Transforming Cleaning: Schools Embrace Robots and AI

A guide to the role of robots and AI in enhancing school cleaning operations for consistency, reliability, insights, and productivity

School Cleaning Struggles

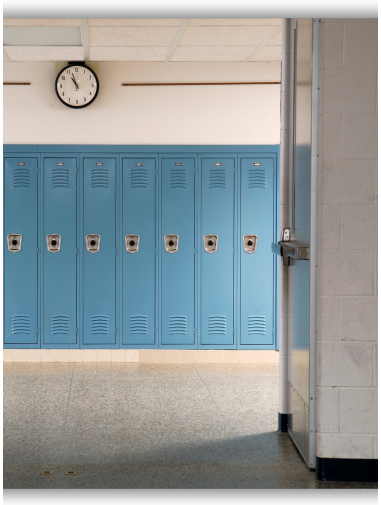
Schools grapple with meeting their cleaning demands amidst labor challenges, including staffing shortages and turnover, compounded by the additional hurdle of budget constraints as costs escalate annually.

AUTOMATED CLEANING ADVANTAGES

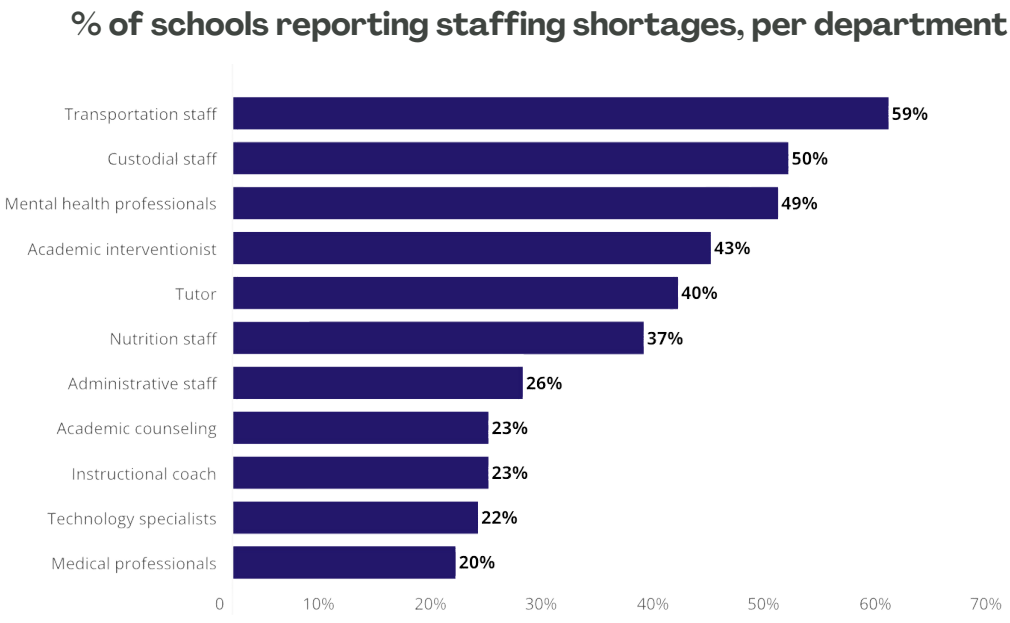
Floor cleaning robots offer a cost-effective solution for schools facing labor shortages and budget constraints by automating cleaning tasks, reducing demands on manual labor and providing financial benefits.

Current cleaning practices face labor shortages and rising costs

Creating clean, safe, and healthy learning environments is a top priority for every school. However, the current labor shortages and escalating labor costs have presented a significant challenge for school leaders. They are faced with the daunting task of maintaining higher cleaning standards while grappling with limited resources. These heightened expectations for facility cleanliness have resulted in understaffed and overworked custodial teams.



Consequently, this strain has a direct impact on the seamless functioning of the school on a day-to-day basis. The shortage of custodial resources has compelled many administrators to witness teachers and other faculty members taking on extra cleaning duties, such as maintaining classrooms and bathrooms. This situation adversely affects job satisfaction and steals valuable time away from focusing on the students' educational needs.

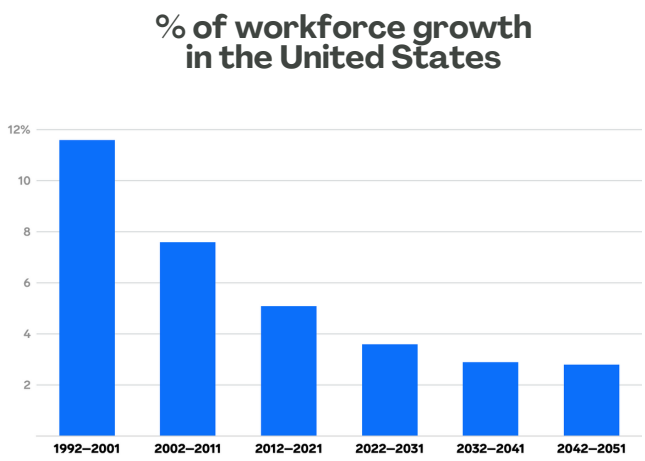


Source: What School Staffing Shortages Look Like Now, Education Week, 2022

Labor shortages are a long term issue

According to Business Insider, in April 2023, the unemployment rate declined to its lowest level since 1969. At the same time, the Congressional Budget Office projects the potential labor force to expand by only 3.6% between 2022 and 2031 — one-eighth of the pace in the 1970s.

Source: The Forever Labor Shortage, Business Insider, 2023



Over the following decade, that growth is projected to slow even more, to 2.9%. What this means is that employers face decades of an essentially stagnant labor pool.

> **"The labor shortage we're dealing with today is likely to remain this way — and perhaps get even worse. It's going to continue to be really hard to attract people and get them into new jobs."**
>
> - Jay Denton, the chief analytics officer at LaborIQ

The multifaceted responsibilities of custodians

Custodians are responsible for maintaining a clean, safe, and hygienic environment conducive to learning. Their role is often underestimated, and the demands placed on them are extensive. Their responsibilities are diverse and encompass a wide range of tasks, including:

- **Cleaning and Sanitizing**: Custodians are responsible for cleaning classrooms, restrooms, and common areas. This includes dusting and disinfecting surfaces.

- **Waste Management:** Custodians must collect, empty, and maintain trash receptacles throughout the facility.

- **Floor Care:** Custodians are tasked with maintaining the floors, which includes regular sweeping, mopping, and, in some cases, waxing and buffing to keep them looking clean and safe.

- **Restroom Maintenance**: Restrooms are a high-traffic area that demands constant attention. Custodians must ensure that toilets, sinks, and fixtures are clean, stocked with supplies, and in working order.

- **Supply Management**: Ordering, storing, and distributing cleaning supplies, toiletries, and other materials are part of the custodian's duties. Keeping an inventory and restocking as needed is crucial.

- **Event Setup and Cleanup**: Schools host various events, and custodians are responsible for setting up and cleaning up after these events, which can involve long hours.

- **Maintenance Reporting**: Identifying and reporting maintenance issues, such as broken fixtures, leaking pipes, or malfunctioning HVAC systems, is essential to prevent costly repairs and maintain safety.

- **Outdoor Upkeep**: From cutting grass, to cleaning playgrounds and parking lots, and even snow and ice removal from walkways , custodians play also make sure outdoor spaces are clean and attractive.

What cleaning means to educational institutions

Educational institutions are breeding grounds for knowledge, creativity, and social interaction. However, they are also breeding grounds for germs if not properly maintained.

Cleanliness and hygiene within educational institutions are not merely aesthetic concerns; they are essential for creating an environment conducive to learning and well-being. Students, teachers, and staff spend a significant portion of their day in these facilities, making it imperative to maintain clean and safe spaces.

Health and Well-being

Clean schools reduce the risk of illnesses and allergies, creating a healthier environment for students and staff. Improved cleaning quality contributes to better health, reducing absenteeism due to illness.

Student Performance

Studies have shown that clean and well-maintained classrooms positively influence student performance. A tidy environment promotes focus, concentration, and a sense of order, leading to improved academic outcomes.

Safety

Clean and clutter-free spaces reduce the risk of accidents. Maintaining walkways, staircases, and common areas free from hazards is crucial for student and staff safety.

$25b

costs of teacher abbesses for schools across the United States annually

$4b

cost of substitute teachers for schools across the United States annually

43.5%

of schools provide guidance for infectious disease prevention

Source: How Dirty Is Your Child's School, ISSA

Bring robots and AI onto your cleaning teams

Many organizations are reconsidering traditional cleaning methods and, instead, deploying robots and AI to help automate the time-consuming task of cleaning floors, creating more efficient and productive teams built for the future.

Increase Capacity of Teams	Offload the time-consuming task of floor cleaning to robots so your teams have more time to tackle all that needs to get done.
Enhance Cleanliness with Added Visibility	Ensure work is getting done and create a foundation for consistent, high-quality cleaning with the visibility provided by insights
Establish More Reliability	Establish consistency and reliability within your operations, while stabilizing your costs

Increase Capacity of Teams

With cleaning demands rising faster than professional cleaning resources, cleaning teams may find themselves overburdened and forced to make tradeoffs between the quantity and quality of their work — especially as it relates to cleaning floors. Enter cleaning robots. Robotic floor scrubbers can take on the tedious, yet crucial, task of deep cleaning floors, increasing custodial staff's bandwidth to focus on disinfecting high-touch surfaces throughout the school. Hence, robots don't replace cleaning staff, they work alongside employees to make existing cleaning teams more efficient. Additionally, some robotic floor scrubbers are practically identical to manual cleaning machines already used by schools. Since cleaning teams are typically familiar with this equipment, adopting robotic cleaning teammates to fill gaps is a relatively simple process.

Enhance Cleanliness with Added Visibility

Making sure cleaning tasks have been completed thoroughly and on time is a challenge for custodial staff and school administrators across the country. However, robot floor cleaners deliver near real-time performance and utilization tracking, assuring school administrations that facilities are consistently and thoroughly cleaned. This data help verify if and when cleaning has been done correctly, delivering quantifiable proof that schools are taking the necessary steps to mitigate health and safety risks.

Establish More Reliability

The heightened focus on facility cleaning means schools must clean more frequently, which implies the need for efficient and reliable work. Additionally, rising wages and changes to mandated benefits raise concerns for school districts that may face even more budget cuts. Robotic floor cleaners provide a solid foundation for consistent facility cleaning, giving schools the confidence that their spaces will be thoroughly cleaned and addressing operational challenges related to logistics and costs. Whereas cleaning in a traditional manner compounds labor costs, robots enable schools to do more to keep facilities clean and stay within their budget, saving them thousands of dollars over time.

Case study: Denver Public Schools leverages robotic floor scrubbers to solve labor challenges and increased demand for cleanliness

Executive Summary

Denver Public Schools, DPS, is one of the largest school districts in the United States with 226 schools for 90,000 students, and 10 administrative facilities that total more than 16 million square feet of floors to clean.

Like many schools across the country, DPS was grappling with increased hygiene responsibilities in their facilities due to the pandemic and post-pandemic expectations. That, coupled with staffing shortages that spanned the US and affected nearly every industry, including education, made meeting the increased demands even more of a challenge. Adding cleaning robots to their maintenance teams helped to close staffing gaps while increasing the efficiency and effectiveness of the cleaning programs for DPS. It also provided a trackable level of cleanliness that improved the safety and wellbeing of students as well as staff.

Challenge

The cleaning challenges that DPS faced are the same ones that many businesses face: increased demand for cleanliness and labor shortages. “Reduced resources mean reduced capacity. Meeting customer service needs is an ongoing struggle that grows more challenging each year,” says Richard Archuletta, director of facility operations for DPS.

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The district’s internal quality assurance program had shown a decrease in scores related to cleaning. “We anticipate our scores will go up with these machines, as they are used daily and nightly to help improve the overall condition of in our spaces,” says Archuletta.

Prior to the COVID-19 pandemic, the district's maintenance and cleaning department was experiencing serious funding gaps and was grossly understaffed. The pandemic exacerbated the issues, bringing them to a critical status. "When you don't have enough staff to meet all the needs of the facility due to funding, one of the things that drops off is floor reconditioning because health and safety cleaning tasks come first," Archuletta says.

With staffing shortages being a hot topic, Archuletta states recent economic changes have only worsened a decades-long problem in the janitorial industry. The district is always looking for ways to save on time and budget, and still deliver a quality product. Necessary labor skills for maintenance employees, training expenses, and a competitive job market have left the district in a difficult position trying to keep up with demand. Presently, the school system shows many open cleaning and maintenance positions, a number that translates into about "75 percent of staff left to do 100 percent of the jobs," according to Archuletta.

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Understaffed teams lead to overworked employees. Research shows that when employees are overworked it can lead to increased stress and burnout, which leads to low morale. This results in increased absenteeism. The lack of effective and adequate employee support has caused employee absenteeism to reach critical levels.

Solution

To address the staffing crisis for their maintenance teams while also providing a clean, safe, and healthy learning environment, DPS began exploring innovative solutions that would be help increase productivity and cleaning effectiveness, and narrow the staffing gap. After considering several options, DPS selected Tennant's T380AMR robotic floor scrubber.

According to Archuletta, “this program will help us fill a staffing gap that most urban school districts face, which is limited resources and funding to meet the ever-growing need for facilities.”

Several factors strongly impacted DPS’s purchasing decision, including:

- **Quality & serviceability** of Tennant cleaning equipment
- **Easy to use** for non-technical employees to train, deploy, and adjust cleaning routes
- **Powered by BrainOS** from Brain Corp, the machines provide “proof of work” metrics, which help verify and optimize performance, and also facilitating data privacy and security
- **Regular software updates** mean the machines have the latest technology and are safe to use while students and staff walk the hallways

“There are tons of robots out there,” says Archuletta, “but they need an operator’s guidance to stay on track.” With the support of Tennant and Brain Corp, deployment of the 20 T380AMR machines went smoothly, and the benefits were noted and appreciated by DPS decision makers.

Results

DPS has realized outstanding results and benefits since deploying the 20 robotic scrubbers. These 20 units clean autonomously an average of an hour and a half each day, per unit, that’s nearly 30 labor hours, per day! During this 90-minute robotic cleaning, each machine scrubs an average of nearly 21,000 square feet. Since the initial deployment, these 20 machines have over 5,500 hours of autonomous run time, robotically scrubbing more than 73 million square feet!

Cleaning and maintenance employees are enthusiastic about this new technology: robotic scrubbers allow staff to level up their own skills by managing the robotics. Furthermore, they are free to focus on other necessary tasks, meaning that they can accomplish more in a day than they could before the autonomous scrubbers were deployed. This has improved employee morale as well.

Leadership is very pleased with the performance and benefits of the first 14 scrubbers, which led to the purchase of an additional 6 units. “These robotic floor cleaners are a critical technology investment that are helping us enhance cleanliness in buildings across our entire district. This is a huge benefit to our staff and students, while maintaining operating costs,” says Archuletta. “These scrubbers can cover more area in a shorter time while freeing up the maintenance staff to take care of other necessary duties that may have been pushed to the backburner due to staffing shortages – it’s a win-win.”

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In all, the Tennant T380AMR robotic floor scrubbers have made a significant difference for Denver Public Schools, and will continue to yield significant returns on the district’s investment going forward.

Our solution: Automating floor care and unlocking cleaning insights with robots and AI

At Brain Corp, we power the world's largest fleet of mobile robots operating in commercial public spaces. Our autonomy platform, BrainOS®, drives robotic and AI applications at scale, empowering organizations to automate and infuse intelligence into core operations.

#1
In Deployed Robots

30,000+
Autonomous Robots Deployed Worldwide

10+ million
Hours of Productivity Added

Our unique approach: We've integrated with leading floor care equipment to deliver the best offering

We embed our robotic brains within allies' brawn - merging AI driver software and partners' stalwart commercial equipment into autonomous robots boasting unparalleled quality.

Superior Cleaning Performance
Many cleaning robots aren't actually good at cleaning. Our partners are renowned for producing high-quality results

Unparalleled Support Networks
You do not want to wait long for your machines to receive maintenance when needed. Benefit from an established and extensive support network, ensuring seamless maintenance

Machine Options
By partnering with OEMs, we enable you to choose the best solution for each building, including different machine sizes and types.

BrainOS® Clean Suite: A comprehensive autonomy platform for floor care

Robotic Autonomy

Increase your team's capacity with the most proven robotics platform that is easy for all to use

Proven Navigation System

More robots run on the BrainOS® Robotics Platform than any other system, giving you the peace of mind that you're utilizing the most trusted solution.

Industry Leading Safety

Our safety-first architecture is unparalleled in the robotics industry. The BrainOS controller meets the UL 60730-1 Safety standard, which is the applicable safety standard for automatic control systems and an active certification is maintained with UL, meaning every single software release we do goes through UL certification. Additionally, the BrainOS platform also enables end product compliance to CSA/ANSI C22.2 No. 336-17 and IEC 63327 which are safety standards written specifically for autonomous floor cleaning machines in public spaces.

Intuitive User Interface

Our smartphone-like user interface is easy for all to use. This provides a familiar and graphical digital interface that is intuitive and requires l training to understand the function of each button.

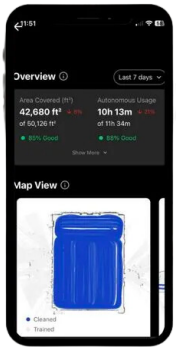
Flexible Route Teaching Methods

Easily create and change routes whenever you wish using our two route teach methods:

- Teach & Repeat: The ability of a robot to learn and replicate specific cleaning routes and patterns, enabling consistent cleaning, customizability/flexibility, and ease of use for all people.
- Area Fill: The ability of a robot to learn and replicate routes in large open areas (e.g. gymnasiums) simply by circling the perimeter, requiring less training time.

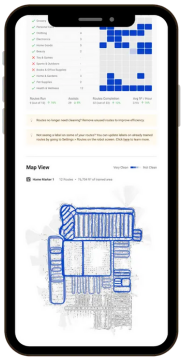
Cleaning Management and Intelligence

Illuminate your operations with powerful insights and analytics



BrainOS Mobile app

Empower your operators and managers with real time controls and insights that provide features like live maps to see proof of work in real time, alerts so operators can easily manage their machines, and usage stats to see the performance of your robots and your operations.



BrainOS® Email Reports

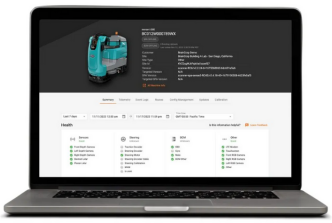
Receive summaries of your cleaning operations, including maps that let you see all areas cleaned and not cleaned, charts that show what routes were cleaned and on what days and summaries of stats to know the number of hours of cleaning, square footage cleaned and % of autonomous usage.

BrainOS® Portal

Our cloud-based Portal provides fleet-level dashboards with drill down capabilities and rich reporting modules. Real-time data capture provides actionable insights and helps drive strategic decision-making!

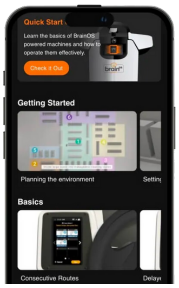
Autonomy Services

Establish more reliability with your cleaning operations with advanced tools and support



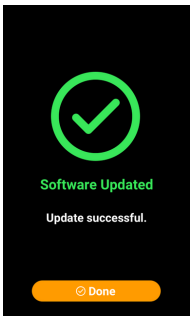
Remote Machine Diagnostics & Route Evaluations

Cloud tools allows us to monitor the health of your machines and diagnose issues quickly to ensure your operations are generating ROI. Additionally, our cloud tools allows us to monitor the health of your cleaning routes, and suggest improvements directly to operators to help your operations.



Trainings

Empower your teams through access to training content and video resources that unlocks the full potential of your robot operations.



Software Maintenance and Upgrades

The ever growing data from seeing more edge cases every day than any other platform means what one robot sees and encounters improves that capability of the whole fleet. We frequently push out new software updates so your autonomous robots continuously get upgraded with the latest features, performance improvements, and bug fixes, helping your operations get even better over time.

Ready for robotic floor scrubbers in your schools?

The ROI is strong if you agree with any of the following statements:

- We spend 90 minutes or more per day scrubbing floors per school location.
- We are looking to provide a cleaner, safer environment for students, faculty and staff.
- We are looking to expand workforce capacity by giving additional time back to custodial teams to take care of higher value tasks.
- We have high faculty turnover caused by faculty going to seek other opportunities.
- We need new operational data and insights to drive performance and verify.

Why leaders choose BrainOS?

Proven at Scale

More autonomous robots with more hours and miles driven than anyone else.

Meaningful Insights

Ensure work is getting done and easily show leadership your productivity gains.

Top Cleaning Performance

Our approach brings you the best cleaning equipment and support, and the best autonomy.

Automate with Brain Corp

Brain Corp is the global leader in robotic AI software that powers the largest fleet of autonomous mobile robots (AMRs) operating in commercial public spaces. Global OEM partners use the company's cloud-connected platform, BrainOS®, to create scalable, self-driving robots that are used by end customers to clean floors and sense environmental data - turning manual operations into automated workflows. Fortune 500 brands across multiple verticals benefit from the growing portfolio of BrainOS®-powered robots and our industry-leading privacy, safety and efficiency tools that make managing and scaling automation easier. Brain Corp currently powers more than 30,000 AMRs, representing the largest fleet of its kind in the world.

www.braincorp.com