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Facebook in Venezuela: Understanding Solidarity Economies in Low-Trust Environments

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ABSTRACT

Since 2014, Venezuela has experienced severe economic crisis, including scarcity of basic necessities such as food and medicine. This has resulted in over-priced goods, scams, and other forms of economic abuse. We present an investigation of Venezuelans' efforts to form an alternative, Solidarity Economy (SE) through Facebook Groups. In these groups, individuals can barter for items at fair prices. We highlight group practices and design features of Facebook Groups which support solidarity or anti-solidarity behaviors. We conclude by leveraging design principles for online communities presented by Kollock to present strategies to design more effective SEs in environments of low trust.

ACM Classification Keywords

H.5.m. Information Interfaces and Presentation (e.g. HCI): Miscellaneous; See http://acm.org/about/class/1998/ for the full list of ACM classifiers. This section is required.

Author Keywords

solidarity economy; Facebook Groups; bartering; consumer-to-consumer; low-trust environments

INTRODUCTION

Over the past five months, Santiago[1], a 32-year old expectant father, has successfully negotiated the exchange of food staples (like flour) for diapers online nine times. He coordinates these trades through Facebook bartering groups, which have emerged as a way to navigate scarcity in Venezuela over the past two years. Santiago regularly monitors eight bartering groups' activity in search of adequate propositions for diapers, acting quickly to out-maneuver competitive offers by commenting on posts and sending direct messages to fellow members to elicit exchanges. He reveals that members must take caution when trading as *"Some people try to take advantage of others."*

[1]All participant names have been changed to protect their privacy.

To manage risk, he reviews the profile of the member with whom he intends to trade, paying careful attention to the number of friends they have in common as well as their gender. *"I try to exchange with women because women are less likely to be involved in scams."* If he believes the member can be trusted, he provides his phone number, and they coordinate via WhatsApp to complete the trade in person at a public space. Through his participation, Santiago has obtained a two-week supply of diapers for his unborn child. He admits that while the volume is insufficient, bartering via Facebook has afforded him the opportunity to secure goods at a fair price, a task which would not have been possible through traditional means of shopping in Venezuela in the current economic and political climate. Santiago was able to barter at fair prices in a time of scarcity and instability because the Facebook group was acting as a solidarity economy (SE) [34].

Through interviews with 21 participants and direct observation of 3 Venezuelan Facebook bartering groups in a large city[2], our research aims to understand how to design and support SEs as social computing systems. We consider the role the socio-political infrastructure of Venezuela plays in the emergence and sustained practice of this SE. Our paper makes the following contributions: we detail the emergence and prevailing qualities of SEs in Venezuela which exist in an infrastructure permeated by anti-solidarity values. We highlight design affordances and constraints which support and prevent anti-solidarity behaviors in Facebook Groups. Finally, we leverage design principles for online communities presented by Kollock [19] , Ostrom [37], and Axelrod [3] to highlight design changes that would better support this economic activity. These include greater visibility of group rules, better enforcement of the real names policy, a reputation system for participants, tools to track rules violations and apply graduated sanctions, and a tool to calibrate fair exchange rates by tracking the history of other trades in the recent past.

BACKGROUND: VENEZUELAN ECONOMIC CRISIS

Economic crisis has gripped Venezuela since the price collapse of crude oil, its main export, in 2014 [9], a year after Nicolas Maduro inherited the presidency [48]. Since that time, the economic and political climate has continued to deteriorate. Venezuelan GDP has experienced an average decline of 6.83% over the last five years[16] in conjunction with food shortages [27], failing hospitals [6], inflation [17], calls by the

[2]To protect participants' privacy, we have not revealed the city name.

government for humanitarian aid [4], and political opposition both domestically [7] and internationally [36]. Such instability has paved the way for a new type of scammer, known as *bachaqueros*, to usurp control of the economy. *Bachaqueros* are individuals who purchase items in bulk through legal and illegal means in an effort to manage the flow and pricing of supplies with the goal of generating a profit at the expense of other citizens. Items sold by *bachaqueros* include food, medications, clothing, electronics, personal hygiene and baby items, among others. Venezuelans often have little choice but to purchase items through *bachaqueros* at elevated prices.

Given this scarcity, many Venezuelans have migrated online in search of goods despite the fact that Venezuela has one of the slowest Internet access speeds in the world, with 98% of the country only achieving speeds of 2 Mbps [28]. Even so, approximately 60% of Venezuelans have access to the Internet [18], and it boasts one of the highest penetration rates for usage of social media such as Facebook [12]. As such, many groups for selling and bartering items have emerged on Facebook to help Venezuelans get access to basic necessities such as food and medicine. This paper focuses on Facebook Groups for barter, which are a noteworthy example of solidarity HCI.

RELATED WORK
We review key aspects identified in the literature regarding SEs, including bartering, cooperation and trust, and design principles of online communities.

Solidarity Economy Movements
The term "solidarity economy" emerged in the 1980's, appearing in France and various Latin American countries, including Venezuela [31]. SEs aim to create communities of cooperation in which members support one another, sharing responsibilities and governance as a democratic group with a goal of achieving social, economic, and/or environmental justice [31, 42]. They are created and enacted through collective action and strive to highlight the importance of human beings over capital gains [34].

Collective action and social movements have been studied at length in the HCI community [43, 45, 24]. The first examination of solidarity HCI was introduced to the field in 2016 by Vlachokyriakos *et al* [47]. In their paper, they examine how digital technology enabled citizens in financially crisis-stricken Greece to develop an SE as an anti-austerity measure. Their work highlights four key components of SEs including the ability of the SE to provide basic goods in a non-competitive environment, a physical space for debate and experimentation, coordination across various solidarity structures, and connection with local institutions to target reform. We build on this work. Our next section will detail bartering activity, specifically the roles of cooperation and trust, key factors of a successful SE.

Economic collapse has an impact on citizens akin to a natural disaster or war. Consequently, we can build on the literature of crisis informatics [39, 40]. In their study of citizens' use of Facebook during the Iraq war, Semaan et. al. found that Facebook groups emerged for mutual aid [41]. They note that social network sites are "malleable which enables them

to adapt to a number of uses during disruption. People can form groups and can self organize" [41]. Semaan et. al. write that Facebook groups that emerged in Iraq were tied to strong communities that existed before the war. As we will see, in the case of Venezuela, the groups that emerge are not tied to pre-existing groups and are so large as to feel anonymous.

Bartering, Cooperation, and the Issue of Trust
Bartering is the direct exchange of goods or services. It is traditionally practiced with face-to-face negotiations and exchanges in public spaces [14]. The emergence of digital communication technologies with e-commerce capabilities in conjunction with global economic fluctuations [5] have led to a resurgence in bartering. Platforms such as Facebook, Craigslist, and eBay have become popular hubs for modern bartering activity.

Online bartering groups are informal economies which may be situated locally [21] or over larger geographic areas [1] in which participants rarely know one another [14]. These groups have limited legal authority and enforcement mechanisms to govern the marketplace [35] and tend to support self-interest over those of the community [14]. Participants often view these communities as spaces which provide both opportunities and threats [25]; as a result, members report higher levels of satisfaction in environments with more trust, transparency, and known peer connections [46]. Yet, the majority of this research is specific to environments which share trust as an underlying value in the country's infrastructure [15]. Such trust allows citizens to operate in risky situations [10, 30], creating a form of social capital which makes coordination and cooperation between peers possible [38, 32] and allowing communities, like online bartering economies, to flourish online.

Unbrokered consumer-to-consumer (C2C) transactions in high trust environments have been studied by Moser *et. al.* [33] In their study, they observed behavior in a mom-to-mom sales group in the United States. They uncovered several key findings including a lack of social engagement between members, group mediated violations, and the role of leadership in Facebook Groups. Our research also observes C2C transactions, and extends the findings of Moser *et. al.* by observing Facebook Groups in Venezuela, a low-trust environment riddled with political and economic instability. To uncover key design considerations for bartering groups in this context, we examine the foundational design principles of online communities as presented by Kollock [19].

Principles for Designing Online Communities
Kollock acknowledges that there is no one formula for designing an effective online community for cooperation and collective action [19]. Rather, he provides a list of design principles based largely on the work of Axelrod [3] and Ostrom [37] to manage social dilemmas in which the actions of individuals conflict with those of the group [20]. First and foremost, he presents the need for individuals of an online community to identify one other, have access to information on members' past behavior, and to engage in ongoing interactions to reduce the likelihood of behaving in self rather than group interest [3]. Furthermore, he explains that group boundaries must be clearly defined to manage use of collective resources [37].

In order to manage cooperation, Kollock advises the implementation of rules. Citing the work of Ostrom [37], he supports the conclusion that rules must be well suited to the specific community, and that those who will be most affected by rules ought to participate in their creation or modification. The group must be able to monitor and track inappropriate behavior, with the ability to implement graduated sanctions as well as low-cost conflict resolution mechanisms. In addition, such rules and mechanisms should be respected by external authorities. Kollock suggests that elements of the physical world such as scarcity and risk should be represented in online communities, as such conditions are necessary for the development of trust. Finally, he states that members of an online community should be able to modify their environment and exchange objects and services in an economic system [19].

Our study investigates the impact of low trust on the emergence and sustainability of SEs in Venezuela, which take the form of bartering groups on Facebook. We extend the computing community's understanding of how to support and design for SEs in low-trust environments by comparing these groups' current functionality to the design principles of online communities recommended by Kollock, Ostrom, and Axelrod.

METHODS

We conducted semi-structured interviews with 21 participants. Of these, 19 were recruited from three public Venezuelan Facebook bartering group communities, each of which has emerged within the same large city within the past two years. The main difference between these groups was size (approximately 45k, 8k, and 1.4k), and subsequently volume of activity. However, when compared in terms of interaction percentages (posts, comments, likes among number of members), the groups were comparable over the period studied.

Two participants did not participate in the bartering groups and were interviewed in order to contextualize the importance of the groups in Venezuela today. All of the interviews and subsequent analysis were conducted in Spanish (participants' primary language), which is spoken fluently by the first author and natively by the second and third author. Interviews were conducted by the first, second, and third authors. Quotes included in this work are translated for the benefit of the reader.

Over a period of 8 months, we conducted interviews which lasted 60 to 90 minutes and regularly monitored activity within three Venezuelan Facebook bartering groups to attain a deeper understanding of member interactions. Initially, we established rapport with one community and contacted the moderator of the group to gain permission to monitor the group's public activity and engage with members. Upon his approval, we recruited participants, who consented to interviews. After conducting interviews with the first group, we selected two additional, public Facebook groups in the same city with similar governance styles to gain additional perspective on motivations and behaviors within these communities.

Participants

A range of ages, genders, and occupations were represented among our 21 participants, who identified as Venezuelan citizens and voiced their struggle to attain basic goods. Par-

ticipants were identified based upon recent interactions with the group (*e.g.* publishing a post, commenting on another member's post), demographics, and group positions (Table 1). Participants were contacted by Messenger or via the "Message Seller" function linked to bartering posts on each group's public wall. Participants who were not directly affiliated with one of the groups studied were recommended via snowball sampling. Participants were not compensated for their involvement. Due to limited connectivity, participants were interviewed in a manner that was feasible given their access to devices (e.g. cell phone, home phone, computer) as well as strength and speed of the Internet. As such, 7 participants were interviewed by phone (at no cost to the participant), WhatsApp, or Skype. Another 2 participants were interviewed through a mixture of text and voice messages via WhatsApp, which mediated the issue of limited data connectivity. Finally, 12 interviews were conducted through text via Messenger, which was used in instances of extremely poor connectivity.

Data Analysis

Our team used both an inductive and deductive approach to analyze the data. First, we reviewed literature on solidarity HCI [47], trust [8], and design of online communities [19] to develop several codes which might be identified while coding the interview transcripts. Example inductive codes included "Ease of Use," "Credibility," and "Sense of Community." Next, a deductive coding process was applied. We reviewed each transcript, line by line, and developed codes around patterns which emerged. Initially, these codes included phrases such as "Motivation for Trading and Participation," "Community Norms," and "Security." We met several times to discuss and further refine the coding scheme, which allowed us to find overarching themes (e.g. "Governance of Groups") as well as smaller subsets of these themes (e.g. "Rule Enforcement," "Offenders' Reactions"). This inductive and deductive process allowed us to recognize and interpret aspects which support and constrain SEs on Facebook bartering groups in Venezuela.

Self-Disclosure

Our analyses and findings are shaped by the background and views of each of the authors. The first author is native to the United States, and speaks Spanish fluently. The second, third, and fifth authors are from Ecuador, Panama, and Mexico respectively. The sixth author is Cuban American, and is fluent in Spanish. Authors four and seven are Americans who speak limited Spanish and no Spanish respectively. The third author started a business in Panama with Venezuelans who emigrated to Panama due to the deteriorating situation in Venezuela.

FINDINGS

In this section, we describe the socio-economic infrastructure in which these groups are situated, and detail how Facebook bartering group SEs arose. We describe ways in which the design of Facebook Groups supports solidarity values but sometimes fails to prevent anti-solidarity behaviors.

Navigating Scarcity: From the Real World to Online

In light of the economic crisis, a new infrastructure of intertwined offline and online mechanisms for obtaining basic necessities has arisen to navigate scarcity.

Table 1. Study Participants

Name	Age	Occupation	Kids	Gender	# Groups	Role	Typical Items Bought	Usage	Participation Duration
Diego	37	IT Worker	N/A	M	N/A	Admin	Baby Food	Daily	2 years
Olenna	33	Technical School Instructor	Yes	M	N/A	Moderator	Food, Medication	3x per week	2 years
Ana	39	Telecommunications Supervisor	Yes	F	2	Member	Baby, Food, Medication	Occasional	1.5 years
Camila	27	Nurse	N/A	F	N/A	Member	Baby, Food, Medication	Daily	11 months
Carolina	20	N/A	N/A	F	N/A	Member	Baby, Food	Occasional	3 months
Cristobal	25	Businessperson	N/A	M	N/A	Member	Baby, Food, Hygiene	3-5x per week	1 year
Fran	29	Store Manager	Yes	F	N/A	Member	Food, Medication	Hourly	1 week
Juan	36	Automotive Detailer	N/A	M	N/A	Member	Baby, Food	1-2x per week	1 year
Nico	24	N/A	N/A	M	18	Member	Hygiene, Medication	1-2x per week	Not disclosed
Pia	32	Engineer	Yes	F	8	Member	Baby, Food	Occasional	1 year
Raquel	31	Homemaker	Yes	F	20	Member	Baby, Hygiene	Hourly	6 months
Rodrigo	N/A	Business Admin	N/A	M	N/A	Member	Food	Weekly	Not disclosed
Santiago	32	Sports Trainer	Yes	M	8	Member	Baby, Food, Medication	3-5x per week	5 months
Sara	20s	N/A	Yes	F	99	Member	Food	Hourly	1 year
Susana	26	Unemployed; completes odd jobs	Yes	F	7	Member	Baby, Food Medication	Hourly	1.5 years
Valeria	19	College Student	No	F	10	Member	Food, Medication, Work	Hourly	2 years
Ximena	21	College student	No	F	1	Member	Food, Medication	Daily	2 weeks
Yolanda	41	Education Worker	Yes	F	N/A	Member	Baby, Food	Occasional	2 years
Yoli	22	College student	Yes	F	5	Member	Baby, Food, Medication, Hygiene	Hourly	1.5 years
Gabriel	38	Businessperson	Yes	M	0	Non-User	N/A	N/A	0 days
Lucas	38	Educator	Yes	M	0	Non-User	N/A	N/A	0 days

Attaining Goods in the Real World

Though Venezuelans have experienced food shortages before [26], participants say this is the most severe they have experienced. They shared that all socioeconomic strata struggle to survive. This scarcity has caused 75% of Venezuelans to lose 19 pounds on average last year [22] while others starved:

"A friend of mine who doesn't live too far from here told me a little girl who lived right near him just died from malnutrition after being fed only rice water." (Rodrigo)

The severity of the situation has caused Venezuelans to focus their energy on securing basic necessities, and some individuals have reacted by not only placing their own interests above the community but by profiting from others' needs. Citizens who engage in this profiting behavior are known as *bachaqueros*. Gabriel comments, *"In Venezuela the norm is freeloaders seeking to take advantage of the rest".*

In an effort to manage scarcity, the government enacted identification-controlled selling of products at supermarkets and pharmacies. However, efficiency is a serious problem. Citizens often spend as long as half of a day waiting in line, many choosing to forgo work entirely to secure basic necessities even though they are often only able to purchase a few of the items they seek. Gabriel, a business man, explains:

"If you get to see toilet paper on a supermarket shelf, it is because you have waited in line since 3 or 4 AM to only get 4 rolls of paper; 12 rolls tops because that is the limit of what they can sell you. And the time you spent in line? It's about making a choice: either you work or you wait in line." (Gabriel)

Venezuelans' inability to obtain products once inside the supermarkets and pharmacies is a two-fold issue. First, the government is unable to import or produce the volume of basic goods needed to meet citizens' needs [4], causing a higher demand than available supply. Second, supermarket employees are reported to routinely purchase incoming goods prior to the items' release for public sale. Valeria, a student and employee of a store, shares a typical scenario:

"Bachaqueros are also people who work at companies that produce goods and have access to large loads of products. They resell the products and profit out of it. In the company where I work, almost all the employees resell products. They make more money reselling than working for the company." (Valeria)

Safety has become another major concern when obtaining goods through the regulated markets. Participants reported that unofficial control of supermarket lines has been seized by various groups of *bachaqueros*, which some participants labeled *mafia*. *Bachaqueros* coerce money from citizens by selling spaces to those who are not designated by their ID to shop on a particular day and by demanding payment from citizens to remain in line on their assigned shopping day.

Venezuelans have little choice but to comply with the demands of *bachaqueros*, and they report that they also control large portions of the black market, which includes selling items on the street and online. Participants explained that certain products, particularly medicine and baby items, were only available through the black market:

"The bachaquero network has gotten to a point that there are anti-seizure drugs that you cannot find in a drugstore but you can for sure get in a stall on the streets, sold next to trinkets or where you can rent a phone." (Raquel)

Attaining Goods Online

Goods and medicines not found in hospitals or drugstores can also be found online, typically through Facebook selling groups managed by *bachaqueros*, which may be general in nature or dedicated to a specific need (e.g. contraceptives, antibiotics). In these groups, participants reported that items are sold two to six times the regulated market price. They revealed that they had little choice but to pay the elevated price, often expressing that they were merely relieved to have had a chance to purchase it:

"My son suffers from asthma and there are medications we just can't find [at the pharmacy]. Thank God for one woman that helped me through Facebook. I was able to

find the medicine we needed at only twice the price of what it would normally cost."(Raquel)

Participants unanimously felt that *bachaqueros* were ethically unacceptable, yet were unavoidable in effectively navigating scarcity. As a result, participants expressed feelings of disempowerment and voiced mistrust of the Venezuelan government, businesses, and their fellow citizens.

Counteracting Bachaqueros with Solidarity Measures

To counteract the existing infrastructure of *bachaqueros*, many Venezuelans have adopted a mentality of *solidarity*. In this section, we describe how solidarity measures have been enacted to navigate scarcity, leading to the formation of an SE via Facebook bartering groups.

Many Venezuelans have developed solidarity practices in private networks of friends and family members. In these networks, individuals donate items to those in need or coordinate equitable exchanges with one another through the use of WhatsApp, the most popular text messaging platform in Venezuela [13]. In addition, some participants harnessed opportunities to obtain products through family members living in other states who had access to a different range of products while others traveled to the Colombian border to buy products. Some groups demonstrated an ability to attain products from *bachaqueros* on their own terms by purchasing in bulk and later dividing the product into portions to be shared among the group. Gabriel describes his process:

"I let my close network of friends, which is rather large, know that I will have flour next week and ask them who needs some of it. Out of 20, 30 people, we all need pasta, we all need rice, we all need sugar and coffee, so we buy these goods together." (Gabriel)

In spite of the trust and support these solidarity mechanisms propagate, participants found these closed networks to be limited in terms of the access they provided to goods. Therefore, in an effort to broaden access and allocate resources equitably, around 2015 Venezuelans began to engage in online solidarity strategies, predominately through Facebook bartering.

Participants indicated that Facebook bartering groups are considered *anti-bachaquero* spaces, with the potential to help citizens avoid abusive practices of the prevailing economic infrastructure. These groups help decrease the need for long lines, increase the speed at which products are secured, and provide quick, reliable information about where products can be found. Furthermore, these groups enable opportunities to acquire products at fair prices through equal exchanges:

"Because of these groups, it is less difficult to find products. It is through these groups that Venezuelans help each other." (Nico)

As such, Facebook bartering groups have become popular among citizens seeking to navigate scarcity, and more than half of the participants interviewed belonged to all three of the groups studied. In addition, in each of the three bartering groups we monitored, a high volume of daily page activity was common. One group often has over 150 posts per day,
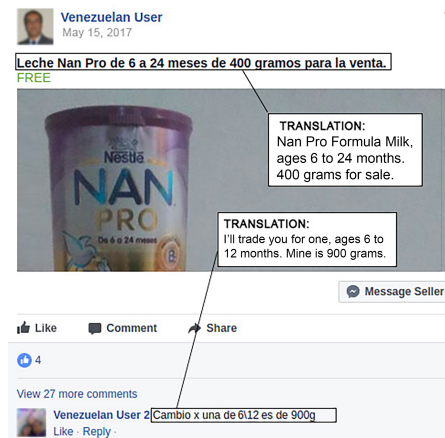

Figure 1. Typical Bartering Post

and each post receives likes, comments, and private messages. A typical transaction is shown in Figure 1.

Supporting SEs through the Design of Facebook Groups

There are various ways in which the functionality and design of Facebook Groups currently supports the development and expansion of Facebook *anti-bachaquero* bartering groups. This section highlights how the current system provides a space for bartering group creation, governance, and cooperation and coordination among group members.

Creating a Unique Space for the SE

Venezuelans have appropriated Facebook Groups to create, spread, and maintain economic justice in this time of scarcity. One feature which supports this mission is the ability to personalize the name of each bartering group, and many have chosen to include the words *anti-bachaquero* within the title. This is used as a tactic to ward off potential offenders by demonstrating at the outset that unjust practices will not be tolerated. Some participants felt that this was an effective mechanism for promoting economic justice:

"The deals here aren't made in-person and the bachaquero won't post in [in these groups] because the group will verbally intimidate him. They get this same discomfort when there are groups that say anti-bachaquero [in the title]." (Rodrigo)

In addition, Facebook Groups provides equal opportunity for any Venezuelan to create a bartering group with its own unique atmosphere through a flexible template. Diego, an administrator, founded his own group after being exiled from a popular community for posting an incorrect item valuation during a barter. He felt as though the moderators should have offered leniency, as it was not only a mistake but his first offense. Rather than providing guidance and support, he revealed that *"The administrators made my life horrible for a while."*

He chose to create his own group approximately two years ago, vowing to create a community of respect, understanding, and guidance. The group has 10 established rules (Table 2) which outline community expectations, including price valuations,

Figure 2. *Translation:* **People be aware of these scammers:** Watch out for these scammers that are selling "new' phones with faults, you realize it when you download apps. I have found the scammer [name/url omitted], here's their Facebook and [name/url omitted]. THEY BLOCKED ME AND ERASED THEIR PHOTOS! BUT I'VE ALREADY SAVED VARIOUS PEOPLE FROM DOING BUSINESS WITH THEM!

behavior while exchanging in-person, and penalties for disobeying the rules. This includes the unwritten stipulation that a member may violate the rules three times prior to expulsion. He explains that such an atmosphere has provided a chance to create a strong, growing community:

> *"My system has worked and I see that my group has grown more than other groups in just a short time. That group [which kicked me out] was my inspiration. It has stayed at 7,000 members and hasn't grown any more. I caught up with the group when it was at 4,000 members and I passed it."(Diego)*

Since then, Diego's group has grown to over 45,000 members.

Governance
Facebook Groups provides a structure in which communities appoint leadership roles (e.g. administrators, moderators) to monitor community members. In Venezulean bartering groups, the activities performed by individuals assigned these roles are not mutually exclusive. Administrators and moderators engage in bartering behaviors with the group, and likewise, many community members who barter in these groups engage in rule enforcement and group development.

"Administrators" generally found the community and develop an initial set of rules. In some cases, the administrator is active in day-to-day activities of the group, including trading, moderating and editing posts. Administrators often provide guidance, warning fellow community members of scams and unscrupulous practices. Administrators appoint moderators to assist with management tasks.

"Moderators" are enforcers of rules in the community. They are typically chosen because they stand out as active, responsible members who uphold the values of the group. Moderator Olenna shares that she and four others were selected to be moderators in Diego's group for this reason. In their group, moderators work as a cohesive unit to enact decisions regarding member behavior through a group chat on Mes-

senger. This may include counseling a member or removing the member from the group. However, given the popularity of *anti-bachaquero* bartering groups and the huge volume of posts, detecting and punishing improper behavior is challenging. Olenna expresses the difficulty of day-to-day moderation:

> *"As administrators or moderators we try to find people [who really take advantage of others] and we block them. But like flies, you get rid of one and three more enter, and it isn't possible to detect them all the time and one can sneak in." (Olenna)*

As a result, moderators and administrators rely heavily on members of the community to uphold group values. Although governance by a small elite group is technically oligarchy, the active participation of members in enforcing social norms and drawing attention to violations has a democratic flavor. Members feel a sense of responsibility in addressing behaviors which contrast with the groups' established rules. The official group rules state that members have an obligation to "denounce" rule violations. Members can report problems to moderators directly via Messenger or call leadership attention to inappropriate posts on the group wall to take action:

> *"Normally moderators are monitoring the publications that are made or comments, and if there is a rude person that changes the environment, they remove them immediately from the group. And also [the community] can denounce a person who is taking advantage of the group if you see it, and they will be removed." (Valeria)*

In fact, several members interviewed were unaware active administrators or moderators existed in any one of the three groups examined. Instead, they believe all members have equal responsibility in managing communities to uphold solidarity values. Many of these participants took on an active role in denouncing inappropriate behavior (e.g price-gouging, scams, robbery) on the public forum or by personally doxing offenders (Figure 2) to disrupt their ongoing participation:

> *"People will speak out [by posting on the wall] if something bad happens. If it is possible, they will capture a shot of the Facebook profile, whatever messages they exchanged with them, their phone number, and name." (Sara)*

Facebook Groups have defined roles codified in software; however, the platform affords flexibility for more democratic participation among administrators, moderators, and members via Messenger and the public wall. Founder Diego admitted that he and his moderators attempt to give advice, but ultimately, it is the members who voice and control the group dynamic and drive community behavior and decision making.

Communication and Coordination
Through community observation and participant responses, we were able to identify mechanisms in Facebook Groups which support cooperation and coordination, a crucial element of SEs. Key features include limited barriers to joining groups as well as flexible communication tools.

Each of the three groups studied were constructed as public groups, which are immediately accessible to any Facebook

Table 2. Group Rules

Attention to everyone who wants to belong to this group. In this group any publications for profit will be eliminated as will the member who posted it. Only exchanges for products of basic necessity at a fair price, reselling is forbidden. This is for honorable people who cannot stand being cheated by bachaqueros. The rules for this group are very simple:
(1) The words BUY and SELL are strictly PROHIBITED IN THIS GROUP. (2) Only posts asking to exchange items are allowed (for example posts asking to exchange essential items). (3) Do not publish items outside the type of items managed in this group. (4) If someone publishes something outside the norms of this group in the comments of a publication, every user has the duty of denouncing the publication so that the administrator can review and take action on the matter. (5) Any user of the group that publishes to make a profit will have that publication deleted and the user will be blocked. (6) Any person that says in their posts that they are willing to buy a product even at a higher price of what it really costs will have the publication or comment deleted. If the user is insistent, the user will be eliminated from the group. (7) Any publication with basic necessities that are regulated will be published at the regulated price. If any user wants to take advantage of others by charging interest they will be blocked and eliminated. *In general, users of this group know the regulated prices of products. It is up to each member if he/she allows a bachaquero to cheat him/her. If a user feels cheated he/she can denounce the publication. (8) It is up to the users how they agree on exchanging products, depending on what they consider convenient and as long as fair prices are respected. (9) All exchanges will be made based on price rather than quantity of products. (10) Any person who commits to make exchanges and plans on the place/time and does not comply, will be sanctioned, removed, and blocked from this group. This person will also be reported to the group of administrators of other groups in the state.
If you are in agreement with the norms of our group, then we welcome you...

user who wishes to join and begin bartering. This low barrier to entry was critical for participants as many joined or began actively participating in *anti-bachaquero* groups for the first time as a result of needing supplies for life-saving, emergency care. These stories were numerous and ranged from seeking medication to prevent a miscarriage to securing sutures to mend a wound. Camila, a nurse, explains that this occurs because hospitals lack even the most basic of supplies. She recounts a medical emergency experienced by her neighbor which prompted him to join online bartering groups:

> *"I have a neighbor that - about 15 days ago - they broke in to rob his house, and he noticed them. They stabbed him in the stomach; not major, they didn't hit any organs, but he was taken to a public health center. They had to suture his flesh naturally, because there was no anesthetics and they had to find sutures [via online bartering groups] because there were none [at the health center]." (Camila)*

While not all such cases resulted in a successful barter, members indicated they could use Facebook Groups' flexible tools to coordinate with other Venezuelans. For instance, they could prompt the community for help in donating or locating items by using the "Start a Conversation" option rather than the "Sell Something" option. Fran, a retail salesperson, shared that she preferred this when she urgently needed medicine for her niece as it gave her the freedom to explain her situation. She reported that the community was able to direct her to the medicine in a real world outlet. These types of conversational posts facilitate solidarity in the form of information sharing.

Instances of information sharing and medication donation did appear within the group, but members engaged in bartering for food, medicine, and baby products more frequently. They said that this is a competitive process, with each post receiving a high volume of responses. Facebook allows flexibility in choosing with whom one wishes to trade, allowing the seller to receive comments on the public post and private correspondence via Messenger. Participants disclosed two main ways in which they select with whom to trade. Some members operate on a first-come, first-serve basis, while others consider the

circumstances and needs of members. Santiago discusses the complications in choosing with whom to exchange:

> *"The thing is there's people that need the item with urgency and then sometimes you don't have enough to give them everything." (Santiago)*

After choosing with whom they will trade, members typically coordinate via Messenger or WhatsApp and agree upon a mutually acceptable public place to meet and make the exchange.

Anti-Solidarity Behaviors in Facebook Groups
Facebook bartering groups exist within the larger socio-economic infrastructure dominated by *bachaqueros*. As such, these spaces are accessible to *bachaqueros*, who often infiltrate bartering groups in search of opportunity. Despite efforts to maintain an SE, various aspects of Facebook Groups are not designed to constrain *bachaquero* activities. This section will detail the impact of the economic infrastructure of *bachaqueros* on the SE bartering groups and highlight consequences.

Personal Gain Over Economic Necessity
Despite the intentions of Facebook bartering groups to function as *anti-bachaquero* SEs, participants are unable to fully escape the economic reality in which the community is situated. Participants admitted that although these groups are essential to obtaining basic necessities, they cannot fulfill their needs entirely. Some, like Susana, used bartering groups to attain 80% of goods weekly, while others, like Carolina, sought only particularly difficult-to-find products such as toothpaste. Members explained that to make trades in the online bartering groups, they were forced to employ *bachaquero* practices such as purchasing unneeded items in bulk. Ana, a 39 year-old supervisor at a telecommunications company, explains:

> *"What you have to do is to wait in line and go to a market to buy the number of products that you can. You buy enough for yourself and also buy enough products that you do not need so that you can later exchange them for products you do need." (Ana)*

In addition, our interviews also showed that some products bartered in these groups were attained illegally:

"To be honest, many products that are on Facebook were attained through corruption. These people have contacts, a family member that works at a supermarket or pharmacy that smuggle products out to barter online." (Yoli)

Finally, others reported some groups were run by *bachaqueros* themselves. The same freedom founders of SEs enjoy via Facebook Groups is afforded to *bachaqueros*, and with no visible regulations or markers identifying genuine SEs from *bachaquero* spaces, some have difficulty distinguishing between them. Experienced participants, like Cristobal, explained that it is predominately new users or people desperate for medication who engage these false *anti-bachaquero* groups.

Capitalizing on Lack of Transparency

Each of the *anti-bachaquero* Facebook bartering groups has a clear set of rules. However, few members of these communities were aware of any rules except that items should not be overpriced. Rules are typically posted in the "Description" section, which remains hidden on the right side of the group's page unless manually selected. As a result, Moderator Olenna and Administrator Diego admitted that community members typically only become aware of the rules once they break them (e.g. inappropriate content).

However, members in the community struggle with following the rules even if they are aware of their existence, particularly with the valuation of items. Diego explained that all barters must be completed with items of equal value, which can be determined by viewing the original price tag. Yet, not all items are issued a price tag, and according to participants, government regulated pricing is no longer strictly enforced. In addition, hyperinflation means original prices on tags may not reflect economic fluctuations. As a result, it is difficult to determine an item's true value, and Facebook allows users to choose valuation. Participants explained that the valuation of an item is reached on a case-by-case basis within the groups by collective perception after a post is made, and then, if determined to be unfair, denounced by group members.

Even as a founder and administrator, Diego admitted that he has struggled with adhering to the fair pricing rule. Approximately one year ago, he was accused of price gouging after posting an item for exchange on behalf of a family member without considering if the valuation she desired was fair. The community deemed the post unjust, and refused to accept apologies or corrections for the error. Diego shared, *"Many members labeled me a scammer. I said my apologies, but they kept telling me I was a scammer."* Despite having the same intentions as when he founded the group, Diego was no longer perceived as a credible member of the community as his actions were in direct contradiction with the group ethos.

This negative perception of the founder became such a problem that he was no longer able to participate in the group. Unwilling to relinquish control, Diego created an alias Facebook account to continue to manage the group as an administrator while upholding the appearance of abdicating control for his wrong doing. The ability to easily create new Facebook accounts under an alias is also a common tactic used by *bachaqueros* who infiltrate these online SEs, despite the fact that Facebook has regulations against such behavior [13]. When occurring at scale, it is simply too difficult to track and manage, especially since participants typically only trade with one another on a one-time basis in large groups.

Insecurity regarding member identity in conjunction with a high volume of trades leads community members to place only temporary trust in other members when establishing and executing an exchange. As a result, few relationships develop among members in the community, and all participants expressed concerns over personal safety, especially the threat of robbery. To manage risk, they cited practices such as reviewing one another's profiles thoroughly, meeting up in public spaces, only trading with women, and never attending a trade alone. Fear temporarily subsided when exchanges were completed successfully, being replaced with bittersweet relief:

"I try to make sure that I am trading with serious people, thank God that I do. When we meet to make the trade, we are both worried but happy to exchange. What a sad truth." (Yolanda)

Threats to Health and Safety

None of our participants encountered physical harm as the result of a trade, but many cited other forms of abuse, including trade cancellations. This was particularly difficult for participants who were dependent on receiving the item agreed upon. However, participants felt there was little they could do to ensure that a trade would occur as promised or to identify unscrupulous members who engaged in these types of practices. Though participants could not conclusively state the reason for trade cancellations, most assumed it was due to desiring a better offer. Cancellations occurred during the planning phases of executing the trade (e.g. when and where to meet up) up until the moment the trade was scheduled:

"So many times I've been told that the deal was off - even when we had already agreed and I needed [the item]. Sometimes they do it because they wanted to take advantage of my need by asking for more than they should. Or just out of spite." (Susana)

In addition to price-gouging, physical harm, and trade cancellations, participants reported that another form of abuse occurred when members traded altered products. Products were replaced with an alternate substance. This occurred with a range of products, from packaged food to personal hygiene items, with little regard for safety of the community. Participants explained that these scams happen to those who put too much faith in others and do not thoroughly examine the product at the time of exchange. However, Yoli shared that, even with thorough examination, it is not always possible to detect this type of scam until after the trade has occurred:

"My son used formula when he was 6 months old, and then we found out that the formula milk [the bachaqueros] were selling was somehow opened and resealed. They were refilling it with Lyme I think. Imagine the level of risk. So, I decided not to buy formula milk at all and to wait until he was 10 months old to stop breastfeeding, when he could eat solids only." (Yoli)

The anti-solidarity behaviors which emerged caused many members to feel as though Facebook Groups did not provide the visibility they desired to fully trust others.

Inability to Enforce Rules
Facebook Groups provides little visibility into the identity and past behaviors of community members in the *anti-bachaquero* groups. To provide security, administrators and moderators establish clear rules to guide community members in appropriate behaviors and exchanges. However, there is no system to track inappropriate behaviors or prevent repeat offenses. Diego admitted he was unable to enforce the "three strikes and you're out" policy, a measure he hoped would create a stronger sense of community. At best, he is able to enact the policy if a member violates rules in quick succession and he remembers that a violation has occurred. Occasionally, reviewing his recent Messenger correspondence with moderators provides some insight, but these long form chats do not provide the opportunity to effectively search for past offenses. As a result, even with the ability to communicate directly and counsel members, he finds it falls short in upholding the SE values.

Despite abuses performed by *bachaqueros* infiltrating the online SEs, participants admit that better alternatives do not exist. Cristobal, a businessman, explained, *"Bad things happen; you get used products or scammed. But you come back to the groups because you have to."*

DISCUSSION
Venezuelan online bartering communities function as SEs which operate in contrast to the dominant economic model saturated with *bachaquero* activity. Yet, these groups are embedded within the Venezuelan economic infrastructure, resulting in the diffusion of varying levels of *bachaquero* activity in spite of the solidarity values they seek to uphold. To conclude, we first discuss the unique occurrence and utility of Facebook bartering groups for Venezuelans. Then, we frame our findings through the lens of design principles for online communities proposed by Kollock and provide recommendations for designing online SE communities situated in low-trust environments.

Assessment of the SE and Utility in Venezuela
The majority of participants cite Facebook bartering groups as their most equitable mechanism to navigate scarcity. As introduced by the work of Vlachokyriakos et. al, SEs play a pivotal role in the lives of those who use them. Much like in Greece, the SE in Venezuela, while imperfect, provides more control over the search, selection, and negotiation process and provides an outlet to coordinate with like-minded individuals. However, the contexts of the SEs studied by Vlachokyriakos et. al and in Venezuela differ. Design implications are altered as a result of the low-trust environment. For the Venezuelan SE, competition is heightened, experimentation is less acceptable, and coordination with government to introduce reform is non-existent. As such, researchers and designers should be mindful of the context in which the SE is situated when analyzing or creating new social technologies as it may impact behavior.

In addition, despite the utility of the SE groups, findings reveal that the low trust environment amplifies the negative aspects

of Facebook Group C2C interactions detailed by Moser et al. in high trust environments. This includes fear of scams, no-shows, and other extreme reactions such as doxing. Participants unanimously expressed fear of the damage *bachaqueros* were capable of inflicting on them. Instances of price gouging, product alterations, and robberies are perceived as genuine threats over which they have little control. Approximately a quarter of participants have faced scenarios in which urgent medical supplies were needed, and in such cases they generally succumbed to the high prices demanded by *bachaqueros*. Participants not facing medical emergencies reported two instances of product alterations and no robberies, nor did they personally know anyone else who had been scammed in these ways. Rather, they heard about such occurrences through reports on the group's public forum, which raised their suspicions of other members.

As the economic and political situation in Venezuela has deteriorated, participants have perceived behavior in the groups to worsen, heightening distrust. Members with more than 6 months of experience reported an increase of *bachaquero* activity while those with more than 1.5 years of experience felt these communities struggled to maintain their call to economic justice. Despite these opinions, only two participants dismissed the groups whereas others sought to improve them.

Success Despite Failure to Adhere to Kollock's Principles
Venezuelans have appropriated Facebook Groups to create a successful SE movement in an environment of low trust. This situation echoes the findings of Ostrom [37] in which one might fear that the tragedy of commons would lead to instances of shared resources failing, and yet somehow groups self organize to manage and share those resources successfully. Kollock [19] extends the work of Ostrom, examining why members of online communities should trust one another. The Venezuelan SE provides an opportunity to investigate which of these principles proposed by Kollock are successfully leveraged in this instance and why.

Kollock states that without consistent identities, repeat interactions, and behavioral logs to hold members accountable, community members are likely to behave in their own self-interest[3]. While Facebook Policy dictates users only have one profile with their real information, *bachaqueros* often disregard it by creating alias profiles to commit abuses in bartering groups. In addition, while Facebook Groups is designed to connect communities through on-going interaction, the nature of Venezuelan bartering groups support one-off trades. Finally, Facebook provides each bartering group with a public wall, which Venezuelans use to denounce inappropriate behavior. However, such logs are quickly lost in the high volume of daily buying and selling posts. This ultimately results in a community with little transparency or accountability.

To foster cooperation in online communities, Kollock cites Ostrom [37] in sharing several design principles for developing and enforcing rules. First, rules must be clearly defined and respected by external authorities. While most bartering groups develop a set of rules, these are placed in the Facebook Group's "Description" section, which is typically not visited by members. Next, Kollock states that community members

who will be affected should participate in creation and modification of those rules, and must have mechanisms through which they can track inappropriate behavior and implement graduated sanctions. Currently, Facebook Groups allows bartering group members to collaborate or denounce behavior on the public wall or via Messenger, but does not provide tools for tracking or sanctioning *bachaquero* activity. Lack of adherence to these design principles has contributed to continued abuses within groups.

Finally, Kollock suggests incorporating real world elements such as an economic system as well as moderate amounts of scarcity and risk for the successful design of an online community. Facebook Groups embodies these design principles. However, for Venezuelan bartering groups, the economic and political reality in which members are situated creates an environment with exceedingly high levels of scarcity and risk. While small amounts of scarcity may help build community, life-threatening scarcity breaks it down. This extreme was not anticipated in Kollock's analysis.

Implications for the Design of SEs in Low-Trust Environments
The Venezuelan SE movement which emerged on Facebook has been relatively successful despite appropriating a platform which was not designed to support this activity. Past research in areas such as crisis informatics have shown that in lieu of software features, determination, resilience, and human ingenuity will find a way to appropriate platforms to accomplish a goal [41, 49]. Even so, in leveraging Kollock's design principles, we recognized several features which can better support individuals in low-trust environments in online SEs, whether on Facebook or other platforms.

Buyer/Seller Reviews To enhance accountability and transparency, we recommend introducing buyer and seller reviews, such as those present on Amazon[2]or eBay [11]. This is particularly critical in low-trust environments as it has the potential to enhance safety and increase the speed of trades. This feature could manifest on Facebook bartering groups by showcasing trade history, reviews from other members, and a percentage of positive trades completed. However, in a low-trust environment with high competition such as Venezuela, it would be prudent to allow members to contest negative remarks, which could be resolved by group leadership.

Prominent Rule Placement Rules which govern SE groups online should be prominently placed to foster cooperation and reduce inappropriate behavior. This will alert newcomers to community norms and reinforce expectations among existing members. Visible placement of rules has been proven effective on other high volume social network sites such as Reddit [29], and will likely benefit SE communities as well. For Venezuelan bartering groups, we recommend these rules be placed in a space which is visible through mobile, perhaps at the top of the group's public wall.

Tools for Tracking Offenses and Graduated Sanctions Successful cooperation is partially dependent upon the ability of the group to track and sanction behaviors [37]. In low-trust environments, particularly those facing economic and political instability, self-interest behaviors such as those exhibited by

bachaqueros, must be acknowledged and documented. When left uncorrected, such behaviors can become the norm, overriding the values SE communities are meant to embody. Introducing tools which allow administrators and moderators to track behavior, enforce graduated sanctions, and comment on any actions taken would enable these groups to uphold solidarity values. In addition, given the high volume of posts, AI already used to moderate trolls at sites like Facebook [23] could be modified to assist in recognizing inappropriate behavior.

Equitable Marketplace Facebook bartering groups reinforce power and equity issues between citizens and *bachaqueros*. While it is not feasible to fully remove this dynamic, we believe it can be mitigated by introducing fair pricing mechanisms such as data-driven pricing assistants. Such tools have been successfully integrated on major platforms like StubHub [44], and help sellers understand appropriate price ranges. We recommend Facebook adopt a similar tool, which can consider factors such as historical valuations across various bartering groups, regulated pricing published by the government, and location of the item. We recommend that such ranges be available to sellers in developing their content, and an appropriate range be visible to buyers in making their selections. This will help to reduce the high levels of scarcity and risk present in current communities by providing additional visibility.

Although these design recommendations have emerged from an analysis of Venezuelans' needs in a time of scarcity, it is notable that many of these features also have the potential to enhance Facebook's functionality as a marketplace in ordinary circumstances as well.

CONCLUSION
We have presented a review of Venezuelan Facebook bartering groups' efforts to create an alternative, SE to counteract an economy encumbered by *bachaqueros* and low trust. In doing so, we have highlighted areas of Facebook Groups which support solidarity and anti-solidarity behaviors, and in leveraging Kollock we present strategies which can be implemented to better support the SE movement in Venezuela and other low-trust environments in the future.

When Mark Zuckerberg first created a social site for college students at elite universities in 2004, he could not have anticipated that just over a decade later, his platform would play a significant role in basic survival for individuals in a prolonged economic crisis thousands of miles away in South America. It is a tribute to human ingenuity and resilience that software tools can be re-purposed in this way. Analysis of the strengths and weaknesses of Facebook Groups for the purpose of bartering in extreme scarcity suggests a host of simple modifications that could make them work significantly better. There may be a viable economic model to motivate this software development, if Facebook wishes to compete with marketplace-oriented sites, or it could be undertaken as a humanitarian effort. More broadly, providing users with more powerful, general-purpose, customizable tools can help empower people–in this crisis and crises of the future–to craft solutions for themselves.

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