

# Chapter 12

## Development of an Interactive Narrative for Adult Literacy Learners

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### ABSTRACT

*This chapter describes development efforts that build upon the Interactive Strategy Trainer for Active Reading and Thinking-2 (iSTART-2), an intelligent tutoring system that provides self-explanation strategy instruction to improve reading comprehension. The chapter reflects on considerations of the unique needs of adult literacy learners, and outlines the specific guidelines followed to adapt the system to these learners. Several modifications have been made to adapt iSTART to adult learners, including the following: 1) two additional strategy instructional modules for summarization and deep question asking, 2) a text library with life-relevant texts for adult learners, and 3) an interactive narrative which allows instantiated practice of reading strategies using life-relevant artifacts. The authors also describe results from two attitudinal studies examining learners' perceptions of the interactive narrative.*

### INTRODUCTION

Approximately one in six, or 36 million adults, in the United States struggle with basic literacy skills (NCES, 2016). However, little research focuses on the educational needs of adult literacy learners and few educational technologies exist to meet those needs. The project described in this chapter seeks to contribute to the understanding of the educational needs of adult literacy learners and investigate the

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efficacy of an intelligent tutoring system in supporting the development of reading skills with these end-users. More precisely, this chapter reports on a work-in-progress that builds upon the Interactive Strategy Trainer for Active Reading and Thinking-2 (iSTART-2), an intelligent tutoring system that provides self-explanation strategy instruction to improve reading comprehension. Throughout the development of the modified iSTART-2 system, the unique needs of the adult literacy learner population were carefully deliberated. The chapter reflects on this process and outlines the specific guidelines followed to adapt the system to these learners.

iSTART-2 provides self-explanation strategy training as well as varied practice generating self-explanations with automated feedback driven by natural language processing (NLP). Developed for high school students, the original iSTART improved self-explanation skills and performance on reading comprehension measures (McNamara, O'Reilly, Best, & Ozuru, 2006). The comprehension strategies that students learn within the newer iSTART-2 (e.g., comprehension monitoring, paraphrasing, bridging inferencing, elaborating) are appropriate and effective for a wide range of readers, and thus, are expected to be effective for adult learners. To further optimize iSTART-2 for adults with low literacy skills, several modifications and supplements have been developed. These changes include additional strategy modules on summarization and question asking, as well as a new interactive narrative (or “choose your own adventure” story) called *Lost in Springdale*, which affords additional opportunities for reading comprehension practice with varied authentic content.

In developing the narrative, several design guidelines and recommendations were followed to address the unique needs of adults who read below functional literacy levels, which is defined as below an eighth-grade level. Pronunciation scaffolding and auditory presentations are incorporated because this population exhibits phonological awareness, decoding, and fluency deficits (Greenberg, Ehri, & Perin, 1997; 2002; Kruidenier, 2002; Nanda, Greenberg, & Morris, 2010). Because learners are motivated by instruction that holds personal significance, media that are life-relevant to adult readers are included (e.g., news stories, instructional manuals, emails; personal health; Lesgold & Welch-Ross, 2012; Guthrie et al., 1996). Additionally, by making the storyline adaptive to learner decisions, the consequences of poor reading comprehension are simulated in a realistic context, yet without any actual threats to their livelihood.

## **Objectives of the Chapter**

The primary objectives of this chapter are to examine the unique educational needs of adult literacy learners and describe specific modifications made to iSTART-2 to address those needs. The chapter describes several system adaptations made to suit the characteristics of this population. One of the central foci of the chapter is on the design and development of a newly instantiated practice module, an interactive narrative, *Lost in Springdale*, and results from two attitudinal studies to assess college students' and adult learners' perceptions of this interactive narrative. The chapter begins with a look at the limited research available on adult literacy learners and educational programs.

## **BACKGROUND ON ADULT LITERACY**

According to the National Assessment of Adult Literacy (NAAL; <http://nces.ed.gov/naal>), which surveyed 19,000 adults in the United States, 14% scored below the basic level, demonstrating an inability

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