Notes on Research Concerning Captioning Presentation Rate

Introduction

Dr. Carl J. Jensema stated in the introduction to the final report for the federally funded research entitled "Caption Speed and Viewer Comprehension of Television Programs" (1999):

> At first glance, the idea of verbatim captioning is very appealing. Allowing a deaf or hard of hearing person to read every word that is spoken on television means that the person has full access. However, it may be possible for spoken television dialogue to go so fast that most people cannot read its verbatim captioning. Creating captions which are delivered too fast to read is counter-productive to the entire purpose of captioning.
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> Many captioning policies, including the move towards verbatim captioning, are not based on research. We need research to determine how fast captions should appear on the screen, what presentation rates people prefer and are capable of reading. We need to know how these preferences and capabilities vary with different people and correlate this information with different kinds of captioned programming people watch.

These critically important issues have only partially been addressed. But there is an existing body of research and study that supports the DCMP policy and philosophy. Much of this documentation can be reviewed in its entirety at the DCMP Web site: www.dcmp.org. Notes on these studies follow.

Children

1. In 1980, Edgar Shroyer and Jack Birch reported on the results of their study of 185 randomly selected hard of hearing students from residential schools. In "Captions and Reading Rates of Hearing-Impaired Students," they indicated that normal extempore speech is measured at 159 words per minute (wpm) and that speech and language on television and films approximated this rate. They found that if speech on television/films was synchronized in content and speed with captions, approximately 84% of hard of hearing students were not able to read it. (That is, 84% of the students in the study possessed reading rates below the 159 wpm of extempore speech.) They noted that other research indicated that the linguistic level of captions would further significantly compound students' reading rate difficulties. They also found that the mean wpm reading rate of primary students in their study was 123.7.

2. Martha J. Meyer and Yung-bin Benjamin Lee published "Closed-Captioned Prompt Rates: Their Influence on Reading Outcomes" in 1995. They reported placing 140 reading-deficient students (from fourth, fifth, and sixth grades) in an experimental study which randomly assigned each to either (a) an average-paced closed-captioned video, (b) a slow-paced closed-captioned video, or (c) printed text with no video. Results indicated significantly more learning occurs for those students using captioned video as compared to those utilizing only traditional print materials. Additionally, students assigned to the slow-paced prompt rate retained significantly more information than those viewing the average-paced captioning (causing them to conclude that prompt rates should be designed so that children with various reading speeds have enough time to read and process the information).

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3. In 1998 Margaret S. Jelinek Lewis and Dorothy W. Jackson selected elementary school deaf students from a Midwestern residential school as participants in their study entitled "Television Literacy: Comprehension of Program Content Using Closed-Captions for the Deaf." They found that the time constraint of captions further compounded the literacy problem for deaf readers as captions move quickly off the screen. Deaf readers also exhibited a lack of fluent word reading, which adversely affects comprehension; word-reading fluency depended on the ability to recognize (effortlessly and automatically) letters, spelling patterns, and whole words. In addition, students who viewed captions at a slower pace of 78 wpm retained significantly more information than students who viewed captions at an average rate of 116 wpm.

4. Carl Jensema and Ramalinga Sarma Danturthi reported in "Time Spent Viewing Captions on Television Programs" (1999) that they had studied the eye movements of 23 deaf subjects, ages 14 to 61, while they watched captioned television programs. They discovered that the viewers in the study spent about 84% of their television viewing time looking at the program's captions, at the video picture 14% of the time, and off the video 2% of the time. ("Off video" was due to eye blinks and normal eye movement.) Their conclusion was that much exposure to print was "bound to influence reading skills." (Note: The DCMP educational and training materials are selected in large part because of their pictorial component, and thus it is imperative that the presentation rate of captions not prohibit opportunity to learn from this component.)

5. In 2000 Carl Jensema reported ("A Study of the Eye Movement Strategies Used in Viewing Captioned Television") that "fascinating" results indicated that deaf children might be totally ignoring captions on television programs until they are about seven years old and then start "utilizing captions bit by bit between the ages of seven and nine years. In other words, they may be ignoring captions until they have the reading skills to understand them, rather than utilizing captions to learn to read." Research was continued (at the Western Pennsylvania School for the Deaf) and reported on in the 2003 "The Relation Between Eye Movement and Reading Captions and Print by School-Age Deaf Children." Conclusions included affirmations that captioned television programs are complex reading material, requiring the reader to obtain information from both a moving picture and words flashed on the screen. Deaf children are supposed to "split his or her attention between the picture and the captions according to some personal formula that maximizes the information gained."

Adults

1. In 1994 a project report from Gallaudet University Technology Assistance Program entitled "Caption Features for Indicating Non-Speech Information: Research Toward Standardization" had the purpose to improve captioning of "non-speech information" (NSI). NSI included identification of speaker, sound effects, music, manner of speaking, audience reaction, and indication of a title (e.g., book, film, newspaper, or play). A total of 189 deaf and hard of hearing consumers in the study confirmed the importance of consistent presentation of this information. One implication that pertains to presentation rate is that while NSI is crucial in conveying information about plot, humor, mood, or meaning of a spoken passage, it does add more written language for the viewer to process.

2. In 1996, Frank and Sondra Thorn ("Television Captions for Hearing-Impaired People: A Study of Key Factors that Affect Reading Performance") examined how caption presentation rate would affect the reading performance of good readers, selecting thirty-two college graduates with

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normal hearing and vision for their study (half of whom were English language learners). They concluded that TV closed-captions for hard of hearing people may not serve many of the intended users because the captions are too small and too quickly presented to be fully comprehended. They recommended that a second captioning style be simultaneously presented that has a slower rate of presentation and larger text.

3. In 1998 Carl Jensema reported in his study of "Viewer Reaction to Different Reading Speeds" that 578 deaf, hard of hearing, and hearing persons responded that the "OK speed," defined as the rate at which "caption speed is comfortable to me," was found to be about 145 wpm. This rate was very close to the mean rate of 141 wpm actually spoken in television programming (as determined by Jensema in a 1995 study). Most viewers apparently had little trouble with captions until the rate was at least 170 wpm. Infrequent viewers (hearing people) wanted slightly slower captions, while frequent viewers were comfortable with faster captions. Age and sex were not related to caption speed preference; educational level was also of no significance except that those who had attended graduate school indicated a preference for slightly faster captions.

4. In 1999 Dr. Jensema reported on research related to "Caption Speed and Viewer Comprehension of Television Programs." He found that caption viewers (1,102 persons in his study) are likely to be able to absorb facts and draw conclusions from captions that are presented as fast as 220 wpm for short periods of time, but he commented, "Video segments in this study were 30 seconds long, far shorter than a normal television program and too short for fatigue to be a factor." With the exception of junior high students, such demographic variables as age, sex, hearing loss, and educational level did not appear to have a meaningful relationship to comprehension.

5. In the 2003 survey results entitled "The State of Closed Captioning Services in the United States," 36% of 203 respondents (deaf, hard of hearing, and ESL) reported that captions moved too fast. The study was conducted by the Annenburg Public Policy Center of the University of Pennsylvania and sponsored by the National Captioning Institute Foundation.

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