

Higher Education Buyers Guide

Automating Student Attendance Tracking

Universities, Colleges and Private Training Institutes

Discover what you need to know about attendance automation:

- What are the challenges of tracking attendance?
- Where will attendance information flow?
- Typical attendance automation scenarios
- The attendance technology landscape and hardware options
- What you need to consider when automating attendance

Higher Education Buyers Guide

Welcome to the attendance system buyers guide which will help you work your way towards successfully automating attendance capture at your College, University or Private Training Institute.

This guide has been prepared based on our research and experience with attendance tracking technology options. In this guide we explore some of the key reasons for taking attendance in higher education, challenges, and the technology options available for automating attendance tracking.

This guide will be valuable if you're evaluating attendance automation options, whether you want to track attendance as a whole, by session, lecture or lab.

Why is Tracking Attendance Important?

- **Funding** - Funding is based on student attendance in many states. Being able to correctly collect, and report this data ensures that the deserved funding is received.
- **Grading** - Courses grades can be based on student attendance. With an automated system, it is easier for students to be aware of their attendance record for a particular class, and be sent notifications if their absences are beginning to impact their grades. It may be that teaching staff believes attendance should be used in grading, but have avoided implementing it due to the time it would take away from teaching.
- **Resource utilization** - Accurate information on how many students are using each room at any time enables you to know which rooms are vacant, under-utilized or over utilized and when. Resource utilization can help with planning and time-tabling.
- **Increase student retention** – For most students, there is a correlation between their achievement and attendance. It makes sense that students who attend more classes are better prepared. Knowing which students are late to class or skip class, helps you to target your early intervention activities. Students who succeed are more likely to complete their qualification or continue their studies with you.
- **Better decision making** – Incorporating attendance information into your business intelligence system enables you to make even more informed decisions based on student attendance patterns.
- **Sports programs** - Manage planned absences for students that are excused to attend sports programs. Coaches can mark in advance when students will be required for sports, and the attendance system can mark those students as excused from class in advance preventing them from being marked as absent.
- **Exams** - Verifying that the person who sat an exam is the same person who is on the exam sheet.

Attendance challenges

When attendance is required, it is typically taken by teaching staff at the beginning of each session or lab. This process is time-consuming and disruptive because if a student is tardy, teaching staff must stop to record it (or remember it for later). Many Student Information Systems (SIS) now facilitate the manual entry of attendance directly into the SIS; it may be slower than using paper and pen.

Many staff will take attendance quickly during class using Excel, or pen and paper, then transfer it into the Student Information System at the end of the day or week.

Manual attendance tracking presents some challenges:

- The teaching staff may misplace the attendance paper or excel file they were using.
- Attendance is not kept in real time.
- Teaching Staff, lose a lot of time cumulatively taking attendance manually.
- Classes can be disrupted by a late student, as teaching staff must stop and record the student as late.
- Teaching staff don't want to take attendance; some of them don't feel like it is part of teaching so try to get it over and done with as fast as possible, risking accuracy.
- Staff must be present to record attendance, meaning resources such as libraries and resource rooms will not record student attendance.
- The larger the class, the greater the challenges.

Attendance tracking is perfect for automation

Moving to an automated system can address many of the pains associated with recording attendance:

- **Automation requires little or no teaching class time.** Students can scan in as they enter the facility, building or room.
- **Rules around lateness can be defined** to mark late comers or absentees. Depending on your SIS, various alerts could be triggered by constant lateness.
- **Administrators can see real-time, accurate attendance.** This is powerful because faculty can send alerts to students querying their lack of attendance, and requesting follow-up if required.
- **For exam attendance, supervisors can verify in real time** that the student presented looks like their photo recorded in the SIS. Extra information about the student can be available in real time including cheating history or, if they have not shown up, alerted so they can potentially arrive and begin before test material can be compromised by students leaving the exam.
- **Accurate attendance information** when you need them from your SIS. No more time spent chasing up staff to complete attendance or query anomalies.

When evaluating automation options, it is critical that the chosen solution works for all students. For example, take care when evaluating solutions dependent on each student having a charged smart phone or a phone of a particular type, as this is unlikely to be feasible across the entire student population.

Where is your data coming from, and where is it going?

Data flow is an important aspect of an automated attendance system. You already have a Student Information System, possibly coupled with a separate learning management system (LMS) and/or time-tabling system. These systems hold your student and class data which needs to be utilized in the process of tracking attendance against students.

There needs to be robust integration between some or all of these systems so that attendance records can be reconciled against students and classes in the right system for the right time. The kind of integration may affect the degree of automation which is possible.

If you run a separate time table management system, this may be the source of all data required for attendance tracking. If your SIS provides timetable and attendance tracking functionality, then this would be the source and destination for attendance tracking data.

Servers	Considerations
Local / On-site	An on-site server will process the incoming scans and direct them to your SIS. If you do not already maintain servers, this will add cost through infrastructure and maintenance to your IT budget.
Cloud	Cloud-based allows you to subscribe to a service that provides the application hosting, maintenance, backups and guaranteed uptime/redundancy.

Accuracy and completeness of timetable data

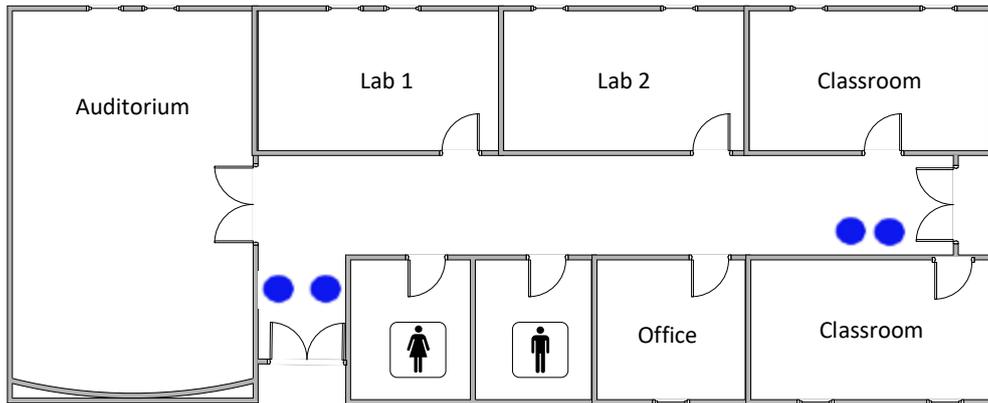
Automated attendance tracking requires accurate data. It is only possible to track each student's attendance if the student's enrolment details are up to date, and the student's classes are scheduled with a set location and time. Until now you may not have needed this information to be up to date.



Attendance automation scenarios

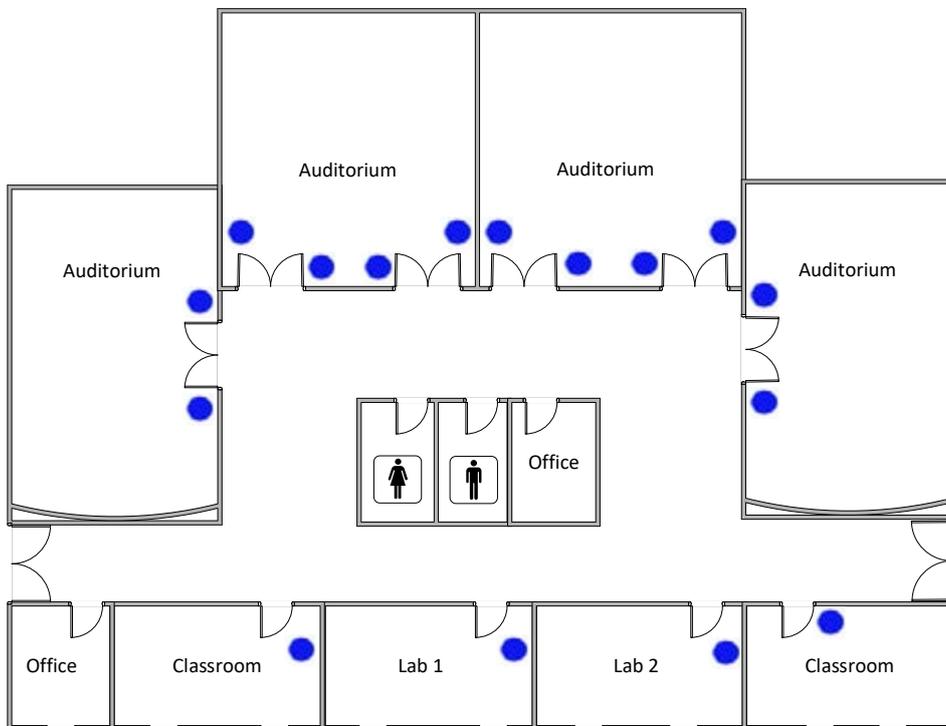
Monitor building/floor/department entry (and exit)

To determine a student entering and leaving a building, or area of a building. This can be useful where a student's timetable does not restrict them to a room. Such as where a student moves between classroom, lab and lecture.



Monitor entry (and exit)

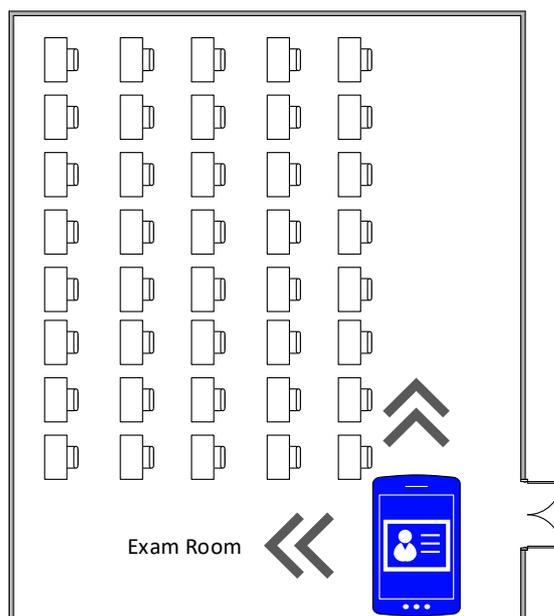
To all timetabled locations to determine a student arriving to specific classes or labs at specific times.



Mobile - exam tracking, tutorials, in the field

In an exam situation, to confirm the Identity of students. A mobile device scans student IDs at the door, allowing the instructor to verify that each student is who they say they are by looking at the student's picture and details that pop up on screen as the student scans.

In a tutorial or in the field, simply scanning each student's card, with their attendance time recorded back to the attendance system.



The attendance technology landscape

There are a variety of technologies which may help to track student attendance. Some of these options do allow for students to circumvent the attendance system. Our experience has shown that only a small subset of students would actively try this. Deterrents such as having staff in the room when the scanning is taking place, significant penalties, or random head-counts (to check if they correlate with the scan ins), can all be easily implemented.

NFC / RFID

A small contact-less tag that can be built into student identification cards, key fobs, and even stickers. These allow students to scan their card past a scanner without removing it from their wallet or lanyard. This makes it possible to scan several students within a short time. Active RFID is a related technology which uses bigger tags that can be scanned by passing near a reader rather than being taken close to the device. Most NFC scanner hardware is not designed with student attendance tracking in mind.

Magnetic stripe

Use of a magnetic card reader to read the magnetic stripe on a card. This can cause delays when many students are trying to get into a room. Students will also have to get the card out of any holder to run it through the reader, causing wear to the card.

Barcode / QR code

Use of a camera or laser barcode reader can also cause delays at classroom entryways. Sometimes barcodes can also be difficult to scan. The cards need to be orientated a certain way, and may not work if in a plastic holder.

Biometric (finger print scanning)

Can be accurate and fool-proof. However biometric systems use degrees of accuracy to match fingerprints and their suitability needs to be carefully checked for reliability, consistency and speed. There may be concerns about storing personal biometric student data. Some options use biometric data to validate that a student is swiping their card - in which case fingerprint data can be stored on each student's card.

Face recognition

Technology has not advanced enough to make face recognition a cost effective method of attendance tracking. Options include having a camera monitoring entry points or a camera which can scan a class room.

Geo-fence (using Bluetooth/Bluetooth LE/iBeacon/Wi-Fi)

By having a centralized hub for each classroom, students can be marked as attended by the hub sensing their phone. While this removes cards from the equation, it does presume that students will always have their phone on them, charged, with the relevant service activated. This works for building or school attendance, and not class by class, due to its extended range. A similar technology called iBeacon can also be used, however, this shares the same weakness as geo-fencing. Impersonating an iBeacon is simple.



How do the technologies compare?

Technology	Contactless?	Speed of Scan	Card Resilience	Location Accuracy	Risk of Impersonation
RFID	Y	Fastest	High	High	Medium (Student can bring others card)
Magnet Stripe	N	Fast	Mid	High	Medium (Student can bring others card)
Barcode or QR Code	Y	Slow	Mid	High	High (Students can photocopy barcodes)
Biometrics or Face Recognition	Y	Depends	N/A	High	Low
Geo-fence	Y	N/A	N/A	Low	Medium (Student can bring others device)



Attendance tracking hardware options

There are several common choices with hardware selection and configuration.

Laptop connected to scanner via USB cable

Many 'off the shelf' USB scanners can read magnetic strip, barcodes, and RFID. This can be the fastest way to digitize the attendance, with the resulting scan being directed into a desktop application such as Excel.

Pros

- Fast startup and off the shelf hardware

Cons

- Laptop must be maintained and kept updated
- May not be desirable to be left unattended due to easy tampering
- Laptop or components could be stolen
- Not scalable



Tablet or Smartphone Based System

Mobile devices can be used to automate your attendance in several ways. Barcodes can be read using the onboard phone/tablet cameras. Most devices now come with RFID readers built in. With the right app, these can be translated into attendance recording devices.

Pros

- Extremely mobile, a good option if you are using one device to record attendance in different locations.

Cons

- Cannot be left unattended
- Requires updates and charging
- Have to scan from the back of the device

Specialized Attendance Scanners

Attendance scanners that have been specifically designed to enable the tracking of attendance.

Pros

- Hardware device, requiring no updating or maintenance
- Wall or desk mounted
- Ethernet or Wi-Fi connectivity to prevent infrastructure installation
- Can be left unattended, fully automated

Cons

- The vast majority are designed for tracking employee attendance (time clock) and to control door entry, rather than for tracking student attendance in education. This means many hardware devices are slow and not designed to integrate with educational systems.

Existing Access Control System

If you have electronic door locks on rooms, that require a card access, then it is possible that these systems will be able to integrate with an attendance system. Integration would be required to convert the scans into attendance (Tardy, absent, etc.). However, these systems are not designed for tracking attendance and re-purposing them for this may not be possible – check with your vendor.

Hardware considerations

Unit Type	Considerations
Accessory (Connected to a computer via USB)	This option requires a PC at every scanner/reader. Requiring that the PC is kept updated and maintained. Increasing costs in the long term. The chances of failure double, as you have the PC and the scanner to keep running.
Standalone Unit (Network/Internet connected)	Standalone unit handles scanning data and data transfer automatically, with direct connection to the network or internet. Data processing handled by a centralized server or cloud service.
Mobile Device (with RFID built-in)	Similar to a stand-alone scanner, with an advantage that it can be highly mobile, allowing for attendance to be recorded outside of the classroom or lecture theater environment. Any mobile device with a camera can read barcodes and QR codes, most android devices now contain a built in RFID reader as well.



Buying soon? Things to consider

These are the questions to ask and points to consider as you navigate towards a solution. You don't need to know all the answers right now. It will help to be aware of what may be asked of you.

Data flow

- Where is your student and timetable data currently? Which SIS do you use, and is information stored within your school or in the cloud.
- Is your student data accessible – does your SIS provide an API or other way to obtain student and timetable information?
- Where do you need the student attendance records to be stored?
 - In your SIS?
 - If your SIS is not accessible, consider if you would be happy to have attendance records managed by third party software

Card management

- If you plan to use cards for students to scan in and out, how will you manage the cards, and those that are not scanned? There needs to be awareness of which cards have been assigned to which students.
 - In SIS? (SIS may not have a facility to manage card information)
 - In third party attendance software?
- If you are already using cards, consider if they will work for automating attendance. Are your cards RFID/ NFC and do they support a common protocol such as MIFARE® or FeliCa®?
- How will new replacement cards be handled?

Time-tabling and tracking

- Do you need to scan by day or half day or class?
- Do you need to track attendance for each individual class room?
- Do students need to scan out?
- How will approved absences be handled?
 - Student Information System
 - Third party attendance software
- How will attendance be recorded for students who lose their cards?
- What kind of triggers and actions do you require as a result of attendance? Do you need absences to trigger notifications of some kind?
- Do you need to be able to disable or override the automated attendance (and notifications) at short notice - such as for an unscheduled snow day or teacher day?

Hardware and infrastructure

- How many scanners do you need and where will they be placed?
- Do you have Wi-Fi, or would you prefer Ethernet / PoE connection?

Attendance automation success can be found here

Founded in 2004, Cobek has developed aPlus+ Attendance - sophisticated solutions for higher education institutes focused on student attendance tracking. We make it easy for colleges and universities to benefit from specialist attendance tracking solutions. With simplified student information system integration, our solutions instantly enable you to effectively track and monitor student attendance - with or without automation.



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