

# The Gold Standard for Correctional Education Technology

March 2020

Noah Freedman

Copyright 2020, Nucleos Inc. All Rights Reserved.

## Table of Contents

<b>Introduction</b>	<b>2</b>
Summary - The Gold Standard for Correctional E-Learning programs	3
<b>Goals</b>	<b>5</b>
<b>Technical Requirements for Gold Standard</b>	<b>6</b>
Content (Integrations)	6
Best-in-Class Principles for Incorporating E-Learning Content in Correctional Agencies	7
Best-in-Class Content Categories for E-Learning Content	8
Software	10
Reporting Features	10
Security Features	11
Integration Features	11
Learner Features	12
Instructor Features	13
Administrative Features	13
Offline Access Features	13
Platform Pedagogical Model	14
Network: Local network vs. Cloud	15
Comparison of Three Network Topologies	15
Security Considerations for Online Filtered Access	17
IT Security Policy	17
Cloud Hosting	18
Network Security Features	18
Network Decryption & Monitoring - SSL Decryption (forward proxy)	18
Network Access Control	19
Network activity datastore	19
Deep Application Inspection	19
Firewall	19
Intrusion Detection System (IDS) and Intrusion Prevention System (IPS)	20
Devices (Hardware)	20

## Introduction

One of the main goals of every correctional institution is to assist and rehabilitate offenders to become productive members of society. Studies show that one of the best ways to reduce recidivism is through education<sup>1</sup>. Education greatly increases the likelihood that offenders will effectively re-acclimate to society.

If we consider the advances that online learning has made across the board from language courses to adult education, high-school, and post-secondary education, it is prime time to revolutionize prison education. The ability to balance security with access will remain the integral aspect to enabling incarcerated learners to advance their education.

Technology presents an opportunity to expand access to a greater breadth of learning opportunities to incarcerated people, drive process efficiencies for correctional staff, and increase the amount of time learners can be actively engaged in coursework. It is important to acknowledge that even as agencies look to implement digital education programs, expanding access to in-person education programs still needs to be a top priority for correctional agencies. However, the choice between in-person and digital education is a false dichotomy. Both in-person programs and digital access must be employed to realize a best-in-class correctional education program. Embracing current technology puts incarcerated learners at a distinct advantage in the job market and increases the odds of successful reintegration. Education technology can enable correctional agencies to meet their expanding rehabilitative and programming needs, with existing staff and classroom resources.

Correctional agencies who want to deliver the best quality digital education programs today need to embrace solutions which expand access to a wide range and breadth of course offerings for learners, while tracking their outcomes against individualized learning plans, keeping learning records, and connecting people with jobs. Correctional agencies wishing to provide the best in class, or “gold standard” for a correctional agency need to:

- (1) Provide access to a wide-range of relevant content and course opportunities related to post-release employment opportunities, including academic, vocational, and social & emotional education
- (2) Provide access to modern technology used for learning today

---

<sup>1</sup> Bozick, R, Steele, J., et al. [Evaluating the Effectiveness of Correctional Education: A Meta-Analysis of Programs That Provide Education to Incarcerated Adults](#). RAND Corporation, 2013.

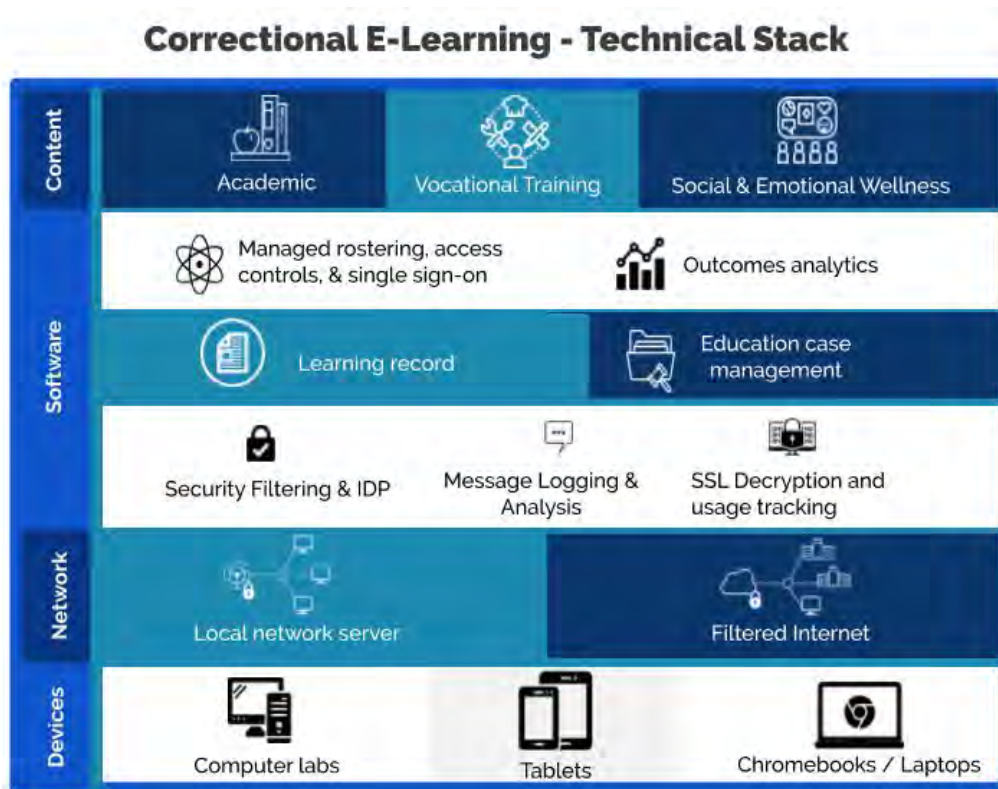
Bozick, R., Steele, J. et al. [Does Providing Inmates with Education Improve Postrelease Outcomes? A Meta-Analysis of Correctional Education Programs in the United States](#). RAND Corporation, 2018.

- (3) Provide an expandable system which can provide increasing access to new learning opportunities and evolving labor market needs.

### Summary - The Gold Standard for Correctional E-Learning programs

There are several top-level considerations when looking to implement an e-learning program, such as whether to use an offline or filtered Internet solution, and what hardware and network infrastructure to provide.

Features should be considered across the whole e-learning stack. There are four main considerations to take into account: 1. **Content** (*Integrations*), 2. **Software** (*APIs*), 3. **Network** (*Security*), and 4. **Devices** (*Hardware*).



**Content (Integrations):** The purpose of a dedicated education platform should be to provide the greatest access to content and courses which can support the best post-release outcomes for incarcerated individuals, as well as providing supportive features to enable the best learning outcomes.

An education platform needs to be able to flexibly integrate a wide and changing set of leading, proven content, from online and offline sources, covering:

**Academics** - adult basic education, literacy and numeracy, languages, GED & high-school prep and testing, college course LMS's, reference material, college applications, and financial aid applications.

**Vocational Training** - vocational education, workforces skills and career technical courses, certificates, licenses, supplementary materials for career technical education, and job preparatory materials

**Social & Emotional Wellness** - cognitive behavioral therapy courses, social skills, life skills, and re-integration content.

### **Re-Entry Programs**

**Software (APIs):** Other considerations such as software features need to be taken into account. Software features determine the types of content which can be integrated, the robustness of these integrations, and the ease and efficiency by which learners, instructors, and corrections & re-entry staff can accomplish their goals.

The following categories of software features should be supported:

- **Learning outcomes management system** - A Learning Outcomes Management Systems (LOMS) supports integrated accounts, monitoring, reporting, records, and analytics across multiple learning management systems (LMS), education applications, courses and tests.
- **Single Sign-On and User Rostering** - Single sign-on and centralized user rostering and access control across all education applications.
- **Unified Learning Record and Case Management** - A Unified Learning Record encompassing all 3rd-party education content, including course progress and completion across all 3rd-party courses and education applications.
- **Communication Logging** - A centralized middleware solution to monitor, record, and store all incarcerated learner communications with instructors allowed on all integrated content or LMS's on the platform.
- **API Integrations** - API Integrations should be provided with agency applications such as Offender Management Systems (OMS), Rehabilitative Case Plans (RCP), and Automated Rehabilitation Catalog and Information Discovery (ARCAID).

**Network** (Offline vs. Online): A cloud solution leveraging filtered and secured online access allows integration with the widest range of content. For this reason, correctional agencies are increasingly looking to employ secure online academic portals for incarcerated learners<sup>2</sup>. A cloud solution also offers the greatest ability to expand and offer an increasing number of content partners and integration with other education partners such as community colleges. It is imperative though, that end-to-end managed and monitored security is provided across the entire correctional education network.

---

<sup>2</sup> [Corrections Tech 2020 - Technological Trends in Custodial & Community Corrections](#). IJIS Institute Corrections Advisory Committee, 2017.

**Devices (Hardware):** The main benefit of a cloud solution is flexibility and future-proofing in terms of devices which can access content. A web-based content portal can be accessed on any device supporting a browser, including existing computer labs.

In terms of new hardware for dedicated education use by incarcerated learners, Chromebooks are recommended as the best-in-class option. While there are many hardware options for incarcerated learners - including e-readers, tablets, Windows or Linux laptops, and computer labs - Chromebooks provide the best combination of security, affordability, durability, and ease of maintenance and administration. In combination with a cloud-based secure onlinable academic portal, Chromebooks can be a powerful tool to implement a best in class e-learning program. Offline access can be maintained on Chromebooks by allowing learners to sync coursework to work on offline. This allows offenders to access course work even in times when they are in the domiciles, and potentially out of range of wireless networks.

## Goals

Correctional agencies that get e-learning ‘right’ have the opportunity to lead in the nation, reduce recidivism, and ultimately transform lives. Setting the correct goals from the beginning is imperative for successful project planning.

Correctional agencies may want to consider the following goals for their education technology programs:

### **1. Maintain Utmost Security**

- a. Expand access to quality education programs, and the time incarcerated learners have to participate in education coursework as much as possible, while maintaining utmost security

### **2. Improve Education Outcomes**

- a. Expand access to leading and proven education programs across academic, vocational, and social & emotional wellness categories
- b. Prepare incarcerated people for work, career and successful reintegration post-release
- c. Expand access to academic, vocational, and social & emotional wellness programs
- d. Track outcomes and learn about which programs are associated with effective outcomes

### **3. Increase Administrative/Process Efficiency**

- a. Reduce the amount of time teachers and administrators spend performing data entry, user rostering, and report generation
- b. Improve the efficiency of education process workflows for instructors, learners, and administrators



The following section on [Technical Requirements](#) goes into details about the technical requirements for content, software, network, and devices which can best meet the proposed goals for a gold standard in correctional e-learning.

**Diagram: Benefits and Features of High-Quality Correctional Education Technology**

Benefits	Critical Factors	Key Features
Increased Education Outcomes	Increased access to high-quality content	<ul style="list-style-type: none"> <li>• Use of online filtered Internet content</li> <li>• Expandable platform to enable new integrations easily</li> </ul>
	Increased Time to Learn	<ul style="list-style-type: none"> <li>• Ability to use some applications on client devices offline for use in cells</li> <li>• Ease of use for teachers and instructional staff to manage</li> </ul>
	Increased Motivation	<ul style="list-style-type: none"> <li>• Vocational Pathways</li> <li>• Motivational and mental wellness courses</li> <li>• Education case management</li> </ul>
Utmost Security	Network Security	<ul style="list-style-type: none"> <li>• Firewall</li> <li>• Network traffic decryption and visibility</li> <li>• Intrusion detection / prevention systems</li> </ul>
	Cloud Security	<ul style="list-style-type: none"> <li>• Message logging</li> <li>• Intra-application security filtering and change detection</li> </ul>
Admin Efficiency	Enterprise application management	<ul style="list-style-type: none"> <li>• API integrations with offender management systems</li> <li>• Automated user rostering across 3rd-party apps</li> <li>• Aggregated app message logs</li> </ul>
	Ease of use for staff and teachers	<ul style="list-style-type: none"> <li>• Single sign-on</li> <li>• Aggregated learning records and course progress data</li> <li>• App management and access controls</li> </ul>

## Technical Requirements for Gold Standard

To implement a gold-standard education solution in a correctional e-learning program, the following technical requirements should be accounted for, across the four broad areas of content (integrations), software (APIs), devices (hardware), and networks (security).

### Content (Integrations)

The strength of a program’s quality and opportunities depends on the courses and learning resources made available. A secure online academic portal should be able to adapt and integrate content from a wide range of sources, including: online websites and applications, and offline (locally hosted, or cached) websites and applications. Device-level caching and

applications (i.e. Android applications) can also be used to provide increased access to offline content and applications on devices. Ideally, device-level applications should be used to augment and support a strategy using cloud-based learning solutions first. A cloud-first strategy gives an agency the greatest ability to avoid lock-in to a particular hardware device, provides access to the greatest range of high-quality accredited programs, and allows for the greatest opportunity to integrate centralized tracking, record-keeping, analytics, and management.

## Best-in-Class Principles for Incorporating E-Learning Content in Correctional Agencies

Many digital correctional platforms (offender services solutions) focused on communications and entertainment are not well-suited to providing the best education and rehabilitative content.

- There is an inherent conflict of interest for general communication platform providers between providing highly-engaging and time-consuming quality education and rehabilitative programming which should not be behind a paywall, and prioritizing the availability of other profit-generating activities available on their digital platforms, such as music, movies, and games paid for by incarcerated people.

Maximizing access to high-quality education & rehabilitative programs is in the direct interest to the state and society, as more access to education & rehabilitation programs decreases the recidivism rate, and increases post-release success for incarcerated individuals. Improving accessibility to education and increasing the time that educational content is available encourages more participation. For these reasons, a dedicated education platform, or secure academic portal, should be developed and provided independently of communication and entertainment systems.

The following principles should be adhered to in deciding which content and courses should be provided:

- Education and vocational training content and courses should be made available at no cost to incarcerated individuals. This will be expected to increase the time and interest of incarcerated individuals in engaging with education and training programs, and ensures that access is equally available to the entire incarcerated population.
- Vocational training programs should be made available on dedicated e-learning devices, which are not used for communications and entertainment purposes. This expands the time available to learners to engage in coursework.
- The platform used to provide education and training content should be able to easily integrate content from a wide-range of sources, and must be able to leverage online content and programs to take advantage of the highest-quality proven courses and applications.



- Whenever possible, e-learning courses and content should provide access to accredited programs that lead to the earning of widely-recognized diplomas, degrees, certificates, and occupational licenses.
- All courses and programs should be aligned to individual rehabilitation case management plans.

### **Best-in-Class Content Categories for E-Learning Content**

The following e-learning content categories should be made available in a best-in-class correctional e-learning program. Suggested content and courses are listed for certain categories where relevant.

For a full list of suggested applications for correctional education, please refer to [Nucleos - Recommended Education Applications & Content](#)

#### **Academic**

- A. Adult Basic Education (TABE) Test Prep and Testing
  - *TABE Test*
  - *Paxen ABE Curriculum*
- B. Literacy
  - *ReadTheory*
- C. High School Supplementary Content
  - *CK-12*
  - *Khan Academy*
- D. High School Credit Recovery
  - *Edgenuity*
  - *Edmentum*
  - *OdysseyWare*
- E. High-School Equivalency (GED / TASC / HiSETT) Test Prep and Testing
  - *TASC, HiSETT, or GED Tests*
  - *Paxen Test Prep*
  - *STARS Renaissance*
- F. Post-Secondary Courses
  - Community college courses
  - Distance college courses
  - FAFSA Application
  - College Applications
- G. College Learning Management Systems (LMS)
  - *Canvas*

- i. Canvas is a currently popular LMS for many of the CA Community Colleges. Open-source learning management systems such as Canvas can be provided by the e-learning platform provider, or hosted on a managed service site such as Instructure. It is recommended to have the learning management systems used by an online academic portal to be hosted in the cloud by the same provided, to make use of maximum security, filtering, logging, and integration capabilities.

H. Language courses

- o *English as a Second Language (ESL) - [Burlington English](#)*

I. Reference Material

- o *Project Gutenberg Books*
- o *Offline JSTOR Repository*
- o *Wikipedia (for Schools)*

**Vocational**

J. Vocational / Industry Certificate Programs (NCCER, OSHA, ServSafe, Automotive, etc).

- o *NCCER*
- o *Osha 360*
- o *ServSafe*
- o *Industry Certificate programs - Ford Automotive Training, HomeDepot Fork Lift Certification, etc.*
- o *Programming Basics - [RoboGarden](#)*

K. Vocational Training Courses

- o *Coursera*
- o *Pearson Books / Digital NCCER Catalog / Pearson Vue*
- o *Community college vocational courses*
- o *CoreLearning Exchange*
- o *Ed2Go*
- o *Metrix*
- o *Financial literacy training*
- o *Workforce Development Board programs, and vocational programs aligned to Labor Market Information*

L. Occupational License Exams

**Social & Emotional Wellness Content**

M. Cognitive Behavioral Treatment - Supplemental digital content and self-paced work in cognitive behavioral treatment programs can augment instructor-led courses. Blended part in-person and part digital programs are expected to be most effective given the importance of in-person instruction in many CBT programs.

- o *Aggression Replacement Training*
- o *Hopeful Paths - Sex Offender Treatment*
- o *Problem-Solving Skills in Action*

- *Motivational Interviewing*
- *Moral Reasoning*
- N. Social Skills
  - *Nucleos Social Skills*
  - *Happiness, Awareness, and Emotional Resilience Training*
- O. Soft Skills
  - *Pairin*
- P. Life Skills
  - [Goodwill Community Foundation Learn Free](#)
- Q. Using Technology Basics
  - [Goodwill Community Foundation Learn Free](#)
  - Typing Training: [TypingClub](#)
- R. Job-Readiness
  - [New World of Work](#)

### **Re-entry**

- S. Re-entry content repository
- T. Guided Re-entry programs
- U. Repository of re-entry guides, applications, and content from parole (such as operations & orientation manuals, etc.)

### **Software**

Software features are critical to get right to ensure a best-in-class correctional education program. The gold standard of correctional education requires providing that feature set which allows a correctional e-learning program to meet top-level goals, such as *maintaining the utmost security standards, improving education outcomes, and increasing administrative / process efficiencies.*

The following software features are proposed for a best-in-class e-learning platform for correctional agencies:

### **Reporting Features**

- ***Learning outcomes management system*** - A new category of Learning Outcomes Management Systems (LOMS) solution which supports integrated accounts, monitoring, reporting, records, and analytics across all third-party content integrated into the platform, including multiple learning management systems (LMS), education applications, courses and tests.
- ***Usage Tracking*** - The time that learners spend using any content or course should be logged. The application, URL, and etc. should all be recorded.
- ***Course Progress Tracking*** - All course progress (i.e. completing certain quizzes in CK-12, or completing a high school credit recovery course in OdysseyWare), will be

recorded in a central data-store, and made available on incarcerated learning records and course progress views available to learners, instructors, and administrators.

## Security Features

Being able to integrate a wide range of 3rd-party online programs into a correctional e-learning solution is extremely powerful, and also needs to include exacting security protocols. The network security features listed here are described in more detail in the [Network](#) section.

### **Application and Third-Party Integration Security Features**

- **Application Security Filtering** - All applications must be integrated against lists of approved URLs. For online access, all features of a site which would allow any communication must be disabled (such as message boards, discussion forums, chats, social media, email, etc.).

All applications must go through a complete security review, and have only essential URLs enabled for site performance, while any features of that site allowing for communication must be explicitly blocked. Automatic testing systems must verify that sites remain secure. When site updates are detected, response protocols may dictate that the site may be taken offline until a manual review of security filters on that site can be performed and secure access validated. A correctional education platform provider can manage security filtering and updating for applications as part of a service offering. Officials at a correctional agency should also be given access to any help desk for URLs, and users at appropriate security levels may also be given administrative access to receive site update notifications and update application security filter settings.

- **Communication Logging** - A centralized middleware solution to monitor, record, and store all incarcerated learner communications with instructors allowed on all integrated applications (i.e. instructor messages from a community college professor in Canvas, or an instructor message in a cognitive behavioral wellness blended in-person program) or LMS's on the platform.

### **Network & Cloud Security Features**

- Network Decryption & Monitoring - SSL Inspection
- Network Access Control
- Network activity datastore
- Deep Application Inspection
- Firewall
- Intrusion Detection System (IDS) and Intrusion Prevention System (IPS)

## Integration Features

- **Expandable capability** - The capability to integrate new content onto the correctional education platform is a must-have capability. The correctional education platform should allow new applications and content to be integrated onto the platform.

Application integration and maintenance, and management of the correctional education platform can be provided as a service. Agency staff should be given administrative access to manage aspects of the services which are appropriate.

- Content should be integratable from multiple sources:
  - Online Courses, Programs, and Websites
  - Documents & Media Files
  - Client applications (Android applications)
  - Locally-hosted content on existing servers at prisons (Video libraries, etc.)
- **Single Sign-On** - Single sign-on should be provided on the education platform, so that a user can use one account with one username and password to access all third-party education applications (including supplemental sites like CK-12 which record progress, and learning management systems such as Canvas).
- **User Rostering and Access Control** - centralized user rostering and access control across all education applications. Administrators should be able to onboard and offboard learners to all education sites and applications through one central interface on the correctional education platform. Application access and on-boarding can be managed and set per users or groups of users.
- **Unified Learning Record** - A Unified Learning Record encompassing all 3rd-party education content, including course progress and completion information across all 3rd-party courses and education applications will provide a permanent record of completed diplomas, degrees, certificates, and courses. Manual entry can allow for additional education notes or ad-hoc courses to enter the record. All other record data collection can be automated by the correctional education platform.
- **API Integrations** - API Integrations should be provided with agency applications such as Offender Management Systems (OMS) and Rehabilitative Case Plans (RCP). Data entry into these systems should be fully integrated with all learning record data collected by the correctional education platform.

## Learner Features

- **Education and rehabilitative goal-setting** for learners and rehabilitative case management staff, to help keep learners motivated and focused on their goals.
- **Learning record** which can be shared with employers post-release.
- **Single-sign-on** to all apps
- Can take skills assessment
- View of all courses available: face to face programs and online
- View of official learner record
- View of goals and course progress across all integrated courses
- Access content and courses
- View usage history

## Instructor Features

- View learner profiles
- View and set learner goals
- View learner progress
- View usage history
- View learning records
- User registration
- Get reports on student profiles
- View class reports and analytics
- View & create rehabilitative case notes and case reports
- Manage their own classes or learners

## Administrative Features

- **Case Management**
  - View & create rehabilitative case notes and case reports
  - View analytics
  - Manage transition process of learners to parole
- **User Management**
  - Manage users, groups, facilities, and classes
  - View learner progress, usage history, learner records
- **Security**
  - View Message Logs
  - Manage application access and on-boarding / off-boarding
  - Manage application security filtering
  - Block access to sites or the system via a kill-switch at every facility
- **Support and Training**
  - Support Ticket / Help Desk system
  - Training of all staff on all systems used

## Offline Access Features

Offline access should be enabled on the client-side program which is used to provide an interface to the correctional education platform. A client-side program needs to be able to cache content which is accessed when a user is in-range of wireless routers, so that a certain subset of content is available on the device when it may be taken out of wireless network range (in the domiciles for instance).

- The client application should load live network content when a connection is available to the learner wireless network, or provide access to just a set of offline Android apps when Internet connectivity is not present. The state of connectivity should be clearly



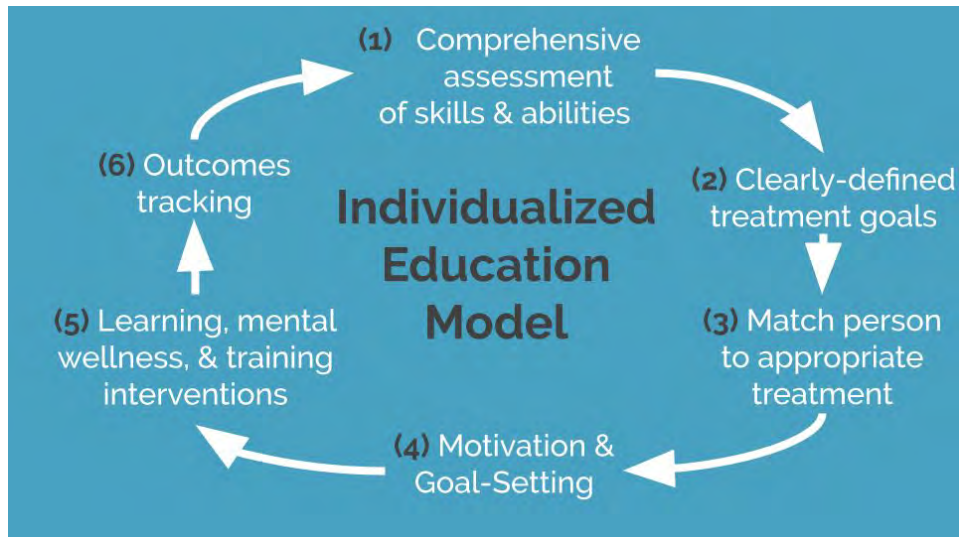
visible to the user. All online-only apps should be greyed out when no connectivity is available.

- The following applications should work in an offline mode:
  - Canvas LMS (courses must be synced offline prior to use)
  - Khan Academy
  - Wikipedia
  - Project Gutenberg
  - Repositories of agency-specific content (manuals, guides, policies, HTML5 courses)
  - For Chromebooks:
    - Google Suite applications (for Chromebooks): Google Docs, Google Sheets, Google Slides
    - Certain applications which may be available on Chromebook or Android App Store should work offline (Chromebooks can provide access to Android applications)
- In an environment with shared devices, a user will need to sign into their accounts and load their content while connected to the network, before being able to take the device out of the network to use it offline.
- All user provisioning data should remain stored in the network, and no user content should be stored on devices if learners will be sharing devices.
  - For Chromebooks, users and content can be provisioned using Google Chrome Management Tools and Chrome Group Policies.
  - For Chromebooks, a local Android application can be used to store limited user and application data in an offline mode

### **Platform Pedagogical Model**

Wherever possible, education programs should be mapped to individualized rehabilitative case plans, and provided in an individualized education model. Content and courses that users partake in should be guided by results on assessments of skills & abilities, and guided by individual goals set with case managers.

The diagram below illustrates how users are guided to courses in an individualized education model.



### Network: Local network vs. Cloud

From the network level, one of the first considerations is online vs. offline access. Using an online program provides access to a far superior range of content which can be incorporated into a secure online academic portal, though requires the highest degree of security measures (which are covered in the software section).

### Comparison of Three Network Topologies

There are generally three topologies for how networks are utilized in a correctional setting:



Secure Cloud - Online filtered access

- An online secure academic portal provides the greatest capability to access and integrate with the greatest variety of programs, and provides the greatest flexibility, content access, and expandability. The highest-quality content, including most accredited courses and courses with vocational certifications require online filtered access. A network allowing for online, filtered access can provide the most opportunities for analytics and integrated learning records with course content.
- This system is used by communication providers to allow telephone calls, although access to educational and vocational web content is generally not available or severely limited.
- Local caching and media servers can be employed to lessen the Internet bandwidth load used at each facility.
- Additional security measures are required for providing online access

Wide-Area Network - Offline, with Internet syncing

- A wide area network may be deployed to link facilities to a central application and content server.
- A typical approach for offline content delivery in correctional settings is to use local servers to host and deliver all applications and content to learners in an offline capacity. An uplink may be present to update the content stored on the server, but whenever the uplink is activated, the server’s connection to the local network is disconnected. No live access to online resources, even in a filtered manner, is made available to learners in this network configuration.

Local Area Network - Offline-only

- Offline-only servers are the most restrictive option, and provide the most limited ability to expand or update systems. Updates may be done manually or via removable hard-drives. No wide area network can be employed, as all facilities are isolated.

An offline-only system, which can make use of locally-cached content, will not be able to leverage the leading e-learning academic and vocational programs.

**Benefits from utilizing an online program:**

<b>Content Category or Feature</b>	<b>Cloud (Online Filtered Access)</b>	<b>Wide Area Network (Offline, with Internet syncing)</b>	<b>Local Area Network (Offline Only)</b>
Offline Android applications, typically unaccredited content	x	x	x
Integrate with offline Canvas LMS for community college systems	x	x	

Online courses, utilizing with part or all remote instruction	x	limited	
Vocational training industry-certificates	x	limited	limited
High School / GED Credit Recovery Programs	x		
Websites / online resources	x		
Vocational programs	x		
Expandable to include new programs and content	Most flexible	limited	limited
Learning record	x	x	
Analytics	x	limited	
Testing (ABE, GED/TASC/HiSETT, etc.)	x	limited	

### Security Considerations for Online Filtered Access

The following are components that should be deployed in an online filtered network. The method in which these are deployed should align with the IT Security Policy at an agency.

### IT Security Policy

Each agency should craft network policy based on overall IT security policy for education networks.

Correctional agency security policies, for instance, may include the following type of policies:

- All communication between learners which is not authorized or monitored is prohibited.
- Communication is typically only authorized between a learner and an instructor on certain approved applications or courses. All such communications must be logged and searchable, and run through anomalous pattern detection algorithms. All other communication is generally prohibited.
- All use of social media is prohibited, as is any posting to discussion forums on public sites.
- Communication between learners is prohibited digitally, except for certain community college courses where discussion forums are permitted but with all messages logged. Certain protocols may be required for a course to enable discussion forums with outside learners.

- Access to content within the education network is only for educational purposes, for academic, vocational, or social & emotional goals.

For best practices, a security system should include:

- Complete visibility into all activity on the network, including within the network
- Provide automatic threat detection and prevention, of both known threats and anomalous patterns. Threats must be detected from both people trying to break into the network (from inside or outside), as well as people trying to break out of the network from the inside.
- Unified data-store of network logs and traffic
- 24/7 threat detection, response and remediation

## Cloud Hosting

A correctional education platform may be hosted in the cloud for security purposes. Cloud hosting on industry-standard cloud providers (such as Amazon Web Services, Microsoft Azure, and Google Cloud) is considered to be as secure as on-premise hosting options, and provides an additional layer of security in the form of physical security measures protecting data centers. Some states may also provide government cloud servers for use by agencies. Nonetheless, industry-standard cloud providers are able to make larger investments in modernizing and maintaining state of the art security at their cloud hosting centers, and may be considered a more secure option. Industry-standard cloud providers also provide a layer of redundancy, as services and data can be replicated across multiple data centers at physical locations which span the country.

Given the security and data redundancy benefits of cloud hosting, many states are now adopting cloud-first policies for agency procurements, and cloud hosting is becoming increasingly adopted within correctional agencies<sup>3</sup>.

## Network Security Features

### Network Decryption & Monitoring - SSL Decryption (forward proxy)

An SSL forward proxy should be implemented to decrypt all network traffic, and ensure the need to gain complete visibility into traffic on network

- In order to enforce visibility into all network traffic within the education network, all network traffic should route through SSL decryption using a forward proxy.
- Devices accessing the network should be required to have a certificate installed to gain access to the network, which enables the decryption of all network traffic by the proxy.

---

<sup>3</sup> [Corrections Tech 2020 - Technological Trends in Custodial & Community Corrections". \(2017\) IJIS Institute Corrections Advisory Committee](#)

- Google Chromebooks can have [SSL certificates installed and managed at the organizational level](#).

### Network Access Control

- All devices and network equipment on the network (routers, switches, servers, etc.) need to be authorized, authenticated, and accounted for to be able to access the network.

### Network activity datastore

All network activity should be logged in a data store.

- All network traffic needs to be logged in a datastore for forensic analysis in the case of any policy or usage violations. All network traffic should be tagged with the device used and the currently authenticated user on that device.
- Analysis of selected network URLs is needed for all requests which involve messaging.
  - Specific URLs, such as those allowed messaging with instructors, need to be sent to a central message log
  - All allowed messages on 3rd-party apps with instructors need to be logged, and provided access to administrative staff to review

### Deep Application Inspection

The system should be able to inspect and log all allowed messaging on 3rd-party platforms, and aggregate these messages into a central messaging record. Messages must be pulled from 3rd-party applications, to capture both incoming and outgoing allowed messages. Part of this can happen at the network level, though another part needs to happen at the software level in order to capture inbound messages.

### Firewall

Firewall access to the network must be as restrictive as possible, to ensure that only access to approved features of approved websites are available.

- In order to provide secure, filtered online access, security filtering off all network requests is required
  - Blacklist / whitelist URL request filtering is a tool which must be rigorously applied and updated for all allowed features on sites brought into the education cloud.
- Default Deny for all network traffic, allowing only the minimum set of network traffic to facilitate approved use cases of approved applications
- Intra-application security filtering needs to be tailored for each individual application. This means that only certain features of an online application may be enabled, while



others, such as messaging, discussion forum, or notes sections which may not be suitable for correctional agency IT security policies are blocked. Access to a

- Application security filters need to automatically monitor any changes to the underlying application which require a re-evaluation of security filtering. In such an instance, access to the application needs to be automatically blocked, and security filtering management team notified, until the security filters can be validated with the new application updates.
  - Filtering management process
  - Identify and conduct a thorough audit
- Security policies for firewalls can be managed as a service by a network solutions provider.

## Intrusion Detection System (IDS) and Intrusion Prevention System (IPS)

### Preventative security

- Automated monitoring and threat detection for any anomalous network events and behavior
- Human monitoring of any potential threats triggered
- Unified data-store of network logs and traffic
- 24/7 threat detection, response and remediation

### Performance

- Enhanced network performance for limited bandwidth going to correctional facilities
  - Facility-level caching of all online content
  - Incorporating large content stores into platform for delivery
  - For environments with a wide-range of content

## Devices (Hardware)

The following considerations should be given for devices for learners:

- Devices should function online or offline
- Devices need to provide a way to consume web content (custom-secured browser)
- Devices need to provide a keyboard for typing essays / longer form courseware
- Devices must be easy maintained by the agency or IT department

Android tablets (with soft detachable keyboards), and Chromebooks, are the two portable devices most commonly used in correctional settings. Windows-based computer labs are the most widespread devices used for incarcerated learners in correctional settings, but are

typically present in very limited student to device ratios, causing problems for scaling a high-quality education technology program.

*Overview of Hardware Devices Used for Correctional Education*

Device	Android Tablets	Chromebooks	Windows (Laptops or Desktop computers)	Desktop Computers (Windows)
Security	Highly secure	Highly secure	More security vulnerabilities	More security vulnerabilities
Enterprise device management	More limited enterprise device management	Advanced enterprise device management	Advanced enterprise device management (requires more custom configuration)	Advanced enterprise device management (requires more custom configuration)
Offline Functionality	Large selection of offline applications	Many apps are cloud-based and require Internet connectivity. Can run Android applications and some Chrome applications offline	Large selection of powerful offline applications	Large selection of powerful offline applications
Input Hardware Support	Touch-based, external keyboard can be used	Keyboard and mouse; Touch support	Keyboard and mouse; Touch support	Keyboard and mouse
Application Support	Online applications, Android applications	Online applications, Chrome OS applications, Android applications	Online applications, Windows applications	Windows applications

Chromebooks are the top hardware recommendation for best-in class correctional education

- Chromebooks dominate the market share for large education deployments of devices managed centrally. This is seen in their dominance in K-12 with school-managed devices for students.
  - Chromebooks can function offline via Chrome OS and Android apps (which can run natively on post-2017 Chromebooks)

