

Education, Training and Mentoring for Voice User Interface Designers

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Voice User Interface (VUI) design, while a necessary and important skill for industrial settings, presents a significant challenge to students and other potential designers who wish to pursue formal educational experiences. Because the required knowledge-base spans traditional academic boundaries and the set of experienced professionals is relatively small, most would-be designers need to take a highly individualized and self-directed approach to creating their own curriculum and finding advanced training and mentoring opportunities. In this brief review, we discuss the relevant knowledge and skills required by the field to assist young designers with identifying appropriate education, training, and mentoring.

Formal Education

Communication is one of our most complex and sophisticated skills. As a result, different academic fields have viewed communication through very different philosophical lenses and tried to understand it better through vastly different methods. When communication is undertaken by a machine, additional academic disciplines are implicated to understand the internal workings of technology and sophisticated interaction between technology's capabilities and the over-learned, automatic skills of the user. Thus, the best curriculum for a potential VUI designer is one that helps instill a fundamental knowledge of human communication and social behavior, then supplements this knowledge with other specialized knowledge specific to working in industry. In short, the ideal curriculum is diverse and multidisciplinary.

In the table below, we offer topics that may be offered within typical university departments, courses, and programs that collectively make up the foundational knowledge required by VUI design. Depending on the university, some topics and courses may appear in other departments than the ones listed here; flexibility is the key to creating a curriculum that meets all the requirements of a VUI designer's role.

Academic Department	Sample Course Listings	Relevant Topics
<ul style="list-style-type: none">• Cognitive Science and Psychology (other behavioral disciplines may also have appropriate coursework in social interaction, cultural issues and communication behavior, such as Anthropology, Sociology, and Philosophy)	<ul style="list-style-type: none">• Cognitive psychology• Social psychology• Social cognition• Methods• Human Factors/Human-Computer Interaction	<ul style="list-style-type: none">• Person perception• Impression management• Schema theory• Automatic cognitive processed• Memory• Personality• Social uses of language• Experimental design• Statistical methods for the behavioral sciences

Academic Department	Sample Course Listings	Relevant Topics
<ul style="list-style-type: none"> ▪ Linguistics 	<ul style="list-style-type: none"> ▪ Introduction to linguistics ▪ Sociolinguistics ▪ Psycholinguistics 	<ul style="list-style-type: none"> ▪ Phonology ▪ Lexicon ▪ Semantics ▪ Syntax ▪ Pragmatics ▪ Conversation (Discourse Processing) ▪ Dialectal and accent variation (regional and social) ▪ Language variation
<ul style="list-style-type: none"> ▪ English, Theater and Communication 	<ul style="list-style-type: none"> ▪ Creative writing ▪ Screenwriting/scriptwriting ▪ Technical writing ▪ Public speaking ▪ Mass communication ▪ Interpersonal communication 	<ul style="list-style-type: none"> ▪ Writing for spoken dialogue ▪ Technical documentation practice ▪ New media ▪ Conversational behavior between interactants
<ul style="list-style-type: none"> ▪ Business 	<ul style="list-style-type: none"> ▪ Marketing 	<ul style="list-style-type: none"> ▪ Brand marketing ▪ Customer segmentation ▪ Services marketing ▪ e-service
<ul style="list-style-type: none"> ▪ Computer Science 		<ul style="list-style-type: none"> ▪ VoiceXML, X+V ▪ SALT ▪ Speech recognition basics ▪ Grammar design ▪ Databases ▪ Call center and telephony technology
<ul style="list-style-type: none"> ▪ Communication Sciences and Disorders 	<ul style="list-style-type: none"> ▪ Phonetics/phonology ▪ Speech science 	<ul style="list-style-type: none"> ▪ Acoustics (psychoacoustics) ▪ Audio editing ▪ Phonemes and transcription ▪ Speech perception ▪ Overview of voice, fluency, articulation, and receptive/ expressive language

For starting VUI designers, a bachelor degree provides sufficient background to obtain a position in a small niche company that specializes in speech technology application development, a large multi-technology company, or other companies that have their own in-house design teams. Advanced degrees help provide a candidate with greater knowledge of human behavior, evaluation design and measurement techniques to design effective usability testing, and/or advanced technical skills, as well as the maturity and self-control necessary to effectively communicate with clients and colleagues. The Ph.D. is intended to provide students with the ability to think critically about and advance knowledge in their specific field, according to accepted methodologies (i.e., quantitative or qualitative); thus, a

doctorate (or similarly but to a lesser degree a Master) prepares the student to conduct applied research and guide knowledge development in the field.

As indicated, most universities don't offer a single major or department program in VUI design. However, higher education is beginning to offer educational programs or individual courses that help prepare students for industry. Institutions with programs and research labs that focus on VUI design include: Auburn University (Juan Gilbert), Stanford University (Cliff Nass), Portland State (Jim Larson), and Johns Hopkins. Additional coursework is also offered at Ulster University (Ireland), Tufts (Kotelly), University of Texas at Dallas, and Cambridge (UK).

Professional Training

Similar to the existing state of formal education in VUI design, additional professional training opportunities tend to be in the form of individual courses offered through training companies like Enterprise Interaction Group (EIG) and the annual SpeechTEK conference, as well as vendors such as Nuance, angel.com, and Intervoice. Comprehensive training in the recommended topics noted above is not currently being offered within the industry.

Informal Learning

Reading is another method of advancing your own knowledge to prepare for a VUI design position. Books across a wide variety of fields can offer substantial background to both the new and experienced VUI designer. Examples of popular titles that a VUI designer should consider reading are listed on the Association of Voice Interaction Design (AVIXD) website.

In addition, there is a wealth of information in academic texts, journals, and industry magazines that may be applied to VUI design, including publications in the fields of multimedia design, interpersonal and mass communication, services marketing, social psychology, linguistics, auditory (sound) design and production, acoustics, speech perception, usability and user engineering, and voice talent development. However, the reader should be aware that much research is not applied and may not appear to specifically speak to the practical concerns of a designer in a project. However, a deep understanding of human behavior and the various perspectives on it will be instrumental in helping a VUI designer explain, describe, and prioritize their work tasks appropriately.

Mentoring

Perhaps the most important method of getting training is by seeking out mentoring experiences with a senior VUI design professional. However, because the field attracts individuals with a wide range of background preparation, it is important to understand a mentor's specific strength within VUI design (e.g., technical implementation, human behavior, scriptwriting, usability testing), as well as his/her limitations. For most relatively inexperienced designers, mentoring will often center on appropriately justifying a design with clients, collaborating with peers with different (and often conflicting)

perspectives, and effectively using compromise without destroying the effectiveness or pleasantness of a VUI design. One of the most important skills of a VUI designer is the diplomatic skill of negotiating a design with a customer. Here, mentoring is an effective method of developing this skill. In addition, mentoring may be used to provide young designers with specific skills that they have not had formal education, training, or experience in executing (e.g., voice talent coaching, prompt writing techniques, design documentation, usability evaluation, etc.).

On-the-job training

Particularly, when it comes to learning how design decisions impact application performance, one way of learning is by analyzing live application data, both by conducting a usability study, listening to whole-call recordings and doing a grammar performance analysis with transcribed utterances. Observing or listening to how a caller is confused by the pacing or wording in a prompt, or seeing what variety of responses callers can come up with, is quite eye-opening and has a lasting impact. Another worthwhile development activity for young designers is to prepare and diagram a script for recording. This task would allow a designer to think through the specific points of vocal presentation, including the desired use of pitch, pausing, pace and emphasis to achieve a specific tone and/or elicit correct user responses. Then, actually coaching a voice talent through the prepared script (or several talents) will provide clearer understanding of how to specifically direct talents of different levels of self-awareness and skill in adjusting their presentation style. Finally, other early instructional tasks may include review and preparation of use cases, client reports, and UI presentations.