

4.6 Experiment Design

by

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Interface Use Description	The VUI we prototype serves to help people get information about their flight status by calling when they have no access to the internet.
Possible Key Questions	<ol style="list-style-type: none">1. Is the VUI trajectory too long for the users to stay patient until the end of the whole dialogue flow?2. <u>Is it better to ask the users to provide one piece of information at a time or multiple?</u>3. Is it better to allow users to use their keypad when they interact with the VUI system?
Chosen Key Question	Question 2. Is it better to ask the users to provide one piece of information at a time or multiple?
Hypothesis	Asking the users to provide multiple pieces of information at once (and ask for any missing information as needed) is a more time-efficient system design compared to asking the users to provide one piece of information at a time.
Independent Variables	Independent variables: <u>the number of pieces of information a user is asked to provide within a single question</u> by the VUI system. We can conduct the experiments by asking the questions designed in our original Dialogue Flow altogether at once, and see if more iterations of Q&A are needed because of incomplete information in the users' response.
Dependent Variables	The dependent variable is <u>the expected time a user needs to obtain the information he/she needs</u> . It is a measure of efficiency of the system.
Instrumentation	The quantitative data to measure the dependent variable (i.e. the expected time a user needs to obtain the info he/she needs) is the <u>number of nodes in the flow graph a user walks to before reaching a goal answer</u> . We assume the cost of walking each edge is one unit.
Survey Questions	<ol style="list-style-type: none">1. We will be collecting the cost of reaching a goal state as explained in the instrumentation part.2. We will be asking users the following questions at the end of both tasks.<ol style="list-style-type: none">a. On a scale of 1 - 5, how do you like answering multiple questions at once?b. How many words should a question consist of for the best comprehension?

Control & Random Variables	<p>Control variables: the <u>specific information</u>(e.g. security check status of an airport) of a <u>specific flight</u>(e.g. flight number and time) the user is asking for. We control these because we want to compare what ways of designing our VUI system allow the users to reach the same answer they need more efficiently. Changing what a user asks for will not lead to a valid result. Inshort, we control the desired final answer.</p> <p>Random variables: The <u>actual phrases that a user uses</u> to interact with the system and trigger each node before reaching the final answer. We keep these as random variables since the actual utterances of the user shouldn't affect the experiment result.</p>
Within subjects or between subjects	<p>We will perform a <u>within subjects experiment</u> since we want to compare two ways of asking questions by the VUI system for the same user to obtain the same information. We need to control the subject to compare which way of asking questions is more efficient.</p>
Tasks	<p>The participants are expected to take part in two short interactive sessions with our system and answer a short survey at the end. Each of the two interactive sessions will take 3-4 minutes and the survey will take 1 minute.</p> <p>In both of the interactive sessions, the user needs to complete the same task of acquiring the needed information about a flight as described in the given prompt. In the first session, the user will be asked to provide multiple pieces of information at once to retrieve the needed information. In the second interactive session, the users will be asked to provide one piece of information each time so as to reach the needed answer.</p>
Task Script	<p>"We'll be running a usability test with you on the same task under two different designs of our VUI system. We'll give you a prompt on a specific information of a specific flight that you need to obtain by calling our system. You'll be interacting with two different designs of our system to complete the same task of acquiring the needed information as described in the prompt in two 3-4 min sessions. After the sessions, we'll be having a 1-min brief interview on your experience of interacting with our different system designs."</p>