

Development of ACTIV 1.0 through Design Research: Innovative Form of Learning for Students with Various Abilities and Needs

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Introduction

Increase in video use in general education classrooms by virtue of new video streaming sources (e.g., *Discovery Education Unitedstreaming*)

Need for new evidence-based strategies to ensure high quality content-based academic education for students with disabilities, including those with intellectual disabilities

Too complex or age inappropriate technology-based products for content instruction for older students with intellectual disabilities

Exploration

Review of existing research on interactive video-based instruction, including anchored instruction (AI), which is effectively used to present academic content to all students

Meta-analysis of existing research on video-based instruction, including modeling and self-modeling, used for teaching functional, social, and behavioral skills to students with intellectual disabilities

Review of strategies and adaptations used to support students with various abilities and needs, including closed captioning, highlighting text, picture symbols, visual cues, enhanced interactivity

Qualitative study conducted with teachers of students with intellectual disabilities to explore their experiences and perceptions of using video for teaching academic skills to students with intellectual disabilities

Major findings/themes included:

- Video – not a panacea; Enhancement of instruction, not replacement
- Video must be short, purposeful, understandable, age and developmentally appropriate.

Enactment

Initial single-case research study

- 11 students with intellectual disabilities from the Mason LIFE Program
- 5 male, 6 female
- 19-25 years of age
- IQ ranging from 40-72
- Combined design (multiple baseline; alternating treatments; ABAC)

Major results included:

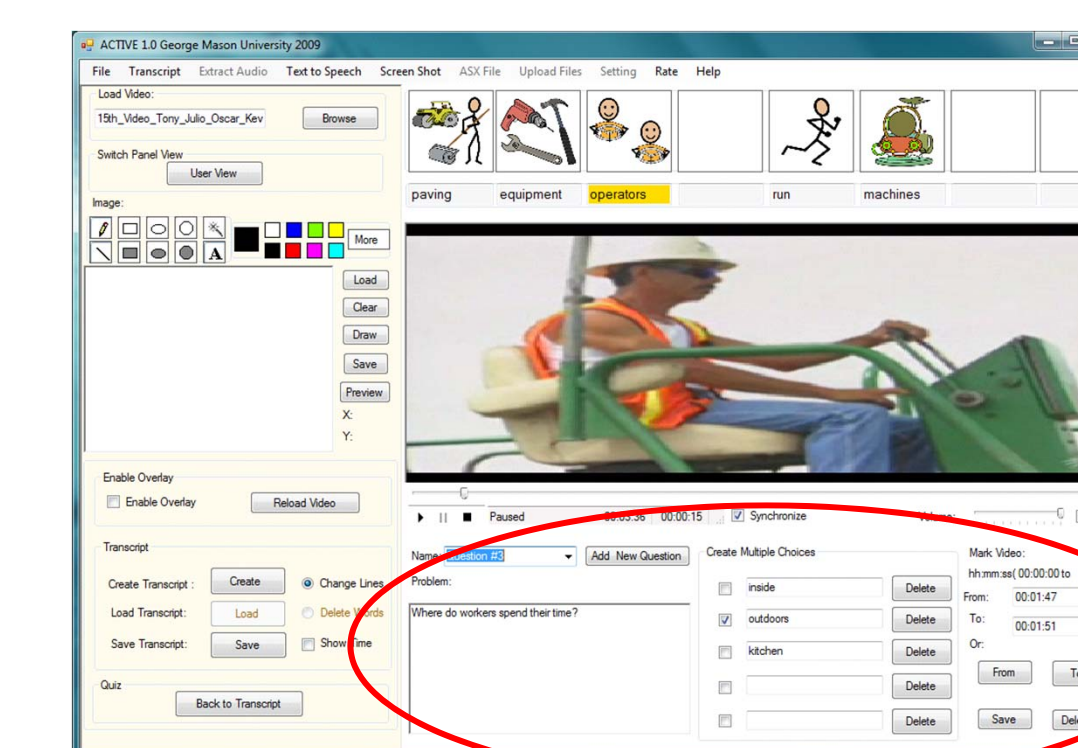
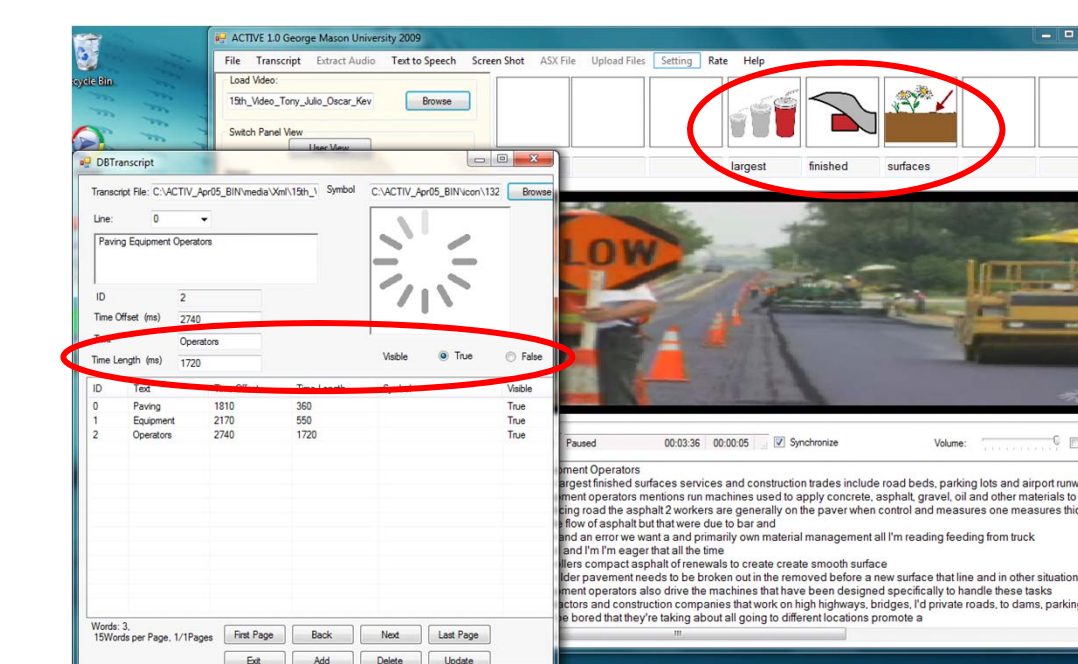
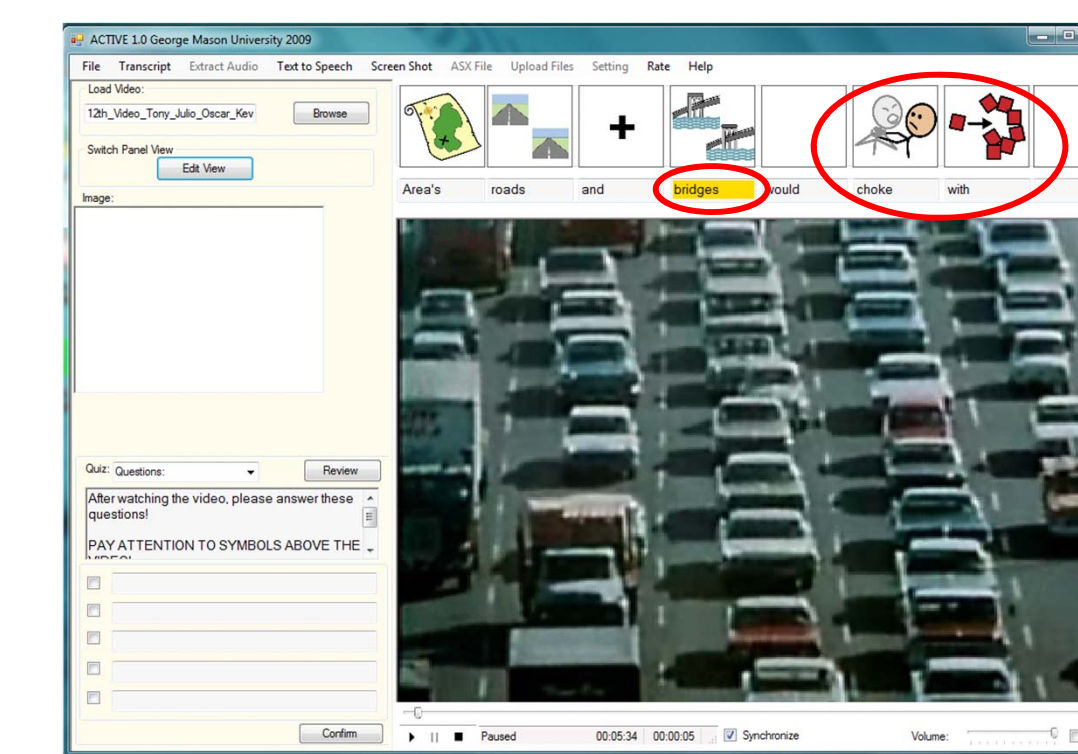
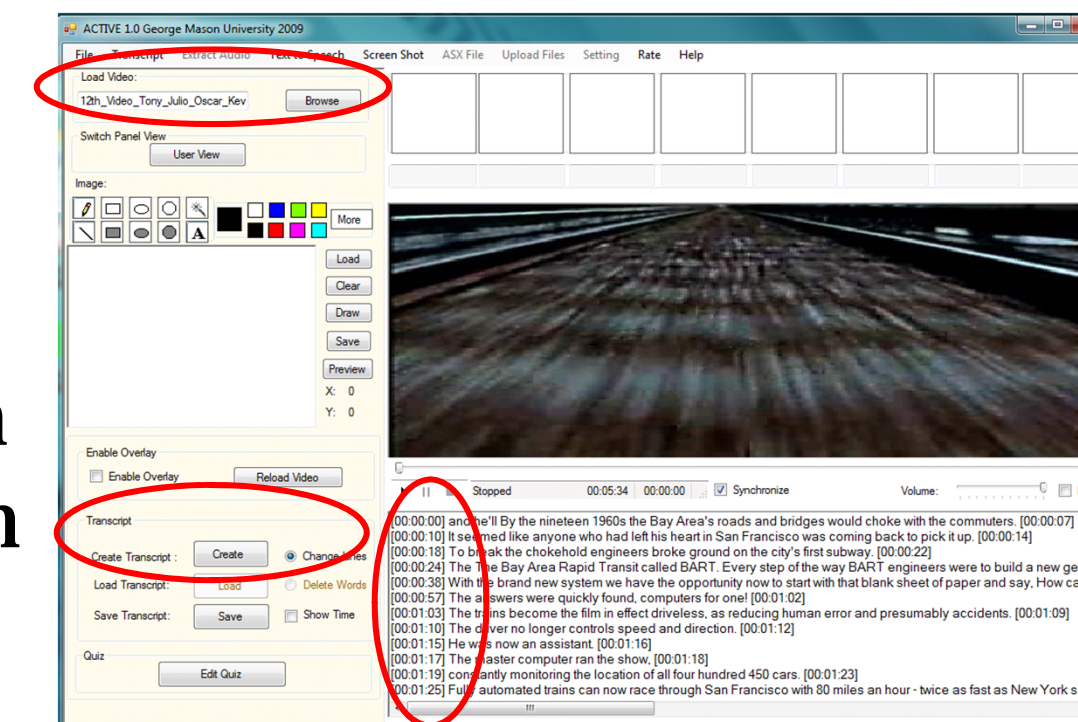
1. Significant improvements in factual comprehension of non-fiction video content after viewing adapted videos (for all 11 students);
2. Modest increase in inferential comprehension;
3. Significantly improvements in both factual and inferential comprehension after students searched the video for answers;
4. Students LOVED adapted videos;
5. Despite promising results, it would be too time consuming and labor intensive for teachers to adapt existing videos with various adaptations.

ACTIV 1.0

Prototype of ACTIV 1.0 enables teachers to enhance existing videos with various adapted and interactive features via an overlay mechanism.

So what can you do with ACTIV 1.0?

- (1) Upload any existing video;
- (2) Automatically create transcript (speech to text) with time stamps added to each word;
- (3) Have each word in the captions automatically highlighted;
- (4) Picture symbols from Symbolstix automatically added to each word in the captions;
- (5) Edit text in the transcript to improve accuracy /to create key word captions;
- (6) Add visual cues to the video to focus user's attention on important stimuli;
- (7) Create multiple-choice or true/false comprehension quizzes;
- (8) Tag each question to the segment so that the user can review/watch a segment containing the correct answer while data are collected & reports generated.



Expert Panel Reviews

Conducted with six members including technology specialists, school-based special educators for students with intellectual disabilities, experts in the area of content-based instruction and instructional design

Data collected via observations while using ACTIV 1.0; expert questionnaires, and interviews

List of revisions and adaptations to the program compiled and included:

- Functional Changes
 - E.g., improve the report on mouse clicks generated by the program
 - E.g., continue working on the text-to-speech feature aiming for the synchronization between text-to-speech and video
- Interface Changes
 - E.g., rearranging the interface to include large bold headings
 - E.g., fewer words per captioning line

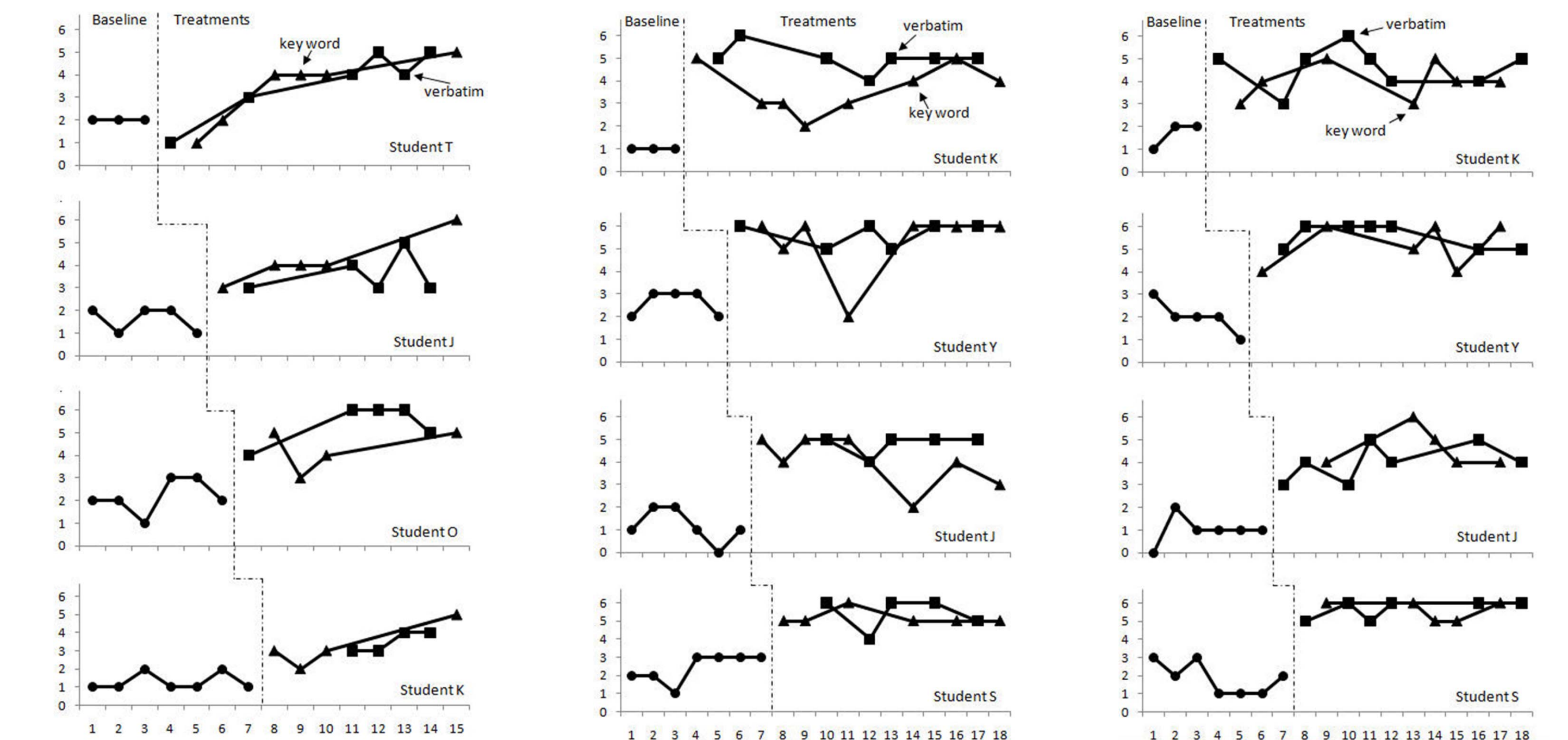
Local Impact

Three classrooms for students with intellectual disabilities: middle school science (4 participants); middle school social studies (4 participants); and high school transition (4 participants)

Multiple baseline across participants and alternating treatments designs

Regular videos in baseline vs. videos adapted with verbatim or key word captions before and after reviewing the segment containing the correct answer; data collected within the program based on the mouse clicks

Number of Correctly Answered Factual Questions After Segment Review



Picture symbol-based captions in high school transition classroom

Highlighted text captions in middle school social studies classroom

Highlighted text captions in middle school science classroom

No functional relation between watching videos adapted with captions and factual comprehension; Eye tracking research - necessary next step.

Significant improvements in comprehension after reviewing captioned segments; No major difference between verbatim and key word captions

Future Steps: Broader Impact

Improve transcript accuracy: profiles, intelligent transcribing, noise filters

Synchronize text-to-speech option to slow down the narration speed

Explore ways to automatically adjust transcript's readability levels

Continue to use Integrative Learning Design Framework (Bannan-Ritland, 2003) to examine Broader Impact of ACTIV 1.0 via large-scale quasi-experimental or randomized trials research studies

Continue Technology Transfer, patent process, and commercialization

Contacts

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