

Running head: BIMODAL VERSUS UNIMODAL PRESENTATION

Excellent work Kristine

I made some comments throughout. I was unclear about whether the quizzes count toward the grade or not. They consume a great deal of class time. Also I'd add: (a) description of the

Bimodal Versus Unimodal Presentation of Digital Texts

Effects on Comprehension for Students in the Postsecondary Setting

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loes students will be required to keep (b) a description of the observation procedures and training of observers (e.g. your gas.) Can you resubmit + I'll re-grade

### Statement of Purpose

The purpose of this study is to determine if digital text presented through bimodal access (auditory and visual) is more effective than when presented through unimodal access (auditory presentation alone) in increasing the comprehension of college level reading materials for students with reading related learning disabilities.

### Previous Research

Previous research study suggests that bimodal presentation of reading material enhances comprehension for poor readers in grades eight and nine. (Montali & Lewandowski, 1996). This research focused on relatively short passages in a structured environment where comprehension and recall questions were given to students immediately after reading the passage. The following research proposes to expand on Montali and Lewandowski's work to determine if bimodal presentation of text increases reading comprehension for poor readers at the postsecondary level with content material in a more natural learning environment.

### Objectives

This investigation will compare quantitative outcomes of two modes of delivery of digital text provided to Freshmen College students who have documented learning disabilities related to reading (i.e. decoding skills, fluency and or comprehension skills). Condition one will utilize computer software (WYNN Wizard), to provide bimodal (visual and auditory) presentation of text. The second condition will provide unimodal (auditory) presentation of text using MP3 file format. Twenty students with learning disabilities will be divided into two groups. The students will participate in a semester long cross-over research design in which each group of students receive their required

reading materials under each of the two conditions for half of the semester. Quizzes testing comprehension will be administered related to each assigned reading and averaged under each treatment condition. At the end of the semester students will complete a survey to elicit information related to their preference for one mode over the other.

It is anticipated that students who are provided with both auditory and visual representation of text (bimodal), will perform better on quizzes testing comprehension than those who receive only auditory presentation (unimodal). It is also anticipated that students with access to the electronic dictionary incorporated into the software in condition one will be more likely to use the dictionary than those students in condition two who have access to a traditional dictionary. Finally, it is believed that overall students will prefer bimodal presentation of text to unimodal presentation.

*Research Questions:*

1. Does bimodal (auditory and visual) presentation of reading material, as apposed to auditory presentation alone (unimodal), improve reading comprehension for students with learning disabilities at the postsecondary level?
  - a. Do students utilize the dictionary more often to identify the definition of unfamiliar words when it is provided electronically as apposed to the traditional paper format?
  - b. Is there a correlation between the number of times the dictionary is used and comprehension scores?
2. Do students prefer one method of presentation over the other?

w/ repeated measures you can see that whether all part is higher in your bimodal condition

when they

interesting

## Method

*Research Design*

This study is a quantitative intervention using a cross-over research design where both conditions will be presented to each of the 20 participants in the study.

*Counter balance treatment order (see bottom p. 6) using a*

*Setting.* This study will be conducted in two required freshmen English Literature courses (ENGL 201) taught at George Mason University. The university is located in Northern Virginia with approximately 30,000 enrolled students. Slightly over 1,000 students are registered with the Disability Resource Center (DRC) and receive services. Thirty five percent of those students have documented learning disabilities.

*Student participants.* Twenty students registered through the DRC with documented learning disabilities related to reading (i.e. decoding, fluency and or comprehension), will participate in a 16 week study. All students in the study will have qualified for an accommodation of recorded books. Students participating in the study will be randomly assigned to one of two ENGL 201 courses taught by the same instructor during one semester. The course will be taught for one hour and 15 minutes two times a week. In addition, students will also be required to participate in a one hour reading period between the first and second class sessions for each week in which reading assignments are given.

*Instructor.* The instructor has taught the ENGL 201 course for two years. For the purpose of this study, she has agreed to teach two sections of the course during the same semester and will cover the identical information in each section. She will also provide a ten question short answer quiz on the required reading material for each week that readings are assigned. This quiz will be administered to all students in the class,

*\* Add paragraph describing anticipated demographics of sample. Eg. Data collected will include gender, age, race, ethnicity, reading level, \* or years classified as a student w/ disabilities*

including those outside of the study. Students will be given credit towards a class participation grade for completing the quizzes.

Materials

Both conditions. All participants will be provided with the required readings for ENGL 201. Readings will be provided the week they are assigned. All students will participate in <sup>identical</sup> course lectures and activities provided by the instructor. Students will be given a ten question, short answer quiz of comprehension each week reading assignments are given. A total of 12 quizzes will be administered to all students during the semester. For students participating in the study, there will be 6 quizzes administered under each treatment condition.

QVC Format? →

A sample item from a quiz is (make one up) - will quizzes be written format, oral, etc?

Bimodal condition (condition 1). Students in this <sup>condition</sup> group will receive a laptop computer loaded with WYNN Wizard software. This software provides the ability to scan hard copy documents such as textbooks and convert them into electronic texts. This text is displayed exactly as it appears in the book and can be read aloud by the computer using a synthesized voice at a rate specified by the user. The software also comes with an electronic dictionary that both displays and reads the definition of unfamiliar words.



Reading assignments will be prepared by the researchers ahead of time and provided in the appropriate electronic format, the week they are assigned. A one page instruction sheet explaining the functions of key components of the software will be provided to the students.

→ will students get on their personal computers? or available in lab? - will software track whether they used it?

Unimodal condition (condition 2). Students in this <sup>condition</sup> group will receive an MP3 player to access reading assignments in through auditory means, as they are accustomed with books on tape. The MP3 player allows students to listen to material at a set speed

files whether they accessed dictionary features? ←

All students will receive both pcs + MP3 players right

with the option to fast forward and rewind. Reading assignments will be prepared by the researchers ahead of time and provided in MP3 format the week they are assigned.

Students under this condition will also be given a standard pocket dictionary to look up unfamiliar words. A one page instruction sheet explaining the functions of the MP3 player will also be provided. *Tracking to validate use?*

*Procedure*

*approval from GMU Human Subj Board and English Dept*  
*at*  
 Both conditions. Once consent forms are collected from all participants, students will be randomly assigned and registered for one of the two ENGL 201 courses. Ten students will be placed in each of the two sections. Five students from each section will be assigned to one of the two treatment *conditions*. All participants will be provided with a one hour workshop. During this workshop, they will be given the appropriate equipment and instructed on its use. Before leaving the workshop each student must demonstrate to the instructor their ability to read a short passage using the technology and look up an unfamiliar word in the dictionary. *Condition - specific*

Reading assignments will be given to all students in the class beginning the second week of the semester. Between the first and second class sessions each week students participating in the study, will be required to complete reading assignments using their assigned technology. The reading will be completed and observed during a one hour reading period. Researchers will note on-task behavior of students. They will also be available for technical support. During this reading session, students will be required to keep a log of the number of times they access the dictionary to look up unfamiliar words from the reading.

*good I was looking for this earlier*

*describe log under materials section*

*baseline is 1h + this < really the design*

*Treat*  
*mp3*  
*adv*  
*pcist*  
 N=5  


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*mp3ist* N=5

*class 2*  
 N=5  


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 N=5

*maybe add an observational data collection section*

At the beginning of the second class session of the same week, students will be given a ten question short answer quiz on the required reading passage. This process will continue through week seven. At week eight, the midpoint of the semester, students will switch to the alternate treatment condition and will not take a quiz. The one hour reading session normally assigned for that week will be used to exchange equipment and provide a review of the use of the technology. <sup>for both conditions</sup> Quizzes will resume in weeks nine through fourteen. A total of 12 quizzes will be administered to all students. For students participating in the study, there will be 6 quizzes administered under each treatment condition. The final two weeks, week 15 and 16 will be used for review and final exam. Students will not be given exams during these weeks. This proposed cross-over design will provide each student with a reading comprehension score for both treatment conditions. Quiz grades will be averaged under each treatment condition for the purpose of the study. Students will be given class participation grades for taking the quizzes. Scores on quizzes will not be used to calculate the final grades for the class. However, students will be told that the average score of all quizzes will count for 10 percent of their final grade. At the end of the semester, students participating in the study will be given a survey to rate their opinion of the two access modes.

*Bimodal condition.* Under this condition students will be required to use the WYNN Wizard software program to read required reading assignments. Students under this condition will both hear and see the text on the computer screen as it is being read to them using synthesized speech. Each word will be highlighted on the screen as it is read. Students are able to control the speed at which the material is read to them. The image on the screen matches that of the hard copy document. Students are also able to look up

unfamiliar words using the electronic dictionary feature included with the software. This feature visually and auditory presents the definition of the word. Reading of the material occurs during a one hour mandatory session at a central location on campus. Students are required to keep a log of the number of times they access the dictionary feature during the reading session. Researchers will be present to record on-task behavior and the speed that the student uses to read assignments.

Can they read materials again w/out observation & what info be recorded?

*Unimodal condition.* Under this condition students will be required to use an MP3 player to read a required reading passage. Students under this condition are not able to control the speed at which the material is read. Students are able to pause, and rewind to review the material. The length of the reading assignment is such that it can be completed within the one hour time period. Reading occurs during a one hour mandatory session each week. Students are required to keep a log of the number of times they access the dictionary during the reading session. Researchers will be present to record on task behavior.

Same for the cond

#### *Data Sources*

Three sources of quantitative data will be collected. They are: (1) reading comprehension scores from quizzes, (2) student records of dictionary usage, and (3) results from an opinion survey.

*Reading comprehension scores from quizzes.* Quizzes will be given to the students to determine their level of comprehension after reading assignments under each of the treatment conditions. These quizzes will consist of 10 short answer questions each worth one point.



*Student log of dictionary usage.* Data will be collected from student logs on the number of times they access the dictionary to look up unfamiliar words during each reading period.

*Opinion surveys.* Students will complete a 20 question survey based on a likert scale from strongly agree to strongly disagree. A high number on this scale would indicate a preference for one of the access methods.

#### *Reliability and Fidelity of Treatment*

Both of the treatment conditions will be monitored graduate students during the mandatory reading periods. Reading assignments will not be given to students until the reading period for that week and will be completed during that time. Technical problems with the technology will be handled in real-time. The instruction for all students is controlled because it will be provided by the same instructor.

#### *Scoring Procedures and Reliability of Scoring*

*Reading comprehension scores from quizzes.* Each quiz will be worth a total of 10 points. All quizzes, including those completed by students not in the study, will be scored. A list of terms or “idea units”, that should be included in the answer to receive credit will be provided to individuals scoring quizzes. All quizzes will be scored by two different graduate students in the English Department who are unaware of the study. The two scores will be examined by the researchers to determine the percentage of agreement in scoring. If reliability is below 90 percent, rescoring of the quizzes will be completed.

*Dictionary usage.* Participants will be asked to write a mark in a log book each time they use the dictionary to look up the definition of an unfamiliar word during each reading period. Each mark will be given a value of 1 and tabulated to determine the total

A check list containing steps for reading appropriately will be developed and used by observers to monitor fidelity of treatment implementation.

number of times each student used the dictionary during individual reading periods under each treatment condition. A total number of marks will also be tabulated for each treatment condition. To ensure a fair level of accuracy this behavior will be observed by graduate students during the reading periods.

*Opinion survey.* An opinion survey will be given to the student at the completion of the study. Each question in the survey will be scored based on a likert scale with a rating of strongly agree, worth 5 points, agree, worth 4 points, neither agree nor disagree, worth 3 points, disagree, worth 2 points and strongly disagree, worth 1 point. The questions will be worded so that a high score on an item would indicate a preference for condition one.

*Proposed Data Analysis - Bonus Points \**  
*Good - you could use a repeated measures analysis which we may touch up this semester*

Reading comprehension scores from quiz scores. To explore the answer to research question 1, the average scores for the reading comprehension quizzes for each week as well as for the entire semester, will be calculated. A paired sample t-test will be run to determine if there is a significant difference between condition 1 (unimodal access) and condition 2 (bimodal access).

*Dictionary usage.* To explore the answer to research question 1a, the total number of times all students accessed the dictionary under each condition will be compared to determine if the electronic dictionary was used more often than the traditional dictionary. *Again Repeated Measures*

To explore the answer to research question 1b, the number of times each student used the dictionary during each reading period will be compared to their comprehension score on individual quizzes associated with each reading period. In addition, the total

Treatment order	QUIZ 1 2 3 4 5	Q 6	total
PC 1 <sup>st</sup>			PC 1 <sup>st</sup>
MP 31 <sup>st</sup>			MP 31 <sup>st</sup>

*same analysis*  
*total*  
*PC 1<sup>st</sup>*  
*MP 31<sup>st</sup>*  
*total*  
*PC 1<sup>st</sup>*  
*MP 31<sup>st</sup>*

number of times each student accessed the dictionary under each treatment condition will be compared to their average score on all quizzes within each treatment condition. This analysis will be done to determine if there is a positive relationship between number of times the student accessed the dictionary and their score on quizzes. This analysis will be done using a Pearson(r).

*Opinion survey.* To explore the answer to research question 3, the results of the opinion survey will be tabulated and compared to determine if there is a clear preference for one mode of presentation over the other. A high number on the opinion survey will indicate a clear preference for condition one.

*Descriptive Analyses*

References

Montali, J., & Lewandowski, L. (1996). Bimodal reading: Benefits of a talking computer for average and less skilled readers. *Journal of Learning Disabilities, 29*, 271-279.