Exploring diversity perceptions in a community through a Q&A chatbot

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Diversity is widely discussed, we have seen much scholarly criticism.

Bardzell. (2010). Feminist HCI: taking stock and outlining an agenda for design. In *Proceedings of CHI2010.*

Costanza-Chock, S. (2020). *Design Justice: Community-led Practices to Build the Worlds We Need.*

Dankwa N.K., Draude C. (2021) Setting Diversity at the Core of HCI. In: *Universal Access in Human-Computer Interaction. Design Methods and User Experience*. HCII 2021. Lecture Notes in Computer Science, vol 12768.

Fletcher-Watson, S., De Jaegher, H., Van Dijk, J., Frauenberger, C., Magnée, M., & Ye, J. (2018). Diversity computing. In *Interactions*, 25(5), 28-33.

Himmelsbach, Schwarz, S., Gerdenitsch, C., Wais-Zechmann, B., Bobeth, J., & Tscheligi, M. (2019). Do We Care About Diversity in Human-Computer Interaction: A Comprehensive Content Analysis on Diversity Dimensions in Research. In *Proceedings of CHI2019.*

Keyes, O. (2019) Counting the Countless: Why Data Science is a Profound Threat for Queer People. In *Real Life Magazine.*

Matzner, T. (2019) The Human is Dead – Long Live the Algorithm! Human-Algorithmic Ensembles and Liberal Subjectivity. *Theory, Culture & Society*, 36(2):123–144

Schelenz, L.; Reinhardt, K.; and Gjuraij, D. (2019) WeNet Deliverable 9.1: Developing a Conceptual and Ethical Framework of Diversity.

What do we mean with diversity?
Beyond surface-level attributes: deep diversity

Harrison, D. A., Price, K. H., & Bell, M. P. (1998). Beyond Relational Demography: Time and the Effects of Surface- and Deep-level Diversity on Work Group Cohesion. Academy of Management Journal, 41(1), 96-107.

But, what are positive use-cases for diversity?

And, what do people actually expect from diversity? How do they perceive it?

Approach

We deployed a technology probe as a research instrument.

(Research through design)

Hutchinson, H., Mackay, W., Westerlund, B., Bederson, B. B., Druin, A., Plaisant, C., Beaudouin-Lafon, M., Conversy, S., Evans, H., Hansen, H., Roussel, N., & Eiderbäck, B. (2003). Technology Probes: Inspiring Design for and with Families. In *Proceedings of CHI2003.*
Zimmerman, J., Forlizzi, J., & Evenson, S. (2007). Research Through Design as a Method for Interaction Design Research in HCI. In *Proceedings CHI2007.*
Stappers, P. J., & Giaccardi, E. (2017). Research Through Design. In *The Encyclopedia of Human-Computer Interaction* (pp. 1-94). The Interaction Design Foundation.

Fully functional chat application – a Telegram chatbot.

Research questions

(Leading question)

RQ1: What do people expect from being presented with diversity? How do people interpret diversity in use?

(Contextual knowledge)

RQ2: How do people perceive a chatbot that connects community members through diversity attributes?

(Contextual knowledge)

RQ3: What do student communities ask from others through a chatbot?

Developing a Q&A chatbot

Q&A chatbot – a “light interface”

As a probe, enabled us to focus our research to the core

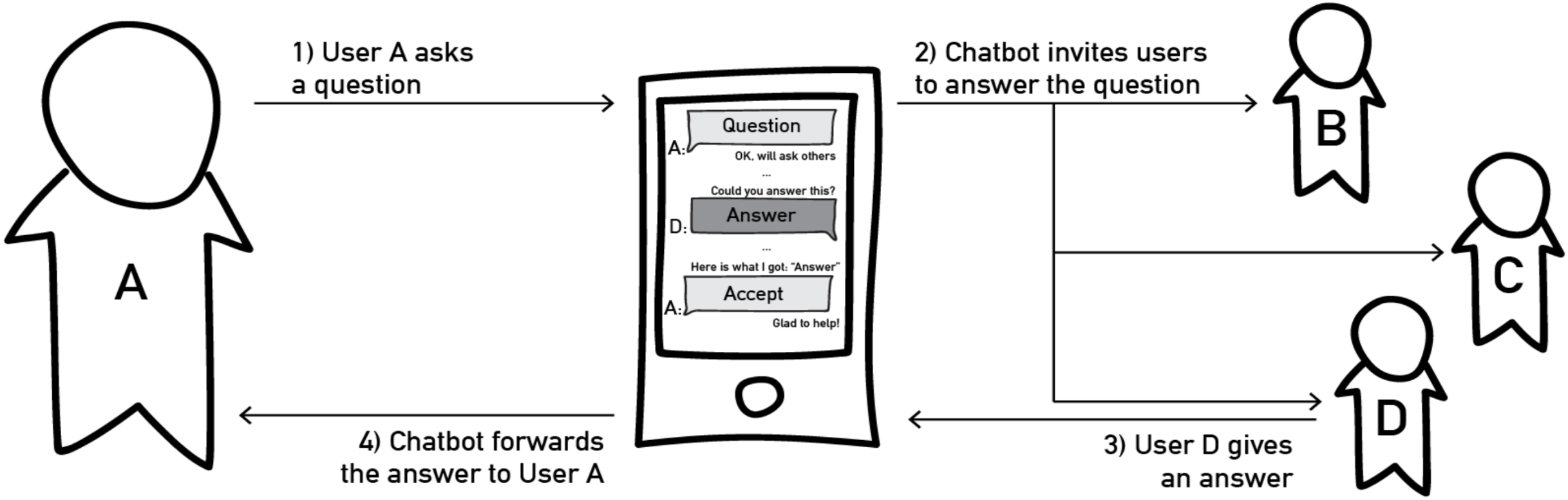
Q&A – simple interaction: asking questions, giving answers

Not a conversational agent, but a social recommendation system

Emphasize diversity in focus and copywriting

Klopfenstein, L.C., Delpriori, S., Malatini, S., Bogliolo, A.: The Rise of Bots: A Survey of Conversational Interfaces, Patterns, and Paradigms. In *Proceedings of DIS2017.* Conference on Designing Interactive Systems. pp. 555–565. DIS ’17Seering, J., Luria, M., Kaufman, G., Hammer, J.: Beyond Dyadic Interactions: Considering Chatbots as Community Members. (2009). In *Proceedings of CHI2019.*

User interaction



Method

Two pilot sites

Two weeks engagement with the chatbot in two pilot sites

N = 80 students participating overall

Total 669 questions asked and 2400 answers sent.

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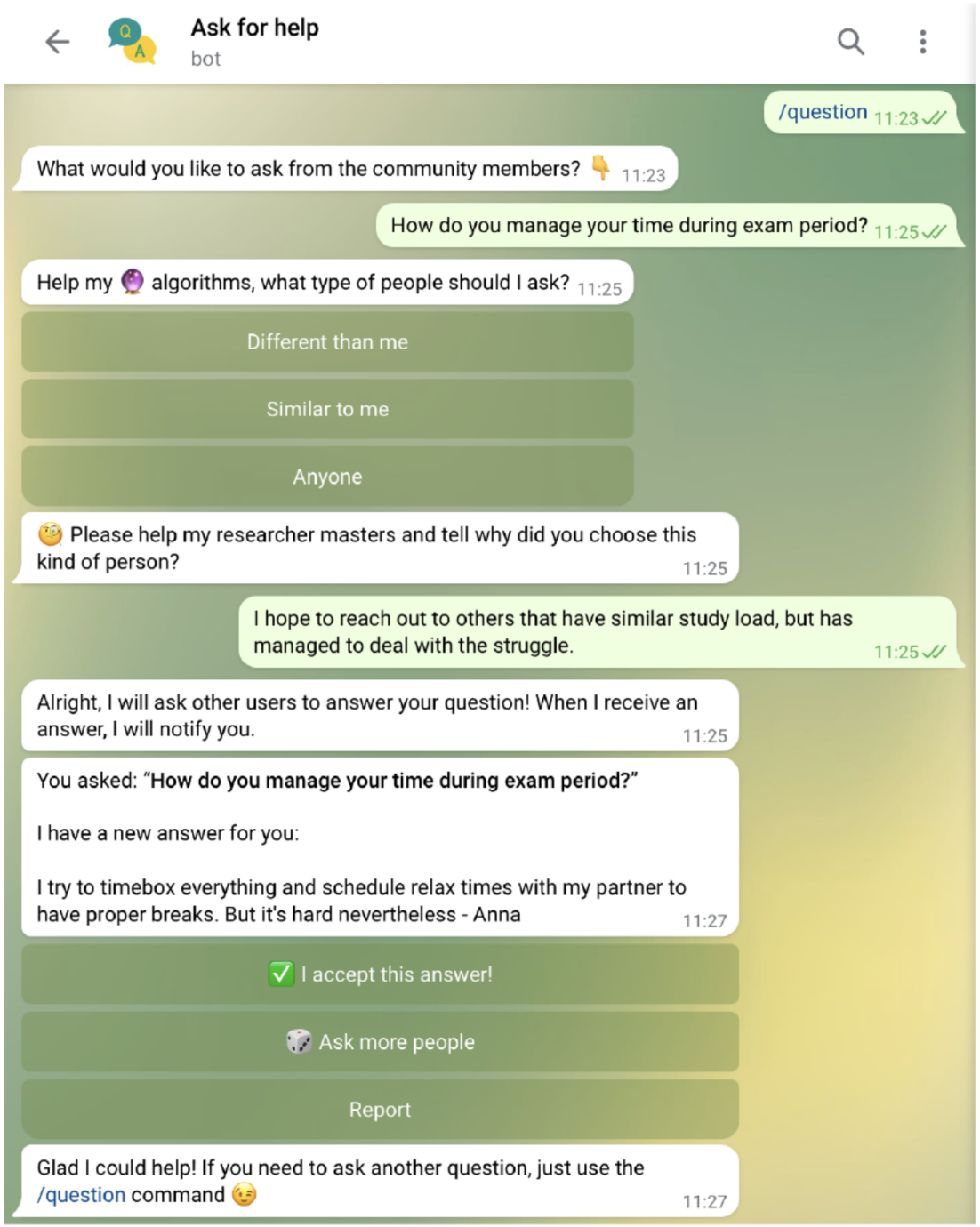
Overview



User asks a question.

#1 Research data collection prompt
User needs to select what kind of other users she would like to answer.

#2 Research data collection prompt
User needs to answer an open-ended question to give a rationale for her choice from the #1 prompt.

The chatbot forwards the question to other users.

User receives an answer that she can accept or request the chatbot to ask more people.

Data collection and analysis

Thematic analysis from the log files (what did people ask and what answers they gave)

In-conversation research prompts

Exit survey and UTAUT2 instrument (technology acceptance)

Focus group interviews for qualitative support of interpretation of the quantitative findings

Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. In *MIS Quarterly*.

Results

RQ3: What do student communities ask from others through a chatbot?

Question type	Example question	Pilot A	Pilot B
Information	*"Is the [park] open?"*	4%	4%
Community	*"Are you thinking of staying in [city] after graduating?*	54%	32%
Connection	*"Anyone interested in forming a study group?"*	0%	2%
Opinions and experiences	*What do you think about the vaccine delivery condition in [country]?*	14%	15%
Suggestion	*"Any fiction book recommendations?"*	22%	30%
Academic	*"Any tips for summer exams?"*	4%	14%
Personal or sensitive	*"Do you want to get married in the future? Do you want kids?"*	1%	3%
N		401	246

RQ2: How do people perceive a chatbot that connects community members through diversity attributes?

From a social networking perspective, the one-shot interaction is very uncommon, clearly a polarizing topic.

People liked it because enabled “more private”, “refreshing” not to engage in a longer conversation (eager to help someone, not to engage)

People minded it, because annoying and interruptive for “real conversations”

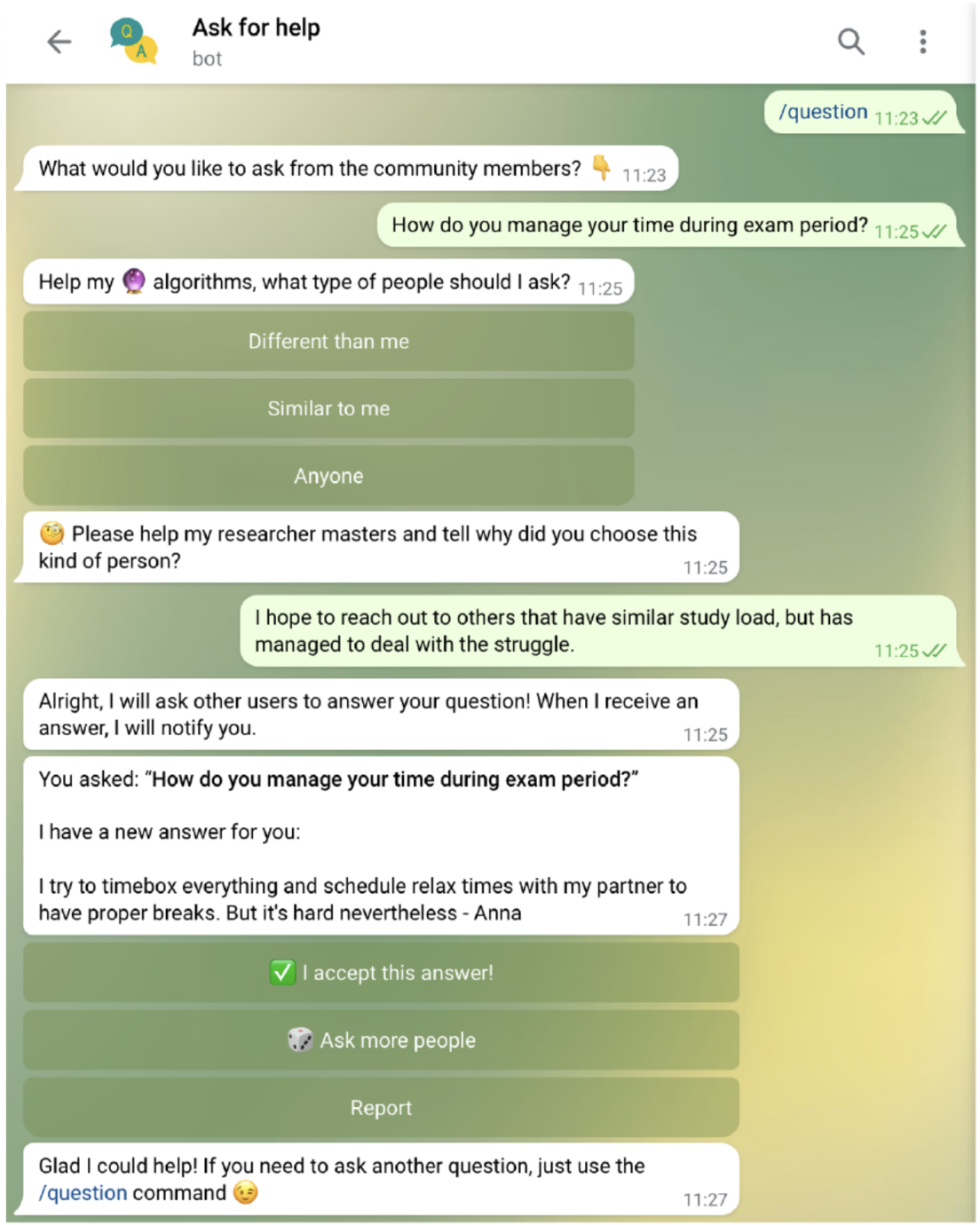
RQ1: What do people expect from being presented with diversity? How do people interpret diversity in use?

From the in-conversation research prompts

Content analysis of open-ended answers for prompts

“What type of people should I ask?”

Ask…	Pilot A	Pilot B
Anyone	72%	74%
Different to me	8%	11%
Similar to me	20%	14%
N	402	257



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RQ1: What do people expect from being presented with diversity? How do people interpret diversity in use?

Lots of “useless data” -->

Choosing anyone, giving generic answer

Qualitatively interesting when someone made a “polarized rationale”

Category	Example	Similar	Different	Anyone	N
Taste	*“Because they have the same taste hopefully” (similar)*	22	4	-	26
Life experience	*“Wanted to know if they had similar jobs like me” (similar)*	5	5	-	10
How are other humans?	*“Nice to get opinions that may differ from your own” (different)*	14	17	-	31
Curiosity	*“For curiosity” (different)*	14	11	26	51
Concrete needs	“Need a local” (different)	-	10	-	10
Meta - chatbot	*“Not sure what it means, not sure how you have profiled me” (anyone)*	-	-	35	35
Study reasons	*“Would like to hear the opinion of other master students at [uni]” (similar)*	28	-	-	28
Self-identity	*“I want to ask others who are into video games” (similar)*	12	-	-	12
No filtering	*“Want to get as many answers as possible” (anyone)*	-	-	218	218
Diverse + more	*“I want to hear different points of view” (anyone)*	-	-	70	70
N/A	*“Masters” (anyone)*	18	12	126	156
N		113	59	475	

Findings 

When exposed to a system that targets diversity,

People seek out to similar people, “their tribe” with niche interests.

When exposed to a system that targets diversity,

People seek out to different people driven by curiosity and serendipity

(and not necessarily people with opposing views, as we expected)

Diversity-aware systems need user profiling. This is paradoxical with not wanting to normatively profile how people are different.

Future work 

Next version of the chatbot implements a diversity-driven algorithm based on the findings.

Instead of a randomized algorithm, resembling wizard-of-oz.

Next version of the chatbot is an improved version based on the findings of this study.

Among these are user profiles with attributes for the algorithm, user agency in guiding the algorithmic matchmaking, asking sensitive or anonymous questions, etc.

Next study with the chatbot takes place with five pilot sites around the globe.

Including global south cultures, such as Paraguay and Mongolia.

Thank you! Questions?

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