Effects of Prompt Explicitness in a Voice Interface

Greta M. Jenkins
Thomas Gibbons, Research Advisor
Department of Computer Information Systems, The College of St. Scholastica, Duluth, MN

Background

- Study investigates interactions between a user and the Amazon Echo (Alexa) Voice User Interface (VUI)
- VUI prominence grows each year & it continues to trend toward natural dialogue
- Ambiguity of VUI often causes confusion and frustration in user
- Five usability goals a system should achieve: learnability, memorability, efficiency, lower error rate, and satisfaction[1]

Objectives

- Find the optimal methods to expand capabilities of voice systems in order to increase user satisfaction as well as natural dialogue
- Benefit the user in daily tasks and information retrieval

Research Questions

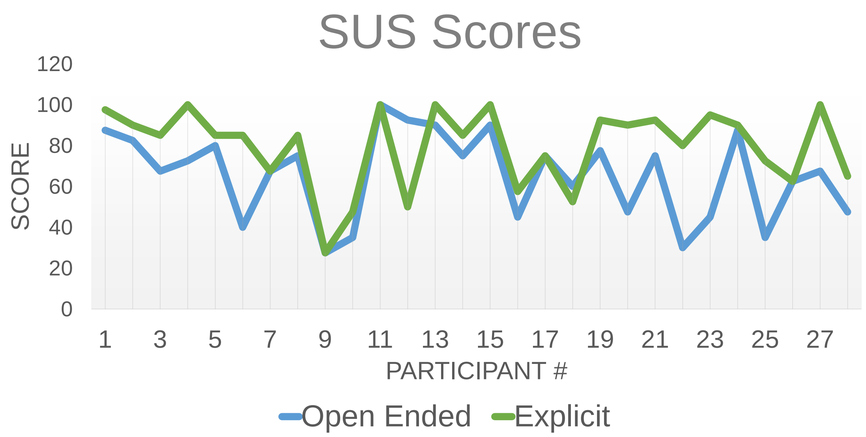
- What are the effects of interface explicitness on usability?
- Do broad or explicit VUIs elicit higher usability ratings?
- Which interface is more natural?

References
[1] Nielsen, J. (1994). Usability engineering. Elsevier.
[2] Affairs, A. S. (2013, September 06). System Usability Scale (SUS). Retrieved July 03, 2017, from https://www.usability.gov/how-to-and-tools/methods/system-usability-scale.html

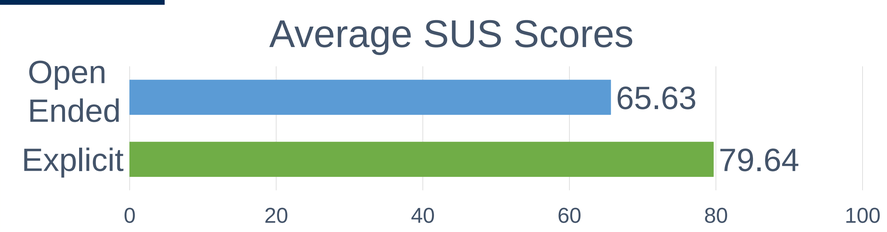
Methodology

- Use Amazon's Alexa Skills Kit (ASK), CloudWatch logs, and Lambda Management Console on Amazon Web Services (AWS) to develop 2 new VUIs with differing levels of prompt explicitness
- College student's, staff, and faculty volunteered to participate
- Half of the participants interacted with the explicit interface first in an effort to eliminate bias from the formation of any mental schemas
- System Usability Survey (SUS) used to assess interface usability[2]
- Participants answered additional question regarding familiarity with gymnastics

Data



Results



Analysis

- Participants found explicit directives easier to navigate
  "Knowing what options are available is easier for the user than trying to guess what might be available" (Participant 19).
- Many participants asked questions in open ended navigation to launch more explicit dialogue directives
- Explicit interfaces are more efficient but elicit less natural interactions
- "Test 1 [open ended] felt more like talking to a real person" (Participant 12).
- Some degree of explicitness still required in open ended & natural dialogue i.e. informing the user that they can ask questions to learn more
- Familiarity with content had no effect on interface usability scores

Future Research

- Measure impact of familiarity with Alexa and with program content
- Study other factors that affect efficiency of VUI navigation
- Effects of implementing a tutorial stage
- Effects of an option to bypass explicit prompting for open ended prompting
- Would cognitive load detection technology increase user satisfaction by adjusting the prompt style accordingly?

Acknowledgements
Thank you to the Clare Boothe Luce Foundation for supporting this research.