Indiana University Bloomington

INSPIRE LLC

Studying Inequities in Academic Technology

A Case Study of Avon High School

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INSPIRE LLC SEMINAR | EDUC-F204

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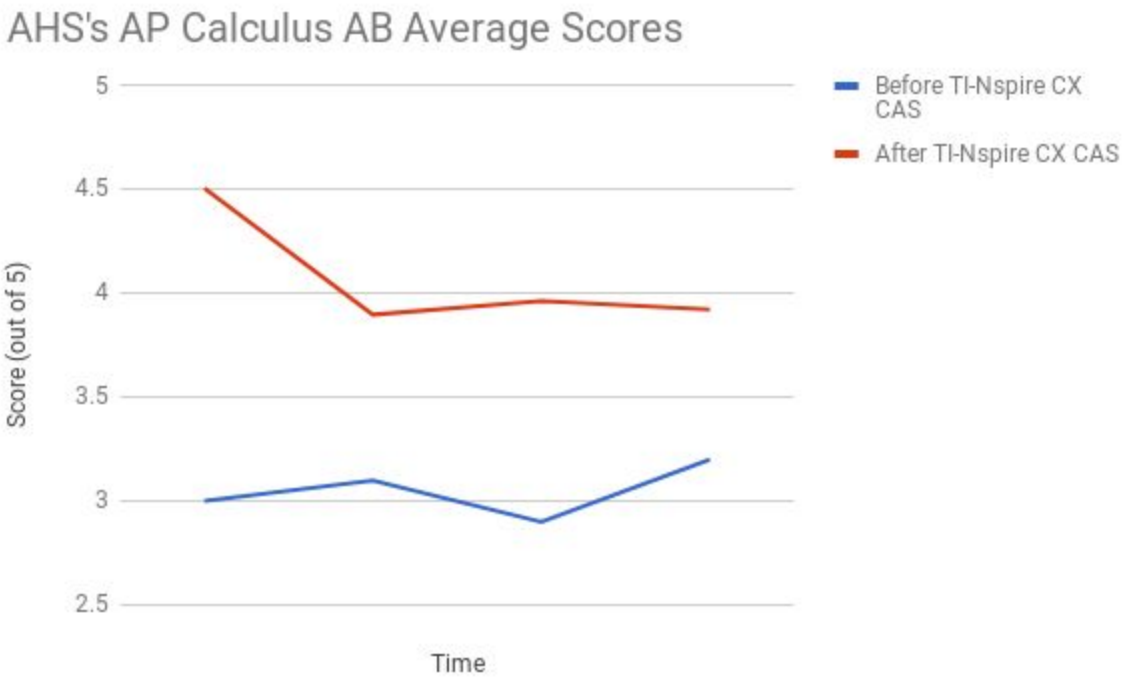
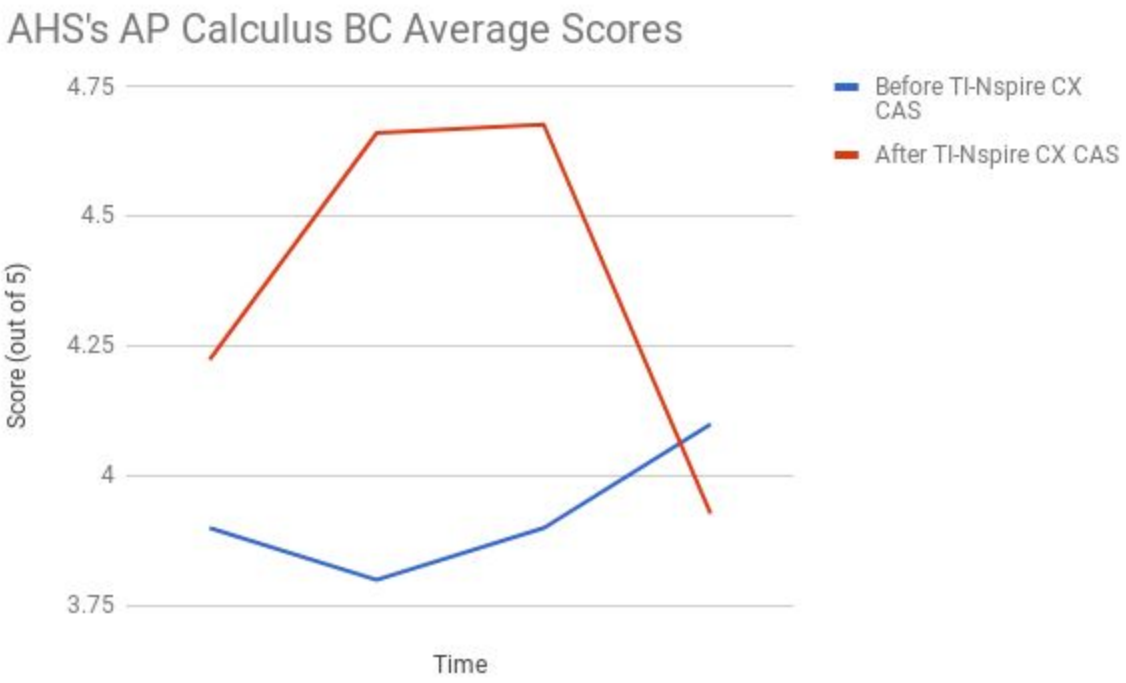
Submitted: 04/23/18

In today's quickly-advancing technological society, the use of computational devices such as iPads, Chromebooks, and advanced calculators is becoming increasingly common amongst publically-funded educational institutions. These devices, in many cases, have been proven to greatly improve and diversify the educational experience, boosting statistics like student involvement, test scores, and college acceptance rates. This creates a bit of a void in terms of equal access to education, in the sense that less populous communities, or those with lacking funding or community support are inherently less likely to have the means to obtain ownership, or even access to such resources. It is our goal to show the advantages of the introduction and adoption of such technology, specifically the TI-Nspire CX CAS by Texas Instruments: a highly advanced graphing calculator with the capabilities far surpassing the limits of other 'standard-issue' graphing calculators.

The graphs on page 3 show the distribution of average AP Calculus scores at a mid-sized high school located in Avon, Indiana, who had access to the Nspire calculator ecosystem, along with an accompanying curriculum to fully utilize the technology. Each of the two graphs represents a different class and thus a different AP exam taken. The red curve is a data stream of the four most recent consecutive years of AP Calculus scores, and the blue curve is the four consecutive years before having adopted the Texas Instruments tech. In each graph's case, the red curve has a noticeably higher average than does the blue curve, leaving a vacuum of cause. We, as well as Mr. Anthony Record (Avon's AP Calculus teacher of nearly 30 years), integrally believe that this performance differential (puns intended) is at least in part due to the utilization of these calculators.





These calculators are not accepted among all well-funded school systems, however; Mr. Record indicates that “[m]any teacher[s] view the machine as a means by which

students could abuse its capabilities," whereas he and many other teachers "see it as an opportunity for student to delve deeper into the mathematics" by not stressing as much about some of the tasks that would otherwise require a pencil and paper.

Nevertheless, Mr. Record maintains that the Nspire mathematics environment is an important tool in his educator toolbelt. "In my 29 years as a teacher, the greatest innovation that [has ever] entered my classroom has undoubtedly been the TI-Nspire CAS calculator," he says.

In direct contrast to Avon High School, a small privately-funded school in Bloomington, IN by the name of Harmony School has not integrated the same level of adoption in terms of technology. They operate under a Montessori principle of thought, which emphasizes physical interaction and hands-on experiences rather than technologically simulated activities or the development of any dependency on technological resources. This, inherently, makes it difficult to track progress (good or bad) due to the complete absence of standardized testing within their educational plan and process. This complete void in the documentation of test scores and overall data is a common theme amongst smaller, often less-funded educational institutions. In many cases, corporations and communities feel that it would be counter-intuitive to release data that could be viewed as negative, or backwardly-paced; instead, they simply do not generate data, or furthermore do not publish the data that has in fact been collected. By improving funding and adoption in the area of technology, both academic progress and data publication could be vastly enhanced. Put simply, a school either without technology or who does poorly in general will often have a lack of published data.

The Critical Web Reader (CWR), owned and operated on by IU faculty, is an internet-based tool designed to help classes read and interpret information from several sources with the hopes of improving critical reading skills. This is a sound

attempt at implementing modern technology in the classroom without it being forced. Some school systems have excessive funding with which it is sometimes shown that too much of a good thing (innovative tech) can go awry quickly, wherein students find ways to largely exploit the equipment instead of using it as a tool for their education. CWR is a solid attempt at something quite the opposite: its purpose is not to provide more tech in the classroom, but rather to educate students on the broadest of topics: the world wide web and the false information that it often contains. Any computer that has internet access can connect to CWR. Not every student would need their own personal device (centralized computer labs would allow the CWR model to function just fine), though it would help. This is an excellent example showing how novel technology in the classroom can mean more than just the latest-and-greatest hardware: the software is equally, if not more influential in the educational process.

Throughout the semester, we've had the opportunity to hear the takes on education from the perspectives of several different professionals in a variety of concentrations. Amongst all of the diverse outlooks, one of the prominent common denominators is equal opportunity for students despite their socioeconomic or cultural differences. By allocating additional funding to the under-funded districts, and allowing them to prosper through the utilization of technology, we can not only improve test scores, but furthermore introduce a new way of thinking and allow students the opportunity to succeed and a level of prosperity limited only by their individual motivation to learn.