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Research on Closed Captioning

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Research, both quantitative and qualitative, shows that the presence of captioning aids comprehension and/or acquisition. However, most studies do not consider the link between viewing and activities. The first section explains the regional and disciplinary fragmentation of closed captioning research. The second section introduces comprehensive studies each of which contain a number of experiments. The third section presents smaller experiments which examine specific questions.

There are three main positions held by teachers with regard to the role of captioning: first, that it is of value; second, an intuitive feeling that captioning does have a role, but one that is not so clear as to where, when, and how it should be used; and third, that captioning can interfere with or hinder language acquisition, especially with advanced learners because at times it does not match with the dialogue 100%. Therefore, captioning omits or modifies parts of the spoken language. When I first presented on the subject of video and captioning in 1991 and twice in 1994 the technology was for many new. However, even now questions still exist as to the value of captioning. There is no research that has found negative effects, and one of

the aims of this paper is to present research which shows unequivocally that captioning is beneficial to the learner, irrespective of age, proficiency, or context.

It is assumed that readers are familiar with closed captioning. However, three points need clarification. First, closed captioning is a technology in which the written form of the dialogue is placed on the screen in the same language as the spoken dialogue. This is to be found on almost all prime time TV broadcasts, on videos, and DVDs. Therefore, for EFL and ESL learners, this means that they can read and listen to the L2 at the same time. Second, closed captioning is one form of subtitling technology and was originally limited to the US. Many countries, such as India, Canada, European countries (including the UK) use the term *subtitling*. For TV broadcasts, these countries also have different technologies, such as *teletext* (UK), which serve the same function. Therefore, a more accurate term would be *same language subtitling* which for the deaf would be the L1 and for second language learners the L2. Third, in this paper the term captioning is used for L2 script on screen and L2 dialogue, even if the original study uses the term subtitling.

Regional and Disciplinary Fragmentation

Research on the effects of closed captioning has been far more comprehensive than is generally realized. This lack of awareness is due to the fragmentation of research both by region and by discipline. Regional fragmentation is evidenced in that, although the closed captioning is now to be found on video software on sale in Europe, this is only a recent development and is not widespread. Shortly the spread of DVDs will replace most need for special captioning, but the easy access to English L2 script on screen will enhance learning opportunities. Research in Europe usually used the wider term subtitling (Vanderplank, 1988, 1990) because other systems are or have been in use such as the *teletext* system in the UK. Thus, the first major paper from the US, Neuman (1990), makes no reference to Lambert et al (1981), Holobow et al (1984) or Baker (1985). Other parts of Asia, other than Japan, do not always use the term captioning (Lin, 2001). Even when the term closed captioning is used, as in Japan, papers published in non-English journals are often missed. The Gaikokugo Kyoiku Media Gakkai publishes *Language Laboratory*, now renamed *Language Education and Technology* (LET), and the Association for Teaching English through Movies publishes the *ATEM Bulletin*. Both have had articles but only a few are in English. Therefore, they need reviews and translations such as by Kikuchi (1997).

Disciplinary fragmentation has occurred because there are different areas in which captioning (or *teletext* or same language subtitling) can be beneficial. The original area or purpose of captioning was to aid the hard-of-hearing (Baker, 1985; Koshinen 1986). This body of

research is rarely mentioned in SLA studies. The second area is that of ESL within mainstream US elementary education (Neuman 1990). The third area is that of ESL for adults in the UK (Vanderplank, 1988), but it appears that US ESL research has generally ignored this area. The fourth area is EFL in Europe but again many reports are not published in English. The fifth area is EFL on the Pacific Rim: Japan, Korea, Taiwan, China, Thailand, and this is the area that has rapidly expanded in the last five years. Educators in Asia have recognized the potential ahead of some mainstream SLA experts. A sixth area is that of applied linguistics and psycholinguistics. Multiple-channels of input, bimodal input and dual processing, cognitive models etc must be considered when analyzing the role of captioning. Unfortunately, researchers do not seem concerned about linking this to pedagogic considerations.

Despite this regional and disciplinary fragmentation, the increased recognition of the role of captioning/subtitling has led to increased research. Decreasing costs of hardware and software and increasing availability has prompted more to consider using this technology inside or outside the classroom. Also computer and DVD offer greater ease of use. Furthermore the Internet has allowed easier access to more references and abstracts which otherwise would be very difficult to track down. Therefore, the degree of fragmentation should decrease.

Comprehensive Studies

This section cannot discuss or refer to all the studies, but it presents some of the key studies in order to focus on the important issues.

Captioning vs. Reverse Subtitling

The first major captioning study was that of Lambert et al (1981). Nine conditions of L1/L2 audio and script input were tested (p. 137). Only two significant effects were found: the captioning condition (called the bi-modal L2 input), and the reverse subtitling condition (L2 script and L1 dialogue). Holobow, Lambert, and Sayegh (1984) again tested the captioning, the reverse subtitling, and the L2 script-only conditions. Significant effects were again found compared with the L2 script only. Holobow, Lambert, and Sayegh state, "when verbal information is presented through the L1 auditory channel, subjects are thereby better able to concentrate on the written L2 form of the same information" (p. 68). Since that time there have been few studies that examine the reverse subtitling condition. For quite a time, it has been possible in North America to obtain Japanese videos subtitled in English. DVDs provide much more versatility in combinations in English and Japanese script and dialogue. Unfortunately DVD software from North America is Region 1 and will not play on standard Japanese Region 2 machines. DVDs bought in the UK are Region 2 but are for PAL TVs, not

NTSC, and can be viewed only with certain machines (e.g. Pioneer 919 linked with a projector). However, Japanese DVD films sold in Japan are beginning to provide English captioning and text. Therefore, while SLA theory and practice would generally oppose the use of reverse subtitling, it is an area which needs more examination, especially for low-level EFL learners.

Nature of Captioning and Linguistic Content

All captioning is modified to a greater or lesser extent. The usually accepted maximum rate for captioning/subtitling is 120 words per minute, as fast dialogues exceeding this cannot physically be placed on the screen as captioning, neither can they be read by the viewer. Baker (1985) states that all the children found the 120 words per minute, unacceptably fast (p. 15). He also examined the whole process of captioning. Linde and Kay (1999) provide the most complete analysis of captioning rates by genre. They state, "all programme types, with the exception of film, contained a marked degree of editing" (p. 50). It would be dangerous to argue either that film is the best form of captioned material or that other materials are unsuitable. However, it probably is true to say that for self-study, film has the best potential because the equivalency of captioning and dialogue is usually high.

The rate of captioning is not sufficient to determine suitability of materials. Baker took eight linguistic measures of subtitles (p. 26). Jung (1990) looked at the 'readability' of two subtitled video clips but limited the analysis to the Flesch and Lix formulas. Liversidge (2000) made use of the *VocabProfile* computer program (Nation & Heatley, 1994) to establish vocabulary equivalency between ten minute films clips. This program provides a breakdown of the *1,000-Word Level*, the *2,000-Word Level,* and the *University Word Level Tests*. Most captioning studies ensure that learners are of a similar proficiency. However, few examine the difficulty of the materials. Therefore, it is very difficult to replicate such studies, or to provide guidelines or information to teachers.

Attitudes and Proficiency

Some teachers have argued that advanced students prefer not to have captioning on the screen. Vanderplank (1988, 1990) conducted extensive research including a survey of advanced learners in the UK and found favorable responses. Liversidge (2000) conducted a survey of learners' attitudes and viewing patterns. One question specifically sought negative feedback but again learners rated the presence of captioning very high, 5 on the Likert Scale of 1-5.

One of the main questions concerning captioning is that of proficiency. Neuman (1990) examined four conditions (captioned TV, normal TV, reading and listening, and textbook only) with three clips

of science educational video. For all the tests, word recognition, sentence anomaly, and written retelling, the captioning condition was highest. However where learner proficiency was lower, gains were not significant. Therefore, the assumption that captioning is only needed when otherwise authentic material would be beyond the ability of the learner is one which needs to be reconsidered. Neuman discusses the "Matthew Effect" (Stanovich, 1986) where the rich get richer and get higher vocabulary gains. This indicated two facts: first, that it may be advanced learners who gain the most from captioning; and second, that more pedagogic intervention is needed at a lower level if such materials are to be used.

Active vs. Passive

Viewing of captioned sequences has largely, although incorrectly, been regarded as a passive activity. Most research has conducted post-tests of word recognition, comprehension, or written production. However, some have involved tasks. Smith and Shen (1992) had learners use interactive video-discs and watch by themselves clips from *The Last Emperor*. Their individual answers determined their progress: if they answered correctly the machine provided the next clip. Post-listening tests (without captioning) showed significant gains for the captioning group. Borras and Lafayette (1994) looked at the effect of captioning on oral communicative performance. Significant effects for captioning were found for both low and high level tasks. They argue that their findings support the contention that "it is the application of the technology in education rather than the provision of technology in education that affects learner performance" (pp. 71-72). In Japan there is still a desire to solve problems with technology. It is one of the challenges to researchers and administrations that they need to provide an environment for teachers and students to use the technology in more active ways, especially linked to student self-study.

Breadth and Depth of Knowledge

Much research has focused on acquisition of new items such as that of Neuman (1990). However, at the same time that learners are acquiring new items their knowledge of existing ones is being deepened. Liversidge (2000) using a battery of tests found that captioning significantly increased depth of knowledge of existing vocabulary items (pp. 148-206). It also increased written production of the same items. However, there were differences with respect to the two film sequences.

Specific Studies

This section outlines specific studies that contain areas which are of interest for future research. Hirose and Kamei (1992) found that the presence of captioning only had an effect upon cognitive items but not upon

emotional items. They found that for three significantly different levels of proficiency.

Shang-Ikeda (1994) examined the effect of captioning upon visual and audio input, and found a significant effect only for auditory input. However, one should not assume that high visual input always has a negative effect. Neuman (1990) created a contextual support measure (p. 11) based on the captioning and visual support and found that 'context' is more important (p. = .01) than the number of occurrences and second only to previous word knowledge (p. = .001).

Kimura and Miyamoto (1997) examined learners' perceived use of strategies using the Group Embedded Figures Test (GEFT). They separated learners' into field independent (FI) and dependent (FD) groups and gave the learners a survey. Five significantly different strategies were found.

Conclusion

Captioning must be seen as part of television, video, DVD, and computer technology. Research shows that all levels of learner benefit from captioning, with possibly advanced learners gaining more. However, there are several areas which need more research. First, we need more information about the difficulty of materials, speed, lexical level, and required cultural knowledge. Second, we need to know for classroom activities how many viewing repetitions are optimum, at what level of proficiency, in what way, and why. Third, more case studies are needed of how self-study assignments should be linked to in-class activities. Fourth, information is needed about academic institutions and their policies about making available to learners film script books, videos, and DVDs both in AV centers, and for use at home.

It is now fourteen years since I first made use of captioned materials. While great changes have occurred in terms of increased availability of hardware and software, ease of use, and lower costs, much more research is needed before we provide learners with an optimum environment which maximizes the benefits of this technology.

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