



Aldine ISD: Student Home Connectivity Challenges and Opportunities

The need for online remote access to K-12 instruction and learning resources is now integral to the education system. Factors identified in the [2021 CoSN Home Internet Connectivity Study](#) include implementing virtual learning options, programming such as online tutoring to address the loss of instructional time and engagement, nontraditional school days, and increased online homework assignments. As a result, the CoSN study provided viable solutions for addressing home bandwidth, devices, and related guidelines for students learning in remote and hybrid learning environments. However, it is essential to note that according to the CoSN Study, there is no one-size-fits-all approach to connectivity solutions. Instead, each solution has its strengths and weaknesses depending on the students, school district, and community's diverse challenges and needs.

One of the districts involved in the CoSN study with unique challenges was Aldine ISD, Harris County, Houston, Texas. In a one-one district of 64,000 students with 60,000 devices connecting to their network daily, the Aldine Technology Department knew that providing students with at-home connectivity was critical. Two areas that were both challenges and opportunities regarding equitable access for the district were utilizing the bandwidth that saturated their county and supporting its educational programming.

The Bandwidth Matters

With a district population of 87% low-income families, mobile hotspot device funding was readily available, and the distribution of these devices provided connectivity for families during remote learning. However, this short-term solution was not enough for the Aldine ISD community, and they began focusing on the increased need for long-term sustainable connectivity options for the entire school community. As part of the district's one-to-one initiative, the team created a VPN tunnel to route all-district devices back to the Aldine data center. This strategy gave the IT department complete control of district-owned devices for security, remote support, and inventory. It also set them up with the opportunity to partner with local ISPs and community leaders to provide adequate bandwidth availability and lower pricing for students and families. Carriers such as AT&T, Verizon, and T-Mobile provided Harris County bandwidth. However, because available bandwidth did not necessarily translate to connectivity, Aldine Tech Department recommended that since the district was already driving traffic back to their network, paying ISPs to reserve bandwidth and VPN back to the district data center would allow Aldine ISD to control equitable bandwidth distribution through the ISP towers.

A recommendation by the CoSN study as a solution for at-home connectivity is a long-term evolution (LTE) Broadband that can be carrier-provided or owned and operated by the district. Carrier-provided approaches leverage a provider-owned LTE radio access network (RAN) to connect home end-user devices via carrier-provided radio transmissions. The Aldine ISD Tech department recognized that this would also be a viable option for the district. Although it was not financially feasible for the community to build a district-owned LTE tower, using the data from the CoSN study, they were able to approach the ISPs for connectivity options. The tech team said, "If we show [them] we have enough customers and need, that carrier may be able to put up a small tower for a few hundred families that needed the connectivity."

The Device Does Matter

Home connectivity is not only the only challenge for Aldine ISD. According to the CoSN Home Internet Connectivity study, high-quality devices are essential for instruction for secondary grade levels that offer programs like career technical education, which may require devices that depend on higher-processor applications. According to data regarding the types and performance of district-provided devices, upload and download speeds during online class/meetings can vary significantly by the age, type, and quality of the device used. Students with older and less powerful equipment had an inferior experience than students with newer devices. Students who received newer devices with limited specifications (e.g., memory and processor) also had more challenges than those with better specifications.

The pandemic created a unique situation for the Aldine ISD's nine high schools' CTE programs. These programs teach students the skills to graduate with a CAD certification that prepares them for rigorous college programs and career paths in engineering, architecture, and manufacturing. However, students need powerful computers with robust Central Processing Unit (CPU) utilization and intense graphic capabilities to participate in these programs during remote and in-person learning. The solution for the district was to purchase VMware licenses and Graphic Processing Units (GPU) to have a VDI solution capable of running 3D graphics. This purchase resulted in six hundred students graduating with an AutoCAD certification.

According to Aldine ISD, studies like the CoSN Home Internet Connectivity Study are wake-up calls. The future is not just how long students and families connect to the internet but what they are doing with the device, the quality of their experiences, and the ability to work and learn without bias or discrimination.