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Report

# THE BENEFITS OF BIMODAL CONTENT PRESENTATION

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## 1. Bimodal Presentation

Bimodal presentation refers to information that is presented in both audio and visual formats at the same time. Bimodal reading refers to the act of reading text while hearing the words at the same time, such as when using speech synthesis software, or reading the text, hearing the words, and having the words (and/or sentences) highlighted at the same time, such as when using text-to-speech software with integrated highlighting.

## 2. The Benefits of Bimodal Presentation

According to the research, specific benefits of bimodal content presentation include:

- Improved word recognition skills and vocabulary
- Improved reading comprehension, fluency, accuracy, and concentration
- Improved information recall and learning/memory enhancement

Some of the lesser known and considered benefits include:

- Increased motivation and more positive attitude with regard to reading
- Increased reading self-confidence and perceived performance

### 2.1. What the Research Says

The following details findings from some of the currently available research.

#### 2.1.1. Reading Comprehension, Word Recognition, and Information Recall

- Disseldorp and Chambers (2002) found that when text was presented bimodally, students were able to better understand what they had read and perform better when asked questions about content.
- In another study, Disseldorp and Chambers (July, 2002) found that comprehension improved for all types of readers and that poorer readers benefitted more than better readers.

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- A study by Elkind, Black, and Murray (1996) measuring the effects of bimodal presentation on college students and working adults with reading difficulties showed that the reading rate and comprehension of most of the participants increased. The participants were also able to read for a much longer period of time.
- Elkind, Cohen, and Murray (1993) tested middle school students with dyslexia using bimodal presentation. Seventy percent of the students increased their comprehension. Students with reading difficulties increased their comprehension. Poorer readers also perceived a better comprehension.
- Shany and Biemiller (1995) found that text reading rates and reading comprehension improved. Listening while reading resulted in twice the amount of reading which led to higher comprehension scores. Word recognition skills also increased.
- Hecker, Burns, and Elkind (2002) showed that with bimodal presentation, students read faster with better comprehension. Reading fatigue was reduced, and students increased their reading endurance and suffered less stress while reading.
- Leong (1995) suggested that bimodal presentation increased comprehension and motivation. This adds to a previous study by Leong (1992) that showed that late-elementary and middle school students with reading disabilities improved reading comprehension.
- Higgins and Raskind (1997) found that students with reading difficulties increased their comprehension. Poorer readers also perceived a better comprehension.
- Wise, Olson, Ansett, Andrews, Terjak, Schneider, Kostuch, and Kriho (1989) and Wise and Olson (1994) found increased word recognition and decoding.
- Other studies also found improved comprehension scores. (Higgins & Raskind, 1997; Reinking, 1988; Reinking & Schreiner, 1985)
- Mastroberardino, Santangelo, Botta, Marucci, and Belardinelli (2008) found that bimodal presentation enhanced recall.

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- Montali (2000) studied the effects of bimodal presentation on word recall by presenting the words aurally, visually, and bimodally. The results showed that students with lower reading abilities were able to recall more words when they were presented bimodally whether they were tested immediately or at a later time. The study showed that bimodal presentation could be useful for learning and memorizing.
- Reitsma (1988) found that students with reading disabilities improved word recognition.
- Steele, Lewandowski, and Rusling (1996) found that bimodal presentation enhanced recall, comprehension, and word recognition.
- Dolan, Hall, Banerjee, Chun, and Strangman (2005) showed that bimodal assessments can be used to better test students with disabilities.

### 2.1.2. Decoding

- Elbro, Rasmussen, and Spelling (1996) showed that bimodal presentation improved decoding skills.
- Olson and Wise (1992) found that students improved their word recognition skills and phonological decoding.
- Elbro, Rasmussen, and Spelling (1996) performed a study on students of various ages with reading and language disabilities using bimodal presentation. Through the text-to-speech support, the students were able to significantly improve their pronunciation skills.
- MacArthur, Ferretti, Okolo, and Cavalier (2001) found that bimodal presentation enhanced comprehension and decoding.

### 2.1.3. Motivation and Reading Self-Confidence

- Barker and Torgeson (1995) found that students enjoyed bimodal presentation and the increased reading time.
- According to Montali and Lewandowski (1996), less skilled readers had better comprehension with bimodal presentation. Their word recognition increased, and they felt more successful. They performed better with more accuracy and enhanced recall.

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- Elkind, Black, and Murray (1996) found that bimodal presentation increased comprehension, motivation, and self-confidence.
- Wise, Olson, Ansett, Andrews, Terjak, Schneider, Kostuch, and Kriho (1989) found that bimodal presentation resulted in a more positive attitude about reading.
- Pisha and Coyne (2001) found that high school students, including students with learning disabilities, appreciated the flexible presentation of content, ease of locating information, and portability.

### **3. Populations that Can Benefit from Bimodal Presentation**

An underlying theme of the available research suggests that the impact of bimodal presentation depends largely on the characteristics of the individual.

- Higgins and Raskind (2005) and Olson and Wise (1992) suggested that comprehension improvement increases according to the severity of the disability.
- Poor and struggling readers benefit more than average- or better-skilled readers. (Balajthy, 2005; Disseldorp & Chambers, July, 2002)
- Lundbeg and Olofsson (1993) and Oloffson (1992) showed that bimodal presentation benefitted older students more than younger ones.

Although the effects may vary on an individual basis, the research shows that specific populations can benefit from bimodal presentation, including:

- Poor readers and those with reading and language difficulties (Elbro, Rasmussen, & Spelling, 1996; Disseldorp & Chambers, 2002; Elkind, 1998; Elkind, Black, & Murray, 1996; Higgins & Raskind, 1997)
- Those with learning and language disabilities, including dyslexia (Dolan, Hall, Banerjee, Chun, & Strangman, 2005; Raskind, 1998); Lewis, 1998; Elkind, Cohen, & Murray, 1993; Reitsma, 1988)
- Those with attention disorders (Hecker, Burns, & Elkind, 2002; Balajthy, 2005)

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## 4. Conclusion

Bimodal presentation can help struggling readers and those with learning and language difficulties, resulting in better reading comprehension and recall. Both the actual and perceived performance of the student has been shown to be improved. This results in higher motivation and self-confidence, which improves the learning experience for all concerned.

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