Seven Ways AI Elevates the Student Experience

By Mark Crawford

With proper support from facilities management leaders, digital technologies can transform university campuses into places where buildings monitor their maintenance requirements, HVAC systems self-adjust in real time, and space is optimized for the needs of students and staff.

This is all possible with the Internet of Things (IoT) and artificial intelligence (AI)—not just for creating the best student experience possible but also for taking innovation in campus facilities management to a higher level. AI nurtures broader confidence among staff in the power of data analytics and how they can lead to more agile and informed decision-making—ultimately resulting in an improved campus experience that makes for happier students and staff.

Facilities management professionals have complex schedules that involve a range of responsibilities, including maintaining infrastructure, HVAC systems, and maintenance routines. Automation, IoT, and AI make these tasks faster and easier to perform, reducing errors, time, and resource costs. These capabilities can personalize student experience and help staff better understand the complex systems they manage.

Below are seven ways that AI assists facilities managers in improving the student experience by creating smoother and more efficient operations, all while prioritizing student comfort, ease, and engagement.

1. **Planning, Design, and Construction:** AI tools are often used on campus to schedule construction when student foot traffic is the lightest. AI can also manage other tasks, often in real-time, such as delivery of materials and equipment, managing the trades on-site, change orders, and reviewing

building codes, regulations, and design guidelines to maximize efficiency during construction. AI-powered drones can improve quality control by inspecting construction sites from the air,

correcting workflow issues and unsafe operations, thereby improving quality control processes and the safety of students in the vicinity of construction.

2. **Streamline and Expedite Orders:** Custodial issues that impact the student experience, such as temperature, backup systems, cleaning schedules, lighting, plumbing, and other daily custodial and maintenance tasks can all be managed by AI. For example, AI can identify an issue with an asset on campus and then automatically generate a work order to schedule a maintenance appointment. "A process like this significantly improves a preventative maintenance routine, as well as possibly reducing what may be added to a deferred maintenance plan," said Ben Boslaugh, utilities manager in the facilities management office at Missouri State University in Springfield, Missouri.

3. **Predictive Maintenance:** When embedded in equipment, AI and IoT sensor technologies analyze operational data that can reveal subtle patterns and variances that can be fixed immediately before they become more serious issues later. Through predictive alerts and automated adjustments, AI solutions can maintain uninterrupted operations, effectively reducing downtime and preventing potential issues from becoming costly problems. This forward-thinking approach ensures that facilities managers are always one step ahead of operational challenges.

4. **Predictive Building Management:** An ongoing challenge for facility managers is making existing classrooms and workspaces as efficient and comfortable as possible while minimizing resource waste. AI can significantly improve space planning by using predictive analytics to evaluate space occupancy, foot traffic, employee preferences, and other space utilization patterns. By understanding how various areas in a facility are used throughout the day, AI can then recommend optimized space layouts and facility managers can leverage this information to create flexible workspaces that adapt to changing workforce dynamics.

5. **Smart Energy Management:** AI can track energy use across all campus facilities and grounds to identify patterns in energy consumption. After analyzing the data, AI then automatically adjusts HVAC systems to optimize energy use, thereby reducing costs and making rooms more comfortable (for example, student housing). Historical data on temperature and weather events can be analyzed by AI to predict possible impacts of high winds, cold temperatures, or heavy precipitation on-campus facilities and grounds, such as frozen pipes. Facilities management staff can also use AI-connected flood sensors to identify potential water and mold damage risks.

6. **Inventory management:** Efficient resource allocation is a vital aspect of facility management, which AI can optimize through data analysis and predictive modeling. AI can analyze data on equipment management to identify current and future equipment needs, track resources, and plan for expansion/upgrades and capital expenditures. AI streamlines inventory management by predicting the consumption rates of supplies and automating restocking processes. Consequently, facility managers achieve significant cost savings and operational streamlining.

7. **Safety and Security:** AI-based video surveillance systems can detect unusual behavior or patterns that may indicate a potential threat and monitor campuses for any safety hazards, such as unattended items or maintenance issues, alerting the relevant teams immediately.

In 2023, Eastern Michigan University (EMU) in Ypsilanti became one of the first higher-education institutions in the state to implement an AI-based gun detection system. The system integrated its AI gun detection and intelligent situational awareness software with EMU's existing digital security cameras. If a gun is identified, images are sent immediately to an operations center. If the threat is deemed valid, alerts and actionable intelligence are transmitted to the campus police force as fast as three to five seconds from detection.

"In the event of gun-related violence, the advance notice will provide our first responders with the opportunity to intervene proactively and potentially de-escalate the situation," said Matthew Lige, executive director of public safety and chief of police at EMU. "It will also provide Department of Public Safety staff the ability to notify the campus community with timely and accurate information in order to make informed safety decisions."

Moving Forward

By using AI and the Internet of Things, facilities staff can quickly monitor operational processes in real-time and make data-informed decisions about space optimization, resource allocation, inventory management, and preventive maintenance strategies. Data sources include machine performance, water and energy usage, maintenance logs, and occupancy data.

Perhaps the most exciting part of AI is Generative AI, or GenAI. This process goes beyond traditional AI by generating new designs and solutions based on analyzing parameters imported into the software program or large data sets.

"Ideas can be generated based on input criteria, optimized floor plan layouts for space efficiencies, and virtual simulations to test-fit scenarios during design development," said Boslaugh. "Leveraging AI in facilities management will be transformative with new ways to improve and become more effective."

Facility managers can leverage generative AI to explore multiple design possibilities and select the most efficient and cost-effective solution, noted Facilities.Net.

This, in turn, dramatically enhances decision-making in facilities management "by transforming complex building data into precise, easy-to-understand visualizations and recommendations," added Brain Box AI. "GenAI can create customized solutions that align with the specific needs of each facility."

Park noted that AI is not just about cutting costs but also about using resources wisely, improving safety, and creating an environment conducive to learning and growth. "By implementing AI solutions," he said, "campus facilities managers can optimize operations, make more informed decisions, and enhance student and staff experience."

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