

Scenario 4: Techtowne

Technology drives the future

This scenario depicts a future where a series of significant technological events cause the whole structure and delivery of education in Charleston County to change. Educator roles change dramatically and a period of displacement and disruption is inevitable. The timing, subject matter, and method of content delivery are drastically changed. The primary role of educators is shifted to facilitators and team leaders. Private companies slowly get involved in the education sector and become ingrained in the governance and operation of the system, further tilting its direction toward an education system based on technology innovation. Virtual schooling becomes the new norm. While overhead costs are reduced, these changes do come at a price, as not everybody has access to the same opportunities. A sizeable portion of students are left behind and many report isolation from peers. There is unequal career development with industrial/technological-oriented professions given preference in detriment to more traditional or creative sectors. The technological ‘haves’ and ‘have nots’ exacerbate a distinct 2-tier system where only some can take advantage of the opportunities offered.

Technology is the primary driver of change

During the 2019-2020 school year, the Board embraces the role of technology and launches the use of digital content as a way to offer both intervention and acceleration of students’ learning paths. The following years make it clear that technological advancements are impacting education in a bigger way than previously predicted. CCSD continues to investigate technology models that mirror best-in-class education systems around the world. This is in line with the great advancements in the field of artificial intelligence (A.I.) and enabling technologies. New infrastructure deployments become widely available across the county, expanding accessibility to the internet. However, historical disparities in resources continue.

Many families living in high-poverty areas are unable to purchase technology hardware or access the internet reliably. These students report feeling increasingly segregated.

Due to the number of high-tech corporations established in Charleston, the high demand for a technologically advanced workforce continues to grow. In order to produce a viable workforce, these companies provide both funding and training to CCSD. These new players negotiate additional access to the students and higher control over the content and data generated from them. A series of new learning devices are deployed to all schools in 2024 allowing learning via virtual interactions and providing for individual learning styles and personal curriculum mastery. The instructional model



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shifts, changing the content delivery method and thereby enabling students to absorb content during non-school hours. Classroom time becomes more dedicated to project-based learning and creative sessions of group-based problem solving. Although postsecondary degrees and certificates continue to be the preferred pathways for CCSD graduates, technology has equally disruptive effects in colleges and universities. Dual credit courses and virtual learning have blurred the lines between high school and college.

As technology becomes an integral part of education in Charleston and elsewhere in the country, the school system struggles to adjust. Educational technology develops at a faster rate than the school system's ability to adapt. The majority of secondary learning takes place on A.I.-based models. While students in preK-8 continue to learn in more traditional formats, all students now have the ability to access all preK-12 curriculum. Students that need remedial help can access earlier material and those moving faster can access higher grade level materials. As more players create content for the education sector, lines begin to blur on who has the ultimate responsibility for what content is being created. Active discussions take place among school administrators, academics, A.I. developers, and corporations to determine the content best suited to schools. CCSD decides on specialized learning with an industrial focus

to better serve the city's industry needs. This decision comes at the expense of more creative work and the arts, which are given secondary status. Decision making based on data and algorithms becomes commonplace. Algorithms increasingly decide career tracks in Charleston, benefitting those prepared to take on these opportunities and their future employers, while further alienating segments of the student population.

The CCSD structure morphs

The School Board elected in 2020 promotes a vision to become a world-class technology leader in education. The Board empowers the superintendent and individual schools to invest in technology and prepare students for the future. The Board composition changes to include new members from various industries in the Charleston area and the Charleston County School District initiates a Career and Technology Advisory Board made up of innovators and representatives from tech corporations.

A period of instability ensues in the early-to-mid 2020s. No significant improvements are made to the achievement gap, particularly for North Charleston. The Board is still charged with operating schools and approving policies and procedures. At the same time, many of the

curriculum decisions begin to be made on a state-wide basis. Future sales tax referendum fails due to the public sentiment that schooling is becoming more virtual and funds for additional schools are no longer necessary. The continuing instability causes grassroots groups to lobby CCSD to select outside school operators to run select elementary, middle, and high schools. CCSD enters into an exclusive partnership with a large tech company. The Board moves the education system further in a virtual direction and both qualifies and oversees the technology applied to preK-12. Curricula is now driven exclusively by mastery of a subject rather than age or a nine-month calendar. Education plans are now individualized, not batched, with educators acting as coaches.

The expansion of virtual learning sees more and more students staying at home. High school and middle school students' soft skills development deteriorates. To counter this issue, year-round programs to encourage team building and problem solving are expanded along with athletics, culture, and the arts. These programs are supported by the school and supplemented by non-profits and state and private funding. Due to the increasing use of technology to deliver instructional content, fewer teachers are needed for secondary education. These labor savings allow for investment in 3K and

4K. By 2029, it is reported that 40% of teachers are working from home due to more virtual education opportunities. As changes in the education system continue, some teachers are moved to companies partnering with CCSD to provide company on-site training.

Bricks and mortar elementary schools continue on through the 2030s, mostly because of the continued need for supervision of children by working parents. Their delivery model looks very different, however. Students are able to work in multiage groups and mastery of standards is not set by age or grade, but by modified Montessori¹ methods. Many middle school and high school students come to educational learning hubs for less than 15 hours per week. K12 becomes K ∞ (infinity symbol), with near-infinite pathways to support life-long learning for all by 2035. These developments are coupled with natural patterns of retraining to adapt to changing market demands.

Education is shaped by technology

The series of rapid changes taking place in technology and in the CCSD structure have a significant impact on teachers and students. The learning devices deployed in 2024 have an initial positive effect on the pedagogy. Encouraged by these results, CCSD decides to open up virtual school options and community-based learning hubs under its own oversight. Teachers begin to serve as instructional coaches, specializing in innovation, design, and problem-based learning. Technology provides active engagement resulting in less emphasis on

1 <https://amshq.org/Montessori-Education/Introduction-to-Montessori>

behavior management and more focus on quality instruction. Students become co-teachers of the technology, as they are often better with the technology than the teachers themselves.

As the role of teachers changes, educators are forced to continuously adapt their teaching methods and increase their abilities to utilize technology efficiently and effectively. This change takes place throughout the mid 2020s and has a profound impact, which is particularly felt by teachers not proficient in technology. Teachers that are unable or unwilling to adapt resist the changes in the system. Many of these teachers leave the profession, while the rest take on additional training offered by CCSD in conjunction with industry. Teacher evaluations are also affected. By 2029, the system re-assesses teacher evaluations. The lowest performing teachers, especially in regard to utilizing technology, are removed from the classroom or removed from the system completely. There are winners and losers in this adjustment period. A new evaluation system allows for improved compensation programs that reward the best educators.

The emphasis on technology proves to be developmentally inappropriate for younger children and children with special needs. Initially, the special needs student population is mostly ignored and left out of technology changes, however software that recognizes specific disabilities such as autism is eventually improved. This advancement allows special-needs students to overcome their learning barriers and advance their knowledge and aptitude. Technology is also a driver

for changes in mobility and transportation. Instead of spending hours on a bus, starting during early hours, students learn remotely or in smaller community centers and in neighborhood elementary schools. Transporting these students is optimized via data with more, smaller, self-driven vehicles, instead of large buses having to travel long routes.

As the technological revolution progresses, more programming and content are demanded specifically by certain industries and companies. These companies push for A.I. and algorithms to determine the best and most-likely candidates for their employment at the earliest ages. Major employers use new tests to identify capable candidates earlier, and pay to educate them on-site, with contracts to work as they are ready. Students are encouraged to prepare for the industries for which they show aptitude, often to the exclusion of their aspirations and dreams. Colleges and universities also are identifying prospects far earlier, based on their aptitude and easily accessible data, and competing for their tuition dollars. Many students complain of not being given a variety of career paths. Avoiding such situations requires additional funds or resources that many families cannot afford. The racial and economic gap in education remains almost unchanged, being imposed not only by legislation, but also by algorithms and technology. By 2035, there are mixed results on the effects technology is having on education.

The changes experienced in Charleston are

Teachers in Tech Hubs

Average rent in Santa Clara County is over \$3500, among the highest in the country. Culinary Arts teacher, Rizi Manzon, says that he would be spending 75% of his salary on housing. Instead, he pays, \$1450/month for his apartment which is five minutes from Apple Headquarters. Mr. Manzon and other teachers are receiving a break because their employer, the Santa Clara Unified School District, owns this apartment complex and rents to teachers at below-market rates. However, they are nervous about their future. The lure of high

tech jobs flashes against anti-gentrification activists in these communities. It creates an unsettled community, which affects how people feel about the public schools. There is a conundrum of increasing gentrification driving out low-income families, leading to declining school enrollment which could mean layoffs for teachers.

Other school districts, including San Francisco, Los Angeles, and some in Colorado and North Carolina are trying similar solutions. In Santa Clara, the district-owned apartment where Mr. Manzon lives has a long waiting list of teachers. Stephen McMahon, a Santa Clara Deputy Superintendent commented:

“This isn’t the work we want to do. We have to do the housing thing because not being able to get employees compromises everything we want to do with our instruction and learning.”

Source: <https://www.nytimes.com/2019/01/04/us/teachers-priced-out-tech-hubs.html>



mirrored every day in classrooms elsewhere in America and the world. More and more students are learning remotely from sources across the globe. Content delivery and instruction are no longer limited to one teacher or classroom and the global demand for the best creates a new market for remote learning. Even if a group of students is receiving content in the same physical space, they may be receiving instruction from different sources around the world.

The dark side of technological progress

Charleston, along with every other district across the country, experiences significant technological advancement from 2020 to the mid 2030s. As much of this progress goes unchecked, technology isolates groups from each other, causing elements of mistrust, even while it makes opportunities to learn accessible to all children regardless of social and economic background. Privacy concerns are constantly raised by members of the community. Evaluations show that students' social skills are being impacted negatively. Additional support staff such as speech pathologists, mental health counselors, and psychologists become increasingly important, eating away at the cost savings of previous years. The rush to eliminate bricks and mortar is slowed as the need grows for community centers for social interaction and development around sports and culture. Education is becoming job- and career-focused to the point where the value of a liberal arts education is largely dismissed and pathways to jobs become the norm.

Some of the policies and practices that embed racism are eliminated with better equality of access to education. Racism, on the other hand, continues, as no significant effort has been made to address it

in the last decade. Developers continue to introduce biases for race or gender in algorithms and software. Segregation in schools and classrooms and resource disparities remain. Technology takes a heavy toll on the teaching and administrator professions. Many educators compete for fewer positions requiring different skills. To the extent that many in the profession are teachers of color, their displacement is an additional cause of friction.

Although most students see technology as an equalizer, they also report the loss of basic skills such as doing research with non-digital mediums like books and paper and, most notably, handwriting. Students and families that are not able to adapt to remote learning fall behind, and many report feeling disconnected from their community. Students left at home by working parents face increased social, emotional, and physical risks and isolation. More parents are forced to remain at home, especially in rural environments, to counteract this development. Few of the families in this situation have the skills and resources to work from home, thereby reducing family income.

The economic gap widens

The economy in Charleston grows throughout the 2020s. Charleston becomes a magnet for innovative companies and continues attracting top industrial players. The changes in the education system result in more students being trained at an earlier age to provide employable services. Flexible learning and working environments result in more trained students entering the workforce at an earlier age, yet continuing their education. Most people become part-time workers and

part-time students and then move to fulltime employment based on their ability to work with people and lead or adapt to change. Students without these skills struggle.

Changes in the world of work exacerbate the economic gap in Charleston. Technology improvements in health increase and expand working ages, leaving fewer opportunities for new employees in existing industries. A distinct two-tier worker system develops: there are those that have the skillset to take advantage of new opportunities created by technology, and those that do not. Charleston's economy grows unequally as a result and as companies move to the area, they bring with them upper-level management to oversee start up and implementation of effective company practices. The impact of these newcomers significantly increases home sales and the cost of homes, causing higher levels of gentrification in certain areas of Charleston, further exacerbating segregation in the county.

A future of increased opportunities and challenges

By 2035, the effect technology has had in the Charleston education system has mixed results. CCSD has moved to a more virtual school model. Teacher and administrator workforces have been impacted significantly, with many leaving the system. A large portion of students report feeling excited about the opportunities for individualized learning available to them. Many students have the resources to learn at their own pace and show mastery without regard to grade levels or school calendars, while others who lack access to technology continue to fall behind. Charleston has become an innovation hub where CCSD, in conjunction with technology companies, has shifted to an industrial focus in detriment to more creative careers and the arts. Algorithms help students decide career tracks where they show aptitude regardless of their aspirations. Race relations in the county have had little improvement and tech has had no effect in combating racism. Automation has become common place, reducing the number of jobs available in the manufacturing sector.