Chatbot-assisted Community Analysis

Bachelor Thesis

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Overview

Introduction
- Motivation
- Thesis Goals

State of the Art
- Social Bots
- Success in Communities of Practice

Concept
- Use Case

Realization

Evaluation
- Requirements of the community
- Final Evaluation

The Rise of online CoPs

- World Wide Web is a place to meet and exchange information easily
- Researches transformed Communities of Practice into online Communities of Practice (CoPs)
  - World-wide collaboration
  - Fast, effortless, information exchange
  - Community Information Systems (CIS) help structure their work
- A CoP is only sustainable, if members continuously provide innovation efforts [Renzel et al., 2015]
- Therefore members need to be aware of their successes and failures to
  - Predict future challenges and opportunities
  - Ensure the survival of the CoP

Measuring Success

- Success of CoP relies on success factors
- It is difficult to measure and evaluate those factors
  - Factors are changing over time [Renzel, 2016]
  - Domain-specific success factors
  - Less resources in long-tail communities
  - Time consuming
- Traditional success modeling systems automate success evaluation
  - Complicated interfaces
  - Not optimized for collaboration
  - Do not take mobile context into consideration [Renzel, 2016]

Chat platforms

Social Networks and chat platforms are used for information exchange

- Intuitive to use
- Familiar to most users
- Real-time collaboration
- Optimized for hand-held devices

Thesis Goals

- Design a chatbot for success modeling and visualizations for a CIS
  - Simplify the success modeling and visualization process
- Find out how the bot affects collaboration and success awareness of the community

Social Bots and Chatbots

Definition

"A social bot is a computer algorithm that automatically produces content and interacts with humans on social media, . . ." [Ferrara et al., 2016]

- Provide better user experience, compared to traditional interfaces
- Engage users in human-like conversations and are therefore more intuitive to use

Communities of Practice

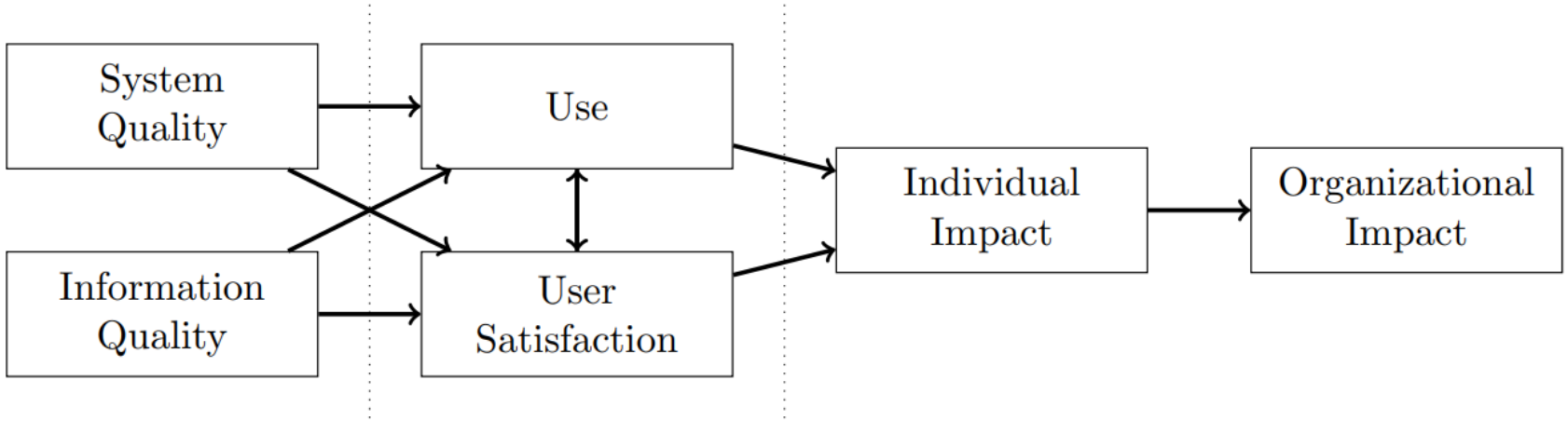
Definition

"Communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly." [Wenger, 1998]

- Learner is actively participating in the work of the community
  - Naturally gains knowledge in the domain
- CoPs make the learning process easier and faster [Cummings and van Zee, 2005]

Success of a CoP

- CoPs use Community Information Systems (CIS) to structure their work
- Success of a Community Information System **CIS** is formalized through a *Success Model*
- Success model is **distinct** for each community



CIS Success Model by DeLone and McLean [DeLone and McLean, 1992]

MobSOS

- Monitors las2peer services [Renzel, 2016]
  - MobSOS Data Processing
  - MobSOS Success Modeling
- MobSOS Continuous Community Analytics [Kersjes, 2020]
  - REST API
  - GraphQL API
  - Provides visualizations of MobSOS data
  - Ability to dynamically add databases

Mensa Communities

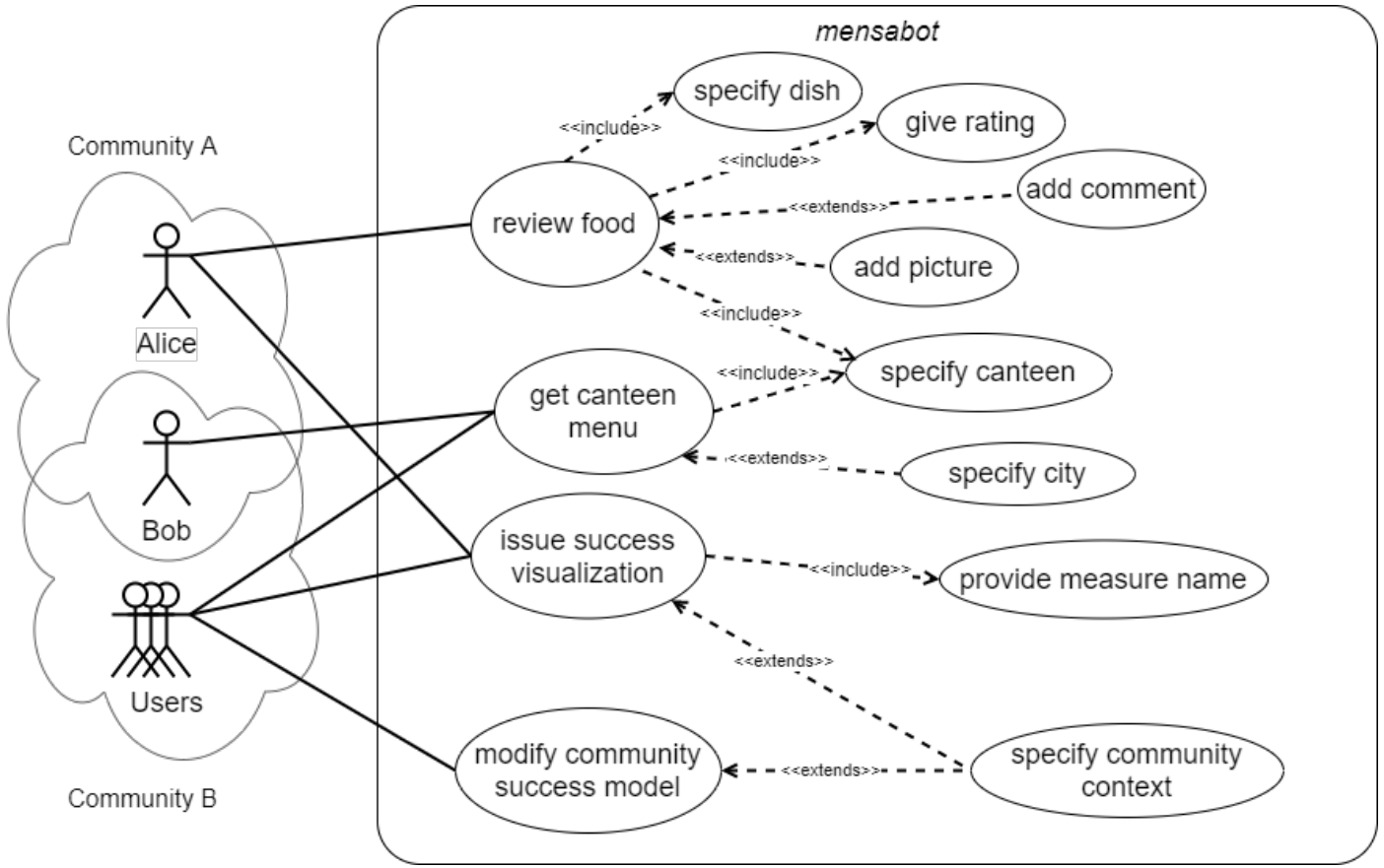
- Community of people frequently visiting the mensa
- Community consists of students and university employees
- Similar to the concept of Community of Practice

Concept

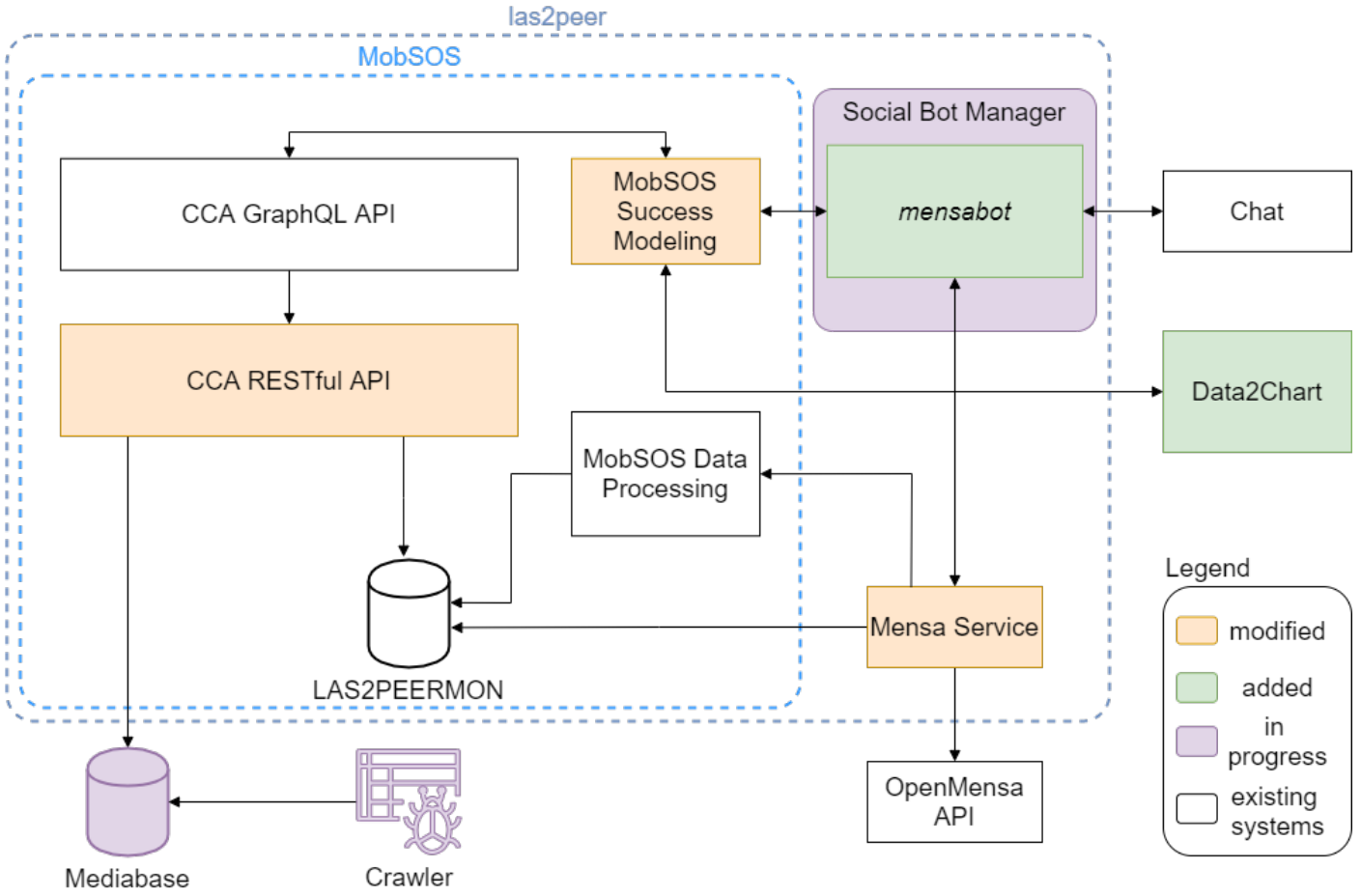
mensabot

For this community a chatbot called *mensabot* is designed, which can be used to

- Get the menu for a canteen
- Rate meals
- Query success visualizations designed by the community
- Modify the success model of the community



Realization

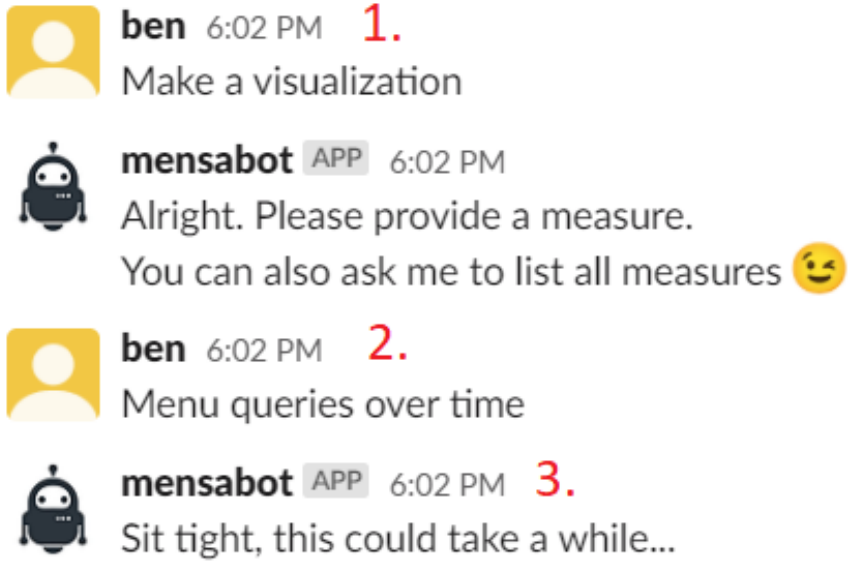


Overview of the different components

Technologies:

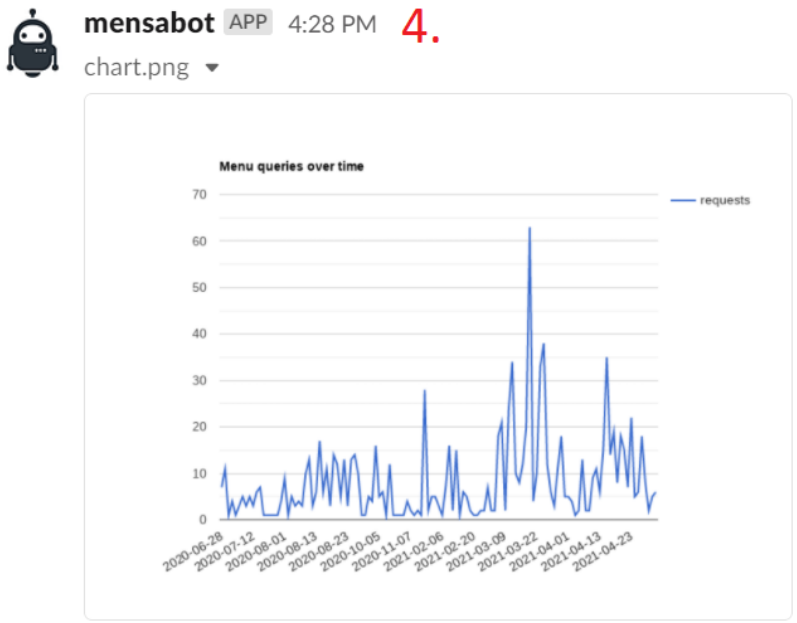
- Chat Platform (Slack)
- las2peer
- Social Bot Manager
- Mensa Service
- MobSOS
  - MobSOS CCA GraphQL API
  - MobSOS CCA REST API
  - MobSOS Data Processing
  - MobSOS Success Modeling
- Mediabase
  - Crawler

Example of a visualization request



1. Intent visualization is recognized
   - Visualization routine is triggered
2. User message is passed to success modeling service
3. Success modeling service prepares the visualization
   - Extract the measure from the catalog
   - CCA GraphQL request for data
   - Data2Chart request to generate chart

Example of a visualization request



4. Resulting chart is sent back to the bot manager
   Bot displays the chart in the chat

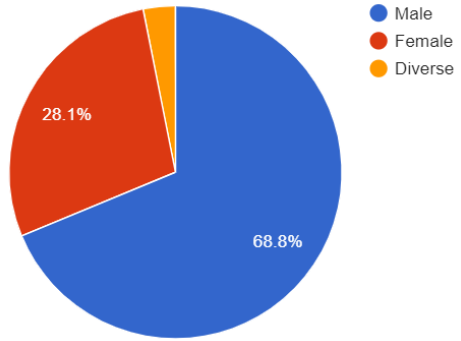
Research Questions

1. How does the use of chatbots affect the success awareness of the community?
2. How does it affect collaboration between members?

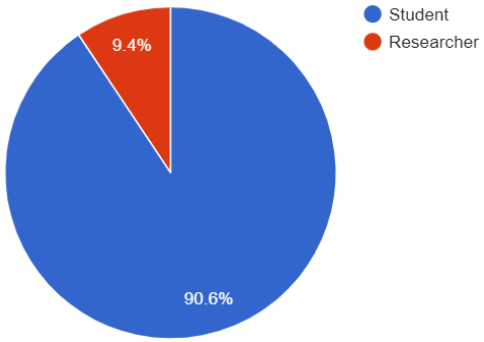
The requirements of the community

- We conducted a survey to figure out the requirements of the community
- 38 participants completed the survey
- Participants were asked to rank success factors based on perceived relevance
- Success model contains the most popular success factors

Gender of participants



Role of participants

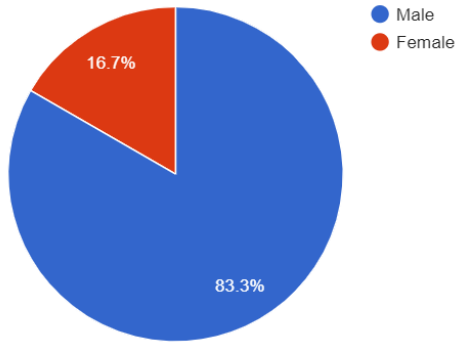


Final Evaluation

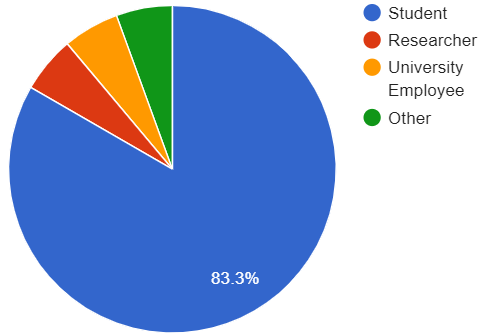
Overall we had 20 participants. Six participants from the first survey also took part in the final evaluation
Tasks:

- Get the menu for a canteen
- Make a review
- Visualize a success measure from the success model
- Get the success model
- Update the success model

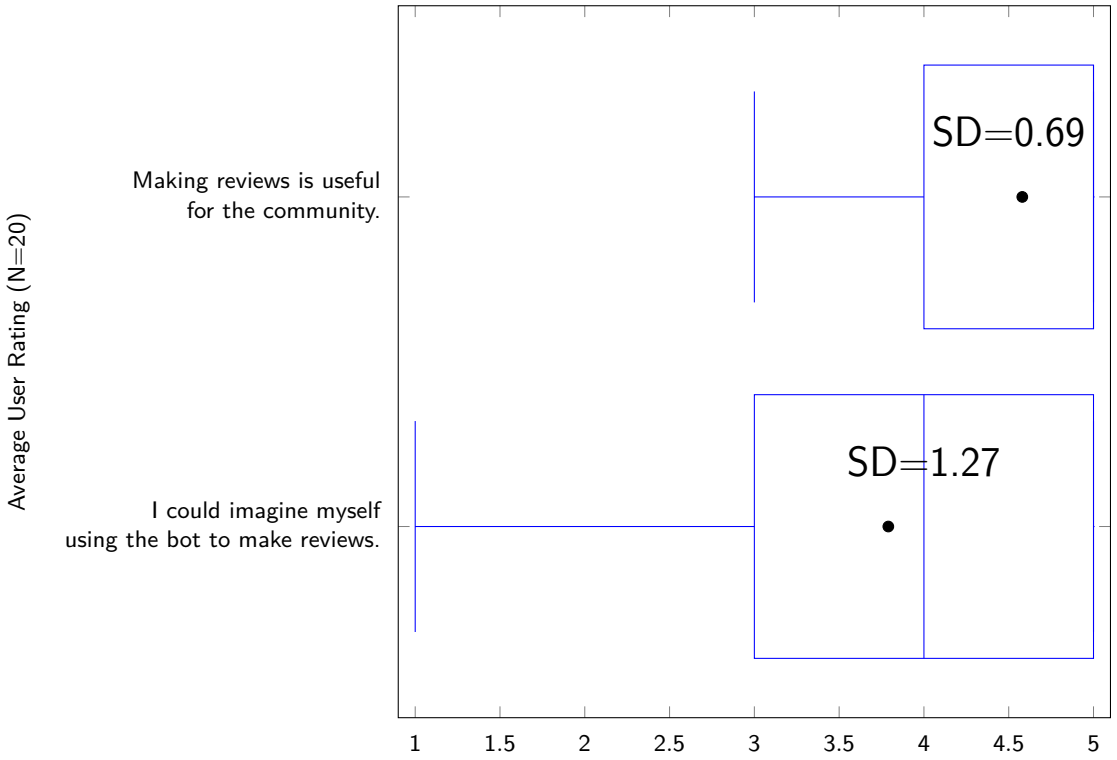
Gender of participants



Role of participants

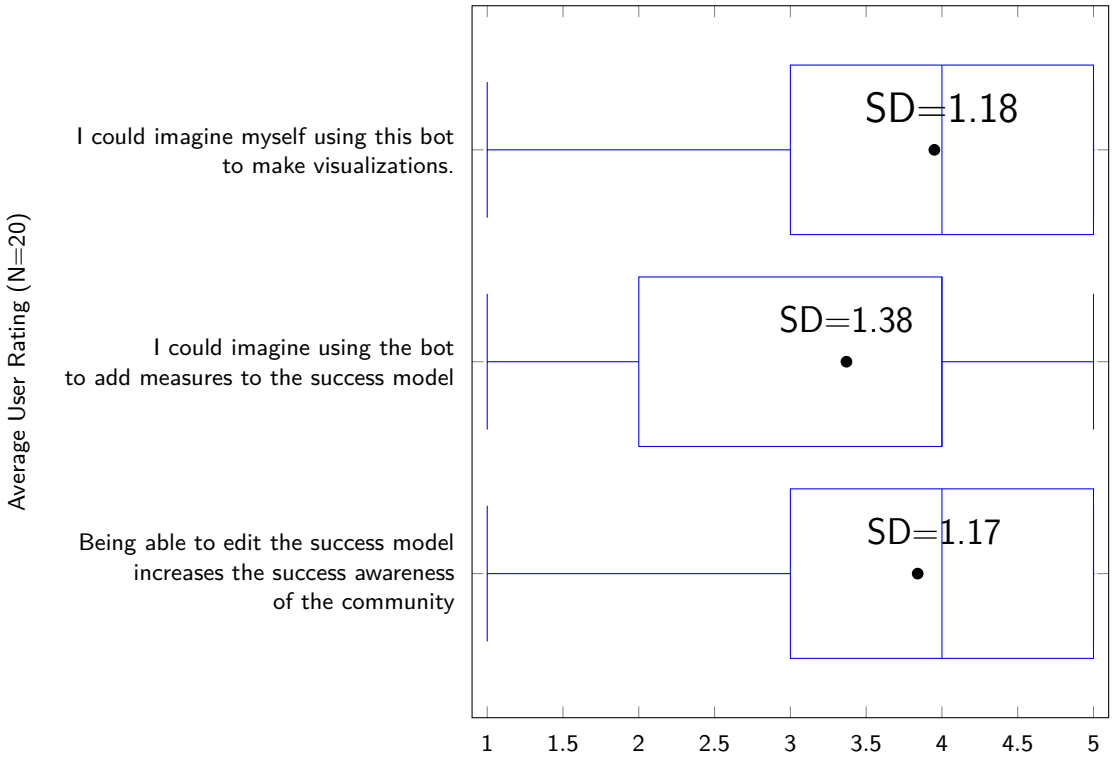


Evaluation of community service



- Participants are aware of the importance of contributions
- But: are less inclined to contribute themselves
- Confirms participation inequality in the community [Nielsen, 2006]
- Participants suggested that contributing without receiving anything in return was not attractive to them.

Evaluation of success modeling service



- Visualizations were intuitive to participants
- However: Participants wished to get more information about measures
- The success model itself seemed not very intuitive to users
  - Provide general information of the meaning of elements in the success model
- Overall, both success modeling and visualizations were well received

Conclusion

- Chatbot was evaluated using the System Usability Scale (SUS)
  - SUS score of 71.7 **Good**
- Overall, the chatbot is useful for simple tasks
- Chatbot increases the success awareness in the community
- Most community members are aware that contributions help the community
- However, they are less inclined to contribute to the community themselves
- We need to introduce incentives to increase contributions

Conclusion

Possible Solutions:

1. Make contributions easier [Nielsen, 2006]
   - Simplify the review process
2. Nudge users to contribute
   - If user asked for the menu, ask if they want to add a review
3. Introduce *Gamification*
   - Periodic visualization of Top contributors
   - Collect points for making reviews
   - Special bot functionalities could be unlocked at a certain level e.g.
     - Recommendations for canteens
     - Alerts if a certain dish is served

Conclusion

Thank you for listening! Any questions?

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