

Technologies for User Experience Assessment in Chatbots: A Systematic Mapping Study - Technical Report

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Abstract

Many studies present and evaluate daily-use technologies ranging from information systems to conversational systems. Most recently, one of the technologies that have attracted the attention of researchers is chatbots through text or voice messages. In particular, User eXperience (UX) has been pointed out as one of the leading aspects of evaluation in chatbots. Therefore, this paper presents a Systematic Mapping Study investigating UX assessment technologies from the hedonic aspect of chatbots. We focused our investigation on studies with chatbots that are activated through text, although they may be able to display click interactions, videos, and images in addition to written text. We discovered 29 different technologies used to evaluate hedonic aspects of UX in chatbots, and the most frequent aspect found is trust.

Table 1. Year of publication: (a)2017; (b)2018; (c)2019; (d)2020; (e)2021.

Ref	(a)	(b)	(c)	(d)	(e)
[1]					x
[2]				x	
[3]		x			
[4]					x
[5]			x		
[6]			x		
[7]			x		
[8]					x
[9]			x		
[10]			x		
[11]					x
[12]					x
[13]		x			
[14]					x
[15]					x
[16]				x	
[17]				x	
[18]				x	
[19]					x
[20]				x	
[21]	x				
[22]					x
[23]				x	
[24]		x			
[25]					x
[26]					x

Table 2. Conferences: (a)CHI; (b)MobileHCI; (c)DIS; (d)CUI; (e)UMAP; (f)Nordichi; (g)MUM; (h)IUI;

Ref	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
[1]	x							
[2]								
[3]								
[4]								
[5]								x
[6]								
[7]	x							
[8]								
[9]							x	
[10]								
[11]								
[12]				x				
[13]			x					
[14]					x			
[15]			x					
[16]				x				
[17]								
[18]								
[19]	x							
[20]								
[21]								
[22]		x						
[23]						x		
[24]		x						
[25]	x							
[26]								

Table 3. (Continuation Table 2) (i)Interacción; (j)ICMI; (k)EAI; (l)CIKM; (m)CHluXiD; (n)CHIIR; (o)CHI EA;

Ref	(i)	(j)	(k)	(l)	(m)	(n)	(o)
[1]							
[2]		x					
[3]			x				
[4]							
[5]							
[6]						x	
[7]							
[8]							x
[9]							
[10]				x			
[11]							
[12]							
[13]							
[14]							
[15]							
[16]							
[17]							
[18]					x		
[19]							
[20]							
[21]	x						
[22]							
[23]							
[24]							
[25]							
[26]							

Table 4. Journals: (a)PACM; (b)MuC; (c)IEEE;

Ref	(a)	(b)	(c)
[1]			
[2]			
[3]			
[4]		x	
[5]			
[6]			
[7]			
[8]			
[9]			
[10]			
[11]	x		
[12]			
[13]			
[14]			
[15]			
[16]			
[17]	x		
[18]			
[19]			
[20]	x		
[21]			
[22]			
[23]			
[24]			
[25]			
[26]			x

Table 5. User Experience Aspects: (a)Interest; (b)Enjoyment; (c)Pressure; (d)Tension; (e)Effort; (f)Motivation; (g)Attractiveness;

Ref	Technology	(a)	(b)	(c)	(d)	(e)	(f)	(g)
[1]	P001_1	x	x	x	x	x		
	P001_2						x	
[2]	P002							x
[3]	P003		x					
[4]	P004							x
[5]	P005							
[6]	P006							
[7]	P007		x					
[8]	P008							
[9]	P009							x
[10]	P010	x						
[11]	P011_1							
	P011_2							
[12]	P012							
[13]	P013							
[14]	P014							
[15]	P015_1		x					
	P015_2							
[16]	P016							
[17]	P017_1							
	P017_2							
[18]	P018							
[19]	P019		x					
[20]	P020							
[21]	P021_1							
	P021_2	x						
	P021_3							
[22]	P022							x
[23]	P023							
[24]	P024							
[25]	P025							
[26]	P026							x

Table 6. (Continuation Table 5): (h)Efficiency; (i)Perspicuity; (j)Dependability; (k)Stimulation; (l)Novelty; (m)Attitude; (n) Trust;

Ref	Technology	(h)	(i)	(j)	(k)	(l)	(m)	(n)
[1]	P001_1							
	P001_2							
[2]	P002	x	x	x	x	x		
[3]	P003						x	x
[4]	P004	x	x	x	x	x		
[5]	P005							
[6]	P006							
[7]	P007							
[8]	P008							
[9]	P009	x	x	x	x	x		
[10]	P010							x
[11]	P011_1							x
	P011_2							
[12]	P012							
[13]	P013							
[14]	P014							x
[15]	P015_1							x
	P015_2							
[16]	P016							
[17]	P017_1							
	P017_2							
[18]	P018							
[19]	P019							
[20]	P020							
[21]	P021_1							
	P021_2							
	P021_3							
[22]	P022	x	x	x	x	x		
[23]	P023							
[24]	P024							
[25]	P025							x
[26]	P026	x	x	x	x	x		

Table 7. (Continuation Table 6): (o)Enjoyable; (p)Likeable; (q)General UX; (r)Privacy Intrusive; (s)Diversity; (t)Easy to Report; (u)Feedback;

Ref	Technology	(o)	(p)	(q)	(r)	(s)	(t)	(u)
[1]	P001_1							
	P001_2							
[2]	P002							
[3]	P003							
[4]	P004							
[5]	P005	x	x					
[6]	P006			x				
[7]	P007							
[8]	P008				x			
[9]	P009							
[10]	P010					x	x	x
[11]	P011_1							
	P011_2							
[12]	P012		x					
[13]	P013							
[14]	P014							
[15]	P015_1							
	P015_2			x				
[16]	P016							
[17]	P017_1							
	P017_2							
[18]	P018							
[19]	P019							
[20]	P020							
[21]	P021_1							
	P021_2							
	P021_3							
[22]	P022							
[23]	P023							
[24]	P024						x	
[25]	P025							
[26]	P026							

Table 8. (Continuation of Table 7): (v)Understanding; (w)Difficulty; (x)Expectation; (y)Intention to Use; (z)Engagement; (aa) Intimacy; (ab)Self-reflection;

Ref	Technology	(v)	(w)	(x)	(y)	(z)	(aa)	(ab)
[1]	P001_1							
	P001_2							
[2]	P002							
[3]	P003							
[4]	P004							
[5]	P005							
[6]	P006							
[7]	P007							
[8]	P008							
[9]	P009							
[10]	P010	x	x	x	x			
[11]	P011_1					x	x	x
	P011_2					x		
[12]	P012							
[13]	P013							
[14]	P014							
[15]	P015_1					x		
	P015_2							
[16]	P016							
[17]	P017_1							
	P017_2					x		
[18]	P018							
[19]	P019							
[20]	P020							
[21]	P021_1							
	P021_2							
	P021_3							
[22]	P022							
[23]	P023					x		
[24]	P024				x			
[25]	P025							
[26]	P026							

Table 9. (Continuation of Table 8): (ac) Selfawareness; (ad) Impressions; (ae) Fun; (af) Frustration; (ag) Psychological Well-being; (ah) Anxiety; (ai) Attention;

Ref	Technology	(ac)	(ad)	(ae)	(af)	(ag)	(ah)	(ai)
[1]	P001_1							
	P001_2							
[2]	P002							
[3]	P003							
[4]	P004							
[5]	P005							
[6]	P006							
[7]	P007							
[8]	P008							
[9]	P009							
[10]	P010							
[11]	P011_1	x						
	P011_2		x					
[12]	P012							
[13]	P013			x	x			
[14]	P014							
[15]	P015_1					x	x	x
	P015_2							
[16]	P016							
[17]	P017_1							
	P017_2							
[18]	P018							
[19]	P019							
[20]	P020							
[21]	P021_1						x	
	P021_2				x			
	P021_3							
[22]	P022							
[23]	P023							
[24]	P024			x				
[25]	P025							
[26]	P026							

Table 10. (Continuation of Table 9): (aj)Intention to Use; (ak)Adaptability; (al)Sociability; (am)Social Influence; (an)Social Presence; (ao) Interpretation; (ap)Psychological Impact;

Ref	Technology	(aj)	(ak)	(al)	(am)	(an)	(ao)	(ap)
[1]	P001_1							
	P001_2							
[2]	P002							
[3]	P003							
[4]	P004							
[5]	P005							
[6]	P006							
[7]	P007							
[8]	P008							
[9]	P009							
[10]	P010							
[11]	P011_1							
	P011_2							
[12]	P012							
[13]	P013							
[14]	P014							
[15]	P015_1	x	x	x	x	x	x	
	P015_2							x
[16]	P016							
[17]	P017_1							
	P017_2					x		
[18]	P018							
[19]	P019							
[20]	P020							
[21]	P021_1							
	P021_2							
	P021_3							
[22]	P022							
[23]	P023							
[24]	P024							
[25]	P025							
[26]	P026							

Table 11. (Continuation of Table 10):(aq)Perceptions of Social Disclosure; (ar)Revealing Emotional Expression; (as)Usefulness of Emotional Expression; (at)Naturalness; (au)Humanity; (av)Affection; (aw) Happiness;

Ref	Technology	(aq)	(ar)	(as)	(at)	(au)	(av)	(aw)
[1]	P001_1							
	P001_2							
[2]	P002							
[3]	P003							
[4]	P004							
[5]	P005							
[6]	P006							
[7]	P007							
[8]	P008							
[9]	P009							
[10]	P010							
[11]	P011_1							
	P011_2							
[12]	P012							
[13]	P013							
[14]	P014							
[15]	P015_1							
	P015_2	x						
[16]	P016		x	x	x			
[17]	P017_1							
	P017_2							
[18]	P018					x	x	
[19]	P019							
[20]	P020					x		
[21]	P021_1							x
	P021_2							
	P021_3							
[22]	P022							
[23]	P023							
[24]	P024							
[25]	P025							
[26]	P026							

Table 12. (Continuation of Table 11): (ax)Sadness; (ay)Anger; (az)Surprise; (ba)Tranquility; (bb)Vigor; (bc)Discomfort; (bd)Well-being;

Ref	Technology	(ax)	(ay)	(az)	(ba)	(bb)	(bc)	(bd)
[1]	P001_1							
	P001_2							
[2]	P002							
[3]	P003							
[4]	P004							
[5]	P005							
[6]	P006							
[7]	P007							
[8]	P008							
[9]	P009							
[10]	P010							
[11]	P011_1							
	P011_2							
[12]	P012							
[13]	P013							
[14]	P014							
[15]	P015_1							
	P015_2							
[16]	P016							
[17]	P017_1							
	P017_2							
[18]	P018							
[19]	P019							
[20]	P020							
[21]	P021_1	x	x	x	x	x		
	P021_2						x	x
	P021_3							
[22]	P022							
[23]	P023							
[24]	P024							
[25]	P025							
[26]	P026							

Table 13. (Continuation of Table 12): (be)Empathy; (bf)Privacy; (bg)Appreciation; (bh) Emotional Support; (bi)Emotion Perception; (bj)Expression of Emotion; (bk)Social Support;

Ref	Technology	(be)	(bf)	(bg)	(bh)	(bi)	(bj)	(bk)
[1]	P001_1							
	P001_2							
[2]	P002							
[3]	P003							
[4]	P004							
[5]	P005							
[6]	P006							
[7]	P007							
[8]	P008							
[9]	P009							
[10]	P010							
[11]	P011_1							
	P011_2							
[12]	P012							
[13]	P013							
[14]	P014							
[15]	P015_1							
	P015_2							
[16]	P016							
[17]	P017_1					x		
	P017_2		x				x	x
[18]	P018							
[19]	P019							
[20]	P020							
[21]	P021_1							
	P021_2							
	P021_3	x						
[22]	P022							
[23]	P023							
[24]	P024							
[25]	P025		x	x	x			
[26]	P026							

Table 14. (Continuation of Table 13): (bl) Commitment; (bm)Unmet Expectations;

Ref	Technology	(bl)	(bm)
[1]	P001_1		
	P001_2		
[2]	P002		
[3]	P003		
[4]	P004		
[5]	P005		
[6]	P006		
[7]	P007		
[8]	P008		
[9]	P009		
[10]	P010		
[11]	P011_1		
	P011_2		
[12]	P012		
[13]	P013		
[14]	P014		
[15]	P015_1		
	P015_2		
[16]	P016		
[17]	P017_1		
	P017_2	x	x
[18]	P018		
[19]	P019		
[20]	P020		
[21]	P021_1		
	P021_2		
	P021_3		
[22]	P022		
[23]	P023		
[24]	P024		
[25]	P025		
[26]	P026		

Table 15. Technologies Found: (a) Questionary created for the study; (b) Existent Questionary; (c) Interview Created for the study; (d) User Experience Questionarie; (e) Existing Interview; (f) User Experience Questionarie - Short; (g) ABCCT;

Ref	Technology	(a)	(b)	(c)	(d)	(e)	(f)	(g)
[1]	P001_1							
	P001_2							
[2]	P002						x	
[3]	P003	x						
[4]	P004						x	
[5]	P005			x				
[6]	P006		x					
[7]	P007							
[8]	P008		x					
[9]	P009				x			
[10]	P010	x						
[11]	P011_1		x					
	P011_2					x		
[12]	P012							
[13]	P013	x						
[14]	P014		x					
[15]	P015_1		x					
	P015_2					x		
[16]	P016	x						
[17]	P017_1			x				
	P017_2							x
[18]	P018	x						
[19]	P019		x					
[20]	P020	x						
[21]	P021_1							
	P021_2							
	P021_3							
[22]	P022				x			
[23]	P023			x				
[24]	P024	x						
[25]	P025			x				
[26]	P026				x			

Table 16.(Continuation Table 15): (h)AMS; (i)Big Five Inventory-2; (j)IMI; (k)IRI; (l)MIM; (m)USE; (n)VAS;

Ref	Technology	(h)	(i)	(j)	(k)	(l)	(m)	(n)
[1]	P001_1			x				
	P001_2	x						
[2]	P002							
[3]	P003							
[4]	P004							
[5]	P005							
[6]	P006							
[7]	P007						x	
[8]	P008							
[9]	P009							
[10]	P010							
[11]	P011_1							
	P011_2							
[12]	P012		x					
[13]	P013							
[14]	P014							
[15]	P015_1							
	P015_2							
[16]	P016							
[17]	P017_1							
	P017_2							
[18]	P018							
[19]	P019							
[20]	P020							
[21]	P021_1							x
	P021_2					x		
	P021_3				x			
[22]	P022							
[23]	P023							
[24]	P024							
[25]	P025							
[26]	P026							

Table 17. Technology specificity: (a)Specific; (b)Generic;

Ref	Technology	(a)	(b)
[1]	P001_1		x
	P001_2		x
[2]	P002		x
[3]	P003	x	
[4]	P004		x
[5]	P005		x
[6]	P006		x
[7]	P007		x
[8]	P008		x
[9]	P009		x
[10]	P010	x	
[11]	P011_1		x
	P011_2		x
[12]	P012		x
[13]	P013		x
[14]	P014		x
[15]	P015_1		x
	P015_2		x
[16]	P016	x	
[17]	P017_1	x	
	P017_2		x
[18]	P018		x
[19]	P019	x	
[20]	P020	x	
[21]	P021_1		x
	P021_2		x
	P021_3		x
[22]	P022		x
[23]	P023		x
[24]	P024	x	
[25]	P025	x	
[26]	P026		x

Table 8. Technologies created for the study: (a)Existent; (b)Created;

Ref	Technology	(a)	(b)
[1]	P001_1	x	
	P001_2	x	
[2]	P002	x	
[3]	P003		x
[4]	P004	x	
[5]	P005		x
[6]	P006	x	
[7]	P007	x	
[8]	P008	x	
[9]	P009	x	
[10]	P010		x
[11]	P011_1	x	
	P011_2	x	
[12]	P012	x	
[13]	P013		x
[14]	P014	x	
[15]	P015_1	x	
	P015_2	x	
[16]	P016		x
[17]	P017_1		x
	P017_2	x	
[18]	P018		x
[19]	P019	x	
[20]	P020		x
[21]	P021_1	x	
	P021_2	x	
	P021_3	x	
[22]	P022	x	
[23]	P023		x
[24]	P024		x
[25]	P025		x
[26]	P026	x	

Table 19. Collection of answers: (a)Likert 7 points; (b)Likert 6 points; (c)Likert 5 points; (d)Open Questions; (e) Likert 4 points; (f)Likert 10 points;

Ref	Technology	(a)	(b)	(c)	(d)	(e)	(f)
[1]	P001_1	x					
	P001_2	x					
[2]	P002	x					
[3]	P003		x				
[4]	P004						
[5]	P005			x			
[6]	P006	x					
[7]	P007			x			
[8]	P008	x					
[9]	P009	x					
[10]	P010	x					
[11]	P011_1	x					
	P011_2				x		
[12]	P012			x			
[13]	P013			x			
[14]	P014	x					
[15]	P015_1	x		x			
	P015_2				x		
[16]	P016	x					
[17]	P017_1				x		
	P017_2			x			
[18]	P018					x	
[19]	P019			x			
[20]	P020	x					
[21]	P021_1						x
	P021_2			x			
	P021_3			x			
[22]	P022	x					
[23]	P023				x		
[24]	P024			x			
[25]	P025				x		
[26]	P026	x					

Table 20. Type of the data:(a)Quantitative; (b)Qualitative; (c)Mixed;

Ref	Technology	(a)	(b)	(c)
[1]	P001_1	x		
	P001_2	x		
[2]	P002	x		
[3]	P003	x		
[4]	P004	x		
[5]	P005	x		
[6]	P006			x
[7]	P007	x		
[8]	P008	x		
[9]	P009	x		
[10]	P010	x		
[11]	P011_1	x		
	P011_2		x	
[12]	P012	x		
[13]	P013	x		
[14]	P014	x		
[15]	P015_1	x		
	P015_2		x	
[16]	P016	x		
[17]	P017_1		x	
	P017_2	x		
[18]	P018	x		
[19]	P019	x		
[20]	P020	x		
[21]	P021_1	x		
	P021_2	x		
	P021_3	x		
[22]	P022	x		
[23]	P023		x	
[24]	P024	x		
[25]	P025		x	
[26]	P026	x		

Table 21. Chatbots for specific groups: (a) Yes; (b)No;

Ref	Technology	(a)	(b)
[1]	P001_1		x
	P001_2	x	
[2]	P002		x
[3]	P003		x
[4]	P004	x	
[5]	P005		x
[6]	P006	x	
[7]	P007		x
[8]	P008		x
[9]	P009		x
[10]	P010		x
[11]	P011_1		x
	P011_2		x
[12]	P012		x
[13]	P013		x
[14]	P014		x
[15]	P015_1		x
	P015_2	x	
[16]	P016	x	
[17]	P017_1		x
	P017_2		x
[18]	P018		x
[19]	P019		x
[20]	P020		x
[21]	P021_1		x
	P021_2		x
	P021_3	x	
[22]	P022	x	
[23]	P023		
[24]	P024	x	
[25]	P025		
[26]	P026	x	

Table 22. Specific type of chatbot: (a) Yes, the chatbot is oriented to task; (b) Yes, the chatbot is oriented to conversations; (c) Yes, the chatbot is both oriented to conversation and task; (d) No;

Ref	(a)	(b)	(c)	(d)
[1]			x	
[2]		x		
[3]		x		
[4]			x	
[5]		x		
[6]			x	
[7]		x		
[8]		x		
[9]			x	
[10]			x	
[11]		x		
[12]		x		
[13]			x	
[14]		x		
[15]		x		
[16]		x		
[17]		x		
[18]		x		
[19]		x		
[20]		x		
[21]		x		
[22]			x	
[23]		x		
[24]			x	
[25]		x		
[26]		x		

Table 23. Empirical evaluation of the technology: (a)Yes; (b)No;

Ref	Technology	(a)	(b)
[1]	P001_1		x
	P001_2		x
[2]	P002		x
[3]	P003		x
[4]	P004		x
[5]	P005		x
[6]	P006		x
[7]	P007		x
[8]	P008		x
[9]	P009		x
[10]	P010		x
[11]	P011_1		x
	P011_2		x
[12]	P012		x
[13]	P013		x
[14]	P014		x
[15]	P015_1		x
	P015_2		x
[16]	P016		x
[17]	P017_1		x
	P017_2		x
[18]	P018		x
[19]	P019		x
[20]	P020		x
[21]	P021_1		x
	P021_2		x
	P021_3		x
[22]	P022		x
[23]	P023		x
[24]	P024		x
[25]	P025		x
[26]	P026		x

Table 14. Evaluation of the mental health: (a)Yes; (b)No;

Ref	(a)	(b)
[1]		x
[2]	x	
[3]	x	
[4]		x
[5]		x
[6]		x
[7]		x
[8]		x
[9]		x
[10]		x
[11]	x	
[12]		x
[13]		x
[14]		x
[15]	x	
[16]	x	
[17]	x	
[18]		x
[19]		x
[20]		x
[21]		x
[22]		x
[23]		x
[24]		x
[25]		x
[26]		x

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Table 2.