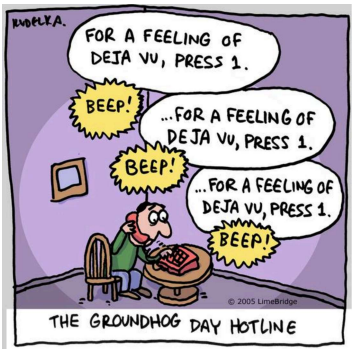
KATHRYN SADLER

Conversational AI | Voice Tech | Experience Design

NOTE: *I created this page in early 2014—prior to the release of smart speakers—when I was pivoting across to UX Design, so the content subsequently centres around VUI design for IVRs. My aim was to explain voice user interface design to hiring managers and to illustrate the parallels with user experience design.*
I've left it unchanged for posterity!

What is Voice User Interface (VUI) Design?



VUI design is the design of the interaction between users and a computer system such as an IVR (Interactive Voice Response system), where the primary interface is audio input and output.

- The user's input can be via speech recognition or touchtone (DTMF) input via a phone keypad.
- The output is either a human voice from pre-recorded sound files (recorded by a voice talent to simulate natural conversation), or using computer generated TTS (text-to-speech).

IVRs can be either speech-enabled or DTMF-enabled.

It can be more difficult to design speech-enabled IVRs, as the voice prompts played by the system need to clearly indicate to users what their options are. This is done using well-designed prompt wording, intonation and emphasis when recording the prompt and minimising cognitive load on the user by keeping prompts clear and concise.

Like User Experience Design, it's useful to have a psychology and/or linguistics background in order to have the right mindset for the human-computer interaction.

Common Design Methodologies

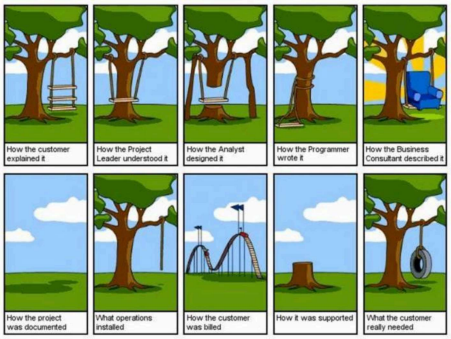
There's **significant** crossover between the methodologies applied during the VUI Design process and those required for User Experience Design:

- **Requirements Gathering/Analysis**
- **User Research**
- **Persona Design**
- **Information Architecture**
- **User Flows**
- **Content Strategy**
- **Stakeholder workshops**
- **Usability Testing**

VUI Design Process

Requirements Gathering/Analysis

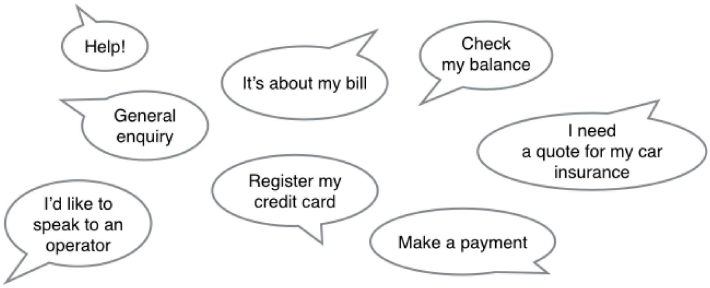
The VUI design process begins with high-level workshops between the design team, customer stakeholders and development team to determine and/or discuss the key requirements of the IVR, such as what information needs to be collected from the user, prompt wording preferences, error handling, back-end interactions, routing, etc.



User Research

Prior to design of an 'open dialogue' system, where callers are asked an open-ended question such as "*How can I help you today?*", an utterance collection would be performed. This involves recording a substantial number of users, then transcribing their utterances so that the data can be analysed in text format. This data can subsequently be used to identify most common queries, types of language used, etc.

Use cases may also be created during the high-level design phase to better understand users' different interactions with the system.



Persona Design

In VUI design, the 'persona' is generally the persona of the system. A detailed persona of the 'voice' of the system may be created in such a way that users can better identify with the system they call, and also so that customer service representatives can be more accepting of the system.

> Vodafone Australia developed the virtual persona 'Lara' for their speech IVRs back in 2005.
> Lara's persona was developed through input from their contact centre agents - she lived in Sydney, drove a VW Beetle, etc.

Information Architecture

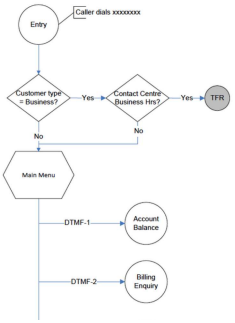
To assist with the design of an 'open dialogue' system, where the user is asked an open-ended question when they first enter the IVR, a matrix of every initial enquiry type and the subsequent options to be presented is created in Microsoft Excel. This is a 'disambiguation matrix'.

User Flows

IVR Call Flows are detailed diagrams illustrating the flow of the user's call through the system, which are created once the requirements have been clarified and refined.

The call flow design process can start out as high-level sketches for review with the development team to ensure that the initial design is feasible. Flow chart diagrams are then created using Microsoft Visio.

Unlike digital design, this is the only visual representation of the system design, so it's important to ensure that all menu options and potential paths through the system are covered.



Call Flow example

Content Strategy

One of the most important aspects of the VUI design process is the dialogue design process - writing system prompts which are in the correct tone (to reflect the company's brand), but which are also concise and clear enough that users can easily determine what is being asked of them. The VUI designer creates the wording of every prompt that a user may hear.

It's also important to consider the order and amount of options presented to users, in order to minimise cognitive load.

Grammar Development

The VUI designer may also be required to create grammar files that are used to provide examples of user utterances for each intent.

Speech-enabled IVRs generally use grxml grammar files to listen out for keywords

from the caller, which the system then matches to a particular option, i.e. "find out my account balance", "I've got a question about my bill".
It's important to ensure that grammars capture a broad range of anticipated user utterances, ideally based on customer data.

```
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      <item>
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      <item>
        <tag>OFF</tag>
        <one-of>
          <item> off </item>
          <item> turn off </item>
        </one-of>
```

Grammar example

Stakeholder Workshops

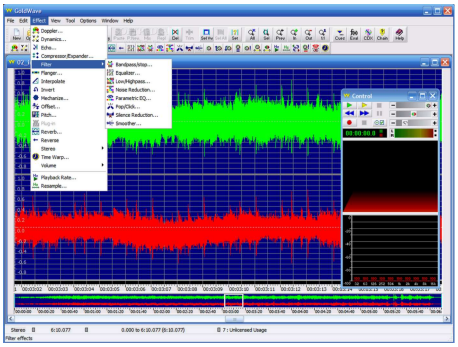
Once the call flow and dialogue design has been created, the design is walked through with key customer stakeholders to ensure that everyone involved is in agreement before continuing.

Usability Testing

Test participants are recruited according to specific demographic requirements to ensure a range of feedback. Participants are provided with pre-planned scenarios to complete using the IVR prototype and observed to determine the efficiency and effectiveness of the prompts and call flow design. This ensures that the system is easy to navigate and will hopefully catch any points of confusion early on. The results of usability testing is fed back into improvements in the design.

Voice Recordings

Once the prompt wording has been finalised, this is professionally recorded in a studio by a voice talent. The VUI designer creates a list of all of the prompts in a format that can be quickly and easily read by the voice talent, with instructions for any specific pronunciation or intonation requirements. The final recordings are then thoroughly QA'd and edited before being loaded into the system.



Development -> System Testing -> Deployment

When the final design is signed off by the customer, the IVR is built by the development team, unit tested, system tested and handed over to the customer for their user acceptance testing before deployment.

Final thoughts

Similar to the design of many everyday items, most people don’t think about how phone systems are created, but as with UX design, a **lot** of planning and consideration goes into designing an IVR.

IVR projects I’ve worked on

A handful of the IVR applications that I've designed and/or updated include:

- Optus "Open Dialogue" call routing
- Optus self-service IVRs (PIN change, SIM replacement, Account Balance, etc.)
- Optus Store Locator
- Vodafone Prepaid Recharge
- Vodafone Prepaid Account Balance
- Vodafone Postpaid Account Balance
- Vodafone Credit Card Capture (PCI compliant)