# EDUCAÇÃO INTERNACIONAL EM UM AMBIENTE DE APRENDIZAGEM VIRTUAL INTERATIVO: EXPERIMENTAÇÃO COM APLICAÇÕES DE MÍDIA DIGITAL PARA DESENVOLVIMENTO COMUNITÁRIO

## *EDUCACIÓN INTERNACIONAL EN UN ENTORNO DE APRENDIZAJE VIRTUAL INTERACTIVO: EXPERIMENTACIÓN CON MEDIOS DIGITALES APLICACIONES PARA EL DESARROLLO COMUNITARIO*

## INTERNATIONAL EDUCATION IN AN INTERACTIVE VIRTUAL LEARNING ENVIRONMENT: EXPERIMENTING WITH DIGITAL MEDIA APPLICATIONS FOR COMMUNITY-BASED DEVELOPMENT

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**RESUMO**: O artigo baseia-se em dados empíricos para avaliar resultados de aprendizagem de um curso interativo sobre mídias digitais para desenvolvimento comunitário. Ministrado conjuntamente por meio do programa de Desenvolvimento Internacional Sustentável (SID) na Universidade Brandeis e do programa de pós-graduação em Mídia e Tecnologia da Universidade Estadual Paulista (UNESP), o curso Learning Across Borders (LAB) permitiu que grupos de trabalho internacionais criassem soluções baseadas em mídia digital para desafios de desenvolvimento em saúde, educação, conservação ambiental, geração de renda e engajamento cívico. O objetivo da pesquisa foi testar se resultados positivos de aprendizagem gerados por uma abordagem pedagógica baseada em problemas e em projetos poderiam ocorrer em um ambiente virtual de aprendizagem internacional. A tecnologia digital criou o ambiente de aprendizagem e também foi tema de estudo, uma convergência que fortaleceu os resultados do curso. Com base em um quadro conceitual que demonstra como as tecnologias de informação e comunicação podem aprimorar modelos de desenvolvimento participativo, bem como em uma análise dos projetos dos estudantes e dados de pesquisa, o artigo conclui que o formato do curso e sua implementação fornecem um modelo inovador para educação profissional de pós-graduação em mídia e desenvolvimento.

**PALAVRAS-CHAVE**: Educação internacional. Mídia digital. Desenvolvimento comunitário. Ambiente virtual de aprendizagem.

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RESUMEN: *El artículo se basa en datos empíricos para evaluar los resultados de aprendizaje de un curso interactivo sobre medios digitales para el desarrollo comunitario. Impartido en forma conjunta a través del Programa Internacional de Desarrollo Sustentable (SID) de la Universidad de Brandeis y el programa de posgrado de Medios y Tecnología de la Universidad Estadual de São Paulo (UNESP), el curso Learning Across Borders (LAB) permitió a grupos de trabajo internacionales crear soluciones basadas en medios digitales para desafíos de desarrollo en salud, educación, conservación ambiental, generación de ingresos y participación cívica. El propósito de la investigación fue probar si en un entorno de aprendizaje virtual internacional pueden ocurrir resultados de aprendizaje positivos generados por un enfoque pedagógico basado en problemas y proyectos. La tecnología digital fue simultáneamente el ambiente de aprendizaje y el tema de estudio, una convergencia que fortaleció los resultados del curso. Basado en un marco conceptual que sostiene que las tecnologías de la información y la comunicación pueden mejorar los modelos de desarrollo participativo, así como en el análisis de los proyectos y resultados de las encuestas de los estudiantes que tomaron el curso, el artículo concluye que el formato de éste y su implementación constituyen un modelo innovador para la educación de posgrado y la formación profesional en medios de comunicación y el desarrollo.*

PALABRAS CLAVE: *Medios digitales. Desarrollo comunitario. Educación internacional. Ambiente de aprendizaje virtual.*

ABSTRACT: *The article draws on empirical data to assess learning outcomes from an interactive course on digital media for community development. Taught jointly through the Sustainable International Development program (SID) at Brandeis University and the State University of São Paulo (UNESP) graduate program on Media and Technology, the Learning Across Borders (LAB) course enabled international working groups to create digital media-based solutions to development challenges in health, education, environmental conservation, income generation and civic engagement. The purpose of the research was to test whether positive learning outcomes generated by a problem- and project-based pedagogical approach could occur in an international virtual learning environment. Digital technology created the learning environment and was also the topic of study, a convergence that further strengthened the course results. Based on a conceptual framework showing how information and communication technologies can enhance participatory development models, as well as on an analysis of student projects and survey data, the article concludes that the course format and implementation provide an innovative model for graduate level professional education in media and development.*

KEYWORDS: *International education. Digital media. Community-based development. Virtual learning environment.*

## Introduction

Several momentous political events of 2016 – the Brexit vote on June 23 in favor of exiting the European Union and Donald Trump's November election as

president of the United States – were widely seen as a popular rejection of economic inequality, unregulated immigration and the perceived loss of sovereignty – all consequences of unrestrained globalization. Yet by mid-2017, British voters had left the pro-Brexit Conservatives without a parliamentary majority, a new French president was leading a re-commitment to European integration and Donald Trump's unpopularity in the U. S. had reached record lows.

Whatever the immediate outcome, the economic, political and cultural tensions exacerbated by globalization will shape both domestic and international politics for the foreseeable future. In developed and developing countries alike, these tensions will be pitted against the benefits – shared unequally within and across societies – of the technology-driven, accelerated movement of capital, labor, goods, services and information across the world's national borders.

So far, however, no discernible ideological backlash has sprung up against the impacts of globalization on higher education. On the contrary, the research literature points to an "increased level of [student] engagement through international collaboration" (HIGGINS et al., 2013, p. 40). Previously restricted to physically mobile students, positive learning outcomes stemming from international education are now available to students who attend classes as usual in their home countries. Drawing on the power of information and communications technologies (ICT), higher education can now move from a system "based on delivered wisdom to one of user-generated wisdom," and even a single classroom can "… facilitate learning across countries" (p.40). Like their counterparts based on physical mobility, virtual international classrooms foster global competencies, including critical thinking, knowledge, empathy, acceptance and awareness of cultural diversity, foreign language ability and intercultural teamwork. These global competencies are enhanced even when internationalization is achieved through technology (HIGGINS et al., 2013, pp. 40-41).

The rise of digital media opens infinite possibilities for innovative approaches to building global communities of learning and practice. Although online courses often still mimic lecture-centered traditional instruction, ubiquitous mobile devices, social media and user-generated online content – to name just a few features of the digital media landscape – afford constantly evolving opportunities to transform traditional instructional design. Professional education stands to benefit from "connectivist pedagogies" enabled by the explosive digital media environment. Governments, international agencies and nonprofit organizations, as well as multinational and even

domestic companies, are increasingly hiring graduates whose training prepares them to work in international teams and "design creative solutions to real-world problems" – which, like climate change or new disease vectors, flow across borders (COCHRANE et al., 2013, p. 1).

In Spring 2016 and Spring 2017, faculty from the Sustainable International Development (SID) program at the Heller School for Social Policy and Management at Brandeis University in Waltham, Massachusetts[3], and the Media and Technology Graduate Program at the State University of São Paulo (UNESP) in Bauru, Brazil[4], collaborated on a jointly taught, seven-week graduate-level course entitled "Learning Across Borders: Digital Media for Community-based Development". Offered as part of an official cooperation agreement between the Heller School and UNESP, the course allowed the professors to test whether positive learning outcomes generated by a problem- and project-based pedagogical approach could be produced in a virtual international classroom. The course outcomes would be further strengthened by the fact that digital media both created the learning environment and served as the topic of study. If validated, these propositions could provide a basis for an innovative approach to professional education in both development and communications studies.

Rather than simply transmitting didactic content *through* digital media, the course enabled international working groups to create digital media-based solutions to widespread development problems. The targeted areas were health, education, environmental conservation, income generation and civic engagement. The media expertise of the Brazilian students and the international development knowledge of the SID students provided information and expertise for the groups. Working together, members created digital media prototypes with the potential to produce direct impacts on poor and vulnerable communities in different parts of the world. Drawing on empirical data from the course, we argue that the Learning Across Borders (LAB) course as taught at SID/UNESP is an effective pedagogical strategy for use in an international virtual learning environment, especially since the topic and the tools converge.

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[3] Founded in 1994, the SID Program grants masters degrees and admits approximately 60 new students per year, including Americans and a majority from developing countries. The SID students have professional experience in the development sector.
[4] The UNESP Media and Technology graduate program, formerly known as the Digital Television graduate program, was originally created in 2008. It accepts approximately 50 Brazilian students per year, most of whom are media professionals. The program offers masters and doctoral degrees.

**Conceptual framework**

The LAB Course rests on a conceptual framework that unites digital media and community-based development. A strong student demand at SID for more information technology skills that could be applied to their work as development professionals stimulated our thinking. For example, in response to an internal questionnaire about a weekend proseminar on the topic, one African student wrote: "I would like to acquire ICT skills that could be applied to a project in developing countries. It's a new technology and not many organizations and development planners are aware of its potential in a resource constrained setting like Malawi." Another signaled his interest in using mobile technology to stimulate economic growth in rural areas, a core development goal: "I'd like to have some understanding of how apps are developed. I hope to do work in social entrepreneurship and income generating projects with rural communities. Knowing what technology is available and how to use it is an essential skill." Yet another student recognized the power of media to improve policies and increase popular participation in development: "I am interested in learning about community outreach to create policies and projects that are more participatory."

The SID/UNESP response to the students' demand was grounded in a long tradition of conceptual approaches to the relationship between information and communication technologies (ICT) and development. Research and writing on this topic have explored themes such as the application of IT systems in socio-economic development (development informatics), the use of ICT in developing countries (ICTD), and the use of ICTs for delivery of specific development goals, such as education, health and poverty reduction (ICT4D). The ICT4D perspective is based on the premise that increased communications furthers social development by providing information and communication technologies directly to communities or through governments, international agencies and local NGOs (HEEKS, 2006; BURRELL; TOYAMA, 2009).

Examples of ICT4D programs and projects abound. Among the best known are: Computer Aid International (1998); NetHope Consortium (2001); the United Nations ICT Task Force (2001-2005); the World Summit on the Information Society (WSIS); the Global Alliance for ICT and Development (2006); and the One Laptop per Child Project (OLPC). Despite widespread enthusiasm, most of these initiatives created controversy because they were technology driven, largely top-down and reflected a

global rather than a local perspective. The OLPC project, initiated in 2005, is a case in point. Developed by Nicholas Negroponte, a computer scientist at the Massachusetts Institute of Technology (MIT), the project aimed to provide individual low-cost computers to school children worldwide. The sheer grandiosity of the scheme meant that it would likely fall short of expectations. Research has concluded "that provision of individual laptops is a utopian vision for the children in the poorest countries, whose educational and social futures could be more effectively improved if the same investments were instead made on more sustainable and proven interventions" (WARSCHAUER; AMES, 2010, p.33)

The main insight emerging from these projects is that technology should be considered as a tool, not as a solution per se. A major weakness is that most projects fail to break out of the pilot stage and lack sustainability, always requiring more funds and support. Further, critics contend that ICT — like many development approaches in the post-war period — is actually an insidious instrument for Western domination and cultural imperialism. While post-development theorists like Arturo Escobar (2007) have made this critique about development in general, it is particularly applicable to technology-based development programs and projects, since most of the hardware, software and content are bought from Western multinational corporations and are not locally produced. Technology-based projects typically increase, rather than diminish, dependency on foreign donors.

Kentaro Toyama, a former Microsoft executive, captures the fundamental lesson from the ICT4D experience thus far. "Technology," Toyama writes, "is only a magnifier of human intent and capacity. It is not a substitute. If you have a foundation of competent, well-intentioned people, then the appropriate technology can amplify their capacity and lead to amazing achievements. But, in circumstances with negative human intent, as in the case of corrupt government bureaucrats, or minimal capacity, as in the case of people who have been denied a basic education, no amount of technology will turn things around" (2010).

Building on Toyama's view, further questions are being asked about how ICT can promote effective development. The focus is on using communications technologies to empower communities to drive their *own* socio-economic development. Indeed, the best practices that have emerged closely mirror contemporary thinking about the underlying process of community-based development. For example, Robert Chambers, a major proponent of "bottom up" development practices, refutes the idea that

government agencies and big NGOs should take a leading role in planning and executing projects. On the contrary, communities must ultimately control and lead projects on their own.

In his classic book, *Whose Reality Counts?: Putting the First Last* (1997), Chambers argues that since the mid-1980s, "a massive shift in priorities and thinking has been taking place, from things and infrastructure to people and capabilities" (p.9). An emerging consensus equates "development" with concepts like "well-being, livelihood, capability, equity and sustainability". Achieving these states of being requires, among other conditions, "facilitating participation, with approaches which are bottom up with processes of learning, rather than top-down with blueprints" (p.11).

Digital media, with its interactive nature, fits particularly well with these bottom up and participatory approaches to development. Whether as text, image, audio, video or animation codified in a computer-readable format, digital media can be easily created, accessed, copied, stored, retrieved, modified, transmitted, streamed, downloaded and distributed. On or offline, this flexibility can enhance participatory communication, in which interpersonal communication technologies become tools that can empower communities to share views and knowledge about specific issues in their local context. This paradigm has led to the rise of new approaches to ICT4D built around the concept of "open development". This refers to the idea that "positive development can emerge through new models of engagement and innovation that are more participatory, more collaborative, and driven more by the beneficiaries" (SMITH; ELDER; EMDON, 2011, p. v). Digital media can be a core component of these interactions.

However, not all digital media products and processes are equally effective in promoting participatory communication. The concept of "participatory civics" helps to explain how digital media can be used to foster engagement in political discussion and civic life -- both of which are critical for participatory development. Ethan Zuckerman (2014), director of Civic Media group at the MIT Media Lab, has developed a taxonomy to map different forms of participatory civics. These range from "thin" to "thick" forms of media engagement, requiring, correspondingly, less or more effort to achieve different forms of action. The actions, in turn, create different types of impact, from simply providing a "voice" to people who care about a particular issue to becoming an "instrument" for changing the course of events (Figure 1).

**Figure 1**: Axes of participatory civics
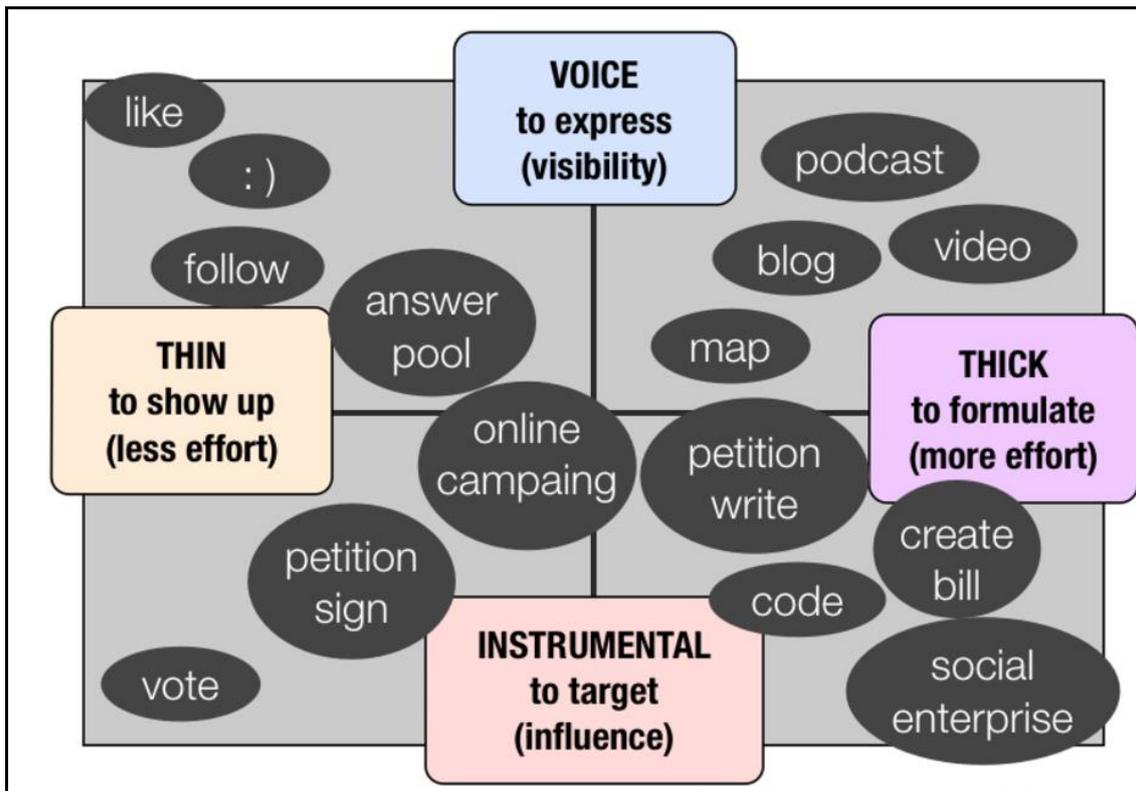


Source: adapted from Zuckerman (2014)

To translate these concepts into educational practice, we conceived the Learning Across Borders (LAB) course. The overarching objective was to create a laboratory in the form of a virtual international classroom. This unique setting allowed faculty and students from SID and UNESP, working together, to explore the intersections between digital media and community development. The thematic focus was selected to enhance the professional education of both groups of students, regardless of their previous educational background and experience. To foster even greater exchange and collaboration, the students' major assignment in the course was to develop communications projects in cross-national groups. Finally, by tracking the course outcomes, the faculty created a resource for future research on international virtual education, its applications to community-based development and its potential contribution to professional graduate-level education.

**Case Study: The LAB Course**

The LAB course challenged the students to explore real-world problems. They investigated and responded to questions such as how communities can use online tools, for example, collaborative maps, to prevent environmental damage, or how schoolteachers can use a blogs or social media to interact with hospitalized children.

From a pedagogical standpoint, the course took inspiration from both project-based and problem-based learning. The students' projects were self-directed, involved collaboration, and covered a wide range of disciplines and subjects. These characteristics are common to both approaches. However, the course combined project- and problem-based learning by requiring the students to develop a clearly defined and well-structured project to address problems that lack precise parameters in the real world. In fact, such "mixed models" are used frequently in higher education. They are based on the premise that "[a] problem as incentive for the learning processes is a central principle to enhance students' motivation" and, most important, that "the problem reflects the conditions of professional practice" (DE GRAAFF; KOLMOS, 2007, p.6). For this reason, this mixed models approach was well suited for use with development and media professionals.

**Course Design and Management**

The course design included assigned readings, participatory discussions, guest presenters and hands-on experimentation with project modeling and management techniques. A procedural handbook for using a multimedia toolkit was provided to the students. In their future work, students would be able to use elements of the toolkit with community members, directly harnessing the power of media technology for development purposes.

The course content included presentations and discussions on the relationship between technology, communication and development, based on data about international access to ICT and the use of digital media to fulfill community needs and broader development goals in different countries and regions. The readings emphasized the persistent unequal access to digital technology (ADERA et al., 2014), despite rapid growth of Internet penetration in upper-middle income countries like Brazil, China and

Mexico and in lower-middle countries such as India and Kenya[5] (Figure 2). The readings also stressed the limitations of technology in solving deep structural questions of poverty and inequality (TOYAMA, 2010). The critique of external development solutions, often parachuted into communities by outside experts, reinforced the need to integrate local perspectives into media- and technology-based development projects (GUMUCIO-DRAGON, 2003).

**Figure 2**: Percentage of individuals using the Internet
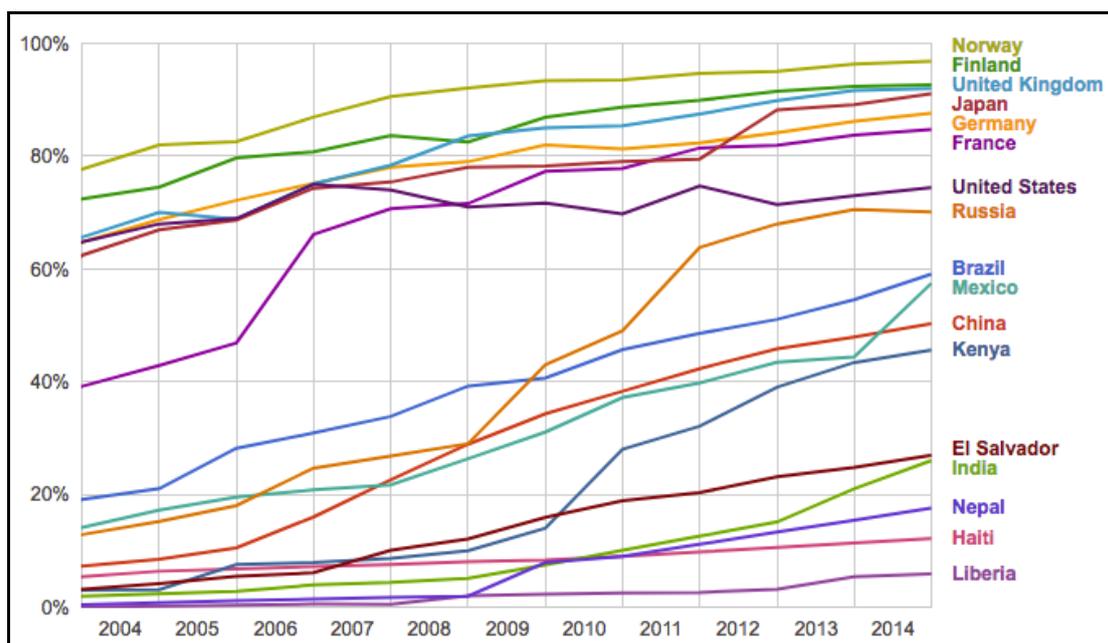


Source: Google Public Data, International Telecommunication Union (2017)

Additional resources included case studies of successful media initiatives to promote community-based development. Examples such as CGNet Swara (a voice-based portal to India's tribal communities), Digital Green (low-cost video to improve agriculture extension services), InfoAmazônia (maps to track the deteriorating forest environment) and Ushahidi (collaborative maps used in Kenya's 2010 governmental referendum) provided students with models of how diverse media strategies and products could be used by community members themselves to document and address real-world development issues. The cases constituted evidence that media interventions did not necessarily require sophisticated technologies to be effective but rather draw their power from local engagement and participation.

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[5] Income classification according to World Bank data. "World Bank Country and Lending Groups". Retrieved from: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519

The cases reinforced one of the course's key lessons, as captured by communications expert Alfonso Gumucio-Dragon: "The ICT component, as any communication component, should develop along with the development process, not in isolation from it. The interaction between community participation, the technical inputs for development and the communication and knowledge tools will define the success or failure of a particular development communication effort" (p. 10).

Group work was an indispensable component of the course. Students were divided into teams based on their thematic interests and level of digital media skills. The goal was to form mixed teams comprised of both international and Brazilian students, ensuring that each group had at least one media expert. It was also important to ensure that at least one of the Brazilian participants in each group had sufficient command of English to interact with the international students. Each team was limited to a maximum of seven members.

The teams were given the task of proposing a media solution (e.g. a website, blog, app, video, podcast etc.) aimed at achieving a specific development goal (e.g. improved health, basic education, environmental conservation, income generation or civic engagement). Teams collaborated via online platforms (such as Skype, Facebook Messenger, WhatsApp, Google Hangout), creating a virtual learning environment for their remote meetings. The platforms allowed the students to test a variety of software and devices. For example, some projects used social networks, such as Facebook. Other projects depended on customized apps to engage users, while still others used interview techniques and audio and video recordings. As a result of this experimentation, the students became familiar with the online tools for collaboration and were also able to develop their own digital media products.

To avoid dispersion, the teams were required to focus their projects on one of five thematic areas: education, health and nutrition, environmental conservation, income generation and civic activism, selected because of their centrality to the United Nations Sustainable Development Goals (SDGs). Approved by 193 countries in late 2015, the SDGs represent the international consensus about development priorities for the next 15 years (UNITED NATIONS, 2015).

Teams were provided with a list of specific roles for individual team members. These included the roles of *speaker*, in charge of leading oral presentations, *writer*, in charge of drafting reports and texts, *designer*, for prototype layouts, *social media director*, to publicize and stimulate engagement through Facebook, Twitter and other

online platforms, *developer*, to build websites, blogs, apps and other web-based products, and *host*, in charge of establishing contacts and facilitating online sessions. In practice, students often assumed multiple roles within their respective groups.

The professors provided students with a list of web-based resources to use in project development. These included software and apps for *website construction* (Wix, Weebly, WordPress etc.), *photo collection* (Flicker, Instagram, Picasa etc.) and *photo editing* (Photoshop, Gimp etc.), *social media* (Facebook, Twitter, Snapchat etc.), *mapping* (Google Maps, Ushahidi etc.), *online meetings* (Skype, Google Hangout etc.), *sending newsletters* (MailChimp etc.), *survey design* (Google Forms, Survey Monkey etc.), *mobile app building* (Appery.io, Mobincube, etc.), *document sharing* (Google Drive, Open Office, Dropbox etc.), *video distribution* (YouTube, Vimeo etc.), *audio recording and editing* (Audacity, Soundcloud, etc.) and *data visualization and infographics* (Infogram, PiktoChart etc.), among others. The list also included references to tutorials and video demonstrations for using these tools.

To develop the group projects, participants were required to use their own portable computing devices, such as laptops and mobile phones. Students were also required to furnish appropriate connecting cables, accessories, software and apps for media production. Most of these resources were readily accessible and affordable. Data from a questionnaire distributed in advance of the course to assess students' previous experience with digital media tools enabled the professors to form project groups with similar interests as well as complementary skills and technical competencies.

A report of between five and seven single spaced pages on each group's digital media project was the final course deliverable. Team members were allowed to combine the skills and knowledge from their previous professional knowledge with the practical inputs obtained in the course. Authors were invited to use figures, photographs, tables, links, and other editing resources. References and citations were included in accordance with academic standards. The paper consisted of six sections, as indicated in Figure 3:

**Figure 3**: Final paper format
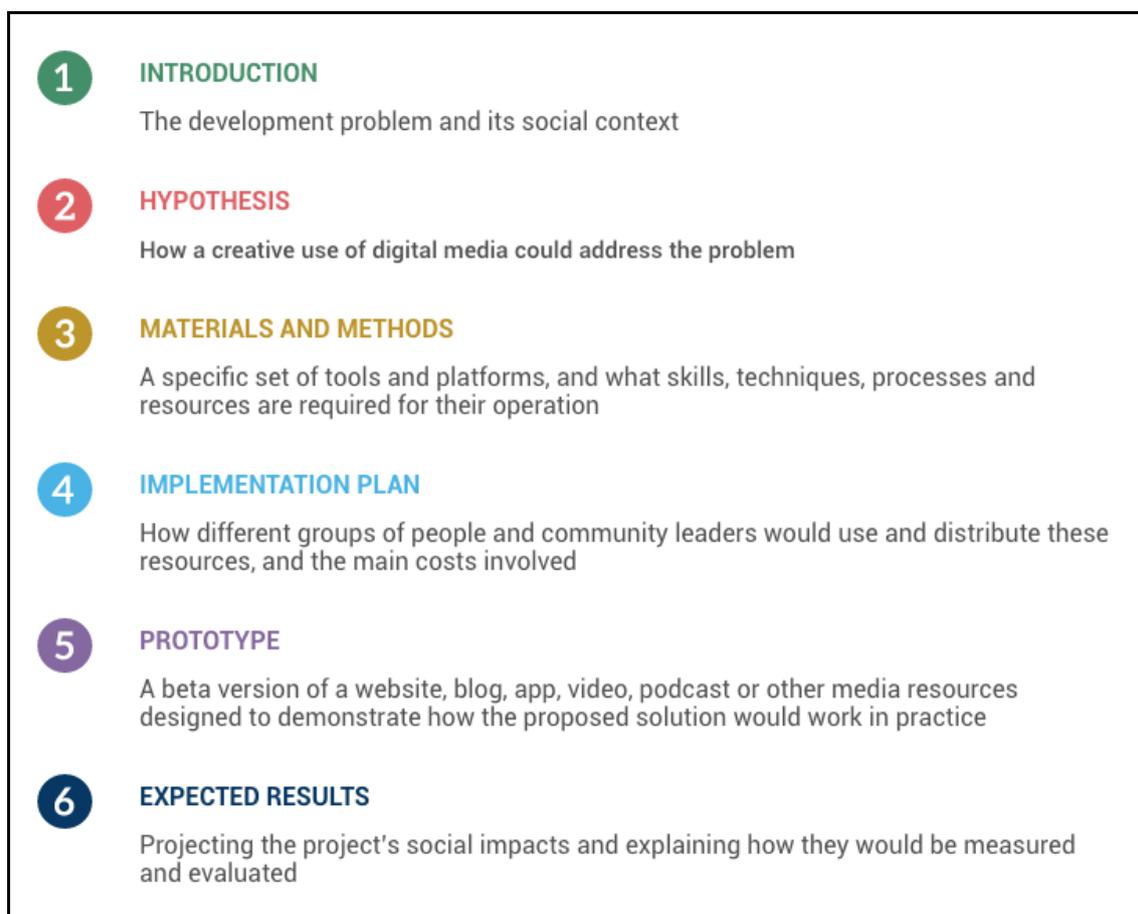


All of the readings, media tools, links, documents and other resources were made available through a public website, hosted at www.labcourse.org. In addition to a traditional syllabus, an open spreadsheet on Google Drive facilitated class planning and dynamics, group assignments, taking of attendance, recording of grades and other administrative tasks. The spreadsheet allowed the students as well as the professors to actively participate in course planning. Professors from SID Brandeis and the UNESP team anchored the course from their respective institutions, directing both joint and individual sessions. The faculty partnership was essential in guiding the student collaboration.

**Analysis of Student Projects**

In 2016 and 2017, the students produced a total of 14 projects, fairly evenly distributed among the five development areas highlighted in the course. Mobile apps were the most frequently used media application, followed by websites (Table 1, Table 2). This distribution indicates the applicability of media technology to a broad range of development areas. The students' preference for mobile apps reflects the increasing popularity and penetration of mobile devices in developing country contexts. In terms of the target audiences, half of the projects focus on children and youth. Media applications are a particularly appropriate channel for reaching young people. They are heavy media users, school settings help to amplify the distribution of media messages and young generations of users routinely share social and mobile media (CORTESI et al., 2015). Moreover, developing countries have high percentages of young people in their overall populations (UNFPA, 2014).

**Table 1**: Projects developed for the LAB Course in 2016

| Project title | Description | Development areas | Media application |
|---|---|---|---|
| Denounce! | Collecting reports on child labor in Brazil | Health / Civic Engagement | Mobile App |
| UGreen | Mobilizing communities for reporting environmental threats | Environmental conservation | Mobile App |
| AprenDemos | An interactive experience for students visiting cultural and educational institutions | Education | Mobile App |
| Ocupa Bauru | A website to foster civic engagement and political information among high school students | Education / Civic Engagement | Website |
| Save Food | A mobile application to manage and prevent food waste in Brazil | Income generation | Mobile App |
| Teens Thinking Politics | Promoting political tolerance, understanding and dialogue-building skills for middle- and high- school students | Civic Engagement / Education | Website and Social Networking |
| What is politics for you? | Hosting multi-platform user-generated content about Brazilian and American teenagers' visions of policy making | Civic Engagement | Online Video and Social Networking |

**Table 2**: Projects developed for the LAB Course in 2017

| Project title | Description | Development areas | Media application |
|---|---|---|---|
| Consumption 4 Tomorrow | Using digital media to enhance financial literacy among Brazilian youth | Education / Income generation | Blog and Online Video |
| Educare | Offering online pedagogical support for teachers of hospitalized students | Education / Health | Blog |
| i-Saúde | A collection of multimedia books with interactive features on health education | Education / Health | Interactive e-books |
| Conservation and Beyond | Raising awareness about environmental protection of riparian forests in Brazil | Environmental conservation | Website and Social Networking |
| Pehn-Pehn | Managing motorcycle taxi services and traffic education in low income communities in Liberia | Income generation | Mobile App |
| WorkAround | A social enterprise to create online employment opportunities for Syrian refugees | Income generation | Website / Task Management Software |
| Go Sola | Empowering women to travel and commute alone by crowdmapping information about the safest routes | Civic Engagement | Mobile App |

Selected examples demonstrate the innovation and creativity that students brought to the projects. One is Save Food, a mobile app that connects food producers and consumers. To address the serious problems of food waste and hunger in Brazil, the app enables food producers (mainly fruit and vegetable sellers) to alert consumers about the food items that farmers or sellers will donate or sell for a lower price. A second example is AprenDemos, a mobile app designed to stimulate interest among young people in Latin American museums and other cultural and educational institutions. The app borrows from videogames and uses a cartoon-like character to guide students through digitized collections. It embeds questions about the collections that, when answered correctly, reward the user who then advances through different levels of a game. A third project, Pehn-Pehn, is an app that allows passengers in Monrovia, Liberia, to locate motorcycle taxi drivers. Training materials embedded in the app teach safety measures to users and drivers. The app simultaneously addresses three critical

issues by increasing drivers' income, improving access to transportation in poor urban communities and helping to alleviate unsafe traffic conditions (Figure 4).

**Figure 4**: Screenshots of the three prototypes
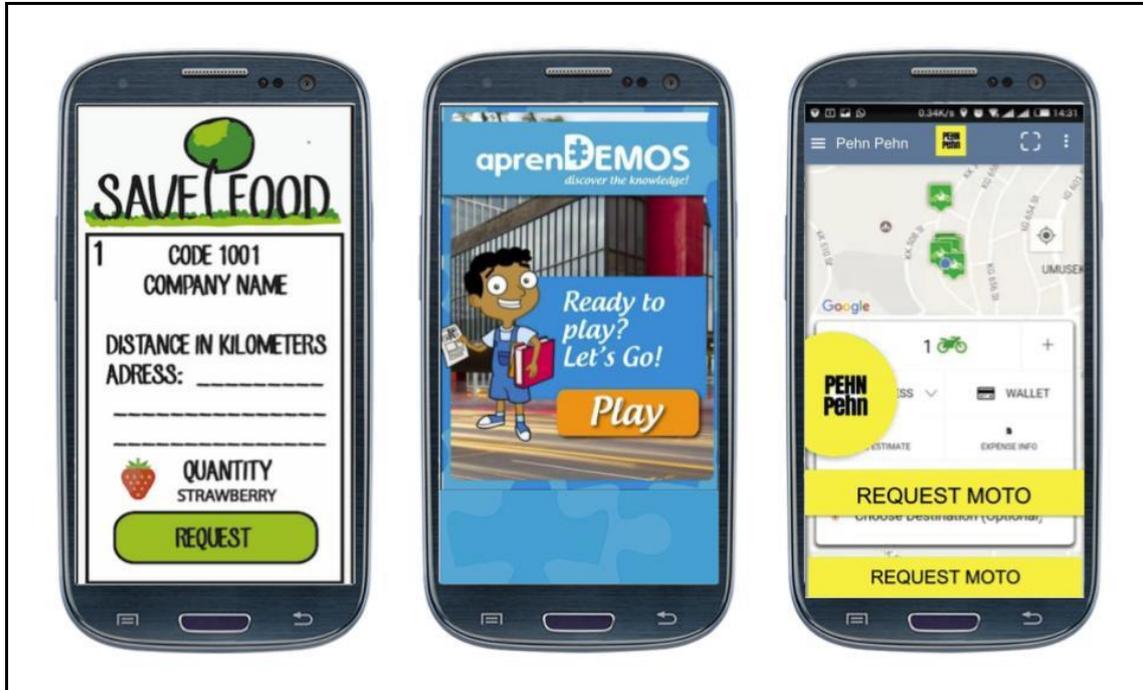


Possibly because of time constraints, students were less successful in going beyond the prototypes to offer implementation and sustainability plans. For example, only a few presented detailed studies of potential users and target communities. Budget information and plans for fundraising or commercial viability, along with evaluation metrics, were rarely included. On balance, however, the projects enabled the students to go beyond a merely conceptual framework. Creating an attractive and functional prototype while keeping the development issues clearly in focus simulated the design challenges that professionals would face when devising media solutions to community-based development problems.

**Survey results**

To gather empirical data about the course results, the professors created and administered an online survey. It was comprised of three parts: general outcomes related to international education; virtual learning interactions; and the specific results obtained

in regard to media and development. The responses were measured on a Likert scale, ranging from "strongly disagree" (1) to "strongly agree" (5). The survey was optional and was sent out one week after the course concluded in 2016 and 2017, respectively. Response rates were 64% out of 36 total students in 2016 and 36% out of 45 total students in 2017. In both 2016 and 2017, approximately ⅔ of the respondents, as well the enrolled students, were Brazilians.

The first survey topic concerned English competency, which can be a major stumbling block for participation in international education. The results offer a mixed picture. In 2016 the required level of English for Brazilian students was more consistently enforced than in 2017. As a result, 80% of the 2016 respondents agreed or strongly agreed that the groups' English language skills were sufficient for a good level of understanding and discussion of the course topics, while 66% agreed or strongly agreed that the Brazilians' level of English comprehension, speaking and writing had improved during the course. In 2017, the corresponding figures dropped to 50% and 30%, respectively. One explanation is that in 2016 the UNESP faculty member teaching the course in Brazil placed greater emphasis on students speaking English in all course activities, not just the interactive sessions. These data suggest that a sufficient knowledge of English should be an entry requirement for the course.

The next survey topic was related to the intercultural competencies acquired by the students. A majority of respondents in both years agreed or strongly agreed that during the course, their "individual awareness of development challenges in other countries improved" (96% in 2016 and 76% in 2017). A majority also concurred that "differences in cultural and political perspectives enriched the international team work" (96% in 2016 and 63% in 2017). In 2016, virtually all the respondents learned about development in various countries and agreed that diverse perspectives were beneficial for carrying out their work. In fact, only two out of a total 81 respondents in 2016 disagreed or strongly disagreed with either of these statements. In 2017, the majority of responses were still positive but more neutral responses were also reported.

Similarly, the majority of respondents in both years saw themselves as "more of a global citizen with increased empathy for diverse perspectives and points of view" after taking the course. Only one out of a total 81 respondents disagreed or strongly disagreed with the statement. Based on these data, the course clearly advanced knowledge of development and increased intercultural awareness, corresponding to

some of the general objectives of international education as well as the specific goals of the LAB course.

The next part of the survey focused on student interaction within the virtual learning environment. Students in both years concurred that they had effectively used diverse media platforms for their interactions, that connectivity failures, although they occurred, were not insurmountable and that the students had been able to convene their groups outside of the scheduled classroom times. Regular contact was established without the need for a designated convener, and commitment to the projects was widely shared. The only significant reported negative was lack of time — a frequently heard complaint at both SID and UNESP about the curriculum more generally. In 2016, 78% of respondents agreed or strongly agreed that their "virtual meetings were productive, collaborative and contributed significantly to the development of the project," while in 2017, the figure was 69%. In 2016, 87% of respondents agreed or strongly agreed that "all team members contributed in some capacity to the project," while in 2017, 75% of respondents agreed or strongly agreed with this statement. The data demonstrate that a large majority of respondents in both years were satisfied with the virtual learning interactions in the course.

The final part of the survey addressed the specific results obtained in regard to media and development. Data from 2016 and 2017 show some common findings. First, at least half the respondents in both years improved their technical skills in digital media. More significant gains were made in soft skills such as social networking, blogging and website design and publishing, than in harder skills such as video and audio recording and editing and app development. Another result was that 91% of respondents in 2016 agreed or strongly agreed that the course improved their knowledge of case studies and research about the potential impacts of media technology on community-based development. This figure dropped to 56% in 2017 but an additional 38% from that year indicated that they neither agreed nor disagreed with the statement.

In 2016, 96% agreed or strongly agreed that their understanding about the application of digital media to specific development problems improved, while in 2017 this figure dropped to 56%. One interpretation of this discrepancy is that the first time the course was offered, there was less division of labor. Most of the students were involved in various aspects of their group projects, including framing problems and devising technical solutions. The second time the course was offered, the media students in Brazil had a greater degree of responsibility for designing the media

prototypes, while the international students in the U.S. focused on the development issues. Although more efficient, this division of labor may have hindered the holistic understanding of the connections between media and development for some students.

On balance, a strong majority of students in both years completed the course with a heightened appreciation that the media solutions developed by the groups could, in the future, be used by members of poor and vulnerable communities to foster participatory, bottom up development. In 2016 and 2017, 96% and 75% of the respondents, respectively, indicated that they agreed or strongly agreed with this proposition. These data confirm the viability of linking digital media and community-based development as an important contribution to the education and training of both development and communications professionals.

In personal emails to the professors, the students recognize some challenges but also stress the long-term benefits of having participated in the course. They suggest that international and institutional cooperation could outlast the course itself. For example, a Brazilian student wrote: "The course accomplished its goal of showing that education has no borders. The format worked. I felt the difficulty with the [English] language. Nonetheless, the experience was worth a lot. It was important to have people from various parts of the world working together thinking about a common proposition. It's an exercise that requires effort but it broadened my vision for the communications media." Another Brazilian student added: "The time in the Lab Course provided knowledge and new discoveries about community development together with media and technology. I'm sure that we learned not only the class content but also benefited from the exchange of knowledge among all the people involved." A Brandeis student, commenting on the institutional relationship between SID and UNESP, wrote: "I think it's an amazing connection and I know this class will continue to be a useful learning experience for students moving forward."

**Conclusion**

Overall, the experience of the course over two years validated our initial premise: that positive learning outcomes could be produced in a virtual international classroom where digital technology created the learning environment and was also the topic of study. The 'mixed model' pedagogy, based on problem-based and project-based

learning, allowed the students to gain knowledge of real-world development problems while working collaboratively on digital media-based and community-driven solutions. Hence the course proved — as we had envisioned — to be an innovative and successful strategy to achieve multiple objectives important for professional education and training in both the development and communications fields.

However, in order to maximize the positive outcomes, certain conditions should be met. First, stronger learning results when students do not select their tasks based only on their previous expertise, and when they work together in an integrated fashion. This was observed when development students ventured out of their comfort zone to learn hands-on digital media applications and techniques, and, conversely, when communications students attempted to frame complex development problems about which they had limited prior knowledge.

Second, the course content should not be restricted to either theory or practice. Rather, the material is most instructive when it covers key references in the academic literature on communications and development and illustrative case studies of innovative media projects, as well as skills-building sessions to increase students' familiarity with and competence in manipulating digital media tools.

Third, although the students encountered obstacles, such as insufficient English, occasional connectivity outages and the perennial challenges of group work, the excitement generated by the novel proposition of the course more than outweighed these problems. The main motivating factor for the SID students was the exposure to media tools that could be applied in their own professional development work. For the UNESP students, gaining knowledge about development and interacting with international students were strong motivations. For both groups, the exchange of ideas and perspectives was highly positive, as would be the case in any international program. Beyond this, though, the virtual learning environment expanded students' horizons and enabled them to cooperate across physical spaces and boundaries.

With the clarity of hindsight, certain modifications can be identified. One would be a more thorough research design that used pre- and post-course surveys to assess selected learning outcomes. For the SID students, it would be useful to assess the improvement in their media skills, while the UNESP students should be assessed in terms of an increase in their international development knowledge. Another improvement would be to ensure that the groups engage all members in a variety of tasks. Finally, the course content would be enriched by additional guest speakers who

could provide students with practical advice about financial planning and advanced media production. Most important, the course should be extended to include a field-based component, allowing students to test their prototypes in real-world settings. This would effectively take the classroom, virtual or otherwise, into the realm of community-based development practice.

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