



**CALIFORNIA STATE SCIENCE FAIR  
2016 PROJECT SUMMARY**

<b>Name(s)</b> <b>Nicholas M. Brdar</b>	<b>Project Number</b> <b>S0402</b>
<b>Project Title</b> <b>Effects of Online vs. Printed Textbooks</b>	
<b>Objectives/Goals</b> The goal of this project was to determine if online or printed textbooks lead to significantly different levels of concentration and comprehension.	
<b>Abstract</b> <b>Methods/Materials</b> To test students' comprehension scores, I randomly divided twenty students into two groups, one for online textbooks and one for printed. Each participant read a section of my school's Biology textbook (Miller & Levine, 574-579), either online or printed, and took a comprehension test that I created. To analyze the results, I conducted a two sample t-test. To test concentration levels, I used an EEG Machine (MUSE: The Brain Sensing Headband) and its iPhone application to interpret the results. I used two student participants. Each of their concentration levels was tested for both the online and printed textbooks and then compared.	
<b>Results</b> I found that students using the printed textbook scored higher on the comprehension test (average score 74%) than those who used the online textbook (average score 50%). On just the questions involving pictures and charts, the online textbook users scored slightly higher (57.5% as compared to 52.5%). Lastly, I found that the students maintained higher concentration levels when using a printed textbook, and their concentration levels constantly changed when using an online textbook.	
<b>Conclusions/Discussion</b> I discover that printed textbooks lead to higher overall levels of comprehension and concentration, while online textbooks were more beneficial when studying pictures and charts. With the increase in the popularity of ebooks and online educational materials, many schools are currently looking into switching from printed to online textbooks. It is essential that they look into the advantages and disadvantages of each type of textbook before making a final decision.	
<b>Summary Statement</b> I found that printed textbooks lead to higher levels of concentration and comprehension, while online textbooks lead to higher comprehension of pictures and charts.	
<b>Help Received</b> My science teacher mentored me through the entire process. My school counselor, who has two Master's Degrees in the field of psychology, guided my research of psychology. Julian Homburger, who has a Bachelor of Science Degree in Biometry and Statistics from Cornell, helped me with the statistics.	