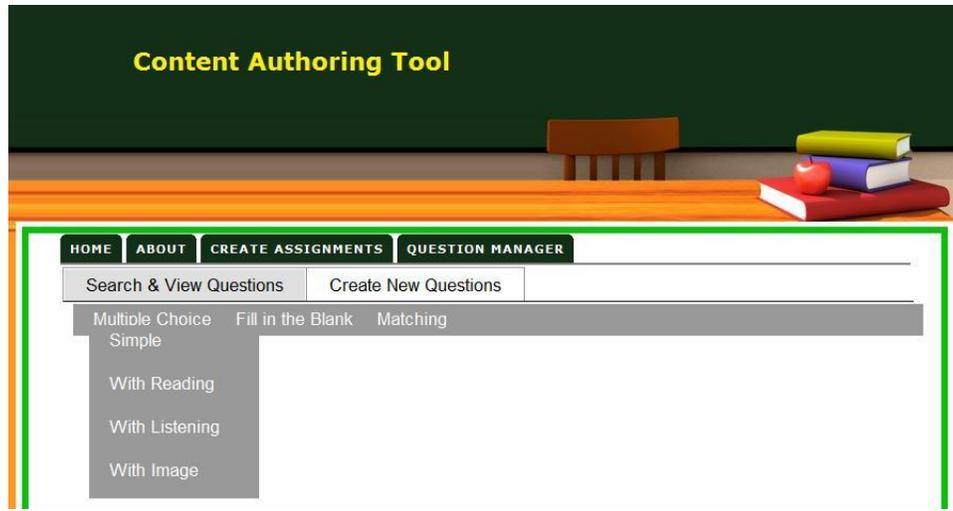
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Create Questions

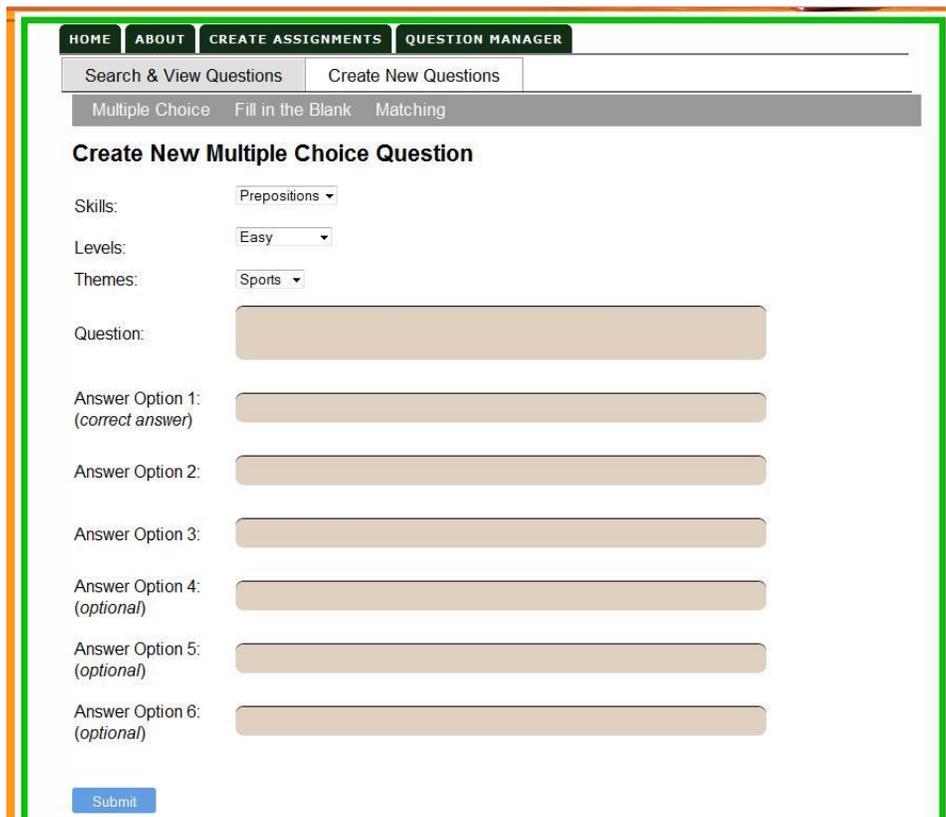
Creating questions on the CAT can be done by:

1. Open the CAT and login.
2. Click on the **Question Manager** tab.
3. Click on the **Create & Edit Questions** tab.
4. Choose a question type:
 - a. Hover over **Multiple Choice** and click on:



i. Simple

Enter the information for a simple multiple choice question: a question, correct answer and at least two other answer choices.



The screenshot shows a web interface for creating a multiple choice question. At the top, there are navigation tabs: HOME, ABOUT, CREATE ASSIGNMENTS, and QUESTION MANAGER. Below these are two buttons: 'Search & View Questions' and 'Create New Questions'. Underneath, there are three tabs: 'Multiple Choice', 'Fill in the Blank', and 'Matching'. The main heading is 'Create New Multiple Choice Question'. The form includes three dropdown menus for 'Skills' (set to 'Prepositions'), 'Levels' (set to 'Easy'), and 'Themes' (set to 'Sports'). Below these are seven text input fields: one for the 'Question' and six for 'Answer Option 1' through 'Answer Option 6'. The first answer option is labeled '(correct answer)' and the others are labeled '(optional)'. A blue 'Submit' button is located at the bottom left of the form area.

ii. With Reading

Enter information for a multiple choice question with a reading attached: a question, reading passage, correct answer and at least two other answer choices.

The screenshot shows a web interface for creating a multiple choice question. At the top, there are navigation tabs: HOME, ABOUT, CREATE ASSIGNMENTS, and QUESTION MANAGER. Below these are two buttons: Search & View Questions and Create New Questions. Underneath, there are three tabs: Multiple Choice, Fill in the Blank, and Matching. The main heading is "Create New Multiple Choice Question with a reading passage attached".

The form includes the following fields:

- Skills: Prepositions (dropdown)
- Levels: Easy (dropdown)
- Themes: Sports (dropdown)
- Reading Passage: A large text area for entering the reading passage.
- Question: A text area for entering the question.
- Answer Option 1: (correct answer) A text area for the correct answer.
- Answer Option 2: A text area for the first incorrect answer choice.
- Answer Option 3: A text area for the second incorrect answer choice.
- Answer Option 4: (optional) A text area for an optional incorrect answer choice.
- Answer Option 5: (optional) A text area for an optional incorrect answer choice.
- Answer Option 6: (optional) A text area for an optional incorrect answer choice.

A blue Submit button is located at the bottom left of the form.

iii. With Listening

Enter information for a multiple choice question with a listening passage attached: a question, an audio file, a correct answer and at least two other answer choices.

The screenshot shows a web application interface for creating a multiple choice question with a listening passage. The interface is framed by a green and orange border. At the top, there are navigation tabs: HOME, ABOUT, CREATE ASSIGNMENTS, and QUESTION MANAGER. Below these are two buttons: Search & View Questions and Create New Questions. Underneath, there are three tabs: Multiple Choice, Fill in the Blank, and Matching. The main heading is "Create New Multiple Choice Question with a listening passage attached".

The form includes the following fields and controls:

- Skill:** A dropdown menu with "Prepositions" selected.
- Level:** A dropdown menu with "Easy" selected.
- Themes:** A dropdown menu with "Sports" selected.
- Audio File:** A text input field with a "Browse..." button next to it.
- Question:** A large text input field.
- Answer Option 1:** A text input field with the label "(correct answer)".
- Answer Option 2:** A text input field.
- Answer Option 3:** A text input field.
- Answer Option 4:** A text input field with the label "(optional)".
- Answer Option 5:** A text input field with the label "(optional)".
- Answer Option 6:** A text input field with the label "(optional)".

At the bottom left, there is a blue "Submit" button.

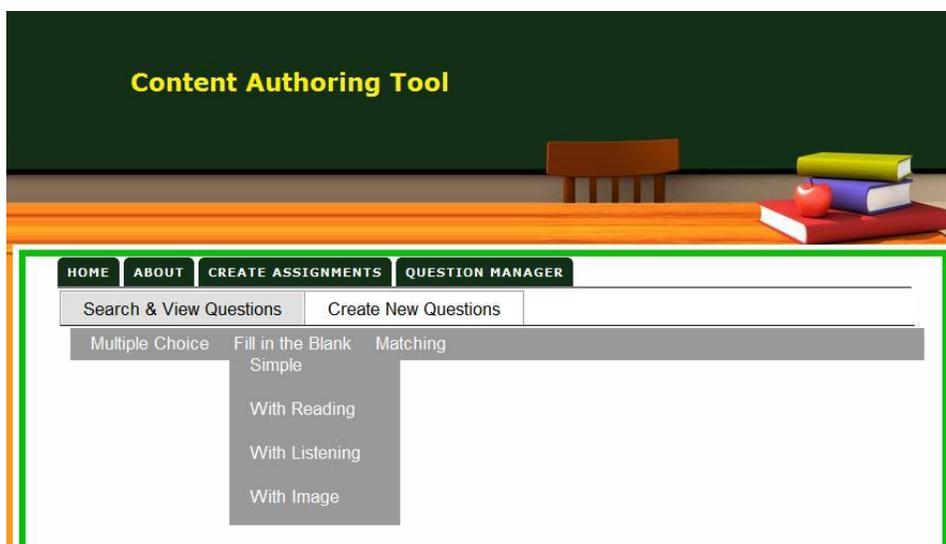
iv. With Image

Enter information for a multiple choice question with an image attached: a question, a jpg image, a correct answer and at least two other answer choices.

The screenshot shows a web interface for creating a multiple choice question. At the top, there are navigation tabs: HOME, ABOUT, TEACHER DASHBOARD_CREATE ASSIGNMENTS, and QUESTION MANAGER. Below these are two main sections: 'Search & View Questions' and 'Create & Edit Questions'. Under 'Create & Edit Questions', there are three options: 'Multiple Choice', 'Fill in the Blank', and 'Matching'. The 'Multiple Choice' option is selected, and the page title is 'Create New Multiple Choice Question with an image attached'.

The form includes several dropdown menus for 'Skills' (Prepositions), 'Levels' (Easy), and 'Themes' (Sports). Below these are text input fields for 'Question:', 'Answer Option 1 (correct answer):', 'Answer Option 2:', 'Answer Option 3:', 'Answer Option 4 (optional):', 'Answer Option 5 (optional):', and 'Answer Option 6 (optional):'. There is also an 'Image:' field with a 'Choose File' button and the text 'No file chosen'. A blue 'Submit' button is located at the bottom left.

b. Hover over **Fill in the Blank** and click on:



i. **Simple**

Enter information for a simple fill in the blanks question: a question, a correct answer.

The screenshot shows a web application interface for creating a question. At the top, there are navigation tabs: HOME, ABOUT, CREATE ASSIGNMENTS, and QUESTION MANAGER. Below these are two buttons: 'Search & View Questions' and 'Create New Questions'. A sub-menu bar contains 'Multiple Choice', 'Fill in the Blank', and 'Matching'. The main heading is 'Create New Fill in the Blank Question'. There are three dropdown menus for 'Skills' (set to 'Prepositions'), 'Levels' (set to 'Easy'), and 'Themes' (set to 'Sports'). Below these is a text box for the question with an 'Insert Blank' button. A note states: 'Type your question in the text box below. To insert a blank, click the "Insert Blank" button. This will insert a placeholder for the blank. NOTE: Only one blank is allowed.' Below the question text box is a 'Correct answer for blank:' field. At the bottom is a 'Submit' button.

ii. With Reading

Enter information for a fill in the blanks question with a reading attached: a question, reading passage and correct answer.

The screenshot shows a web application interface for creating a question with a reading passage. It has the same navigation and sub-menu as the previous form. The main heading is 'Create New Fill in the Blank Question with a reading passage attached'. It includes the same dropdown menus for 'Skills', 'Levels', and 'Themes'. Below these is a 'Reading Passage:' label followed by a large text box for the passage. Below the passage text box is a text box for the question with an 'Insert Blank' button. A note states: 'Type your question in the text box below. To insert a blank, click the "Insert Blank" button. This will insert a placeholder for the blank. NOTE: Only one blank is allowed.' Below the question text box is a 'Correct answer for blank:' field. At the bottom is a 'Submit' button.

iii. With Listening

Enter information for a fill in the blanks question with a listening passage attached: a question, mp3 file and correct answer.

The screenshot shows a web interface for creating a question. At the top, there are navigation tabs: HOME, ABOUT, CREATE ASSIGNMENTS, and QUESTION MANAGER. Below these are two buttons: 'Search & View Questions' and 'Create New Questions'. Underneath, there are three tabs: 'Multiple Choice', 'Fill in the Blank', and 'Matching'. The main heading is 'Create New Fill in the Blank Question with a listening passage attached'. There are three dropdown menus for 'Skills' (Prepositions), 'Levels' (Easy), and 'Themes' (Sports). Below these is an 'Upload an Audio File (mp3 or wav):' section with a text input field and a 'Browse...' button. A text box contains instructions: 'Type your question in the text box below. To insert a blank, click the "Insert Blank" button. This will insert a placeholder for the blank. NOTE: Only one blank is allowed.' Below this is an 'Insert Blank' button and a large yellow text area. At the bottom, there is a 'Correct answer for blank:' label and a text input field, followed by a blue 'Submit' button.

iv. With Image

Enter information for a fill in the blanks question with an image attached: a question, jpg image and correct answer.

The screenshot shows a web interface for creating a question. At the top, there are navigation tabs: HOME, ABOUT, CREATE ASSIGNMENTS, and QUESTION MANAGER. Below these are two buttons: 'Search & View Questions' and 'Create New Questions'. Underneath, there are three tabs: 'Multiple Choice', 'Fill in the Blank', and 'Matching'. The main heading is 'Create New Fill in the Blank Question with an image attached'. There are three dropdown menus for 'Skills' (Prepositions), 'Levels' (Easy), and 'Themes' (Sports). Below these is an 'Upload an Image File:' section with a text input field and a 'Browse...' button. A text box contains instructions: 'Type your question in the text box below. To insert a blank, click the "Insert Blank" button. This will insert a placeholder for the blank. NOTE: Only one blank is allowed.' Below this is an 'Insert Blank' button and a large yellow text area. At the bottom, there is a 'Correct answer for blank:' label and a text input field, followed by a blue 'Submit' button.

c. Click on **Matching**:

Enter information for a matching question: a question and four pairs to be matched.

The screenshot shows a web interface for creating a matching question. At the top, there are navigation tabs: HOME, ABOUT, CREATE ASSIGNMENTS, and QUESTION MANAGER. Below these are two buttons: 'Search & View Questions' and 'Create New Questions'. A secondary menu shows 'Multiple Choice', 'Fill in the Blank', and 'Matching'. The main heading is 'Create New Matching Question'. Below this, there are three dropdown menus: 'Skills' (set to 'Prepositions'), 'Levels' (set to 'Easy'), and 'Themes' (set to 'Sports'). There is a 'Question:' text input field. Below that, there are two sections: 'List 1' and 'List 2'. Each list contains four 'Item' text input fields. At the bottom left, there is a blue 'Submit' button.

Create Assignments

Creating an assignment for OCT can be done by selecting the questions, assigning an ID and a name to the assignment and exporting a zip file with an xml file and the images and listening passages:

1. Open the CAT and login.
2. Click on the **Teacher Dashboard_ Create Assignments** tab.
3. Enter an **Assignment id**. (This can be any alphanumeric string without spaces)
4. Enter an **Assignment name**.

HOME
ABOUT
CREATE ASSIGNMENTS
QUESTION MANAGER

Teacher Dashboard: Create Assignments

Select the questions you want to include in the assignment and click on the submit button

Assignment id:

Assignment name:

Multiple Choice Questions

IDs	Simple Multiple Choice Questions	
7	Luis Suarez is one of the ____ players of the national team	<input type="checkbox"/>
20	Why did the chicken cross ____ road?	<input type="checkbox"/>
Multiple Choice Questions with reading passages		
6	Diego Forlán was born ____ Montevideo	<input type="checkbox"/>
7	Luis Suarez is one of the ____ players of the national team	<input type="checkbox"/>
17	What nutrient is found in ____ apple?	<input type="checkbox"/>
Multiple Choice Questions with listening		
25	What does this sound file say?	<input type="checkbox"/>
Multiple Choice Questions with image		
4	The picture shows the flag of the nation who's football team is called the "Black Stars". Name the country.	<input type="checkbox"/>

Fill In The Blank Questions

IDs	Simple Fill in the blank Questions	
2	What _1_ the name of the fruit?	<input type="checkbox"/>
8	Orange has vitamin _1_	<input type="checkbox"/>
9	how _1_ you?	<input type="checkbox"/>
10	how _1_ she?	<input type="checkbox"/>
12	What _1_ your name?	<input type="checkbox"/>
14	Where ____ the remote control?	<input type="checkbox"/>
15	In baseball, if the batter hits the ball out of the park he scores a ____.	<input type="checkbox"/>
16	In basketball, a shot from beyond the arc is worth ____ points.	<input type="checkbox"/>
Fill in the blank Questions with reading passage		
3	The boy likes _1_ marbles.	<input type="checkbox"/>
Fill in the blank Questions with listening		
4	The recorded passage is a _1_ message.	<input type="checkbox"/>
Fill in the blank Questions with image		
14	The year in the image is _1_.	<input type="checkbox"/>

Matching Questions

IDs	Simple Fill in the blank Questions	
1	This is a test question	<input type="checkbox"/>
2	Match the food to it's nutrient	<input type="checkbox"/>

[Submit](#)

5. Right Click on **here** at the top of the page and click on **save link as**

HOME
ABOUT
TEACHER DASHBOARD_CREATE ASSIGNMENTS
QUESTION MANAGER

Your content file has been created. Please right-click [here](#) to save the file.

Teacher Dashboard: Create Assignments

Select the questions you want to include in the assignment and click on the submit button

Appendix H – iSTEP 2011 Media Kit

Fact Sheet

Carnegie Mellon



iSTEP: innovative Student Technology ExPerience

A unique research internship opportunity from
TechBridgeWorld at Carnegie Mellon University

What is the iSTEP ExPerience

iSTEP is a summer internship program that provides Carnegie Mellon students with the opportunity to apply skills learned in the classroom to benefit underserved communities around the world. Students who have participated in iSTEP have exhibited tremendous personal and professional growth as a result of their real-world experiences conducting research in developing community settings.



About TechBridgeWorld

TechBridgeWorld is a research group based in the Robotics Institute at Carnegie Mellon University that innovates and field tests technology solutions to meet sustainable development needs around the world. Through strong collaborations with partners in developing communities, we explore and enhance the role of technology globally.

"Carnegie Mellon has a long tradition of reaching out to underserved communities in need of **innovative solutions for solving basic problems**. The students, faculty, and staff who make TechBridgeWorld possible are among the finest examples of this commitment in our academic community. Their projects have had **meaningful impact** and continue to improve the quality of life for many where the need is greatest."

-Dr. Jared Cohon,
President, Carnegie Mellon University

2011 Partners and Projects

The 2011 iSTEP team is working with the Administración Nacional de Educación Pública (National Administration of Public Education) and schools located in Montevideo, Uruguay. The team will work to develop three projects to help improve English literacy in Montevideo. The three projects include:

- (1) an online computer tool for students to practice their literacy skills
- (2) a content authoring tool for teachers to customize literacy content
- (3) a Facebook application for motivating students to enhance their literacy skills

I am very excited because I believe the iSTEP technology research experience will give me a **strong foundation** to pursue a career in research in the future.

Asma Hamid, Carnegie Mellon University in Qatar,
Information Systems Management 2012



One Laptop Per Child Computers in Uruguay

7 Students, 3 projects,
1 Summer
Follow the Journey...

Carnegie Mellon



2011 Team Members

This year's team consists of 7 total students, with 4 students working from Montevideo, Uruguay, 2 in Pittsburgh, USA and 1 in Doha, Qatar. They represent a variety of departments, backgrounds, and skills

Three masters students at the Heinz College in Pittsburgh: Roberto (Public Policy and Management), Hanae Timoulali (Information Systems Management), and Vanessa Vázquez (Public Policy and Management).

Two undergraduates from the Pittsburgh campus: Elise Gonzales (junior, Computer Science), and Meghan Nahass (junior, Policy Management and Biology).

Two students from the Doha campus Asma Hamid, (junior, Information Systems) and Afnan Fahim (sophomore, Computer Science).

Roberto was selected as the Team Leader and TechBridgeWorld's 100@100 Fellow! This position is sponsored by the 100@100 fundraising campaign started in fall 2010 as a grassroots effort to support the iSTEP program

It is an opportunity to be part of a new generation of projects that work through the use of technology for development.

Roberto Ponce Lopez, Heinz College,
Masters in Public Policy and Management 2012



Montevideo team with our ANEP partners

Follow the Journey:

<http://istep2011.techbridgeworld.org>
www.istepuruguay.wordpress.com
www.facebook.com/iSTEPtbw
www.twitter.com/iSTEPtbw
www.youtube.com/iSTEPtbw
www.flickr.com/photos/isteptbw/
isteptbw@gmail.com



Informational Poster



iSTEP 2011: Uruguay



*7 Students
around the globe*

3 Projects:

One-Laptop-Per-Child/Computer Tool
Content Authoring Tool
Facebook Tool



Follow the Journey:

Website: <http://istep2011.techbridgeworld.org>
 Blog: www.istepuruguay.wordpress.com
 Facebook: www.facebook.com/iSTEPtbw
 Twitter: www.twitter.com/iSTEPtbw
 YouTube: www.youtube.com/iSTEPtbw
 Flickr: www.flickr.com/photos/iSTEPtbw
 Email: isteptbw@gmail.com

Carnegie Mellon

iSTEP (Innovative Student Technology ExPerience) is a summer internship of the TechBridgeWorld research group at Carnegie Mellon

جامعة كارنيجي ميلون في قطر
Carnegie Mellon Qatar

Quote Sheet

Carnegie Mellon



جامعة كارنيجي ميلور في قطر
Carnegie Mellon Qatar



iSTEP 2011: Uruguay

I was looking for an opportunity to develop real-world technology while doing research in order to find a way to impact people's lives. With my experience, iSTEP was the perfect match.

- Hanae Timoulali, Carnegie Mellon University,
Masters in Information Systems Management 2011



I believe iSTEP technology research experience will give me a **strong foundation** to pursue a career in research in the future.

- Asma Hamid, Carnegie Mellon University in Qatar
Information Systems 2012



You make a **real impact** on a developing community and **influence** their lives and education in great ways.

- Elise Gonzales, Carnegie Mellon University,
Computer Science 2012



I have always been passionate about international and community development; iSTEP gives me the opportunity to **learn new skills** that address those aims.

-Vanessa Vázquez, Carnegie Mellon University,
Masters in Public Policy and Management, 2012





7 Students

3 Projects

1 Summer



Global teams have always fascinated me and the experiences working with the iSTEP team will **definitely help me** in pursuing similar projects in the future.

- Afnan Fahim, Carnegie Mellon University in Qatar,
Computer Science 2013

iSTEP is an opportunity to be part of a **new generation** of projects that work through the **use of technology for development.**

- Roberto Ponce Lopez, Carnegie Mellon University,
Masters in Public Policy and Management 2012



iSTEP explores international development, technology, and policy. The internship is the **intersection of these areas** and lets diverse backgrounds experience **working across cultures and disciplines.**

- Meghan Nahass, Carnegie Mellon University,
Policy Management and Biology 2012



Follow the
Journey:

<http://istep2011.techbridgeworld.org>
www.istepuruguay.wordpress.com
www.facebook.com/iSTEPtbw
www.twitter.com/iSTEPtbw
www.youtube.com/iSTEPtbw
www.flickr.com/photos/isteptbw/
isteptbw@gmail.com

CMU Press Release – Pittsburgh, USA

Carnegie Mellon

Department of Media Relations

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For immediate release:
April 30, 2011

Carnegie Mellon students participate in nontraditional summer internship

Summer internships typically involve students learning a specific skill or doing office work to get their foot in the door of an industry. This is not the case for the innovative Student Technology ExPerience (iSTEP) interns. The [iSTEP](#) internship program, organized by the [TechBridgeWorld](#) research group at Carnegie Mellon University, provides students with the opportunity to apply skills learned in the classroom to real world challenges in developing communities. Now in its third year, the iSTEP program is building upon past experiences in Tanzania in 2009 and Bangladesh in 2010 to bring a new focus to the internship.

For the first time, the iSTEP team will be working with a government agency – Administración Nacional de Educación Pública (National Administration of Public Education, in short “ANEP”). Through this partnership and relationships with local schools, the iSTEP team and ANEP will work together on three technology projects to improve English literacy skills in Montevideo, Uruguay. This unique collaboration will allow iSTEP interns to create resources to potentially influence educational programs in Uruguay and other countries in the future.

Seven students from Carnegie Mellon’s Pittsburgh and Doha campuses will work together for ten weeks on the three projects. The team will be globally distributed, with five students stationed in Montevideo, two in Pittsburgh and one in Doha. The ethnically diverse iSTEP team is a mixture of graduate and undergraduate students with computer science, information systems, and public policy backgrounds. Two of the eight interns are native Spanish speakers.

Another nontraditional and interesting feature of the iSTEP internship program is that students start their preparations well before the official internship begins. During the Spring 2011 semester, the interns trained for four months through mini courses that introduced them to field research in developing communities and simulated the summer internship. iSTEP 2011 intern Meghan Nahass mentions, “iSTEP gives us an unparalleled and unmatched opportunity to have a true impact. iSTEP is not your traditional coffee-fetching internship, but one that truly helps students learn and grow. I’m looking forward to seeing our efforts set the groundwork for future development.”

Follow the iSTEP 2011 team’s journey through their [website](#), [Blog](#), [Facebook](#), [Twitter](#), [YouTube](#) and [Flickr](#) pages.

CMU Press Release – Doha, Qatar

Carnegie Mellon

Department of Media Relations

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For immediate release:
April 30, 2011

Carnegie Mellon Qatar students participate in nontraditional summer internship

Summer internships typically involve students learning a specific skill or doing office work to get their foot in the door of an industry. This is not the case for Asma Hamid, a junior Information Systems major and Afnan Fahim, a sophomore Computer Science major. Asma and Afnan are both Carnegie Mellon University in Qatar students participating in the innovative Student Technology ExPerience (iSTEP) internship program. [iSTEP](#) organized by the [TechBridgeWorld](#) research group at Carnegie Mellon University, provides students with the opportunity to apply skills learned in the classroom to real world challenges in developing communities. Now in its third year, the iSTEP program is building upon past experiences in Tanzania in 2009 and Bangladesh in 2010 to bring a new focus to the internship.

For the first time, the iSTEP team is working with a government agency – Administración Nacional de Educación Pública (National Administration of Public Education, in short “ANEP”). Through this partnership and relationships with local schools, the iSTEP team and ANEP are working together on three technology projects to improve English literacy skills in Montevideo, Uruguay. This unique collaboration allows iSTEP interns to create resources to potentially influence educational programs in Uruguay and other countries in the future.

Afnan, based in Montevideo, is the Technical Lead for one of the projects and Asma is the Technical Floater based in Doha, providing support for all three projects. In describing iSTEP, Asma states, “I am very excited because I believe the technology research experience will give me a strong foundation to pursue a career in research in the future.” In addition, Afnan is looking forward to working on his project as well as having the chance to work in “a completely different part of the world, with a unique culture.” He adds, “iSTEP offers a great blend of utilizing both my interest in technology as well as my love for meeting people from different parts of the world.” Afnan and Asma will be joined by five other Carnegie Mellon students from the Pittsburgh campus.

Another nontraditional and interesting feature of the iSTEP internship program is that students start their preparations well before the official internship begins. During the Spring 2011 semester, the interns trained for four months through mini courses that introduced them to field research in developing communities and simulated the summer internship

Follow the iSTEP 2011 team’s journey through their [website](#), [Blog](#), [Facebook](#), [Twitter](#), [YouTube](#) and [Flickr](#) pages.

CMU Press Release – Montevideo, Uruguay

Carnegie Mellon University

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Para publicación inmediata:
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Estudiantes de Carnegie Mellon desarrollan soluciones de Tecnología para mejorar la educación de inglés en Uruguay

Estudiantes colaboran con funcionarios de educación del Gobierno de Uruguay

PITTSBURGH-Siete estudiantes de la Universidad de Carnegie Mellon, provenientes de los campus en Pittsburgh, Pensilvania, Estados Unidos y en Doha, Qatar, están trabajando este año con funcionarios de educación del gobierno de Uruguay en Montevideo. El equipo está desarrollando unas nuevas herramientas tecnológicas para mejorar la enseñanza del inglés en las escuelas secundarias del Uruguay.

El equipo de estudiantes está trabajando en colaboración con la [Administración Nacional de Uruguay de Educación Pública \(ANEP\)](#), desarrollando aplicaciones para la computadora del Plan Ceibal y para el Facebook. Estas herramientas tienen el propósito de alentar a los estudiantes a que practiquen sus habilidades de inglés en su tiempo libre, así como facilitar a los maestros la preparación y distribución de ejercicios de práctica. Asimismo, los estudiantes también están desarrollando una herramienta de creación de contenidos, que permita a los profesores la personalización de los contenidos de las herramientas del OLPC y Facebook.

Los estudiantes forman parte de un programa de prácticas profesionales único, el cual se llama [Experiencia Estudiantil de Tecnología Innovadora \(iSTEP por sus siglas en inglés\)](#). Este programa es organizado por un grupo de investigación denominado [TechBridgeWorld](#) y que pertenece al Instituto de Robótica de la Universidad de Carnegie Mellon. TechBridgeWorld primero desarrolla, y después prueba e implementa soluciones tecnológicas de acuerdo a las necesidades de la comunidad. iSTEP brinda a los

Page 2 of 2 /Carnegie Mellon Students Developing Tech Solutions for Improving English Literacy in Uruguay
 estudiantes la oportunidad de aplicar sus conocimientos adquiridos en el aula a problemas del mundo real en comunidades en vías de desarrollo.

Por ejemplo, Roberto Ponce López, un estudiante de maestría en el Heinz College de la Universidad de Carnegie Mellon mencionó haciendo referencia al proyecto: "Cada niño tendrá acceso a la tecnología para competir en el siglo 21." Roberto es uno de los practicantes de iSTEP de este año. Asimismo mencionó: "A través de iSTEP, esperamos ayudar en este esfuerzo con el desarrollo de instrumentos de tecnología que ayuden a estudiantes y profesores a mejorar su inglés, haciéndolos más competitivos en el mundo globalizado".

El grupo de practicantes de iSTEP se encuentra en Montevideo desde Mayo. Han realizado grupos de enfoque y entrevistas con autoridades escolares, profesores y estudiantes del Liceo 39, una escuela secundaria pública. También han estado trabajando con expertos en educación y otros docentes afiliados a la ANEP. Siga las actividades del equipo de iSTEP 2011 a través de su [página de internet](#) [Blog](#), [Facebook](#), [Twitter](#), [YouTube](#) y [Flickr](#).

Este proyecto ha sido impulsado por Silvia Pessoa, una graduada del Liceo 39 que ahora es una profesora asistente en Carnegie Mellon de Qatar. Silvia es una de las asesoras de la pasantía de iSTEP 2011.

"Estoy impresionada por el compromiso del equipo para mejorar la educación mediante la tecnología", dijo Pessoa. "El equipo ha acumulado un gran conocimiento de cuales soluciones de tecnología funcionarán mejor para hacer una contribución positiva a la enseñanza de inglés en las escuelas secundarias en el Uruguay".

Aunque el trabajo de campo en Uruguay terminará el 29 de Julio, ANEP y TechBridgeWorld están discutiendo maneras de probar las nuevas herramientas para seguir su desarrollo en el largo plazo.

TechBridgeWorld y el Instituto de Robótica son parte de la Escuela de Carnegie Mellon de Ciencias de Computación. Siguen la escuela en Twitter @ SCSatCMU.

###

Acerca de la Universidad Carnegie Mellon: Carnegie Mellon (www.cmu.edu) es una universidad privada. Realiza investigación a nivel internacional, con programas en áreas que van desde la ciencia, la tecnología y los negocios, hasta el orden público, las humanidades y las artes. Siete escuelas componen la universidad y hay más de 11.000 alumnos. Los estudiantes gozan de una muy baja tasa de números de alumnos por docente y de una educación caracterizada por su enfoque en la creación e implementación de soluciones para problemas reales, la colaboración interdisciplinaria y la innovación. Es una universidad global, el campus principal de Carnegie Mellon se encuentra en Pittsburgh, Pensilvania, Estados Unidos. Sin embargo, tiene campus en Silicon Valley de California y Qatar y programas en Asia, Australia, Europa y México. La universidad se encuentra en medio de una campaña de recaudación de fondos de \$ 1 mil millones, titulado "Inspira Innovación: La Campaña para la Universidad de Carnegie Mellon", que tiene como objetivo desarrollar un fondo patrimonial, apoyar docentes, alumnos e investigaciones innovadoras, y velar por la salud física del campus con equipamiento e instalaciones mejores.

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