

Mobile Text Entry Challenges Among Low-Income Users in a Developing Country

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Motivation

Low-income users in developing regions face challenges in mobile text entry

- ❑ Mobile devices enter developing markets at a much-advanced stage
- ❑ Most text entry techniques are designed for wealthier markets
- ❑ Most text entry techniques are designed for the English language
- ❑ Most popular regional text entry techniques assume some knowledge of the Latin alphabet

An understanding of these users' needs, desires, expectations, and challenges with mobile text entry is essential to address the issue

Location

We conducted a survey in Dhaka, Bangladesh to investigate low-income mobile users' text entry challenges. Dhaka is

- ❑ The densest city of Bangladesh
- ❑ One of the fastest growing mobile markets in the world
- ❑ "Low-income" is the dominant income group in the country
- ❑ The country has a low educational attainment rate—literate people in the country can barely read and write their native language, Bengali

Low-Income

Low-income individuals are identified based on the World Bank criteria

- ❑ Individuals with a daily per capita income between US \$2 and \$10 (2015)
- ❑ All local amounts were converted to Purchasing Power Parity (PPP) dollars
- ❑ Did not consider "poor" (individuals living on US \$2 or less daily) since they typically do not possess the purchasing power to own a mobile device



Methodology

We recruited participants from the densest areas of the city

- ❑ Randomly approached potential volunteers at common gathering places
- ❑ Explained our survey to the ones that self-identified themselves as low-income
- ❑ Screened them for age, mobile phone ownership, and education
- ❑ Separated one from the crowd to conduct the survey in private

The survey used a semi-structured questionnaire

- ❑ It was carried out verbally, in Bengali
- ❑ All responses were recorded using a mobile phone or pen-and-paper
- ❑ Translated and transcribed to English for analysis

131 out of 643 users were considered for the final analysis after post screening

Participant Demographics

Age	N	%	Gender	N	%
19-29	104	79.39	Male	107	81.68
30-39	19	14.50	Female	24	18.32
40-49	6	4.58			
50 or above	2	1.53			
Education	N	%	Household Size	N	%
Primary	12	9.16	1-2	12	9.16
Junior	28	21.37	3-4	56	42.75
Secondary	28	21.37	5 or above	63	48.09
Higher-secondary	33	25.19			
Post-secondary	30	22.90			

Average Time Spent (Hours) Every Day in Mobile Text Entry Episodes

Age	Feature (Hour)	Smart (Hour)	Gender	Feature (Hour)	Smart (Hour)
19-29	1.47 (2.0)	1.33 (1.3)	Male	1.39 (1.9)	1.18 (1.2)
30-39	0.62 (0.9)	1.02 (0.7)	Female	0.71 (0.5)	1.68 (1.3)
40-49	0.81 (0.7)	NA			
50 or above	0.08 (NA)	0.5 (NA)			
Education	Feature (Hour)	Smart (Hour)	Household Size	Feature (Hour)	Smart (Hour)
Primary	1.1 (0.9)	1.5 (0.7)	1-2	1.62 (1.1)	1.29 (0.9)
Junior	1.24 (1.4)	0.77 (0.3)	3-4	1.18 (1.7)	1.41 (1.5)
Secondary	1.22 (2.5)	0.76 (0.6)	5 or above	1.3 (1.9)	1.17 (1.1)
Higher-secondary	1.39 (2.2)	1.06 (1.5)			
Post-secondary	1.28 (1.1)	1.9 (1.4)			

All values inside the brackets signify ± 1 standard deviation (SD)

Most Common Keypad and Keyboard Layouts and Text Entry Techniques

Keypad/Keyboard	Feature (%)	Smart (%)	Text Entry Technique	Feature (%)	Smart (%)
Qwerty	7.14	45.9	English Unambiguous (e.g., Qwerty)	7.14	70.49
Virtual Qwerty	7.14	37.7	English Ambiguous (e.g., Multi-tap)	60.01	8.2
Half-Qwerty	11.43	6.56	Bengali Unambiguous (e.g., UniBijoy)	NA	13.11
Virtual Half-Qwerty	1.43	NA	Bengali Ambiguous (e.g., Nokia Bangla)	27.14	1.64
12-Key	67.14	NA	Bengali Transcription (i.e., Mayabi)	5.71	6.56
Virtual 12-Key	5.71	9.84			

Languages and Writing Scripts Used in Mobile Text Entry

Text Entry Technique	Language				Writing Script			
	Feature		Smart		Feature		Smart	
	BN (%)	EN (%)	BN (%)	EN (%)	BN (%)	LN (%)	BN (%)	LN (%)
English Unambiguous	4.29	2.86	27.86	44.25	NA	7.14	NA	70.49
English Ambiguous	47.14	12.86	6.56	1.64	NA	60.01	NA	8.2
Bengali Unambiguous	NA	NA	9.84	3.28	NA	NA	13.11	NA
Bengali Ambiguous	21.43	5.71	1.64	NA	27.14	NA	1.64	NA
Bengali Transcription	5.71	NA	4.93	NA	5.71	NA	6.56	NA

"BN" signifies the Bengali language and script, "EN" signifies the combination of the English and the Bengali languages, and "LN" signifies the Latin script

User Reported Difficulties with Mobile Text Entry

Challenges	Feature (%)	Smart (%)
1. It takes too much time to input text	35.71	24.6
2. The technique is difficult to use	22.86	18.03
3. The layout is difficult to learn / the layout is poorly designed	21.43	14.75
4. I frequently make mistakes with the technique / the technique is unreliable	17.14	27.87
5. The technique is difficult to learn / it is difficult to learn all functionalities	15.71	9.84
6. The technique requires some knowledge of English / I would prefer inputting in Bengali / There is no efficient Bengali technique	15.71	21.31
7. No challenges	NA	1.64

"Technique" imply a text entry technique, "Layout" imply a keypad or a keyboard layout. The values do not add up to 100% as many complained about multiple aspects of their keypad, keyboard, text entry techniques

Key Findings

- ❑ Users use the native language but (forced to) write with the **Roman alphabet**
- ❑ Both feature and smartphone users feel existing text entry techniques are **difficult**
- ❑ The fact that some **knowledge of English** is necessary, even to use the local text entry techniques, frustrates them as it **compromises their entry speed and accuracy**
- ❑ The paper includes further details on low-income mobile users' text entry behaviors

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