PAA 2013 Conference Submission

Experiment on Internet Use and Capability Change in Rural Mexico

Abstract:
Duflo's (2012) *Tanner Lecture* focuses on why "hope" should be included as a primary human capability and development goal. Duflo highlights a need for rigorously measuring the impact of development interventions on individuals' capabilities. I evaluate the impact of the construction of an Internet café by a development NGO in rural Mexico through survey data from a sample of rural communities (N>1600 individuals) both before and six months after construction. I find that Internet use nearly doubled among young adults (ages 15-24), individuals' social and educational capabilities increased, which some described as greater "hope" that motivated them to work hard to convert their resources to capabilities, but that immediate development outcomes (employment, literacy, or healthcare) were unaffected. It is argued that measuring changes in capabilities in field experiments is important to broadly capture the influence of development interventions, particularly when interventions' influence fall outside the boundaries of pre-determined goals.

I. Introduction

Ester Duflo's (2012) recent *Tanner Lecture on Human Values* at Harvard University focused on why "hope" should be included as a primary human capability within Sen's (1989, 1999, 2008) capability approach. Reflecting broadly on the implications of the results from various field experiments, Duflo argued that if hope is increased via a particular development intervention then that project can be deemed in some sense a success, even when other pre-determined impacts may not have improved. Duflo's reflection highlights a need for measuring the impacts on human capabilities within experiments of particular development interventions' effectiveness. While a number of scholars attempt to operationalize the capability approach into quantifiable outcomes, few have undertaken their operationalizations under the framework of experimentation and randomization.

Drawing on survey data both before and six months after the construction of an Internet café near a cluster of over twenty small, remote communities in Mexico (N>1600 individuals), I find that while Internet usage nearly doubled among young adults (ages 15-24), more measurable and generally celebrated development outcomes were less affected, such as increases in employment, literacy, or healthcare.

From this research, I develop the concept of measuring capability change, an effort to broadly capture the many ways in which development programs influence individuals' and groups' capabilities (Ibrahim 2006; Foster and Carey 2008; Nussbaum 2011; Wolff and De-Shalit 2007). The capability change methodology used here is suited for field experiments that intend to measure the impact of interventions that have a less direct impact on accepted developmental outcomes, but which are nonetheless significant. Scholars who conduct RCTs on development interventions that have more long-term consequences may find capability change an efficient methodology for measuring broader and less predictable impacts of particular interventions.

II. Efforts to Operationalize the Capability Approach

Many researchers operationalize the capability approach to evaluate the impact and relative success of development programs (Alkire 2008). In this endeavor, they experience various difficulties in the process of operationalization, including selecting capabilities to examine, deciding on objective indicators, creating appropriate survey questions, and weighting variables (Alkire 2008; Alkire and Santos 2009; Alkire and Foster 2011).

These attempts to operationalize make normative assumptions that development programs can lead to "capability *expansion*," as Sen (1989) says. Some efforts to numerically capture the level of capability expansion share normative assumptions with other econometric measures within program evaluation literature, such as randomized control trials and outcome-based research (Duflo, Glennester, and Kremer 2007). Though Sen (1999) states that people "are the means and ends of development" (p. 6), and his

followers regularly quote him in this respect, program evaluation research that claims to use the capability approach focuses on the measurement of the increase of specific capabilities as evidence of development.

Alternatively, other scholars who shun RCTs and outcome-based research view development projects as politically motivated (Abdelrahman 2004; Cox 1999; Ferguson 1994; Fisher 1997). They claim that development institutions have their own discourses, internal cultures, and leadership hierarchies, despite their anti-political mission statements. They tend to conclude that development NGOs' programs are not helpful. Still others argue that development NGOs are political actors contributing to the cultural dominance of strong cultures in the "world polity" (Beckfield 2003; Boli and Thomas 1999; Meyer 2010). These authors focus on the social and political missions of development projects and institutions.

In this paper, I adopt the view of Watkins, Swidler, and Hannan (2012) that development institutions are organizations that cause social change; they are agents of social transformation. Development programs cause both positive and negative changes in terms of individuals' capabilities in the same manner that other types of organizations create social change. Therefore, it is necessary that evaluations that attempt to measure the impact of a program on capabilities incorporate a broad number of capabilities. An increase of one type of capability does not make a program a "success," rather, rigorous analysis of the programs' numerous impacts on many types of capabilities, and a final analysis of the total capability change, is paramount to understanding the far-reaching impacts of development efforts.

III. Capability Change

Development programs influence, contribute to, and impact social life beyond a series of pre-determined outcomes. Many *unexpected consequences* often result and introduce new layers of complexity insofar as judging the relative success and impact of programs. Unexpected consequences need to be captured in evaluation measures so that a more full picture of the impact of programs on individuals' capabilities is captured.

The myriad of ways that development NGOs' programs—and the presence of the NGOs themselves—influence individuals' capabilities, I call *capability change*. Capability change considers all the ways in which development programs influence individuals' and groups' capabilities (Ibrahim 2006; Foster and Carey 2008; Nussbaum 2011; Wolff and De-Shalit 2007), and embraces the interconnectednesss between different capabilities, which Sen has mentioned (Sen 1999:53). In addition, the multidimensional nature of a single capability needs more analysis.

For example, and adult literacy program in a community will often produce a greater number of literate adults. While it is important to capture the effectiveness of the program on the number of literate adults, there is more to be explored. Perhaps, the adults involved in the literacy classes develop relationships and friendships with each other, leading to a particular social group of friends within the community bonded by a shared experience. This increase in solidarity can be counted as capability expansion. However, feelings of sociality within groups often create out-groups (Comim and Carey 2001; Sen 2004; Somers 2005), which could potentially lead to social divisions within the community. Also, whereas children in the community may have been literate due to increased public schooling opportunities around the world, their relationship with their parents may change once their parents become literate. Their parents can help them on homework, leading the children to respect their parents' authority more. On the other hand, literate children can feel less valuable to their parents, as they no longer are needed to read for their parents. Many other outcomes can result because of the literacy classes, with successive changes feeding on each other in somewhat vague and unpredictable fashions.

Capability change, unexpected consequences, and vagueness are illustrated in this paper using research on the impacts of an Internet café in a village in rural Mexico. In Mexico, the Internet expanded users' educational resources and aspirations of self-realization, as well as increased exposure to international media and the world outside their village. Many other capability changes have resulted, and, potentially, many more are yet to be realized. On the aggregate, important structural changes could occur, including the migration of individuals to cities in search of intensified benefits of urbanization that they have been introduced to via these development programs. This paper explores this case study from Mexico in detail,

as it illustrates the principles of unexpected outcomes and capability change quite well.

Outcome-based evaluation of these programs misses the plethora of changes in the communities' and individuals' capabilities. Viewing the programs as stimulants of social change allows for the capture of more phenomena, both expected and unexpected, as a result of the programs. Evaluation of capability change, as opposed to capability expansion of pre-determined indicators, paints a more complete picture of the story of the program and the lives of those involved.

IV. Methodology

To measure the impact of this project intervention on Internet use and human development, we coordinated a two-wave study in all of the 21 communities near El Estanco, each of which were within a 90-minute drive. Sixteen of the 21 communities selected had prior contact with the local NGO, while five had not. A household survey was created and carried out in two waves. The first wave took place before the Internet was installed in early 2011. The second wave was carried out six months later. The survey was performed twice in hopes of capturing the impact of constructing the Internet café; it was believed that Internet use would dramatically increase in the first six months and that the first significant impacts of the Internet café on local development would begin to become manifest.

After the Internet café had been running for about two and a half months, North American college students volunteering for the local NGO offered free one to two-hour computer training classes for a period of two weeks to any desiring local community member. In the classes, between one to three local people would gather around a single computer and one North American volunteer would instruct them. There were four computers available, meaning that there could be up to sixteen people at one time in the small one-room Internet café.

V. Analysis

In order to sort out the independent influences of gender, education, age, and wealth, and to show the shift over time, we conduct a logistic regression predicting Internet use before and after the introduction of the cybercafé and the free computer and Internet training classes. Marginal effects are shown (Table 2), and coefficients show the odds of Internet use relative to the comparison group. Values above one indicate increased odds of use and values below one indicate lower use.

Table 2. Multivariate Logistic Regression Predicting Internet Use at Wave One and Wave Two (odds ratios)

		Ever used the Internet:	
		Wave One	**Wave Two**
Gender:	Male (comparison is Female)	**1.147**	**.563**
Education:	Middle School (comparison is Primary or None)	**.306**	**.727**
	Secondary School	**4.581**	**13.575**
Age:	12-14 (comparison is 25 +)	**1.590**	**13.998**
	15-19	**13.858**	**27.077**
	20-24	**8.585**	**5.068**
Wealth:	Middle (comparison is Low)	**.656**	**.549**
	High	**2.270**	**1.048**

We also conduct OLS and Poisson regression analyses using the digital divide variables to predict whether the Internet was used for capability-enhancing activities. This data comes exclusively from the wave two household survey. Respondents could list up to five uses for the Internet. We gave each response a value of two for education or information seeking, a value of one for social contact and entertainment, and a value of zero if they reported never having used the Internet before. We summed these values across all five possible uses and recoded the index to range from zero, for no use, to three, for scores of three or higher (only five people had an index higher than three). We then regress this scale on the digital divide variables: gender, education, age, and wealth (see Table 3).

Table 3. Regression Model Predicting Whether the Internet is Used for Beneficial Activities		
	OLS Regression	*Poisson Regression*
Gender: Male (comparison groups is Female)	-.105	-.376
Education: Middle School (comparison is Primary or None)	-.030	.168
Secondary School	.852*	1.097*
Age: 12-14 (comparison is 25 +)	.357*	2.336*
15-19	.695*	2.904*
20-24	.115	1.980*
Wealth: Middle (comparison is Low)	-.127	-.836*
High	-.122	-.767*

People's opinions regarding the value of technology and having the Internet available in their community did not differ significantly after the construction of the Internet Café. Furthermore, when asked if the Internet would have positive or negative effects on the community, not one respondent voiced their opinion that the Internet would have a negative influence. Still, feelings of inequality greatly increased from wave one to wave two. In wave one, 59.6% of people said that a few families in their communities had more of the money and resources in the community than others, while 40.4% stated that things were divided evenly. In the wave two, after the NGO selected a social entrepreneur, a belief that some families had the majority of the money and resources jumped to 83.3%. It is difficult to target the exact reason for this quick change in opinion given the data collected, but it is probable that the construction of the Internet café as a family-owned business, as opposed a public good available in the community center or public school, influenced this change in community opinion.

VI. Conclusion

The data presented here demonstrate that the Internet café was somewhat effective in bridging that divide and in enhancing human development. While considering the unique circumstances under which this study was conducted, including the construction of the Internet café next to the only local high school in the region and the offering of free computer classes from North American volunteers for two weeks to the students, the following conclusions can be gleaned. First, Internet access and rural peoples' Internet usage is very limited in rural areas of Mexico. Second, a digital divide exists in rural communities based on age, gender, education, and wealth. Age and educational achievement are the best predictors of Internet use; most users in our study were young adults with some high school education. The construction of the Internet café and the offering of free computer and Internet training courses can be linked to the decrease in wealth acting as a predictor of the digital divide. Third, education and age are strong predictors of Internet use, whether or not Internet access is available locally, since these factors were strong predictors both before and after the Internet café was constructed. Fourth, a few users advance more quickly in their ability to use computers and the Internet. Fifth, the Internet is perceived as valuable among users, particularly among advanced regular users, but most of those who have never used the Internet do not think that it is important. Sixth, Internet use is helpful in terms of increasing social and educational capabilities for users, but had no measurable impact on political, economic, or security capabilities.