

# Computer Mediated Communication: Patterns & Language Transformations of Youth in Arabic-Speaking Populations

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## Abstract

*This paper describes a study investigating the usage of Computer-Mediated Communication (CMC) and its impact on language transformation in the context of youth in Arabic-speaking populations, specifically in Saudi Arabia. In particular, this project examined patterns of CMC using BBM and WhatsApp captured in a qualitative diary study comprised of logs and reflection. Gender and individual differences in the CMC patterns and factors contributing to the transformation of language in CMC communication (e.g. Arabizi) are discussed. Design implications are described.*

**Keywords:** CMC, Mobile HCI, BBM, Language Transformation, Arabizi.

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## 1. INTRODUCTION

The widespread adoption of BBM and WhatsApp by youth in Saudi Arabia has given rise to a new sub-culture in which patterns of communication, expectations of social communication exchanges, and language formality have changed. Research in Sociolinguistics and HumanComputer Interaction (HCI) examining technology adoption and adaptations related to introducing the Latin alphabet to the Arabic writing system has emerged in recent years [1, 3]. Investigations of this sub-culture can expose opportunities for technology design and innovations in supporting the varying patterns of communication (e.g. Islam Bani-Ismail [1]). This consequently helps support more effective technology utilization and innovative design to meet the expectations of a growing population known to have a high diffusion of technology usage [3, 4].

In the design of computer-mediated communication (CMC), it is essential to consider the language and mode of communication to develop technologies that support users' preferred mode of communication. The Arabic language presents its own challenges for the design of such CMC applications. Furthermore, the transformation of Arabic usage has introduced new challenges for the design of communication technologies

[7]. Understanding the local patterns of CMC gives insights into the requirements of such systems that can provide better technology support and intuitive and seamless interaction for Arabic speaking populations.

In this study, we examined the patterns of CMC in Saudi youth with a particular focus on variations between gender, age and weekend and weekday CMC exchange as well as the context of use and the technologies used.

## **2. EXISTING CMC STUDIES RELATED TO LANGUAGE TRANSFORMATIONS**

Language transformation has long been examined in the context of technology adoption and adaptation of users to limitations in technology support of their native languages. Warschauer, El Said, & Zohry found that the modern standard Arabic was rarely used on the internet and instead a new language between English and a Romanized colloquial Arabic has emerged which he named it Romanized Arabic [12]. The term Arabizi was coined more than a century ago and is comprised of the two words “arabi”(Arabic) and “englizi”(English); the transliteration of the Arabic pronunciation of the two languages. (Yaghan, [13]) talked about arabizi history, supporters, and opponents. He mentioned that the first proposal was made by Wilhem Spitta in 1880 in his book *Vulgar dialects von Agypten Grammatik des Arabischen* [The rules of Slang Arabic in Egypt]. Which had some support in the following 40 years from people such as Abdelaziz Fahmy and a similar trend was adopted by Kamal Atatürk where he altered the Turkish language by changing the Arabic letters to Latin letters. In opposition it faced great antagonism from Arab nationalist and Muslims worried about any change to the Quran language or script.

In recent years, researchers have investigated the issues related to language transformations in the Arabic language and the context of CMC. (Yaghan, [13]) mentioned many reasons that support the Arabizi adoption of which are the lack of Arabic letters support in some cell phones, economics where bigger number of Latin letters are allowed per message, expressive power where capital letters are used for emphasis or shouting using the Latin format when compared to the Arabic script, convenience where usage of one set of letters to express two languages.

Interestingly, some research studies have reported higher perceived usability in using English characters by Arabic speaking users of CMC. In one study, Muhammed, Farrag, Elshamly, & Abdel-Ghaffar reported that users find it easier and faster to type in English characters than in Arabic characters as they feel Arabic characters are not technologically friendly [11]. And some others have reported this style of writing to emulate their peers and respond in CMC in a manner that is in line with expectations. Image and identity are often cited as key factors in mobile usage as noted by Yaghan [13] and El Essawi [5]. In their work, they both reported findings that suggested a perception of being ‘cool and hip’ was among the reasons for Arabizi usage in CMC amongst Arabic-Speaking populations. The Arabizi mode of communication has increasingly gained acceptance in youth population and mainstream media. (Warschauer, El Said, & Zohry, [12]) believe that the absence of authority and the informal context gave colloquial writing the rise, where this style of writing was rejected and faced with opposition before being used in this context. (Yaghan, [13]) justified the

adoption and acceptance of Arabizi among the young generation due to the fact that it wasn't forced upon them from the elite. Rather it started due to technical challenges where at the young days of the internet Arabic letters were not supported and therefore Arab youth found their way to communicate in Arabic using the Latin letters. Moreover the earlier proposal wanted to alter the Arabic writing system as a whole while Arabizi is used for slang or colloquial Arabic and not formal Arabic language.

## **2.1 Variations in CMC Usage**

Variations in CMC usage according to age differences have been reported in previous work [10, 9, 6]. A study by Ling showed that text messages are the largest use area for adolescents [10]. Around the age of 20 texting is gradually being replaced by voice calls. Jantz, mentioned that parents are forced to text their children instead of calling them because this the only way they'll respond, since teens avoid answering their phone calls to train people to text them instead [9]. He mentioned that teens think that texting is easier and more convenient. Ericsson [6] found that teenagers prefer texting to voice calls for its convenience, since they can text from anywhere and anytime without interrupting their lives. They mentioned that teenagers are not comfortable with phone calls since they are not sure of the unwritten rules of a phone call such as dealing with an awkward pause.

Demographic characteristics such as age and gender have been the subject of many studies in relation to computer use. Overall, early studies have suggested that males seem to be more involved in computing, are more experienced and have more favourable attitudes towards computers than females. However, the gap between genders seems to have been reduced if not eliminated in recent years. In one study, Jantz has reported that girls send and receive an average of eighty messages per day, while boys send and receive an average of thirty messages per day [9]. In 2002, Höflich & Rössler showed that patterns involving boys and girls in Germany differ with slight variations where boys tend to phone more and girls were found to text more [8]. The studies conducted by Ling have also shown that females send more text than males in the same age group [10].

## **2.2 Language Transformations in CMC**

Undoubtedly languages in different cultures have been affected by CMC. Recent studies conducted on English language transformations have reported transformations related to changes in terms of abbreviations and grammatical structure. This applied to English which uses Latin characters similar to the original character-sets available to users of computers or mobile devices. Tastan & Martinez, conducted a qualitative study on the use of Turkish on the internet and they found the English language influenced Turkish such that some spelling changes have been noticed such as substitution of v with w and k with q and I with y. Moreover characters "s" and "c" are replaced with "sh" and "ch". Tastan & Martinez, attributed Turkish language transformation due to English language influence and lack of keyboard Turkish characters such as the dotted characters. Vershinskaya, presented a Russian experience in mobile communication. With regard to using the Russian language in mobile communications it is mentioned that not all mobile phones have "Russified"

SMS services, so a user should know English or at least English alphabet to be able to transliterate a message. The author used the word transliterate to indicate writing Russian by using English Alphabets. Moreover he mentioned that some words are mixed between Russian such that making English words sound Russian for example "forvardni" means forward which he called English-Weblish. Fewer studies have examined the language transformation of Arabic, such as the exploratory studies conducted in Jordan and Egypt [7]. However these studies have focused on general characteristics that define Arabizi as a writing code and our understanding of how this language transformation affects CMC and interaction design with Arabic interfaces remains inadequate.

### 3. DIARY-LOG STUDY OF CMC USAGE IN SAUDI ARABIA

The aim of our research is to examine texting practices and patterns of youth in Arabic speaking populations' with a particular focus on language usage for texting whether it is Arabic, English, or Arabizi (a slang term describing a system of writing Arabic using English characters for example: (I'm going to college at 3:00 PM == Ana raye7a el gam3a elsa3a 3 el 3asr)). Additionally, it examines the differences in texting patterns between different genders. The method adopted for this study was a qualitative study; where participants were asked to fill in forms explaining their messages and characters-sets or language used to communicate. Different days and time slots were chosen to reveal different patterns among different days and times whether it is weekend or a week day, early in the day or at night. This data was later gathered and analyzed to find patterns and study the young youth -male and female- texting behavior and its impact on language transformation.

#### 3.1 Participants

Sixty-one participants took part in the study, fifty-two females and nine males. The participants' ages ranged between 14 to 24 years old and were all recruited from a large city, Riyadh. Ages of the male participants ranged between 14 to 20 years old and females between 15 to 24 years old. Some participants were university students recruited from KSU. Demographics of participants are described in Table 1. The study was comprised of good representation of youth populations in each age in the 10-year range examined in this study.

	All	Males	Females
<b>Number of participants</b>	61	9	52
<b>Range</b>	14-24	14-20	15-24
<b>Mean Age</b>	20.2	17	20.75
<b>SD</b>	2.25	1.73	1.78

*TABLE 1: Demographics of participants in the Diary Study*

In order to collect background information about participants of the study, surveys were distributed prior the study. The first group of questions was about the using of technology on regular basis, the results were all participants have computers at home and mobile owners. 86% percent of participants use internet regularly. 52% percent use internet 4 to 7 hour daily, 31% percent 0 to 3 hours daily and 17% 8 to 11 hours daily. 69% of participants reported regular use of e-mail. Most of participants estimate sending from 0 to 3 e-mail messages per day and 45% percent of them receiving form 4 to 7 e-mail messages per day. In addition of using e-mail, 39% percentage of participants used computers device and 61% used mobiles phone (see Table 2).

		All	Males	Females
Internet Regular Use (%)		86%	78%	87%
Daily Internet Use (%)	0-3 hrs	31%	44%	29%
	4-7 hrs	52%	56%	51%
	8-11 hrs	17%	-	20%
Regular e mail Use (%)		69%	11%	78%
Daily Sent email Use (%)	0-3 hrs	75%	100%	71%
	4-7 hrs	19%	-	22%
	8-11 hrs	2%	-	2%
	Above 12 hrs	5%	-	5%
Daily Received email Use (%)	0-3 hrs	31%	44%	29%
	4-7 hrs	45%	33%	47%
	8-11 hrs	17%	22%	16%
	Above 12 hrs	6%	-	7%
Tech. Used to check email	PC (%)	39%	67%	35%
	Mobile (%)	61%	33%	65%

**TABLE 2:** Usage of Technology by Participants

The second group of questions was about Smartphone and landing using. 50% percent of participants have two Smartphone's, 48% percent has one Smartphone and 2% have more than two smart phones. All participants use Smartphone for instant messaging. 59% percent of participants connection by using 3G for texting, while the rest 41% percent by using Wi-Fi. 17% percent of their phone cost is paid them. Participants were also requested to indicate the type of payment plans they have for the mobile services; two contracts of payment were reported in the sample, with 25% percent of the sample paying the bill in pre-specified periods

and 30% are enrolled in pre paid plans. 69% participants reported making less than 4 voice calls per day and receiving less than 4 voice calls per day on their mobile phones. It is also noted that participants had use of landline telephones from home. Most participants estimated making less than 4 landline phone calls per day, and receiving about the same number. (see Table 3)

		All	Males	Females
Using Smart phone		100%	100%	100%
Number Smart Phone (%)	1	48%	44%	49%
	2	50%	56%	49%
	More	2%	-	2%
Communication Tech. used (%)	Wi-Fi	41%	22%	44%
	3G	59%	78%	56%
Daily Call % ( )	0-4	69%	44%	73%
	5-9	27%	44%	24%
	More	5%	11%	4%
Daily received Call (%)	0-4	67%	56%	69%
	5-9	31%	44%	29%
	More	2%	-	2%
Using Landline phone		34%	11%	38%
Daily Call % ( )	0-4	33%	11%	36%
	5-9	2%	-	2%
	More	-	-	-
Daily received Call (%)	0-4	28%	11%	31%
	5-9	5%	-	5%
	More	2%	-	2%

**TABLE 3:** Using Smart Phone and Landline Communication by Participants

In summary, participants in this study had different types of technologies available to them to support communication with others. Their options included: internet- based communication methods including e-mail and instant messaging; making and receiving landline phone calls; making and receiving mobile phone calls; and sending and receiving text messaging.

### 3.2 Data Collection

Log files were created to monitor the communication behavior of each participant in order to collect and analyze the type of messages, the language used to send/receive the messages, as well as different information that will be highlighted in the coming explanation in result section. In this study, there were two different log files, one for recording sent message and the other for the received messages. A sample of the log is shown in Figure 1.

1	2	3	4	5	6	7	8	9
No (ID)	Date	Time	Your Physical Location	Reply to another message? If yes give message ID	Received from ?	Broadcast or Group Message or Personal Message?	Describe Content	Length of Message (number of letters or lines)
R1	8th Mar	7pm	Bedroom	S1	soso	PM	مافي شي اللي ارسلته لكم عشان تتسوفونه	1 line
R2	8th Mar	7pm	Bedroom	S2	soso	PM	اللي ارسلته تو؟ أي واحد قُصدك؟	1 line

10	11	12	13	14	15
List any Abbreviation or Emoticons used	Language used; i.e Arabic, English, Arabizi	Media Received (text, image, voice note, video, hyperlink)	Received by BBM or WhatsApp ?	Did it lead to a phone conversation or meeting, etc. ? If yes, explain.	Any encountered Problems? e.g. Language, content intent, mis-addressing
	arabic	text	BBM	no	no
	arabic	text	BBM	no	no

FIGURE 1: Sample of two entries from one participant log for received messages

Each column of the table is labeled based on various information that will reveal how each one adapts the way they text message. For instance, columns 1, 5 & 6 are the message identifier, the reply's identifiers & sender/receiver. Columns 2,3 & 4 are the day, time & location of the texting. Column 7 identifies the way the message was sent, either as a broadcast, group or direct messages.

For the contents of the message, length, emotional expressions and language used including the attachments such as images, media or photos, are labeled in columns 8, 9, 10, 11 & 12 respectively. To help understand the way the message is sent/received, column 13 was added to specify what platform was the text sent/received by either BBM or WHATSAPP. And to understand the consequences of the texting we labeled columns 14 & 15 with what has the texting led to and were there any conflicting issues such as misunderstanding or miscommunication.

### 3.3 Procedure

Consents were obtained prior to enrolling participants in the study. The participants were given written and verbal instructions before beginning the study to ensure that they understood how to fill the log forms. Then they were asked to fill in the log forms with different information that would help us understand the pattern they text a message. Moreover, the study facilitators notified each participant 10 min before and after the logging schedule time as shown in Table 4.

Day	Time	Type of Day
Sunday	9:00 AM – 1:00 PM	Weekday
Tuesday	7:00 PM – 11:00 PM	Weekday
Thursday	5:00 PM – 9:00 PM	Weekend
Friday	11:00 AM – 3:00 PM	Weekend

**TABLE 4:** Log day schedule

As can be seen from the table, that we have selected four different days of the week. Starting by Sunday which is the second workday of the week and a day time was chosen to highlight their texting behaviour during school hours; Tuesday is the fourth workday and late in the day time was chosen to study their texting behaviour during after school hours. On the other hand Thursday is the first day of the weekend and evening time was chosen to study their texting behaviour on the weekend; Finally Friday is the holy day in Saudi Arabia and selected before and after Friday prayer to examine texting behaviour during the religious period. Variations in communication patterns were expected in accordance with the variations in days and times.

#### 4. RESULTS AND DISCUSSION

In this study, three variables were investigated: gender, time of logging and linguistic pattern. In view of the fact that this research is geared to language transformation, this characteristic was an essential variable to analysis.

##### 4.1 Gender Variable

Table 5 shows the mean and standard deviation for the number of messages both sent and received. The average for both messages sent and received were slightly different for the males and females; males tend to send and receive messages more than females but no significant variation was found. The average sent messages were 20.6 message for males and 18.7 for females, and the average received messages were 39.8 messages for males and 30.01 for females.

	Sent		Received	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<b>Males</b>	20.6	11.3	39.8	21.6
<b>Females</b>	18.7	17.1	30.1	21.4

**TABLE 5:** Mean and SD for Sent and Received Messages

Table 6 shows the total distribution of sent and received messages from both males and females. The number of sent messages was 1150 and 2086 messages were received, which sums up to a total of 3236 message



exchange. As reported in Table 6, number of sent messages for the males were 191 (34.1%) and for the females were 959 (35.8%), and number of messages received were 359 (65.9%) for males and 1717 (64.1%) for females.

	Sent		Received		Total Messages	
	<i>No. of Messages</i>	<i>(%)</i>	<i>No. of Messages</i>	<i>(%)</i>	<i>No. of Messages</i>	<i>(%)</i>
Males	191	34.1%	359	65.9%	560	17.3%
Females	959	35.8%	1717	64.1%	2676	82.7 %
All	1150	-	2086	-	3236	-

**TABLE 6:** Distribution of sent and received messages

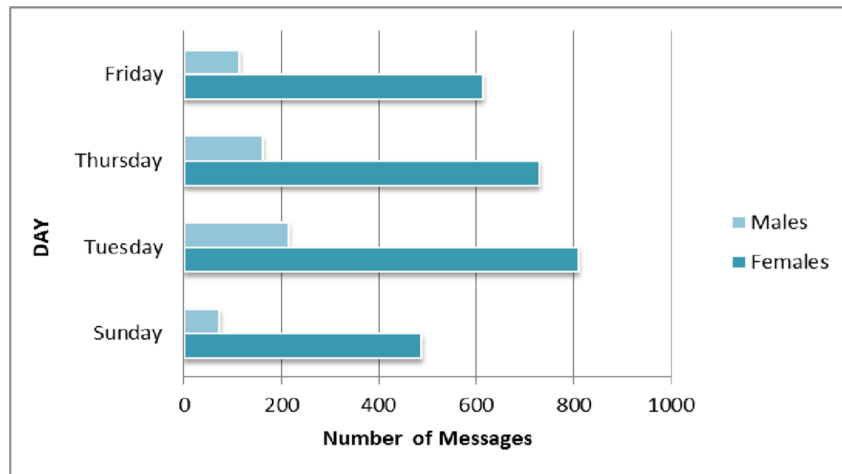
Demographic characteristics such as age and gender have been the subject of many studies in relation to computer use. Overall, prior research has suggested that males seem to be more involved in computing, are more experienced and have more favorable attitudes towards computers than females. Our data suggests that the gap between males and females is not significant and perhaps is narrowing in our sample of youth populations.

#### 4.2 Time of Logging

Table 7 shows texting on the four different days of the week was quite different. Tuesday was the highest for texting in which 214 (38.2%) and 810 (30.7%) messages for males and female respectively. However, 12.9% percent of males and 18.5% of females were texting on Sunday, the total number of messages were 72 for the males and 488 messages for females. On Thursday male were texting 161 messages (28.8%) and female 729 (27.6%). Finally on Friday, total numbers of text messages were 113 (20.2%) for males and female were 614 messages (23.2%). It is noted that the type of messages exchanged on Friday were more of the religious type (e.g. prayers and quotations from religious texts).

	Sunday		Tuesday		Thursday		Friday	
<b>Males</b>	72	12.9%	214	38.2%	161	28.8%	113	20.2%
<b>Females</b>	488	18.5%	810	30.7%	729	27.6%	614	23.2%
<b>ALL</b>	560	17.5%	1024	32%	890	27.8%	727	22.7%

**TABLE 7:** Distribution of messages in different days



**FIGURE 2:** Distribution of times of logging

ANOVA (one way) is used in this study and showed that variations in days and times is significantly different ( $F=4.2, P<0.05$ ). The data suggests that patterns of CMC vary according to the day of the week as well as the time of day. Participants were active on weekdays during the evening more than weekdays during the day. This can be explained by the involvement of these young participants in their school work during the day when compared to the flexibility of activities in the evening. The data also suggests that on the weekend participants were relatively active in their CMC.

### 4.3 Language Transformations

Linguistics patterns of CMC exchanged are described in Table 8. For the Arabic messages it was observed that the majority of casual dialog CMC was in local dialects; in contrast, the majority of quotations and prayers exchanged in CMC were in Modern Standard Arabic MSA as it was used as the mode of language for these Arabic messages. The pure English content in CMC was observed to be more prevalent in cases where participants were proficient in English or the message itself was passed on in Broadcast from its original English form. The Arabizi that was observed included pure Arabizi in which all the Arabic message was written in Latin characters as shown in sample 1, 2 and 3 in Arabizi column.

The Mixed form was observed in CMC of participants. In this category, different language combinations were used, some write Arabic script combined with English words written in Arabic such as Midterm Exam is expressed using the Arabic transliteration for “Mid”; some write Arabizi combined with English words; and some write Arabic script combined with English words as shown in the Mixed column for sample 1, 2, 3 respectively.

Language Transformation in CMC			
English	Arabic	Arabizi	Mixed
Male 2%	Male 70%	Male 25%	Male 3%
Female 9%	Female 75%	Female 11%	Female 2%
All 8%	All 74%	All 13%	All 2%
1. "hey , im out there, open ur door"	1. الله نم عامم "ي كاقسد :\$" مهنجلا	1. "ymdyk t6l3"	1. نم ديبملا "ي تصلخ ؟"
2. "I'd love to go Saudi Arabia. I bet its beautiful x"	2. الله ي ضريري "ركذ نمحرلا دعسيويو ب ههههذيويو لامبيوو ن ناسنلاا ن ن الزحلاا ن ن الزبيملا"	3. "yalla bye t25rrrt"	2. "kefk 0o kef UK?"
3. "Go and study .. Don't stay here Come on move it .. Go Go and make your future"	3. "ي يذ تبعلاا" "وشوو"		3. ن بينانفلا "ل ثم: عامسأ ي يزييلجنلاب تملاء = "ب غارر he wants a mark

**TABLE 8:** Observed Language Transformation in CMC

In order to examine differences in language transformation between males' texting compared to females' texting patterns. F-test and analysis of variance were used. As shown in Table 9, there were significant differences ( $F= 44.1$ ,  $P<0.0001$ ) for English Messages. Data suggests that females were significantly more likely to text in English when compared to male participants.

Arabizi Messages were found to be significantly more prevalent in CMC of male participants when compared to female ( $F=0.137$ ,  $P<0.00001$ ). Of the texting messages, Arabizi messages accounted for a total 424 messages in our study, 25% were from males and 11% from females.

	Male		Female		F	P
	M	S.D	M	S.D		
Arabic	43.4	33.1	38.7	30.7	0.8	=0.3
English	1.4	2.4	4.6	15.9	44.1	<0.000001

Arabizi	15.6	24.8	5.5	9.2	0.137	< 0.0000001
Mixed	1.9	5.3	1.2	3.9	0.54	=0.08

**TABLE 9:** Differences in language transformation between males and females

The emergence of a new language with the advent of the Internet's familiarity has been reported in (Warschauer, El Said, & Zohry, [12]). Interestingly, Arabizi and Mixed messages were observed in this study. Table 10 shows that 18.2% of the sent CMC messages were of Arabizi type at a total of 210 sent messages in the sample; and 10.3% of the received CMC messages were of Arabizi type with a total of 214 received messages. Comparing males with females, the percentage of sent Arabizi messages to the total sent messages were 37.1% for males and 14.4% for females, while received messages were 19.2% for males and 8.4% for females.

Participant	Sent		Received	
	Arabizi Message	Arabizi / Total (%)	Arabizi Message	Arabizi / Total (%)
<b>Males</b>	71	37.1%	69	19.2%
<b>Females</b>	139	14.4%	145	8.4%
<b>All</b>	210	18.2%	214	10.3%

**TABLE 10:** Sent and received Arabizi messages

In this study, we wanted to examine text messaging that could have led to transformations in the mode of communication (e.g. language transformation). In this context, Arabizi is one of new texting pattern; it is somewhat surprising that Arabizi percentage was 13% of the text messages trafficking. The reason for this is not clear, but there are several possible explanations for this result.

Table 11 lists the categorization of messages exchanged as Broadcast (BC), Group Message (GM), and Direct Messages (DM). In this sample the males tend to send and receive direct messages more than females as listed in the table.

One of the reasons could be because of the observation of having males send and receive direct messages in this sample is proportionally more than females, direct messages for males were 80% while females were 68% of the total messages; and direct received messages for males were 43% and females were 42%.

	Sent			Received			All Messages		
	BC	GM	DM	BC	GM	DM	BC	GM	DM
Males	19.4%	0.5%	80.1%	56.9%	0.3%	42.8%	44.1%	0.4%	55.5%
Females	26.5%	5.3%	68.2%	54.9%	3.6%	41.5%	44.7%	4.2%	51.1%

**TABLE 11:** Broadcast, group and direct messages in sent and received messages

In line with patterns of CMC found in previous studies conducted by (Yaghan, [13]; Muhammed, Farrag, Elshamly, & Abdel-Ghaffar [11]; El Essawi [5] ), findings suggest that males send and receive messages more than females due to having females exhibited more CMC broadcasting and group messaging than direct messages, i.e. holiday greetings, poems, funny jokes or comments, etc. Moreover, in this sample we found that males seemed to respond in CMC somewhat more than females. If we have a look to compare numbers of reply messages between two genders, males replied to 40% of the total messages, where females were 37%.

The observation of having Arabizi in the CMC captured in these logs could be explained by the purpose of ‘convenience’ for using Arabizi that has been reported in the literature (e.g. Muhammed, Farrag, Elshamly, & Abdel-Ghaffar, 2011 [11]) in that users find it easier and faster to type in English characters than in Arabic characters because they feel Arabic characters are not technologically friendly in terms of constraints of the settings as well as the expression of media and links which are often in Latin characters. And some others just do it to respond in their interaction in a way that is similar to their peers.

In addition, some studies showed that when Arabizi typing started it was because the ease of using the English letters. This was due to technological constraints, as the whole computer system default was in English. Consequently, it was perceived as easier to write in that format other than configuring the systems’ setting to write a message. Despite advances in supporting Arabic script, some users tended to continue with this communication patterns, as they perceived it easier and faster to do so.

## 5. CONCLUSIONS

In this paper, we described patterns of CMC communication in an Arabic youth population. Findings indicate that most CMC was in the native language, and Arabizi usage was not prevalent as expected in youth population. From a gender difference perspective, the study reveals unexpected, and so far not totally explained, results that male used Arabizi more than female. Another finding was that mixed Multilanguage in one script has been observed in this study. This paper has given an account to that variation in communication patterns in accordance with the variations in days and times. The result showed there were statistically significant differences in the volume of CMC between times of logging.

Findings have implication for the design of CMC applications and technologies. These findings suggest several courses of action for supporting the patterns observed in mixed-language usage in CMC by youth. Findings suggest a definite need for Bi-directional support and mixed mode in language use which is essential in the editing functionality of these CMC applications. In recent years technology applications have been introduced that support emerging patterns of language transformations such as Rosette Chat Translator for Arabic. Similar to the emergence of applications that automate the process of translating Arabizi to MSA, despite the resistance described in the literature for supporting Arabizi usage in CMC, opportunities for the development of applications that support the patterns of expressing English using Arabic scripts exist and can help support transforming casual dialog into formal MSA.

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