**CAPITAL Passages Grant Proposal**

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According to the American Library Association, 14% of adults in the United States cannot “search, comprehend, and use continuous texts” [1]. Current government and philanthropic funding only indirectly helps 10% of these nearly 30 million individuals. There is therefore a significant opportunity for the development of technology to help improve literacy rates. The goal of the Comprehension and Pronunciation Instructional Tools for Adult Learners (CAPITAL) project is to make high quality learning resources accessible to users of all literacy levels. The project aims to automatically create exercises based on instructor specified parameters that will help users improve their reading skills. CAPITAL Passages aims to educate those adults with some basic literacy skills who are still working with a literacy program on passage comprehension skills.

**Project Summary**

CAPITAL Passages will include two main products—a web interface to generate questions and a student smart phone application. The process will begin with a website where program instructors can compile reading passages for students. Comprehension questions will be generated automatically for each passage from an algorithm that identifies the most important concepts in a passage. The passage will be parsed using the Stanford NLP Parser, and the generated parse trees will be searched for specific patterns using Tregex and manipulated using Tsurgeon to change sentences into questions which will be stored in a SQL database. From there, the students will receive the practice passages and questions via an HTML5 smartphone app. This way, students with many different types of phones can be reached as well as those who can access a computer. The system will then incorporate a preexisting platform, ReMIND, that utilizes the spacing method to test students on material they did not understand at pre-determined, ideal time intervals throughout their use of the app.

**Intellectual Merit**

This system hopes to improve upon existing but inadequate fact-based question-generation technologies. Current fact questions only test facts reached in one sentence and do not test passage comprehension as a whole. Our system will determine which facts of a passage are related, such as by a common subject, and craft questions that require knowledge and comprehension of more than just one sentence in the passage. Linking facts about subjects in a passage poses great challenges, as it is difficult to determine which facts are important and even more difficult to formulate intelligible questions from a list of facts. However, it is important to explore this area of question generation to ensure true reading comprehension. This technique is new, innovative, and will provide a greatly expanded way to test reading comprehension.

**Broader Impacts**

Illiteracy is an epidemic that greatly affects the lives of more than 30 million individuals. It prevents them from obtaining employment, severely limits the types of jobs they can work, increases the chances their children will be illiterate, and limits their ability to effectively function in many facets of society. Although a few classroom-based education options are available for some low-literacy adults, CAPITAL is designed to help the many illiterate Americans who are unable to take advantage of these limited options. Moving outside of the traditional classroom is key to reach these learners—many of whom work multiple jobs with strange hours and cannot commit to a classroom based learning system. With a smartphone app, they can work on exercises on the bus, at home, and whenever they have free time. And, with automatic question generation creating limitless exercises, CAPITAL Passages has the opportunity to provide a learning environment that makes a difference for millions.

[1] ”Outreach Resources for Services to Adult New and NonReaders.” American Library Association, n.d. Web. 13 Nov. 2014.