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COLLEGE OF INFORMATION SCIENCES AND TECHNOLOGY

Managing Information, Powering Intelligence

Youth Mobile Phone and Internet Use January 2015 Za'atari Camp, Mafraq, Jordan

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Executive Summary

As mobile phone and internet use in Za'atari Refugee Camp continue to grow, there is a need for a more clear understanding of the current modes of connection and patterns of use. This report provides an overview of refugee youth mobile phone and internet use as well as an infrastructure assessment.

The youth analysis is based on survey data collected in January 2015 from a non-presentative sample of 157 youth. As data collection primarily occurred in youth training centers (126 cases), the outcomes are slightly biased toward that group. Based on comparisons with a sub-sample of youth from outside the centers, the center subjects are significantly more educated and more likely to be female. However, no significant differences were found in average age, English language ability, and internet use in Jordan or Syria. Data were also collected from 71 adults both at and outside youth training centers. The adults, other than being older, differ from the youth by being more heavily male, with slightly lower self-reported English language ability, and slightly better educated, with nearly 55% having some or completed university education. Where appropriate, youth versus adult comparisons are made.

The definition of youth used by UNHCR and its partners is persons between the ages of 15 and 24 years. The sample has an average age of 20.16 and a fairly even gender balance, slightly favoring females (74 vs. 63). Approximately 36% of youth have attended or completed university. The majority of self-reported English language reading skills are either good or fair.

In terms of handset ownership, 88% of youth own mobile handsets. In the entire sample only 21 subjects do not own a handset, but 19 of those are youth. Of youth, 85% own SIM cards, and on average each owns an average of 1.39 SIM cards. Even with reasonably high levels of ownership, and some having multiple SIMs, 80% also borrow them from friends and family.

Unsurprisingly, mobile phones are the most popular medium for accessing the internet. This was true in Syria as well, but is even more so in the camp. Of the three available mobile carriers, youth overwhelmingly choose Zain. Because the quality of carrier signals can vary, we inquired as to where people most commonly access the internet and among the camp's districts, 4 and 1 were the most popular for calling Syria. To understand the skills and experience refugees bring to the camp, we inquired about previous use. In Syria, internet use was primarily a home-based activity although the second most popular was at an internet café.

In terms of communication services, WhatsApp was the most frequently used to communicate to those in both Jordan and Syria, while mobile voice was used more frequently for communicating within Jordan. However, apart from mobile voice, there is little difference in use among a variety of services when communicating with those in Jordan versus Syria.

We also wanted to understand whether internet, social media and online video use differs in the camp versus when respondents lived in Syria. While online video is much less popular than internet or social media, the use of all three has increased since moving to the camp. In fact, social media use nearly doubled in intensity.

Given the potential interest in expanding internet-based services to refugees, it is important to know what they do online currently and what they would like to do if high quality, low cost services were available. When asked about favorite online information sources, they offered a wide variety but six were cited most frequently: Google, Facebook, YouTube, Skype, TV and Wikipedia, with Google being significantly

more popular. Without resource constraints, the youth indicated they would like more access to Instant Messaging/WhatsApp, news sources and the opportunity to communicate with people via social media.

Like many youth around the globe, the skills to access online content and use social media often derive from interpersonal assistance from friends and family. In terms of providing assistance, the Za'atari youth indicated they frequently help family and friends as well as receive help. The top services for receiving help were online education, legal and health information search and news. In terms of the importance of this assistance, youth differ from adults in both the areas they deem help to be important as well as the level of importance.

Our infrastructure assessment examined the mobile network service quality, particularly in the type of service provided and its reliability in terms of being able to access the network on the first try. Results show Zain and Orange base stations provided the slower EDGE connectivity more often than the faster HSDPA technology, while Umniah offered HSDPA around half of the time. This could be due to network technology or may also be a function of Zain being the most popular provider, at least among the youth in our survey. In terms of reliability, all networks experience failure to provide network connectivity on the first try to some degree, however the poorest performance on this measure was experienced by phones on the Zain network where assignments fail roughly ⅓ of the time.

Based on the findings from the survey as well as the infrastructure assessment, we offer the following recommendations. First, among the youth population as represented by our survey, there is high level of internet activity and interest in a wide variety of online activities. However, continued access via mobile devices may limit the benefits and skills developed over time. Using internet-based services to solve strategic challenges such as access to information through online sources is certainly possible, at least in terms of interest and ability.

Enhanced access should be pursued through a combination of actions targeting improved cellular network services by mobile carriers, complemented with a camp-wide community wireless intranet. Camp management may be able to work with the mobile carriers providing commercial services in the camp to improve service quality, reliability and bandwidth. At the same time developing a camp-wide wifi network that is not connected to the internet, will allow refugees and camp staff alike to share information and local messaging without incurring ongoing costs. Such a network may help offload traffic from the commercial mobile network, enable more efficient communications among the service providers, and provide a mechanism for serving centrally stored content such as educational and training materials throughout the camp.

This report is merely the first step in what we hope will be a continuing assessment of ICT use in Za'atari. Further analyses of the current survey data are continuing, potentially providing deeper insights into the drivers of internet use. However, this study was limited in scope and the answers to some questions may require further data collection and analyses. Also, further explorations of the viability of network improvements, including the issue of managing expectations and assessing competing technologies and business models that may enable widespread internet access, could be conducted.

1. Introduction

Increasingly, the lives of refugees are affected by the use of information and communication technologies (ICTs). Refugees themselves are more frequently arriving in camps with mobile phones and with computing and internet skills. The phones provide an important lifeline of information and communication with loved ones, whether they stayed behind or settled in a different destination.

For refugee service providers, mobile phones and other forms of ICTs are quickly becoming vital tools. In many cases, UNHCR or other service providers have come to rely on refugee mobile phones as a means of communication and information provision. Other forms of ICTs, such as tablet-based data collection and biometrics have also become standard tools.

Despite the rapid emergence of these tools, systematic data collection and publicly available analyses are limited. To begin to shed light on one important area of ICT use, the following report provides detailed information concerning refugee youth internet and mobile phone use in one of the world's largest refugee camps.

In January 2015 a team of 7 U.S. researchers visited Za'atari Refugee Camp, Mafraq, Jordan. The overarching purpose of the visit was to scope the potential for a collaborative research project with Jordanian colleagues. This study of the camp's infrastructure and youth ICT use provides a baseline understanding of camp infrastructure and use, while establishing relationships between the study team, UNHCR and implementing partners. The January 2015 Za'atari Refugee Youth internet Use Survey was a collaborative effort of faculty and students from Penn State University, Rochester Institute of Technology, University of California Santa Barbara, and the University of Washington, together with UNHCR and the Youth Task Force. The data were collected with partial support of U.S. National Science Foundation grant #1427873.

This report contains analyses of data collected through paper surveys in the camp. A companion report explaining the data collection, cleaning and analysis process as well as the survey instruments and the data itself are all available at http://cmaitland.ist.psu.edu/?page_id=335.

The report is structured as follows. The first part describes the survey outcomes, including sample demographics and descriptive statistics of key variables. In particular, six aspects of mobile phone and internet use are examined:

1. how refugees connect to the mobile network and internet,
2. communication services used in connecting with friends and family in Jordan as well as Syria,
3. internet and social media use,
4. the types of information sources they use,
5. the types of internet activities they would like to engage if resource constraints did not exist, and
6. how they help one another gain access to networks and information.

We also report the findings of multivariate analyses addressing the following questions:

1. What is the relationship between interest in online activities and demographic variables?
2. What variables can predict camp-based internet access?

The second section examines the results of the infrastructure assessment. The assessment tested the relative performance of the mobile networks and makes recommendations for camp infrastructure.

The report concludes with recommendations and suggestions for subsequent research.

2. Descriptive Statistics

In the following sections we report on survey outcomes through graphs and tables. Unless otherwise indicated, the graphs reflect the number of times a particular response category was chosen or 'mentioned.'

2.1 Demographics

The sample consisted of 234 respondents, including 157 youth and 71 adults (6 subjects did not report their age). The basic demographics collected from the sample include age, gender, education and English language reading ability.

For youth, as depicted in Figure 1, the ages range from 15 to 24, with an average age of 20.16. The gender balance is fairly even, with 11 more females than males (74 vs. 63). The sample is fairly well educated with nearly 36% having either started or completed a university degree. By sex, we find that in upper levels of education, particularly 'some university' and 'finished university' more males than females have achieved that level. As for English language ability, the majority reported good (54) or fair (58), with none reporting fluent.

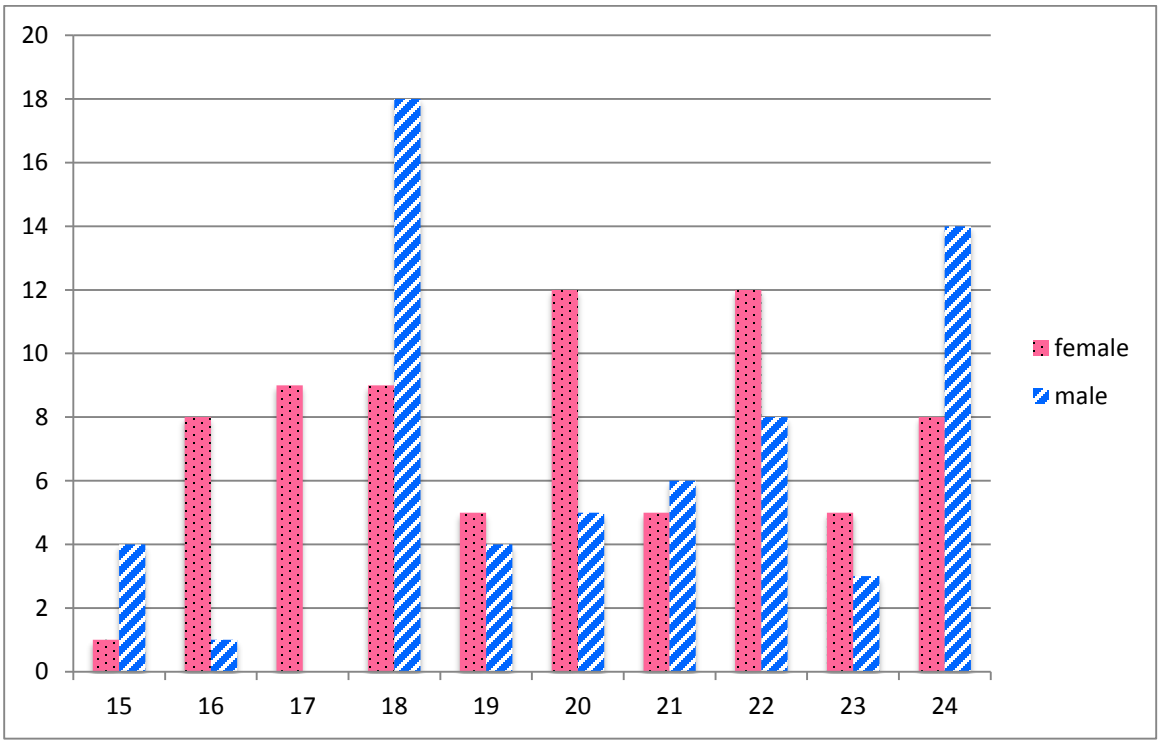

Figure 1: Youth Age Distribution by Sex

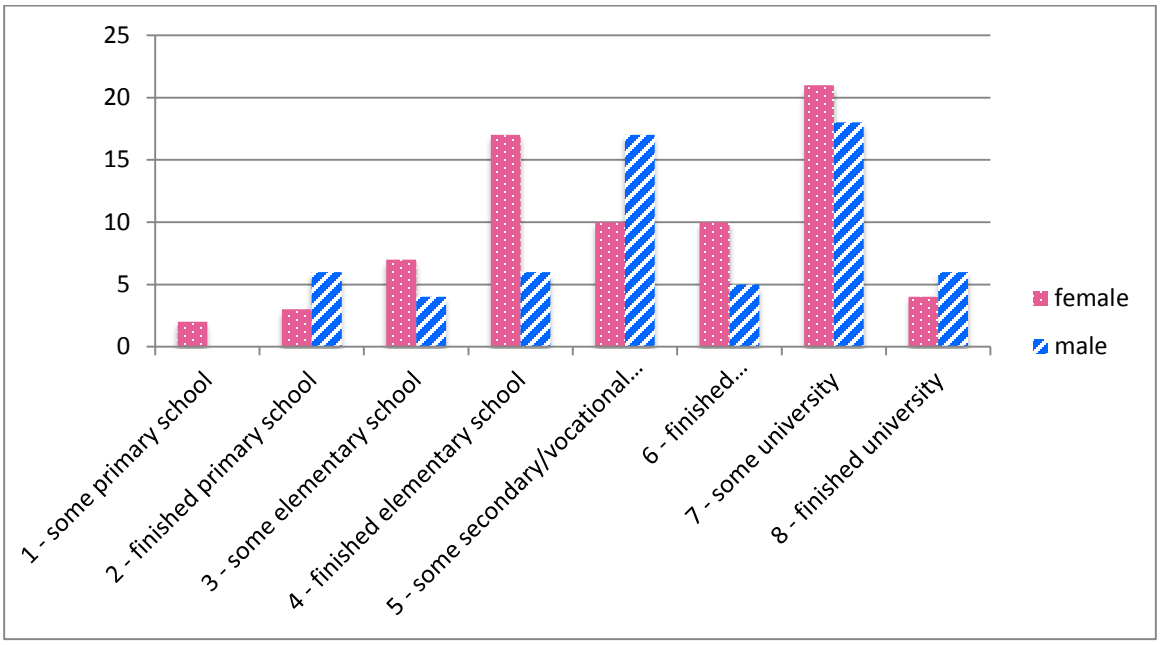

Figure 2: Youth Education Levels By Sex

In terms of demographics, the adult population is naturally older, having an average age of 31.02. It is more heavily male, slightly better educated, with nearly 55% having some or completed university education.

To understand whether subjects recruited from youth training centers are significantly different from those who are not, the data were separated into center subjects and non-center subjects. Statistical comparisons indicate center subjects are significantly more educated and more females are participating in the study in the centers. However, no significant differences were found in age, English language ability, and internet use in Jordan or Syria.

2.2 Mobile and Internet Connections

While the popularity of mobile phones among refugees is widely known, little information exists about the precise types of phones and nature of use in the camp. We investigated three dimensions, namely handset and SIM ownership, connection mode (fixed/wireless), and location of connection (camp district). The results indicate 134 out of 157 (85%) youths own a handset, with the most popular brands being Samsung, Nokia and iPhone. In the total sample, nearly all of the 21 subjects who do not own a handset are youth (19/21). Of the three carriers available in the camp (Zain, Orange and Umniah) the most popular is Zain: 139 subjects (89%) reported using Zain, with Orange in second place with 35 customers (22%) and Umniah third with 27 (17%)[1].

In terms of SIM card ownership, 85% (134 out of 157) of youth own SIM cards and 80% (126 of 174) borrow them. To understand whether borrowing is supplementary to ownership or an exclusive means of connection, we performed further analyses. Of the 157, only 10 youths indicated they solely own and do not borrow, 4 only borrow, and 124 both own and borrow. We also accounted for multiple SIM card ownership and found on average youth own 1.39 SIM cards and borrow an average of 1.45. This can be compared with adults, who on average own 1.42 SIM cards and borrow 1.36. Hence, on average youth own fewer SIM cards and borrow more.

[1] Multiple choices were allowed given the potential of multiple SIM card ownership

The gender analysis on handset and SIM card ownership and SIM card borrowing, depicted in Figure 3, shows there is a small difference between females and males. As we discuss further later, the difference is not statistically significant for handset ownership but is for SIM ownership and borrowing.

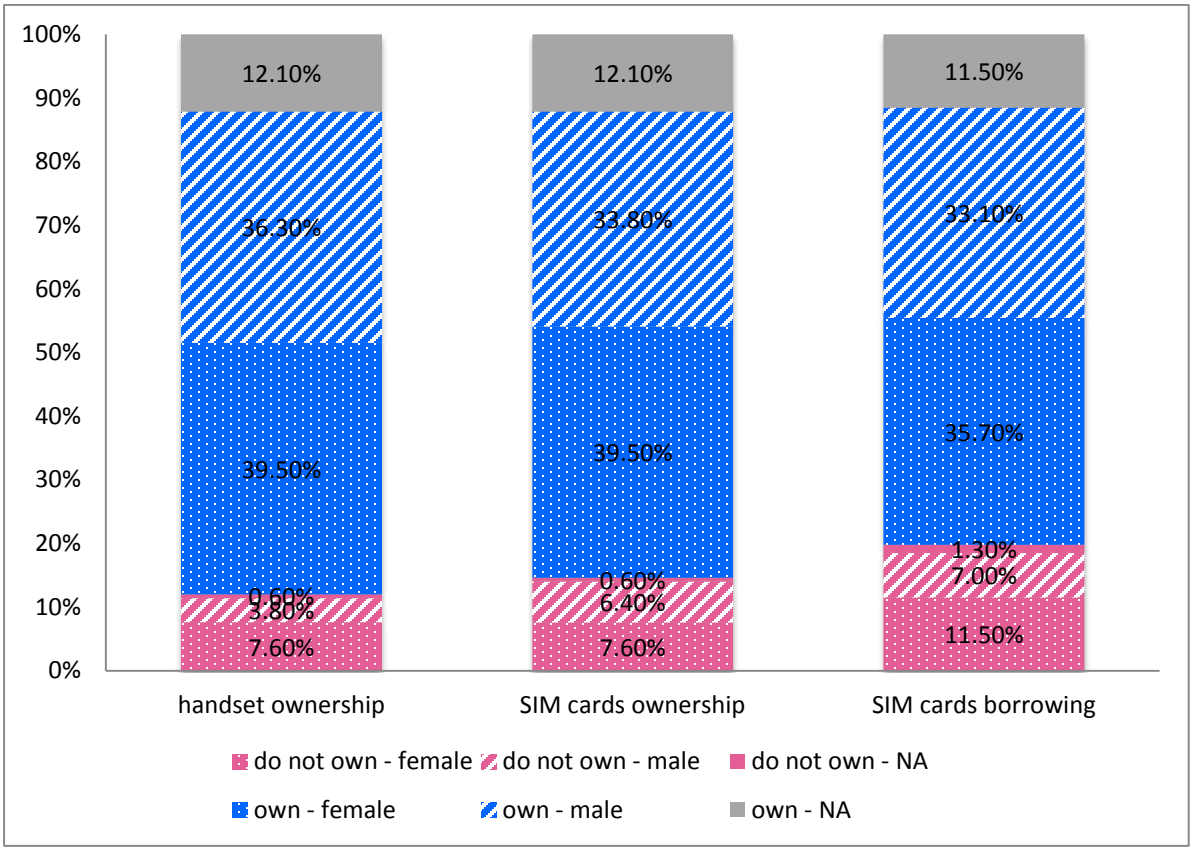

Figure 3 Gender Analysis on Handset and SIM Card Ownership

What more can we know about these 19 youth that do not own a handset? In terms of age, 13 out of the 19 are 18 and under. Females account for 12 of the 19. Likely related to their young age, 12 of 19 had not finished secondary school. The average English language abilities of the non-owners is not significantly different from those who own (via t-test). While they do not own a handset, 8 of 19 own one or two SIM cards, and 9 out of 19 borrow SIM cards. Clearly we should have asked a question (but did not) about borrowing handsets. Their average internet use in Syria was 1.58, between never and occasionally, which is significantly lower than the average for owners of 3.09 or monthly. And while they lacked experience and handset ownership, 13 of the 19 reported offering assistance with online services to others. (For more on helping behaviors see Section 2.7)

As indicated in Figures 4 and 5 respectively, for youth and adults, mobile phones are the most common mode for connecting to the internet, either through their own mobile phones or by borrowing others'. The numbers of users connecting via computers or fixed networks were relatively low, both in Syria and in the camp.

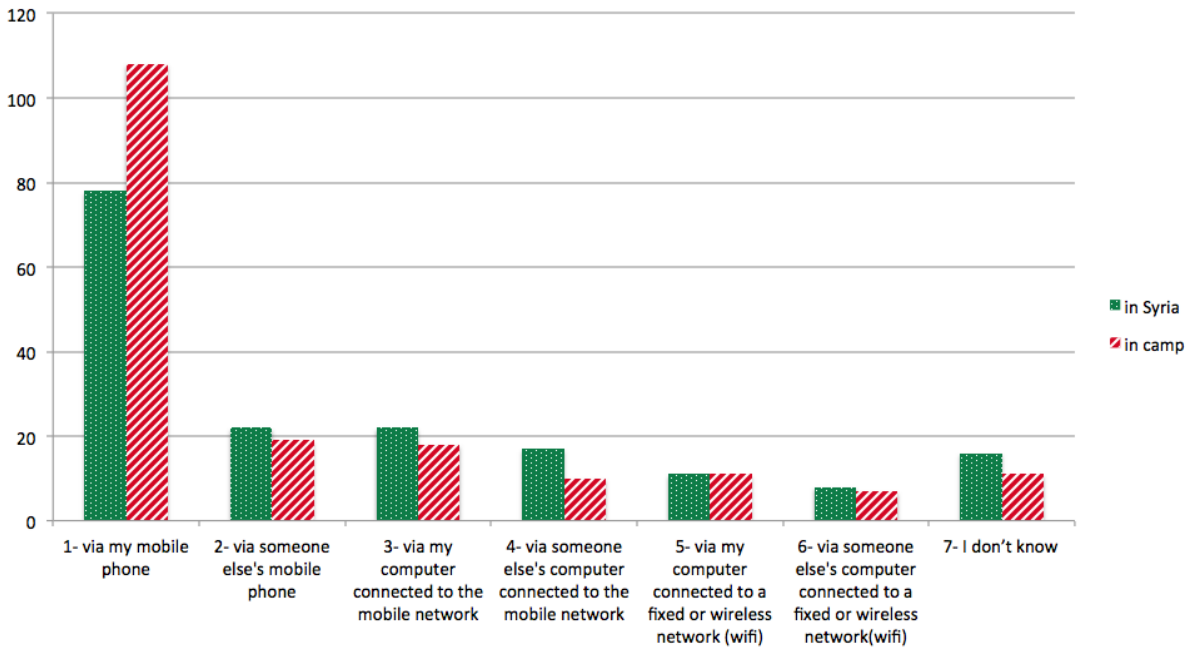

Figure 4: Ways to Connect to the Internet for Youth

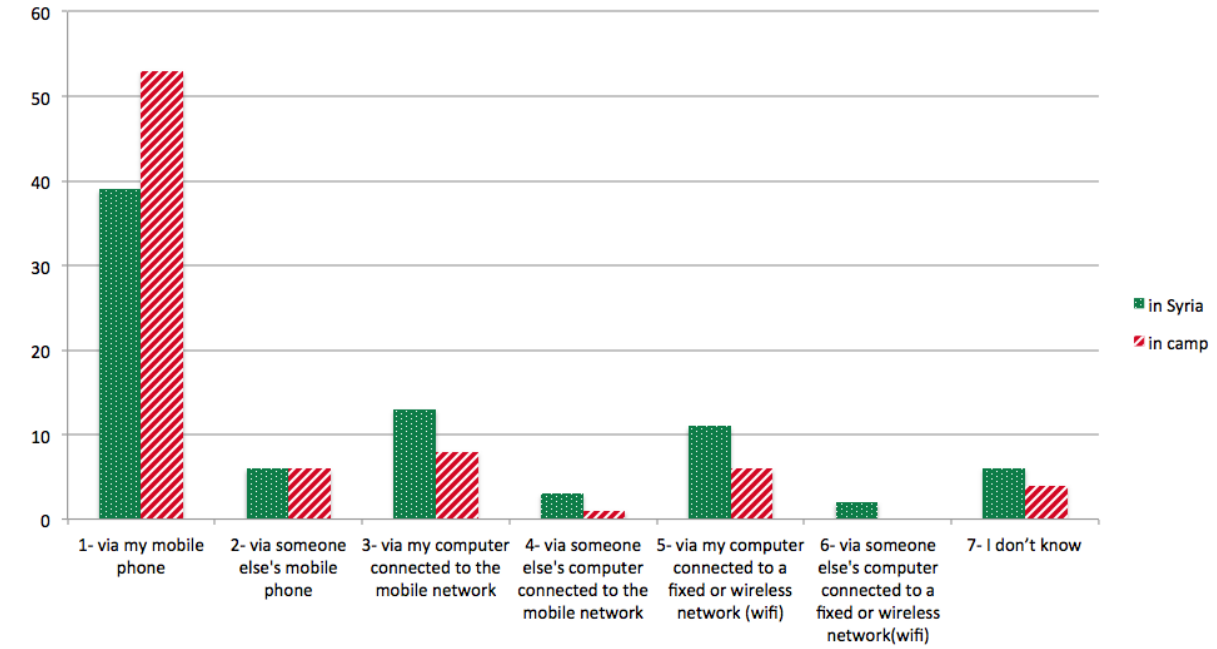

Figure 5: Ways to Connect to the Internet for Adults

We were also interested in understanding the skills and experience refugees bring with them into the camp by inquiring about their internet use in Syria, and then comparing it with use in the camp. We also looked into whether differences exist between youth and adults' current and previous internet experiences.

As depicted in Figure 6 and Figure 7, on a percentage basis, while living in Syria, mobile phones were the most common internet access tool. As compared to adults, in Syria, youth were more likely to connect via mobile and also via a borrowed mobile phone. They were less likely to connect via computer only. Now residing in the camp and in a change from their Syrian experience, adults are more likely to connect via mobile only and

the percentage of computer and other means of connection declined dramatically. This suggests that as compared to life in Syria, in the camp refugees are more reliant on their mobile phones as a means of communication and as an information source.

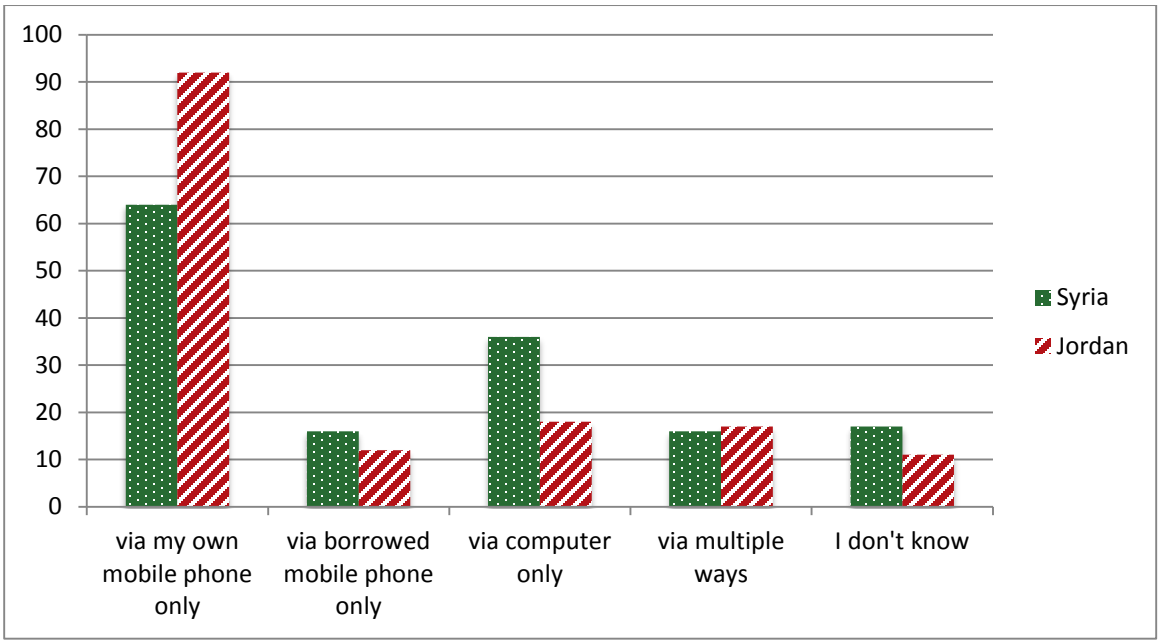

Figure 6: Internet Connection Mode Change for Youth

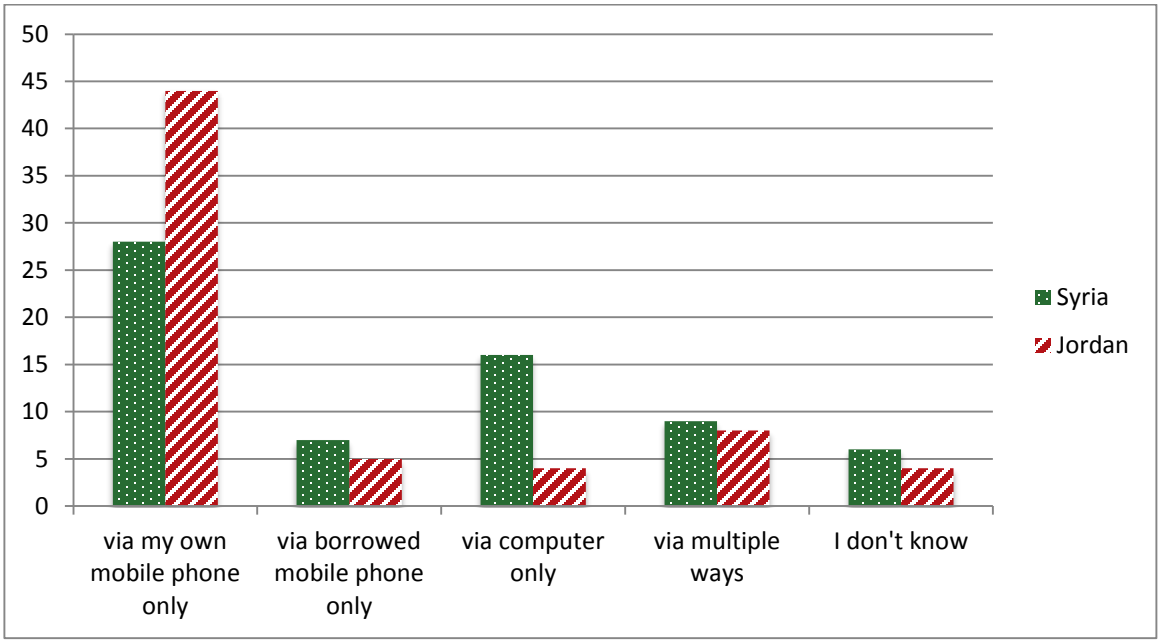

Figure 7: Internet Connection Mode Change for Adults

The analysis suggests a significant change occurred in Internet use between Syria and the camp. Both youth and adults show a shift from using computers to go online, either with a laptop or a desktop, to using mobile phones to connect to the internet. Even though the majority were already using mobile phones to connect to the internet in Syria, in the camp more people are using their own mobile phone as their only internet connection mode. The drop in computer usage in the camp could raise challenges in various areas, such as education where longer written assignments are difficult to compose on a mobile device. While research in other contexts find mobile-

only access creates challenges for developing some skills, such as creating a CV in order to find a job, [2] further research is needed in the camp to identify specific skills gaps. However, addressing skills gaps may require internet connections and other infrastructural services, for which further analyses may also be needed. For instance, if electricity is still a problem, laptops are a better choice compared to desktops for connecting to the internet. If desktop computers are chosen, UPS systems would be helpful for either individual households or in training centers. Research should also investigate the limits of individuals' abilities to pay for access. While the refugees in our sample are able to pay for access now, the limits of that ability should be assessed.

We were also interested in the location of internet access in Syria. As shown in Figure 8, for youth, the most common location for internet access was at home. Assuming this was unlikely in the camp, we did not ask this question but instead inquired as to the physical location of use. Within the camp, Figure 9 shows districts 4 and 1 were the most popular for calling Syria due to perceptions of having better connectivity in those areas. However, most respondents indicated they 'didn't know' their location, which we interpret as 'no preference', as some subjects wrote in this unsolicited response.

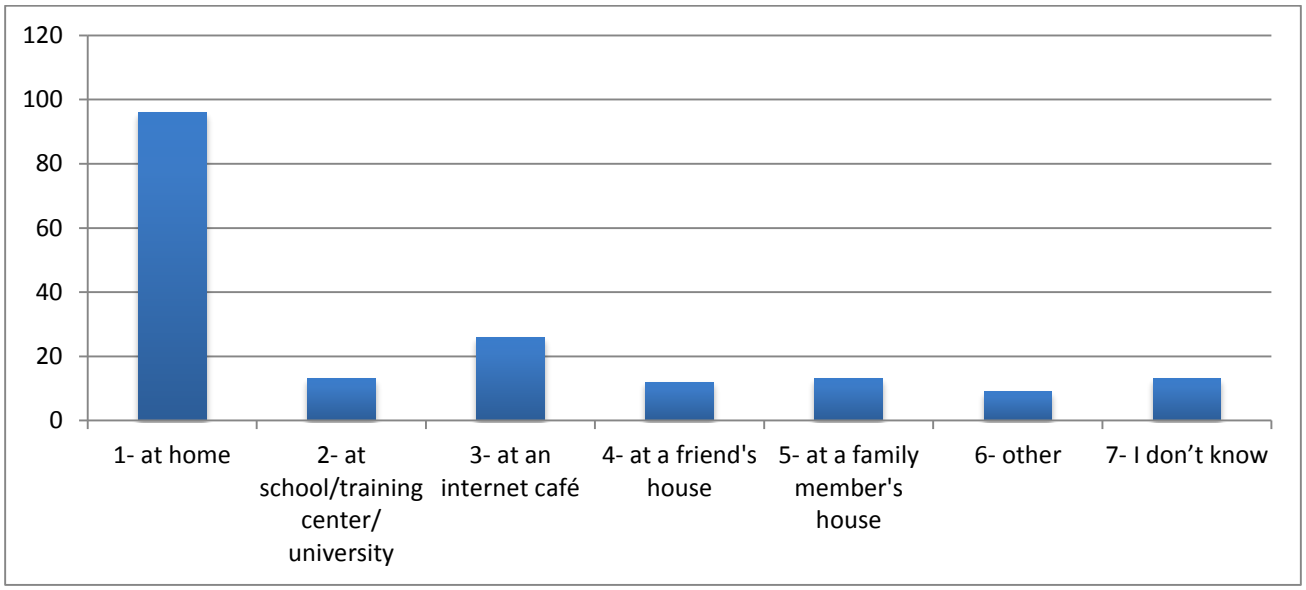

Figure 8: Locations of Internet Use for Youth Population in Syria

[2] Shikoh Gitau, Gary Marsden, and Jonathan Donner. After Access – Challenges Facing Mobile-Only Internet Users in the Developing Countries. CHI 2010: HCI and the Developing World. Atlanta, GA, USA.

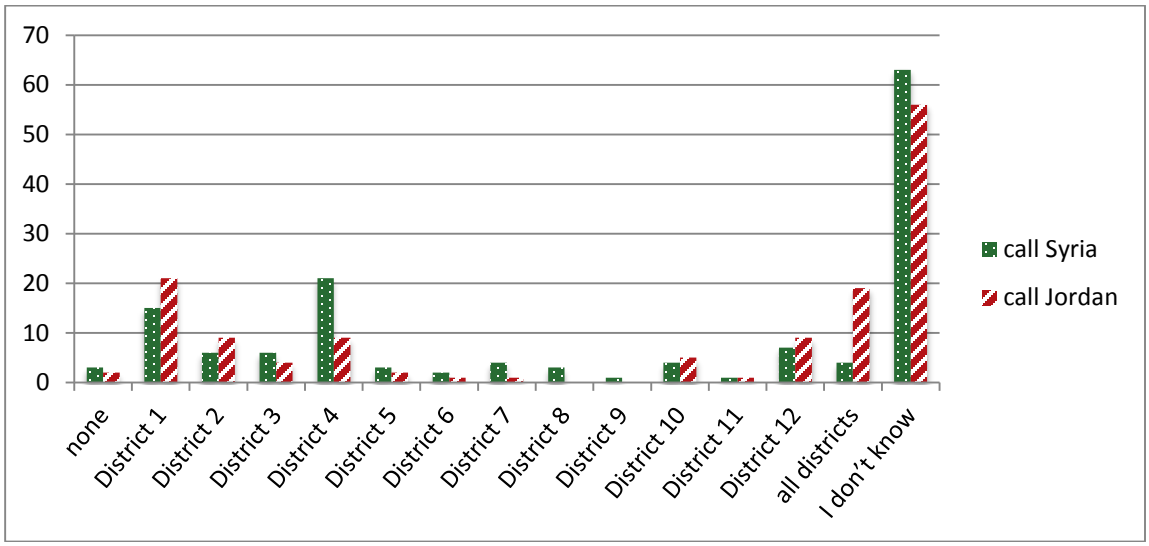

Figure 9: Youth District Connection to Call Syria or Jordan

2.3 Communication Services

We investigated the types of communication services used, independent of medium. In a closed choice question [3], we asked respondents which communication services they use most frequently and whether there was a difference in their use when communicating with friends and family in Syria or Jordan. This approach would capture if communications with family and friends (back to Syria) require different media. In both, choosing among the services and then in frequency of use, youth refugees show a preference for mobile voice and WhatsApp (see Figure 10). The latter is the most frequently used service for communicating with both countries, while mobile voice was used more frequently for communicating within Jordan. Together, it appears there is little difference in the services used when communicating with friends and family in Syria versus Jordan.

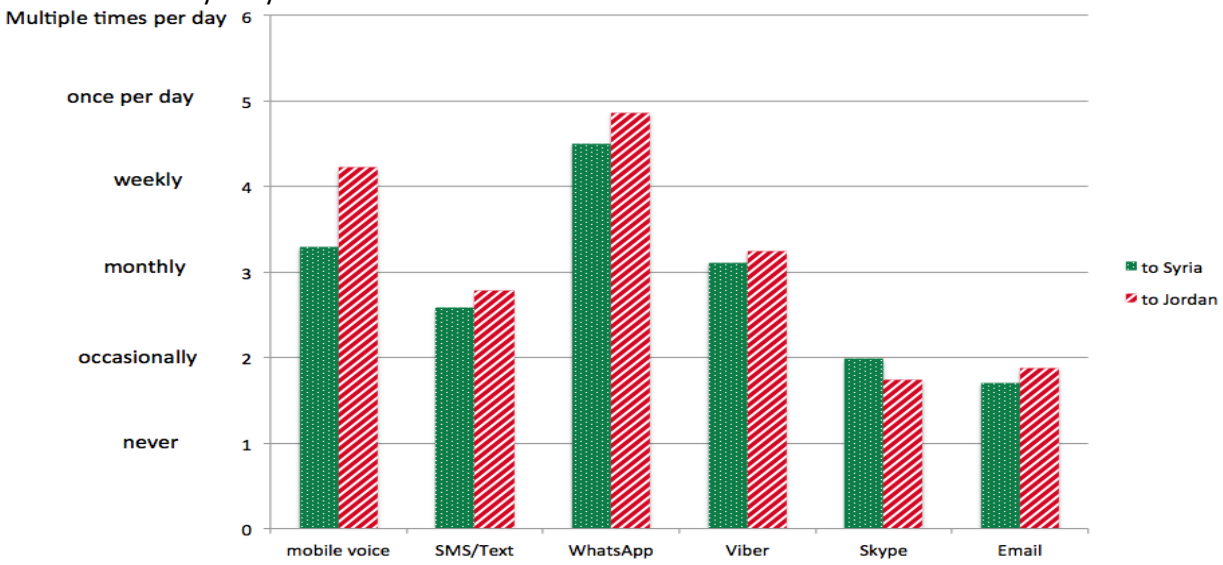

Figure 10: Frequency of Communication Service Use in Syria and Jordan

[3] Choices included mobile voice, SMS/Text, the web-based text service WhatsApp, the free video service Viber, Skype and email.

2.4 Internet Use

Respondents reported on the frequency of their internet, social media and online video use in Syria versus in the camp. Table 1 shows the change in use as measured on a scale from 1 to 6, with 1 being never and 6 being multiple times per day. All three experienced significant growth in the frequency of use between Syria and the camp, while the numbers of users, whether occasional or heavy, were relatively constant.

Figure 11 shows the frequency of internet use in both locations, with the majority of youth using the internet multiple times per day. Camp staff and refugees themselves suggested the reasons for the changes are 1) internet access in Jordan is less expensive; 2) refugees have more free time living in the camp; 3) the perception (albeit unconfirmed) that Jordanian censorship/surveillance is less restrictive than that in Syria.

Table 1: Average Frequency of Internet/Social Media/Online Video Use in Jordan and Syria

	Syria mentions	Syria mean frequency	Jordan mentions	Jordan mean frequency	Average Difference
Internet use	154	2.90	152	4.41	1.5
Social media use	156	2.72	153	4.26	1.54
Online video	156	2.24	155	3.59	1.35

The frequency of social media use in the camp is nearly double that in Syria, with 95 youths using social media once or multiple times per day in the camp, compared with 44 in Syria. Also, the numbers of youth reporting never having used the service declined from 64 to 16 between Syria and the camp.

Compared with internet and social media use, online videos were less popular. However, similar to social media, there is a big difference between the practice as it was in Syria and the camp. Only 24 youths reported watching videos once or multiple times a day in Syria, while 68 do so in the camp. Together, these results suggest the intensity of use is growing.

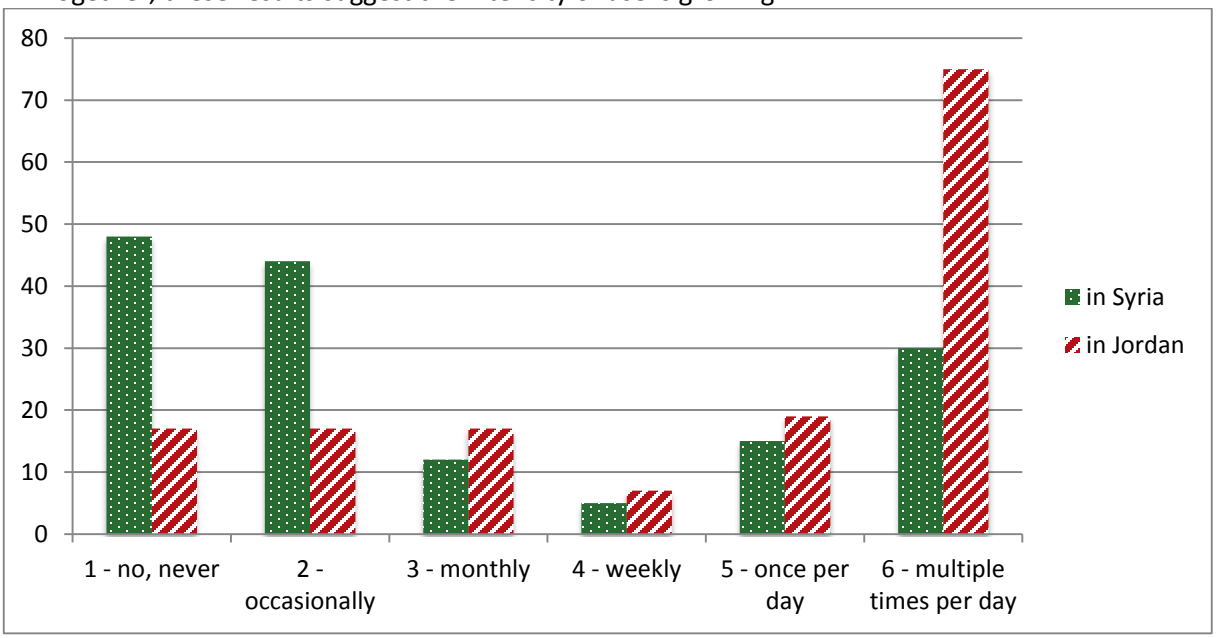

Figure 11: Youth Internet Use in Syria versus Jordan

2.5 Information Services

In an open-ended question, respondents were asked to identify their favorite information source while living in Syria. Responses varied widely, but the top 6 most frequently named sources for youth were Google, Facebook, YouTube, Skype, TV and Wikipedia, with Google being significantly more popular, as shown in Figure 12.

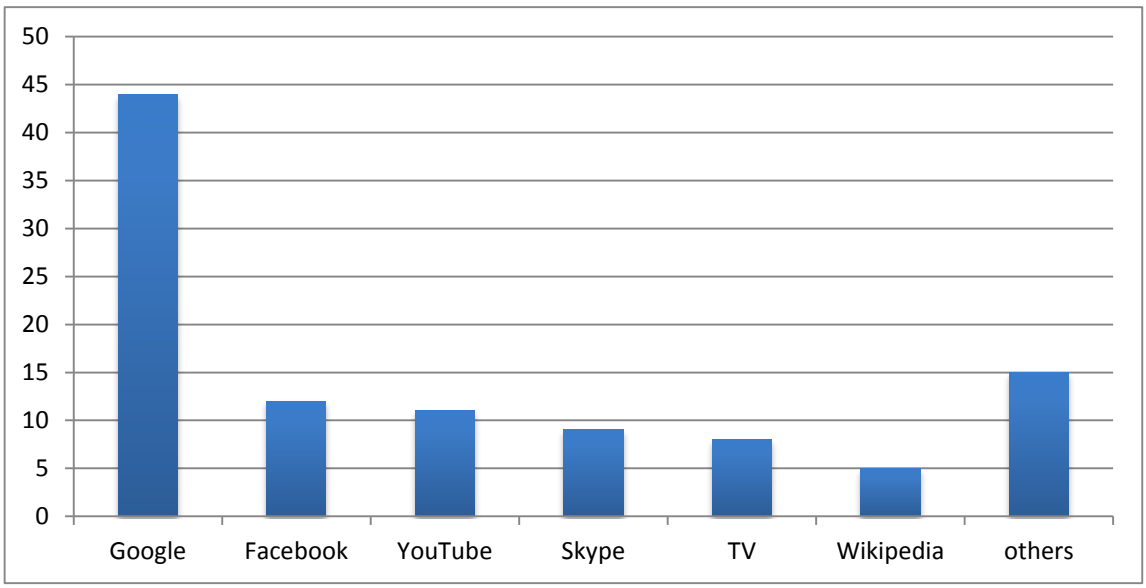

Figure 12: Youth Information Source in Syria

In a separate open-ended question respondents were asked about online information sources that differed from those accessed in Syria. Of the 58 youth responding to both open ended questions, which allowed for comparison, roughly 41% (24) reported no difference between Jordan and Syria, while the remainder did note a difference. For the latter, they listed many new information sources accessed once in the camp, including Facebook and YouTube.

2.6 Interests in Internet-based Activities

Next, we wanted to know the areas and levels of interests in online activities, if refugees were provided internet services that were reliable, high speed and inexpensive or free. Choosing from a predefined list, youth participants showed interest in a wide variety of online activities. Their interests were gauged on a scale of 1 to 5, ranging from 'not at all' to 'very interested.' As shown in Table 2, the highest ranked by levels of interests are Instant Messaging/WhatsApp, News, Information Search, Communicating with People via Social Media and Facebook, on top of the list, both in terms of mentions as well as in level of interest.

Table 2: Ranking by Levels of Interests in Internet-Based Activities for Youth

Ranking	Internet-Based Activities	Level of Interest - Youth	Level of Interest - Adult
1	Instant messaging/WhatsApp	3.88	3.90
2	News	3.86	3.80
3	Information search (health, legal)	3.66	3.47

4	Connecting with people outside the camp via social media (Facebook, etc.)	3.55	3.69
4	Facebook	3.52	3.44
6	Jobs/employment	3.51	3.53
7	Connecting with others inside the camp via social media (Facebook, etc.)	3.40	3.70
8	Participate in online school/education	3.38	3.37
9	Participate in online college/university/vocational training	3.33	3.29
10	Information Search (entertainment, sports)	3.23	2.47
11	YouTube	3.04	3.33
12	Viber/Rounds	2.94	3.00
13	Twitter	2.80	2.42
14	Gaming	2.75	2.15
15	Mapping (Google Maps, etc.)	2.66	3.21
16	Email	2.65	2.54
17	Skype	2.32	2.84

2.7 Youth Helping Behavior

Next we were curious whether or not refugee youth as in many other contexts, assist others in technology use. Using the same list of activities, we inquired about the help they provided or received, and their perceptions of the importance of that assistance.

When asked about the assistance they may provide or receive, 104 out of 157 youth (66.2%) indicated that among a variety of potential social contacts including families, friends, camp staff and visitors, they had provided assistance frequently to family (60 mentions, 57.7%) and friends (65 mentions, 62.5%).

In terms of receiving help, the top services were 'Participating in Online School/Education,' 'Instant Messaging/WhatsApp' and 'News.' And for offering help, the top services were Instant Messaging/WhatsApp, Facebook and News. And we found that areas that are important to youth are not as important as to adults. For example, as shown in Table 3, help offered on Instant Messaging/WhatsApp was ranked 1 by adults but 9 by youth, and conversely with adults ranking email 15, whereas for youth it is ranked 12. The low level of interest in email by youth is notable, given its use in many organizational processes. Email is important in accessing online education programs, confirming passwords, correspondence on education and other opportunities. A better understanding of email skills may be called for and organizations should use and advise partners of the need for using alternative media for communicating with refugee communities.

Table 3: Rank of the Level of Importance on Areas of Help Offered Between Youth and Adults

Ranking	Level of Importance on Help Offered Area of Youth	Level of Importance on Help Offered Area of Adults
1	YouTube	Instant messaging/WhatsApp
2	Facebook	News
3	Information search (health, legal)	Facebook
4	Participate in online college/university/vocational training	Information search (health, legal)
5	Mapping (Google Maps, etc.)	Connecting with others inside the camp via social media (Facebook, etc.)
6	Jobs/employment	Connecting with people outside the camp via social media (Facebook, etc.)
7	Connecting with others inside the camp via social media (Facebook, etc.)	Jobs/employment
8	News	Participate in online college/university/vocational training
9	Instant messaging/WhatsApp	Participate in online school/education
10	Skype	Information Search (entertainment, sports)
11	Twitter	Gaming
12	Email	YouTube
13	Gaming	Viber/Rounds
14	Connecting with people outside the camp via social media (Facebook, etc.)	Mapping (Google Maps, etc.)
15	Participate in online school/education	Email
16	Viber/Rounds	Twitter
17	Information Search (entertainment, sports)	Skype

For youth helping behavior, we find that men are more likely to help than women. Also, people with relatively higher education - some/finished university and secondary vocational school, are more likely to offer help. There is no statistically significant difference between those with or without English reading skills or ages with helping behaviors.

In general, helping behavior on mobile phone and internet use is an active assistance behavior in the camp. The interactions could potentially improve the digital literacy in the camp. Providing basic infrastructure, connectivity, and common space and devices could help foster this spontaneous behavior.

3. Multivariate Analyses

The results presented above, from demographics to internet assistance, raise a variety of questions such as: What is the relationship between interest in online activities and demographic variables? and, What variables can predict camp-based internet access? To answer these questions we performed statistical analyses to reduce the overall number of variables, examined correlations between the factors and demographic variables, and then compare their impacts through multivariate regression.

3.1 Explaining Differences in Online Activity Interests

After extensive analyses for data reduction, examining relationships between the various activities, five scales were created. The first, **Youth Media 1** (α=.789), combines the popular applications WhatsApp and Facebook. **Youth Media 2** (α=.871), combines the less popular YouTube, Twitter, Skype, Viber/Rounds and email. A third scale, called **Information Communication** (α=.883), includes online motivations and channels such as communicating via social media inside and outside the camp, information search for health, legal, news, and jobs and employment, as well as mapping technologies. A fourth, called **Youth Online Education (**α=.824**)**, combines the two items on online education. A fifth, called **Youth Entertainment** (α=.744), includes items on information search for sports and entertainment and gaming. Table 4 indicates the closed list of online activities reported on above and how they were grouped among the 5 factors.

Table 4: Online Youth Activities Factors

	Youth Media1	Youth Media2	Information Communication	Youth Online Education	Youth entertainment
Participate in online school/education				x	
Participate in online College/university/vocational t raining				x	
Information search (health, legal and news)			x		
Jobs/Employment			x		
Mapping (Google Maps, etc.)			x		
Connecting with others inside the camp via social media (Facebook, etc.)			x		
Connecting with people outside the camp via social media (Facebook, etc.)			x		
Email		x			
Skype		x			
Viber/Rounds		x			
Instant Messaging/WhatsApp	X				
Twitter		x			
Facebook	x				
YouTube		x			
Gaming					x
Information search (entertainment, sports)					x

Table 5 shows the correlations between the demographic variables and the factors. Demographic variables are shown to have significant relationships with the following online activities. **Age** is

significantly correlated with online education (+.248; p<.05), with older youth showing higher interest, and youth entertainment (-.257; p<.05), with younger youth showing higher interest.

Gender plays a significant role in explaining the preferences of females and males, in all but online education, with women being as interested in online education as mean. Being male had a positive relationship with both factors representing Youth Media, as well as Information Communication and Entertainment. With gender being a dichotomous variable, we were able to test the differences in the means. Using t-test, significant differences (p<.01) in the average interest between men and women were found in Youth Media 1 and 2, as well as Information Communication. Hence, while young men and women are equally interested in online education, men generally show a higher level of interest in media and communication, with less of a difference in online entertainment.

Level of education, measured as 'highest level achieved' with 8 response categories ranging from 'some primary school' to 'finished university', has a positive relationship with all variables except Youth Entertainment. Among these positive relationships, the strongest is with online education. **English language ability**, measured as a self-assessment of English reading ability ranging from poor to fluent, is only correlated with Youth Online Education.

Hence, in general, interest in online activities is highest among male youth, as well as those with higher education and better English skills. To advocate higher participation of online activities, especially online education, improving refugee youths' English skills and education level may improve their confidence as well as interest. Naturally, online education also requires investments in information infrastructure.

Table 5: Correlations Between Demographic and Internet Use Variables

(strongest relationship for each demographic variable bolded)

Demographics	Youth Media 1	Youth Media 2	Information Communication	Youth Online Education	Youth Entertainment
Age	n.s.	n.s.	n.s	**+.248***	**-.257***
Sex	-.345**	**-.498****	-.465**	n.s.	-.277*
Education	+.274**	+.309**	+.438**	**+.457 ****	n.s.
English Language	n.s.	n.s.	n.s.	**+.290****	n.s.

** Significant at level of 1%. * Significant at level of 5%. n.s. = not significant

Given the interest in online education, using linear multivariate regression we examine the relative predictive power of the demographic variables. Table 6 below reports the explained variance (adjusted R^2) for three predictive models of online education interest, each with an increasing number of predictors, and compares the relative strength of the predictors (through standardized betas). All models were free from multicollinearity (r's < .6).

Table 6: Online Education Interest Model

	Model 1	Model 2	Model 3
Adj. R2	.218**	.218**	.221**
-Age	n.s.	n.s.	n.s.
-Sex	n.s.	n.s.	n.s.
-Education	.34*	.31*	.318*
-English	n.s.	n.s.	n.s.
-Handset ownership		n.s.	n.s.
-Syrian ICT Use			n.s.
-Jordan ICT Use			n.s.

3.2 The Relationships between Demographics and ICT Use

Next we examine the variables that might influence the frequency of ICT use in the camp. We hypothesized demographic variables as well as the frequency of previous ICT use in Syria would partially predict use in the camp. The ICT use scales, Syria (α =.812) and Jordan (α =.84), consisted of three items each where respondents were asked about their frequency of use, from never to multiple times per day, first in Syria and then in the camp. This design enhanced the items' comparative nature. The three items covered general internet use, social media use and online video watching. They were developed to be independent of access medium (phone vs. computer) and to represent general as well as two very specific but popular uses. We first examine the entire sample, combining adults and youth, and then restricted the analysis to youth. Multicollinearity between the variables is not a problem in either sample, with Table 6 showing correlations for the Youth sample.

Table 7 Combined Sample Correlation Matrix

Correlations

		1_AGE	1_SEX	2_EDU	3_ENGLISH	SyrianICTUse	JordanICTUse
1_AGE	Pearson Correlation	1	-.096	.459**	-.005	.152	.247**
	Sig. (2-tailed)		.266	.000	.955	.061	.002
	N	157	137	156	155	153	150
1_SEX	Pearson Correlation	-.096	1	-.062	.262**	-.322**	-.506**
	Sig. (2-tailed)	.266		.476	.002	.000	.000
	N	137	137	136	135	133	132
2_EDU	Pearson Correlation	.459**	-.062	1	.373**	.320**	.438**
	Sig. (2-tailed)	.000	.476		.000	.000	.000
	N	156	136	156	154	152	150
3_ENGLISH	Pearson Correlation	-.005	.262**	.373**	1	.016	.110
	Sig. (2-tailed)	.955	.002	.000		.847	.180
	N	155	135	154	155	152	149
SyrianICTUse	Pearson Correlation	.152	-.322**	.320**	.016	1	.509**
	Sig. (2-tailed)	.061	.000	.000	.847		.000
	N	153	133	152	152	153	149
JordanICTUse	Pearson Correlation	.247**	-.506**	.438**	.110	.509**	1
	Sig. (2-tailed)	.002	.000	.000	.180	.000	
	N	150	132	150	149	149	150

**. Correlation is significant at the 0.01 level (2-tailed).

For the combined sample, the 5 variables of age, sex, education and English language levels, together with Syrian ICT use, explain 42.6% of the variance in camp-based internet use (Adj. R^2 = .426, p < .01). In Table 7, the standardized betas reflect the relative weight of 5 predictors on camp-based ICT use. The strongest among the significant predictors is sex, confirming males are more likely to be users. The next strongest predictor is Syrian ICT use, adding further support for the well-known relationship between current and former use in a variety of internet use studies. The next strongest predictor is education, with the more highly educated more likely to use ICTs. Finally, age has a negative relationship with use, suggesting younger residents are more likely to use ICTs in the camp. Interestingly, English language ability did not have a significant relationship with ICT use. In summary, the strongest predictors of the frequency of camp based ICT use are sex, ICT use in Syria, education and age.

Table 8: Relative Explanatory Power of Demographic Variables and Prior Internet Use on Camp-Based Internet Use- Youth plus adult sample

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	13.827	1.840		7.514	.000
	1_AGE	-.172	.051	-.199	-3.363	.001
	1_SEX	-3.186	.573	-.336	-5.564	.000
	2_EDU	.598	.161	.245	3.720	.000
	3_ENGLISH	.424	.314	.082	1.351	.178
	SyrianICTUse	.336	.064	.331	5.281	.000

a. Dependent Variable: JordanICTUse

With the youth sample, the model provides a slightly better fit, explaining 43% of the variance, with an adjusted R^2 of .431 (p<.01). In comparing the results with those of the combined sample, in Table 8 below we find again the strongest predictor is sex and is slightly stronger in this youth sample. It is interesting, that even among youth, male use dominates. Similar to the combined sample, the next strongest predictors are prior use and education, with both having slightly lower power than in the combined sample. As expected in this sample with reduced variance on age, that predictor is no longer significant and similar to the combined sample neither is English language ability.

Table 9: Relative Explanatory Power of Demographic Variables and Prior Internet Use on Camp-Based Internet Use – Youth Sample

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	10.070	2.949		3.415	.001
	1_AGE	.069	.138	.039	.501	.617
	1_SEX	-3.655	.681	-.395	-5.364	.000
	2_EDU	.610	.227	.233	2.690	.008
	3_ENGLISH	.428	.406	.080	1.056	.293
	SyrianICTUse	.287	.075	.287	3.847	.000

a. Dependent Variable: JordanICTUse

Next we perform a gender analysis, examining relations for the sub-samples of female and male youth separately.

Table 10 Female Sub-sample Correlation Matrix

Correlations

		1_AGE	1_SEX	2_EDU	3_ENGLISH	SyrianICTUse	JordanICTUse
1_AGE	Pearson Correlation	1	.[a]	.378**	-.135	-.027	.164
	Sig. (2-tailed)		.	.001	.256	.825	.169
	N	74	74	74	73	71	72
1_SEX	Pearson Correlation	.[a]	.[a]	.[a]	.[a]	.[a]	.[a]
	Sig. (2-tailed)	.		.	.	.	.
	N	74	74	74	73	71	72
2_EDU	Pearson Correlation	.378**	.[a]	1	.363**	.244*	.527**
	Sig. (2-tailed)	.001	.		.002	.040	.000
	N	74	74	74	73	71	72
3_ENGLISH	Pearson Correlation	-.135	.[a]	.363**	1	.173	.154
	Sig. (2-tailed)	.256	.	.002		.148	.195
	N	73	73	73	73	71	72
SyrianICTUse	Pearson Correlation	-.027	.[a]	.244*	.173	1	.523**
	Sig. (2-tailed)	.825	.	.040	.148		.000
	N	71	71	71	71	71	71
JordanICTUse	Pearson Correlation	.164	.[a]	.527**	.154	.523**	1
	Sig. (2-tailed)	.169	.	.000	.195	.000	
	N	72	72	72	72	71	72

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

a. Cannot be computed because at least one of the variables is constant.

Examining the Jordanian ICT use model for this sub-sample, the explanatory power is still reasonably strong, although slightly less at 41.7% (adjusted R^2 = .417, p<.01). As shown below, now

with just 4 predictors the relative effects of education (β =.464) and prior use (β=.426) stand out as the only significant predictors.

Table 11 Female Sub-Sample Model Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.861	3.815		.750	.456
	1_AGE	-.025	.187	-.014	-.133	.894
	2_EDU	1.170	.292	.464	4.002	.000
	3_ENGLISH	-.481	.545	-.092	-.883	.381
	SyrianICTUse	.481	.107	.426	4.477	.000

a. Dependent Variable: JordanICTUse

Next, we examined how the model fit with the sub-sample of male youth. With this demographic, the data no longer fit well, with an adjusted R^2 = .155 (p=.01), and the only significant predictor being English language ability (β =.322; p<.05).

To begin to understand the differences in these sub-samples, we first turn to the correlation matrices, with the male sub-sample shown below. There we find the relationship between education and *Syrian* ICT use, which was reasonably strong in the combined sample (r =.320) is stronger for males and slightly less for females (male r =.453, female r = .244). However, when examining the relationship between education and *Jordanian* ICT use, which was even stronger (r=.438) in the combined sample, is no longer significant for males, but is even stronger for females (male r=n.s., female r=.527).

Table 12 Male Sub-Sample Correlation Matrix

Correlations

		1_AGE	2_EDU	3_ENGLISH	SyrianICTUse	JordanICTUse
1_AGE	Pearson Correlation	1	.567**	.034	.280*	.242
	Sig. (2-tailed)		.000	.791	.028	.063
	N	63	62	62	62	60
2_EDU	Pearson Correlation	.567**	1	.292*	.453**	.236
	Sig. (2-tailed)	.000		.022	.000	.069
	N	62	62	61	61	60
3_ENGLISH	Pearson Correlation	.034	.292*	1	.047	.318*
	Sig. (2-tailed)	.791	.022		.717	.014
	N	62	61	62	61	59
SyrianICTUse	Pearson Correlation	.280*	.453**	.047	1	.289*
	Sig. (2-tailed)	.028	.000	.717		.025
	N	62	61	61	62	60
JordanICTUse	Pearson Correlation	.242	.236	.318*	.289*	1
	Sig. (2-tailed)	.063	.069	.014	.025	
	N	60	60	59	60	60

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

With a limited role for Education and even Syrian ICT use for explaining Jordanian ICT use for male youth, we examined the potential influence of handset ownership, the number of SIM cards owned and the number of SIM cards borrowed. However, we first needed to understand the basic aspects of these variables. Within the combined youth sample, with both males and females, t-tests show there is a statistically significant difference ($p<.05$) in the means of SIM ownership and SIM borrowing with men owning and borrowing slightly more, but not in handset ownership (see Table 12). Given the differences in males and females for SIM cards, we expect inclusion of these variables might improve the explanatory model across all samples.

Table 13 Basic statistics on Handset Ownership, SIM Card Ownership and Borrowing

Group Statistics

	1_SEX	N	Mean	Std. Deviation	Std. Error Mean
13_HANDSET_OWNERSHIP	1.0	63	.905	.2959	.0373
	2.0	74	.838	.3711	.0431
14_SIM_OWN_NUMBER	1.0	55	1.491	.7168	.0967
	2.0	60	1.250	.4739	.0612
14_SIM_BORROW_NUMBER	1.0	52	1.615	.9108	.1263
	2.0	57	1.281	.5263	.0697

However, as there was general interest in understanding handset ownership, we first tested a logistic model for handset ownership, with predictors of age, sex, and education, using the

combined sample – adults plus all youth. The model's fit is reasonable, with a Nagelkerke R^2 of .306 and 90.7% of cases correctly classified. As shown below in Table 13, age and education were significant predictors. Hence, given the relatively even levels of handset ownership between males and females, it is a higher level of education and being older that make a difference.

Table 14 Logistic Regression on Handset Ownership for both Adults and Youth

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	@1_AGE	.286	.095	9.084	1	.003	1.331
	@1_SEX(1)	.821	.596	1.897	1	.168	2.273
	@2_EDU	.420	.168	6.275	1	.012	1.523
	Constant	-5.831	1.929	9.137	1	.003	.003

a. Variable(s) entered on step 1: @1_AGE, @1_SEX, @2_EDU.

From this analysis and review of correlation matrices, we decided to proceed by including handset and SIM variables in the overall model. A new factor of JordanSIMAccess was formed of the 2 items, ownership and borrowing (α=.729). The correlation matrix for the full sample is shown below.

Table 15 Correlation Matrix with JordanSIMAcces

Correlations

		1_SEX	1_AGE	2_EDU	3_ENGLISH	13_HANDSET_OWNERSHIP	JordanSIMAccess	SyrianICTUse	JordanICTUse
1_SEX	Pearson Correlation	1	-.168*	-.145*	.082	-.112	-.218**	-.269**	-.439**
	Sig. (2-tailed)		.019	.041	.247	.117	.007	.000	.000
	N	202	197	200	200	199	155	196	193
1_AGE	Pearson Correlation	-.168*	1	.191**	-.082	.257**	.017	.044	-.055
	Sig. (2-tailed)	.019		.004	.222	.000	.826	.514	.423
	N	197	228	225	226	226	178	222	218
2_EDU	Pearson Correlation	-.145*	.191**	1	.373**	.208**	.146	.377**	.404**
	Sig. (2-tailed)	.041	.004		.000	.002	.051	.000	.000
	N	200	225	231	229	227	179	224	220
3_ENGLISH	Pearson Correlation	.082	-.082	.373**	1	.050	-.036	.118	.204**
	Sig. (2-tailed)	.247	.222	.000		.452	.636	.077	.002
	N	200	226	229	232	228	180	226	221
13_HANDSET_OWNERSHIP	Pearson Correlation	-.112	.257**	.208**	.050	1	.083	.183**	.362**
	Sig. (2-tailed)	.117	.000	.002	.452		.268	.006	.000
	N	199	226	227	228	230	179	224	220
JordanSIMAccess	Pearson Correlation	-.218**	.017	.146	-.036	.083	1	.315**	.337**
	Sig. (2-tailed)	.007	.826	.051	.636	.268		.000	.000
	N	155	178	179	180	179	180	176	175
SyrianICTUse	Pearson Correlation	-.269**	.044	.377**	.118	.183**	.315**	1	.494**
	Sig. (2-tailed)	.000	.514	.000	.077	.006	.000		.000
	N	196	222	224	226	224	176	227	218
JordanICTUse	Pearson Correlation	-.439**	-.055	.404**	.204**	.362**	.337**	.494**	1
	Sig. (2-tailed)	.000	.423	.000	.002	.000	.000	.000	
	N	193	218	220	221	220	175	218	222

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

The results of adding handset ownership and SIM access to the existing model of Jordan ICT use for the full, youth, youth female and youth male samples are shown in Table 15.

Table 16 Jordan ICT Use Model for Different Samples

	Full sample	Youth sample	Youth female	Youth male
Adj R2	**.510*** **	**.538*** **	**.418*** **	**.411*** **
-Age	-.283**	n.s.	n.s.	n.s.
-Sex	-.363**	-.443**	NA	NA
-Education	.143**	n.s.	.307*	n.s.
-English	n.s.	n.s.	n.s.	.292*
-Handset owner	.261**	.330**	.246*	.494**
-SIM access	.154**	n.s.	n.s.	n.s.
-Syria ICT use	.273**	.259**	.371**	.284*

*p<.05, **p<.01, ***p<.001, n.s. = not significant

This model, now with Handset Ownership and SIM Access is more robust across the samples, providing consistently higher explanatory power. Handset ownership is a consistently strong predictor, with greatest impact in the male youth and the combined youth samples. Similarly, previous use in Syria continues to play an important role. The largest difference is seen in the roles of education and language. The former has particularly strong predictive power in the youth female sample (β=.307), while relatively weak or not significant in the other samples. Similarly, English language is only significant in the male youth sample, with stronger predictive power than previous use, while it is not significant in any other sample. To shed further light on these findings, additional research using qualitative methods, such as interviews or focus groups, are recommended.

4. Infrastructure Analysis

In a second component of our analysis we investigated the quality and spatial variability of the cellular network service. In the camp, mobile service is of critical importance not only to the refugee population but to service providers as well.

The cellular network analysis is based on comparative assessments of signal strengths collected via a variety of handsets across the networks of the camp's mobile network operators. The analysis recorded location information, cellular signal strength data, mobile data connectivity status, and low-level radio messages from 8 mobile phones. We evaluated cellular coverage across all major networks: Zain, Umniah, and Orange. Figure 14 shows the locations of our measurements within the camp.

Figure 13: Each Pin Represents One or More Cellular Radio Measurements

During the three day period in the camp, we recorded the network connectivity type (3.5G, 3G, or 2.5G), with our phones set to prefer 3G networks. We collected at least one thousand measurements per carrier. The 3G technology observed in the camp was High-Speed Downlink Packet Access (HSDPA). The cellular technology being used by carriers has a major impact on user experience, particularly on mobile data usage. In the best case, HSDPA, a 3.5G technology, provides download speeds orders of magnitude faster than Enhanced Data rates for GSM Evolution (EDGE), a 2.5G technology.

As shown in Figure 15, Zain and Orange base stations provided EDGE connectivity more often than HSDPA, while Umniah offered HSDPA around half of the time. Transitioning more base stations near Zaatari from 2.5G to 3.5G/4G would increase mobile data performance. Upgrading to 3.5G networks would also increase capacity, due to increased spectral efficiency of 3.5G technology. As discussed in the next section, our measurements show that capacity increases are required, as we detected the presence of congestion on all networks serving Zaatari.

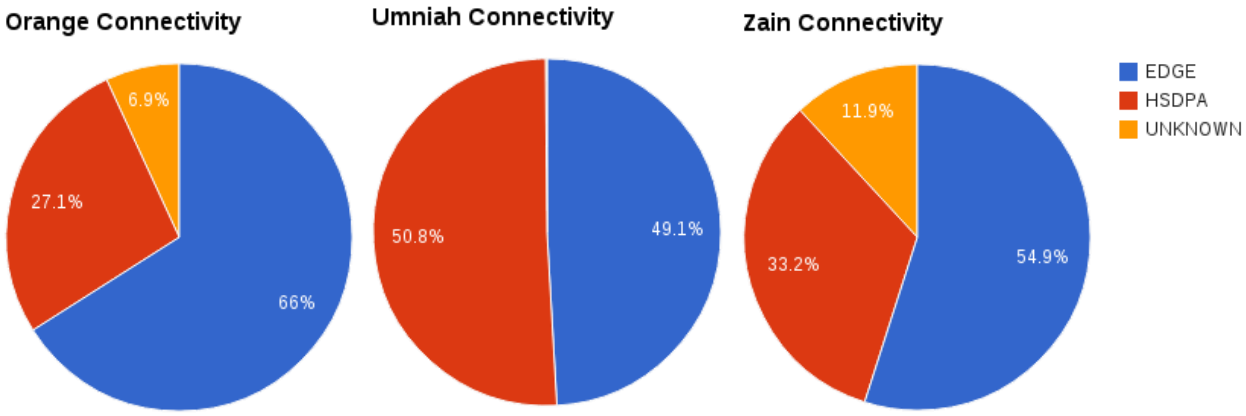

Figure 14: Connectivity Types for Providers While Attempting to Connect to HSDPA (3G)

We passively observed cellular base station broadcasts to record success and failure of channel assignments. A channel is assigned by a cellular base station to enable voice calls, use of mobile data, and text messaging (SMS). If all of a base station's channels are in use, but additional users are trying to use the cellular network, the base station will reject users' attempts to use the network. As shown in Figure 16, all networks experience failure to some degree, with the poorest performance on this measure experienced by phones on the Zain network where assignments fail roughly ⅓ of the time. These results are indicative of congested, overburdened cellular base stations.

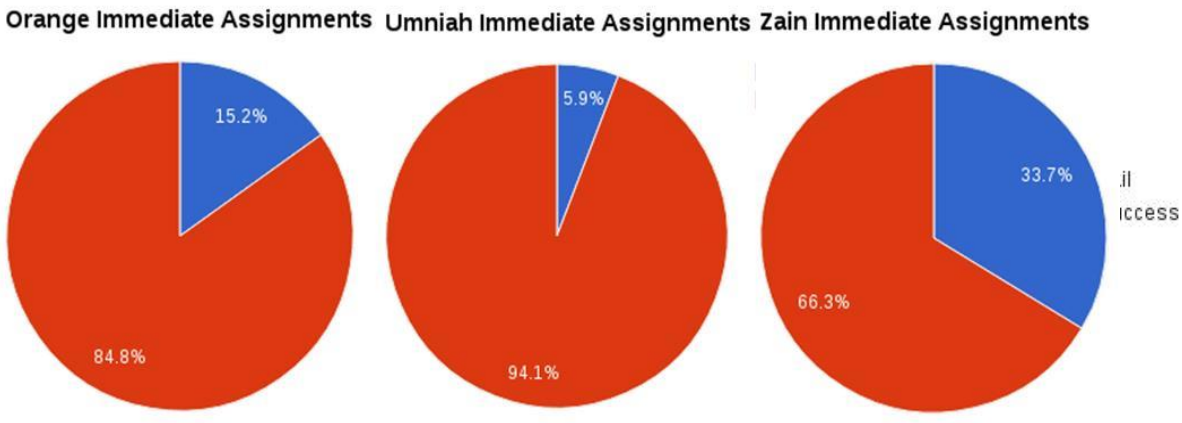

Figure 15: Successful and Failed Channel Assignments by Carrier. A Failed Channel Assignment May Represent a Dropped or Delayed Call, Web Request, or SMS.

Recommendations for Infrastructure in Za'atari. Given the importance of the mobile networks to Za'atari's residents as well as service providers, camp management might seek service improvements with the mobile network operators. Naturally, camp plans that will allow carriers to fully recover the costs of

networks investments over a number of years will be an important component of the carrier's investment decisions.

Additionally, enhance information and communication services might also be developed through a camp Waide Area Network (WAN). A WAN can be developed either as a purely local solution or to provide a secondary connection mode, in addition to the cellular network. A stand-alone network (one that does not provide internet connectivity) would allow for camp-based communications via wifi-enabled phones and laptops and would not incur carrier or backhaul charges. In addition to providing connectivity for buildings such as youth training centers with base camp, access by residents could enable intra-camp communications, via messaging services, reducing congestion on the cellular network and saving refugees' money otherwise spent on calls or text messages.

Such a network can also be used to serve and distribute online content throughout the camp. With appropriate management, servers can be loaded with educational content and distributed to computers throughout the camp. A one-time content purchase can thus benefit hundreds of users. Also, by not being connected to the internet, service providers need not fear excessive telecommunications charges or time and money wasted on non-instrumental/frivolous internet usage. However, as users often expect full internet connectivity when sitting down at a computer, expectations and functionalities have to be carefully managed.

Building such a network must take into account the following. Za'atari's layout and geography make it well suited to point-to-point and point-to-multipoint wireless infrastructure. To provide reliable Wi-Fi coverage throughout the camp, we suggest a hierarchical architecture. One or more servers in base camp could be used to host content locally and serve that content to residents and workers throughout the camp. The centralized servers would act as the hub of a camp-wide network. To ensure data can be distributed reliably throughout the camp, point-to-point or point-to-multipoint backhaul links would connect the hub to omnidirectional access points located throughout the camp.

We suggest placing Wi-Fi base stations on the elevated water tanks throughout the camp.

Each water tank would have at least two Wi-Fi radios:

1. An access point with an omnidirectional antenna. This would provide Wi-Fi coverage to camp residents and workers near the water tower, allowing nearby residents to connect using their smartphones.
2. One or more backhaul links with directional antennas. These are used to connect the base station to base camp or to other base stations in the camp.
3. Optionally, one or more access points with sector antennas. These allow more distant households, NGO facilities, and other Wi-Fi base stations to connect to the Wi-Fi network using directional antennas.

Specific hardware recommendations are available upon request. Our team observed several Ubiquiti wireless devices deployed in the base camp. If these Wi-Fi devices have served you well thus far, we suggest you deploy additional Ubiquiti wireless gear.

Deploying such a large scale network requires proper planning and evaluation. Before a large scale deployment, 5.8GHz links should be evaluated during the dry season to determine if airborne dust impacts performance. 5.8GHz Wi-Fi is less susceptible to interference from residents' devices, but does not propagate through obstacles as well as 2.4GHz Wi-Fi. The network must be configured to use subnets capable of assigning IP addresses to hundreds of thousands of devices. Throughout the deployment, network traffic should be observed to ensure broadcast and multicast traffic is not unnecessarily retransmitted across wireless links.

As line of sight is required for longer range links, backhaul radios and sector antennas should be deployed in elevated positions. This is a primary advantage of locating Wi-Fi devices on the water tower structures throughout the camp. We observed that water towers often had clear line of sight to multiple other water towers. However, more traditional masts or existing features such as hills and light poles could also be used. We suggest using 5.8GHz Wi-Fi for point to point and backhaul links, as this increases the number of non-interfering channels available. We suggest using 2.4GHz Wi-Fi to provide access points for residents. As most cellular phones support 2.4GHz Wi-Fi but not 5.8GHz Wi-Fi, this configuration will maximize compatibility with end user devices.

5. Conclusions

Findings from the survey indicate a high level of internet use among youth in the camp. The survey's sample is biased toward those most engaged with programs offered by service providers, however we feel this bias is justified by the goal, which is to assess the viability of offering internet-based programs in the camp. The likely audience for these programs are those refugees already seeking to improve their lives through service provider activities. Certainly, a broader, more representative study of internet use would be beneficial.

The study shows that penetration rates of mobile device and SIM cards are high for both female and male refugee youths. However, in terms of internet use and potential online interests, male youths show a higher level of both usage and interest. Therefore, a targeted study of women's use, one conducted with access to more private domains where women meet, is necessary to understand how internet-based services may or may not be attractive to women. Studies may seek to shed light on the role of English language ability on female use as this was shown to be a significant predictor for males but not females. Further research could also provide greater insight into women's use patterns and the role of borrowing both handsets and SIM cards in their access.

The high level of internet access bodes well for internet-based services. However, continued access via mobile devices may limit the benefits and skills developed over time. For example, interface differences of mobile devices do not enable development of keyboard skills, which are necessary to communicate longer, more thoughtful and reflective writing. Other skills related to generating, rather than consuming, content such as video editing and the production of graphics used in presentations are also difficult to develop on a mobile handset. Computer training centers should be prepared to teach students with a variety of skills, such as those with well-developed internet search skills but no familiarity with a computer. Also, training could include assessments based on established internet or broadband skills

measurement scales. These scales measure high, medium and low skills levels via questions assessing familiarity with a variety of terms such as 'reload,' 'spyware,' or 'JPEG.'

Given this survey's finding of the level of interest in online education (ranked 8 of 17 online applications), using internet-based services to solve strategic challenges such as access to higher education is certainly possible, at least in terms of interest. However, with the lack of access to computers in the camp, over time the skills of younger and younger students are likely to trend away from desktop or laptop computers. Attention to this skills gap must be paid in the planning of future online programming.

Online education can take a variety of forms. Enrollment in programs that provide a credential, such as a degree, can be expensive and out of reach of many refugees. However, efforts have been taken to provide combined in person and online post-secondary education through programs such as the Borderless Higher Education for Refugees (BHER) project offered by York University together with Kenyan universities for students in Dadaab, Kenya (see refugeeresearch.net).

Not-for-credit or informal education programs, such as the Massive Open Online Courses (MOOCs), offered through platforms such as Coursera and EdX, among others, offers nearly 1,500 courses from universities around the globe. Most are in English but in 2013 a partnership was announced between Coursera and Taghreedat to translate selected courses into Arabic. An analysis of the availability of Arabic language MOOCs and their fit with the educational interests and needs in the camp is needed. Also, while these courses will not replace a university degree in terms of their value for future employment, they can help students prepare for higher level course work.

Online programming, particularly for bandwidth intensive applications such as video educational content, must first address the connection deficit. Mobile internet access is primarily geared toward content consumption as opposed to production. Hence, students could potentially watch an educational video through their phones, but the expectations of most online educational programs include engaging in online discussions, writing papers and the like, which typically require a more complex interface (laptop/desktop) and possibly applications. Software for tasks such as word processing and presentations, as well as basic photographic, video and audio editing, can provide the tools needed for job training, further education or just simply helping share their stories and lived experiences with the rest of world.

To resolve the access issue, a two pronged strategy should be developed. The first requires targeting improved cellular network services by mobile carriers. This will require an assessment of conditions that might favor and offer a realistic payback in terms of a continued customer base. These efforts with mobile carriers should be complemented by a camp-wide wifi network, which need not be connected to the internet but enables local, camp-based communication and information transfer. The latter may help offload traffic from the mobile network, enable more efficient communications among the camp's service providers, and provide a mechanism for serving centrally stored content such as educational and training materials throughout the camp.

This report is merely the first step of what we hope will be a continuing assessment of ICT use in Za'atari. Further analyses need to be conducted of the survey data to answer deeper questions about the drivers of internet use and providing a more comprehensive picture of those who do not frequently use the internet or do not have access to a mobile phone. Also, further explorations of the viability, including the issue of managing expectations and assessing competing technologies and business models that may enable widespread internet access, must be conducted.