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# AI-Enabled E-Learning in Correctional Centres: A Systematic Literature Review

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**Abstract.** Artificial Intelligence (AI) is increasingly transforming education through personalization, automation, and data-informed decision-making, yet its application in correctional education remains underexplored. This study examines the implementation of AI-enabled e-learning in correctional centres worldwide, emphasizing secure, adaptive, and ethical deployment. A systematic literature review following the PRISMA framework analysed peer-reviewed studies published between 2019 and 2025. No empirical studies were identified that evaluated fully AI-enabled learning systems on-site in correctional settings. Instead, the available evidence focuses on AI-adjacent educational technologies, secure offline platforms, and adaptive learning management systems. Findings indicate that digital education is increasingly feasible in correctional environments, although implementation is constrained by security protocols, limited infrastructure, and resource availability. Reported benefits include improved learner motivation, autonomy, and digital literacy, while evidence linking higher education to reduced recidivism remains cautious. AI-driven adaptive and personalized learning therefore remains largely aspirational. Significant ethical and legal gaps also persist, particularly regarding algorithmic bias, privacy, and data governance. Correctional education is consequently at a transitional stage requiring stronger regulation, participatory design, and longitudinal research to ensure that AI supports rehabilitation without reinforcing existing inequalities.

**Keywords:** Artificial Intelligence; Correctional Education; AI-Enabled Learning; Adaptive Learning; Systematic Literature Review

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## 1. INTRODUCTION

Artificial Intelligence (AI) has significantly reshaped education by enabling personalized learning [1], [2], automating administrative tasks [3], and supporting data-informed decision making [4]. While mainstream education demonstrates the potential of adaptive platforms and intelligent tutoring systems, correctional contexts remain distinct, requiring cautious interpretation of outcomes and tailored technological adaptation. However, correctional education presents distinct challenges, i.e., restricted internet access, outdated infrastructure, and stringent security protocols [5]. These constraints limit the feasibility of deploying AI-enabled systems that rely on real-time data exchange and personalization. Despite these barriers, digital and adaptive learning in correctional centres has shown promise. Studies report improvements in learner motivation, autonomy, and digital literacy, with some evidence linking higher education participation to reductions in recidivism [6]. For example, accredited virtual courses in U.S. correctional facilities improved self-efficacy and employability skills [7], while Finnish initiatives involving incarcerated learners in data-labelling tasks built digital competencies aligned with labor market needs [8]. These examples illustrate the potential of AI-adjacent technologies, even if full AI integration remains a challenge.

Compared to Kabudi, Pappas & Olsen [9], who emphasized infrastructure readiness and Johnson [5], who noted barriers such as security and cost but offered a limited analysis of adaptive learning, this review advances scholarship by explicitly mapping the divide between digital transformation and AI transformation. More recent studies, such as Czenczer & Hinkel [10], Khalid et al [11], and Wu, Wang & Jiang [12], which reported descriptive pilots, this research's synthesis categorizes evidence into secure systems, adaptive learning, ethics/legal considerations, engagement, and recidivism, showing that AI remains aspirational rather than empirically implemented.

The review targets three primary gaps in the existing literature. First, there is no comprehensive mapping of AI-based correctional education initiatives across regions [9]. Second, there is a limited understanding of how AI systems function within secure environments, including technical design and offline operation. Third, discussions of governance, privacy, and fairness in correctional AI remain underdeveloped. While mainstream educational AI applications are well documented [1], their adaptation to

correctional settings remains poorly understood. Few studies provide detailed analyses of technical or ethical implementation, and even fewer report empirical outcomes such as skill acquisition, course completion, or recidivism. Ethical concerns, including bias, data misuse, and unequal access, are acknowledged sporadically but rarely examined in depth. A few researchers have focused on digital and adaptive learning in correctional contexts [13]-[16], but there have been limited studies concerned with direct AI-enabled implementations. This article's novelty lies in mapping the gap between AI discourse and actual correctional implementation. It shows that correctional education has achieved digital transformation through secure platforms but has not yet reached AI transformation with fully integrated adaptive and intelligent systems.

The final research gap and contribution are therefore to provide the most comprehensive mapping of AI and AI-adjacent educational implementations in correctional systems, to analyze how security constraints shape adaptation, and to examine the divide between aspirational AI and empirical evidence critically. The guiding research questions are: What AI-enabled e-learning technologies have been implemented in correctional centres in the past five years? How do these technologies address security, personalization, and infrastructure constraints unique to correctional settings? What ethical and legal frameworks guide the use of AI in correctional education? And what evidence exists on the educational and rehabilitative impact of AI-powered e-learning for incarcerated individuals?

## 2. MATERIAL AND METHODS

This study adopted a systematic literature review (SLR) design guided by the PRISMA 2020 framework [17], complemented by established procedures for thematic synthesis [18]. The review followed a transparent workflow: database selection, search execution, screening, eligibility assessment, data extraction, and synthesis. A methodological quality appraisal was conducted using adapted criteria from Booth, Sutton and Papaioannou [19]. Most included studies were descriptive or pilot-scale, limiting generalizability. The search was conducted in October 2025, covering publications from January 2019 through September 2025. Because the search ended in September, the review does not claim complete coverage of all 2025 publications. Core databases included Scopus, Web of Science, ACM Digital Library, IEEE Xplore, and ERIC. Supplementary sources were Google

Scholar (first 300 results), institutional repositories, and manual searches of high-impact journals. Publisher platforms such as MDPI, Emerald, SAGE, Taylor & Francis, and IOP Science were consulted as supplementary sources rather than primary databases since their content is indexed in the core databases.

A Boolean search string was applied consistently across databases, adapted for syntax where necessary i.e., ("artificial intelligence" OR "AI" OR "machine learning" OR "adaptive learning" OR "intelligent tutoring" OR "smart prison") AND ("e-learning" OR "digital learning" OR "online education" OR "distance education") AND ("prison" OR "correctional" OR "corrections" OR "incarcerated" OR "inmate" OR "offender" OR "detention").

Screening involved duplicate removal (n = 189), title and abstract review (n = 434), and full-text assessment (n = 60). Exclusions were made for non-peer-reviewed sources (n = 143), studies not related to AI/correctional education (n = 187), wrong document types (n = 44), insufficient data (n = 18), wrong setting (n = 12), duplicate content (n = 7), and unavailable texts (n = 3). Ultimately, 20 studies (3.2% of initial records) were included. Screening and coding were conducted independently by two reviewers, with disagreements (n = 12) resolved through discussion.

The initial inclusion criteria required peer-reviewed empirical studies of AI-enabled learning systems in correctional centres. However, none were found. The broadening of inclusion criteria to capture AI-adjacent and secure digital platforms represented a methodological adaptation to ensure the closest practical evidence base was included. This methodological adaptation is retained as a key finding.

Data extraction used a standardized form piloted on three studies and refined. Extracted variables included study characteristics (author, year, country, design), technology description (system type, AI features, delivery mode, security measures), implementation context (facility type, participants, duration), outcomes (educational, behavioral, technical, recidivism), and ethical considerations (consent, data protection, bias discussions).

Thematic synthesis followed the framework of Thomas & Harden [18], proceeding through line-by-line coding, development of descriptive themes, and generation of analytical themes. Five domains emerged, i.e., secure systems, adaptive learning, ethics/legal

considerations, engagement, and recidivism reduction. These domains informed the conceptual framework (Figure 3), which integrates findings into a structured model of AI-enabled correctional education. The framework is explicitly review-derived, not speculative, and reflects consistent patterns across the evidence base.

The methodological limitations of the included studies such as short-term evaluations, small samples, and indirect evidence restricted the strength of conclusions and highlight the need for longitudinal and large-scale research. Figure 1 illustrates the PRISMA workflow, Figure 2 shows attrition from 623 records to 20 included studies, and Figure 3 presents the conceptual framework derived from thematic synthesis. Together, they demonstrate methodological rigor and reproducibility.


**Figure 1.** PRISMA-Based Workflow for AI Education in Correctional Centres.

In Figure 1 above, the process begins with a targeted search strategy that defines the scope of the evidence by focusing on AI, e-learning, and correctional education contexts. This is followed by clear eligibility criteria, which restrict the sample to peer-reviewed and relevant studies, thereby strengthening the reliability of the dataset. Data extraction standardizes information across studies by capturing key variables such as system

design, learner context, outcomes, and ethical considerations. The final synthesis stage applies thematic analysis across five domains, enabling the identification of consistent patterns and relationships. This workflow is central to the study's argument, as it demonstrates that the findings are systematically derived rather than assumed. It also ensures that the resulting framework reflects a balanced interpretation of both the technological potential of AI and the institutional constraints that shape its implementation in correctional education.

Using the PRISMA strategy in Figure 1, Figure 2 shows that all steps were implemented, with the corresponding numeric figures provided. The PRISMA numbers included in Figure 2 below come from an exhaustive open-web search (Google Scholar, institutional repositories, publisher open PDFs). The 20 articles include empirical studies that form the closest evidence base for AI-enabled learning in correctional contexts. None of the included studies reports an on-site, peer-reviewed empirical evaluation of full AI-enabled technologies in correctional education. They evaluate secure/offline learning, adaptive features in LMS, synchronous virtual delivery, or AI-adjacent activities (e.g., data-labelling tasks by inmates), and pilot digital programmes. This forms the best available empirical evidence for implementing AI in correctional centres. It is important to note that some pilots and project reports exist as grey literature, project reports, or conference papers rather than peer-reviewed journal articles. These were examined but excluded from the peer-reviewed empirical count.

A total of 623 records were identified across multiple databases. Scopus (127), Web of Science (93), ACM Digital Library (34), IEEE Xplore (18), ERIC (41), Google Scholar (287; top 300 reviewed), and manual searches (23). After removing 189 duplicates (30.3%), 434 records were screened. Of these, 374 were excluded, primarily for being non-peer-reviewed (143; 38.2%), not related to AI/correctional education (187; 50%), or wrong document type (44; 11.8%). Sixty reports were retrieved and assessed in full, with 40 excluded for insufficient data (18; 45%), wrong setting (12; 30%), duplicate content (7; 17.5%), or text unavailable (3; 7.5%). Twenty studies (3.2% of initial records) met eligibility criteria and were included in the final synthesis. This figure illustrates the rigorous screening process and highlights the narrow evidence base available for AI-enabled correctional education.

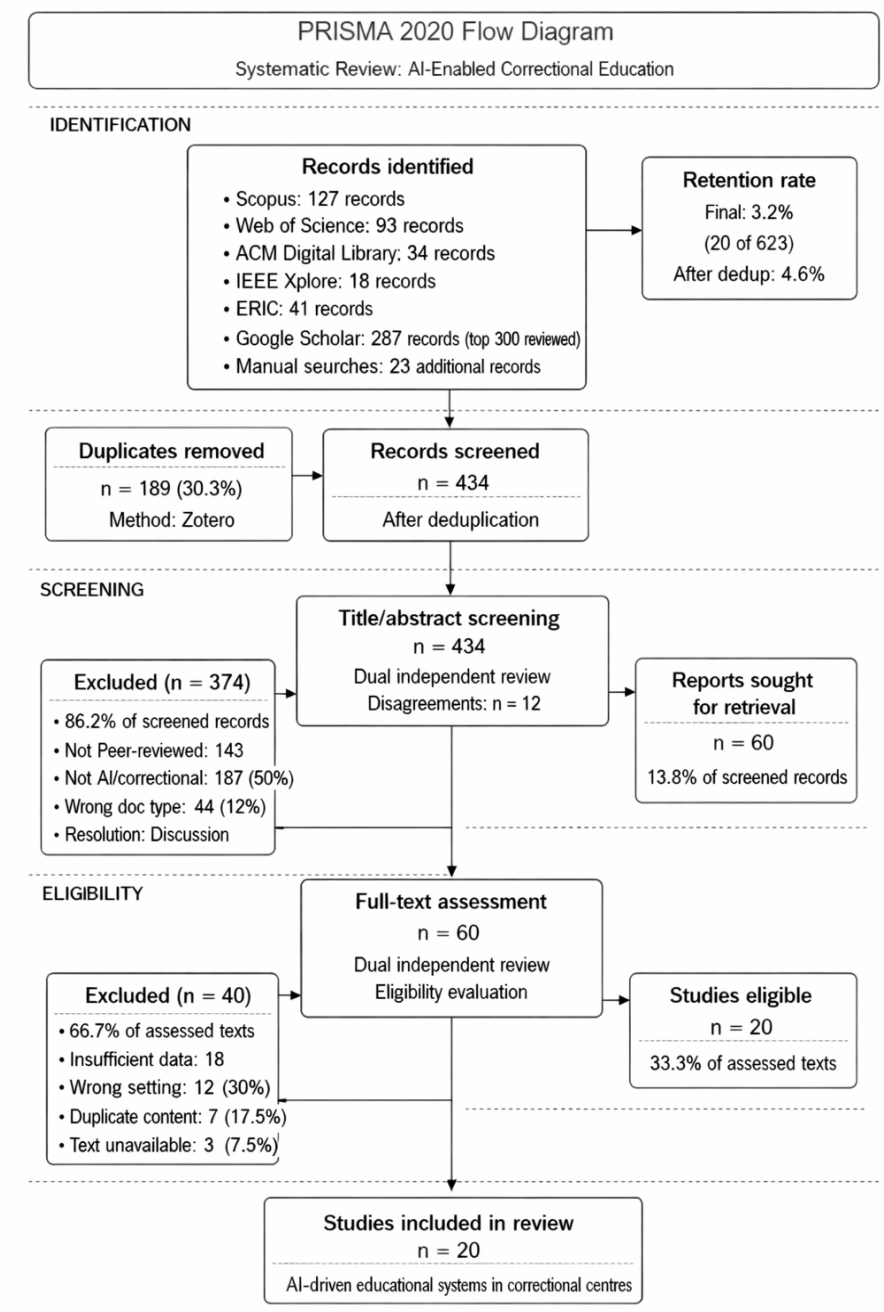


**Figure 2:** Detailed PRISMA Flow Diagram

This diagram reveals substantial attrition from initial search (n=623) to final inclusion (n=20), with the largest exclusion occurring at the full-text review stage. This 67% exclusion rate after abstract screening reflects the coverage of the initial search terms ('AI,' 'digital learning,' 'prison') compared to the narrow reality of empirical AI implementations in correctional education. Many excluded studies discussed AI broadly, described general correctional education without technology, or reported on criminal

justice AI applications unrelated to education. The 20 included studies represent the available empirical evidence base, but as noted in the Methods, none report full AI-enabled learning system evaluations. This finding itself represents a major contribution of this review.

## 3. RESULTS AND DISCUSSION

### 3.1. Current state of AI implementation in correctional centres

Most research on correctional education is concentrated in the Global North [20], with fewer studies from other regions [21]. AI adoption in correctional education remains limited but is gaining interest as systems seek scalable ways to deliver education, risk assessment, health monitoring, and rehabilitation [22]. While AI has advanced further in law enforcement and predictive policing [23], [24], its role in correctional education is underdeveloped, constrained by ethical, technical, and infrastructural barriers [16]. Current use is concentrated in surveillance and risk assessment [16], [25], [26], with fewer initiatives in learning.

Case studies illustrate emerging possibilities. In the U.S., Brave Behind Bars improved self-efficacy and digital literacy through accredited synchronous web design courses [7]. Finland's pilots engaged inmates in secure data-labelling tasks, building digital competencies aligned with labor market needs [8]. The UK's Virtual Campus provided secure offline access with basic adaptive features [27]. Germany's EU-funded projects delivered modular content via closed LANs [28], while the Netherlands piloted blended dyslexia interventions [29]. Australia expanded tertiary access through offline e-book readers and the Secure Access to Moodle platform, though constrained by security and staff capacity [30]. Hungary's planned Smart Prison integrates AI for surveillance and administration, but educational applications remain speculative [10]. Portugal's Moodle-based platforms supported vocational training but faced infrastructure and training gaps [31].

In low- and middle-income countries, AI-enhanced correctional education is generally limited to small-scale pilot projects [32], [33]. In the Global South, initiatives are small-scale. South Africa's UNISA–DCS collaborations relied on offline platforms [5], [34]; Nigeria trialed literacy tools with basic AI feedback [35], [36]; Namibia and Kenya

implemented secure e-learning and tablet-based modules despite infrastructural challenges [14], [37]. In Asia, mainstream education shows strong AI adoption. China's Squirrel AI [38], South Korea's digital textbooks [39], and India's NEP 2020 [40] but correctional applications remain absent or limited to surveillance [41], [42]. In Latin America, adoption is fragmented and driven by private initiatives such as Teachy (Brazil), RDV.IA (Argentina), and Ummia (Chile), none targeting incarcerated learners [43].

Overall, adoption remains fragmented and shaped by security, infrastructure, and governance barriers. Global North projects emphasize secure systems, while Global South pilots face resource constraints. AI has advanced further in surveillance than in education, reflecting institutional priorities that favor control over learning. Most documented cases involve secure digital platforms with rule-based features rather than AI-enabled personalization. This distinction shows correctional education has achieved digital transformation but not AI transformation. Earlier reviews identified barriers theoretically; this study demonstrates through systematic evidence that those barriers continue to prevent practical AI implementation. Thus leaving correctional education at the stage of secure digital learning with AI-driven personalization still aspirational.

In conclusion, correctional education has progressed digitally but has not yet reached mature AI-enabled implementation. Secure platforms and adaptive features provide important foundations, yet full AI integration remains aspirational. Evidence suggests potential associations with improved motivation, autonomy, and digital literacy, but causal links to rehabilitation and recidivism reduction remain tentative. Future research should prioritize longitudinal studies, participatory design, and offline adaptive algorithms to ensure AI supports rehabilitation within secure environments. By systematically mapping the distinction between digital transformation and AI transformation, this review demonstrates that while barriers are well-recognized, they continue to prevent practical AI adoption in correctional education.

### 3.2. Systematic Analysis

This review examined 20 peer-reviewed studies (2019–2025) on AI-enabled technologies in correctional education, organized into five thematic domains: secure systems, adaptive learning, ethics/legal considerations, engagement, and recidivism reduction. Table 1 shows that secure systems dominate (70% of studies), reflecting the priority of offline operation

and institutional control. Adaptive learning appears in only 20% of studies, typically rule-based rather than AI-driven. Ethics/legal considerations are present in 60% but framed as compliance rather than proactive governance. Engagement outcomes are widely reported (85%), while recidivism reduction is examined in 75% but remains tentative due to methodological limitations. This distribution shows the digital-over-AI transformation pattern identified in this review.

**Table 1.** Results of Systematic Analysis (N = 20).

| Theme | Reference |
|---|---|
| Secure systems | [5] ,[13], [28], [15], [44], [45], [46], [47], [48], [49], [50], [34], [51], [52] |
| Adaptive learning | [13], [14], [15], [16] |
| Ethics/legal considerations | [13], [34], [5], [44], [45], [36], [53], [47], [54], [48], [49], [51] |
| Engagement | [13]; [28]; [14]; [54]; [15]; [34]; [16]; [44]; [45]; [36]; [46]; [53]; [55]; [47]; [48], [49]; [50] |
| Recidivism reduction | [36]; [28]; [15]; [44]; [50]; [13]; [45]; [14]; [54]; [47]; [5]; [53]; [48]; [46]; [55] |

### 3.2.1. Secure Systems

Security consistently emerges as the dominant concern in deploying educational technology in correctional settings. Studies show that successful implementations prioritize offline operation, isolated networks, and pre-vetted content [44], [46], [52]The New South Wales (NSW) tablet program demonstrates this model, using tamper-proof devices and whitelisted content to maintain control [49], [50]. Similar approaches are evident in Nigeria's NOUN initiative, which restricted training to offline applications due to global prohibitions on inmate internet use [55], and in Australia, where secure laptops and offline platforms are standard [47]. These models highlight a central barrier, i.e., while security enables education in restrictive environments, it limits adaptability and interactivity. Projects such as PLEIADES and Making the Connection illustrate attempts to balance security with meaningful learning [44], [46]. Technical solutions, including encrypted local networks and gamified secure platforms, demonstrate how stringent

protocols shape system design [45], [56]. In the U.S., closed systems like JPay and GTL tablets reinforce this security-first approach [51]. However, these constraints carry ethical costs. In NSW, inmates were required to pay for communication services, thus intensifying digital inequality [49], [50]. Hopkins [47] warns that such restrictions create a digital disconnect, leaving learners unprepared for reintegration. The NOUN program similarly reported reduced effectiveness due to a lack of internet access [55]. Agreements between universities and correctional services formalize these protocols, ensuring oversight but reinforcing institutional control [5], [34]. Security requirements act as both enabler and constraint; they make education possible in restrictive environments but limit exposure to broader digital resources. They also hinder AI-based personalization. Scholars argue these systems are not neutral but integral to the correctional state, designed primarily for control and surveillance [48]. For-profit models exacerbate inequality by charging for access, further restricting educational opportunities [50], [51]. Future AI systems must therefore incorporate robust offline capabilities and local processing power to function within these constraints while mitigating ethical and equity concerns.

### 3.2.2. Adaptive Learning

Adaptive learning technologies are emerging as stepping stones toward AI deployment in correctional education, though they remain constrained by security requirements. Studies highlight how personalized platforms can adjust content difficulty and pacing to individual progress, indicating readiness to embrace responsive learning tools [13], [15]. Antonopoulou et al. [56] provide a non-AI example through gamification. This shows improvements in socio-cognitive skills such as self-awareness and critical thinking. It also illustrates how tailored interventions can support rehabilitation. Despite these promising outcomes, significant gaps persist. They include limited internet access, infrastructure constraints, security restrictions, digital literacy deficits, inconsistent implementation, and a lack of empirical evidence [5], [15], [16]. Technical specifications for offline personalization algorithms are rarely detailed, and cloud-dependent AI models face challenges in secure, isolated environments. Innovative responses to these constraints, such as robust local storage, simplified technical requirements, and tablet-based solutions, suggest potential pathways for AI systems that process data locally while maintaining security [28], [36]. However, ethical concerns around algorithmic bias and transparency complicate implementation, emphasizing that genuinely adaptive AI in

correctional facilities will require both technical innovation and strong governance frameworks.

### 3.2.3. Ethics/Legal Considerations

Education in correctional settings is grounded in rights-based frameworks such as CESCR Article 13 and national constitutions (e.g., South African constitution, Section 29 [57]). However, this review identifies a gap between technological capability and regulatory oversight. Scholars emphasize that while international frameworks are referenced, specific governance mechanisms for AI in correctional education remain underdeveloped [45], [50]. Secure educational technology is often positioned as an ethical necessity to restore rights denied during crises such as the pandemic, with platforms designed to affirm lifelong learning and access to information [56]. Gender equity emerges as a critical dimension. Studies highlight that uniform device provision does not guarantee equitable participation. Female inmates in NSW used tablets less frequently than males [49], and Nigeria's NOUN initiative reported only male participants [55]. Scholars argue that digital education must account for intersecting disadvantages of race, gender, and class [47] and that oversight must be gender-responsive to avoid reinforcing trauma and exclusion [50]. Broader ethical concerns include algorithmic bias, data privacy, and transparency in AI systems [58], [59], [60]. Critics warn that technology in correctional contexts often serves population management rather than rights affirmation [48]. For-profit models intensify inequality by charging inmates for essential communication and educational content, creating financial barriers even in state-run systems [49], [51].

These findings show that while rights-based principles are acknowledged, current frameworks inadequately address AI-specific risks and gendered impacts. Governance structures must ensure that future AI systems in correctional education remain transparent, fair, accountable, and responsive to vulnerable groups.

### 3.2.4. Engagement

Learner engagement consistently emerges as a strength of digital initiatives in correctional education. Quantitative evidence from New South Wales (NSW) shows exceptionally high usage, 87% of inmates used tablets daily, with 45% for more than two hours per session [49], [50]. Qualitative studies in Namibia report students sacrificing sleep to study late at night [14], [54], while Nigeria's NOUN program documented a strong commitment to digital literacy training [55]. Gamification has proven particularly

effective in sustaining motivation. Giannoulis et al. [45] showed that game-based learning attracted and maintained inmate interest, while Antonopoulou et al. [56] empirically validated improvements in socio-cognitive skills such as self-awareness, emotional intelligence, and critical thinking. These findings illustrate how tailored interventions can enhance both academic and rehabilitative outcomes.

Contextual factors also explain high engagement. During pandemic lockdowns, digital devices became lifelines against extreme isolation, with inmates confined for over 23 hours a day [51]. In NSW, two-thirds of inmates agreed that tablet access improved their overall correctional experience [49]. However, engagement was shaped by constraints such as educational features being less used than communication functions, indicating that social connection was a primary driver [49]. Hopkins (2022) cautions that offline literacy tasks may not translate into skills needed for networked communication, limiting reintegration readiness. Gender differences further complicate engagement. Franich and Martinovic [50] found men engaged more frequently and for longer than women, a pattern confirmed by NSW data [49]. Hopkins (2022) links this disparity to the lack of differentiated content addressing female learners' needs and safety concerns. Mdlungu and Hlatshwayo [16] add that digital literacy gaps could hinder future AI adoption. Across diverse contexts, including European correctional centres [28], Nigeria [36], Namibia [14], [54] and South Africa [5], [16], [34], digital platforms consistently foster motivation, autonomy, and skill development. These findings support the hypothesis that technology-mediated education, particularly when incorporating engaging elements like gamification, can sustain learner commitment even in restrictive environments.

#### 3.2.5. Recidivism reduction

Theoretical models rather than measured outcomes dominate the literature on digital education and recidivism reduction. Gaikwad et al. [13] argue that AI could personalize learning and automate tasks to improve education and lower recidivism, though they caution about privacy and bias. Giannoulis et al. [45] establish a causal pathway, showing that digital interventions foster interpersonal communication, social adaptation, and self-perception, all linked to reintegration. Antonopoulou et al. [56] provide empirical support, demonstrating that gamified platforms improved emotional and social competence, leadership, and digital literacy skills essential for post-release success. They cite statistics showing recidivism reductions from 72% to 10% among second chance

school participants, offering strong correlational evidence. Reisdorf [51] reinforces this pathway by linking digital access to two key intermediate variables, i.e., maintained social support and digital literacy for employment. She cites studies showing that visitation and communication are positively associated with re-entry outcomes. The NSW evaluation found that 85% of inmates felt tablets improved family connections and autonomy [49]. Hopkins [47] adds that lack of networked communication during incarceration undermines reintegration and argues that advanced digital literacy, not just basic skills, is necessary for employment and access to services post-release. The NOUN initiative in Nigeria frames digital literacy as a solution for self-employment [55], though it provides no post-release tracking. Similarly, Franich and Martinovic [50] note that NSW data confirms improved wellbeing but lacks evidence on re-offending rates. Other scholars extend the rehabilitative framework. Mahlangu [54] highlights optimism and life skills fostered by e-learning, while Bradley and Davies [15] emphasize autonomy and empowerment. Johnson [5] underscores employable skills and social connections as critical to re-entry. Farley and Seymour [44] claim higher education reduces recidivism more effectively than vocational training, though without supporting data. Adeyeye [36] is one of the few to cite a figure, claiming education reduces re-offending by 43%, but does not isolate digital technologies from traditional methods.

These findings show that digital education is consistently linked to intermediate outcomes such as social support, well-being, autonomy, and employability, which are theorized to reduce recidivism. However, empirical evidence directly connecting digital or AI-enabled education to lower re-offending remains scarce. Hopkins [47] argues that effective reduction requires holistic approaches addressing poverty, domestic violence, and other root causes of incarceration. Thus, while the theoretical pathways are strong and supported by intermediate evidence, the field lacks longitudinal data to confirm causal impacts on recidivism.

### 3.3. Conceptual framework of AI in correctional education

The conceptual framework was developed through a systematic thematic synthesis of the 20 reviewed studies, following established qualitative synthesis procedures [18]. Data were first extracted and coded line by line to identify recurring concepts related to AI use, institutional conditions, and educational outcomes. These initial codes were then grouped into descriptive themes based on frequency and similarity across studies. Five

core themes emerged, i.e., security and infrastructure constraints, adaptive or personalized learning features, ethical and legal considerations, learner engagement outcomes, and recidivism-related outcomes. These themes were subsequently interpreted to construct higher-level analytical components represented in the framework.

The "promise of AI" reflects commonly reported benefits such as adaptive learning and personalisation. The "constraints" component captures the dominant influence of security-driven institutional environments. The "transitional stage" represents the current state of implementation, where most systems remain partially adaptive rather than fully AI-driven. The "outcomes" component integrates both short-term educational benefits and limited evidence on long-term reintegration. The relationships between components were derived from consistent patterns across studies, particularly the constraining effect of institutional conditions on AI implementation and the uneven translation of technological potential into measurable outcomes. This stepwise approach ensures that the framework is empirically grounded, transparent, and reproducible. This is visualized in Figure 3.

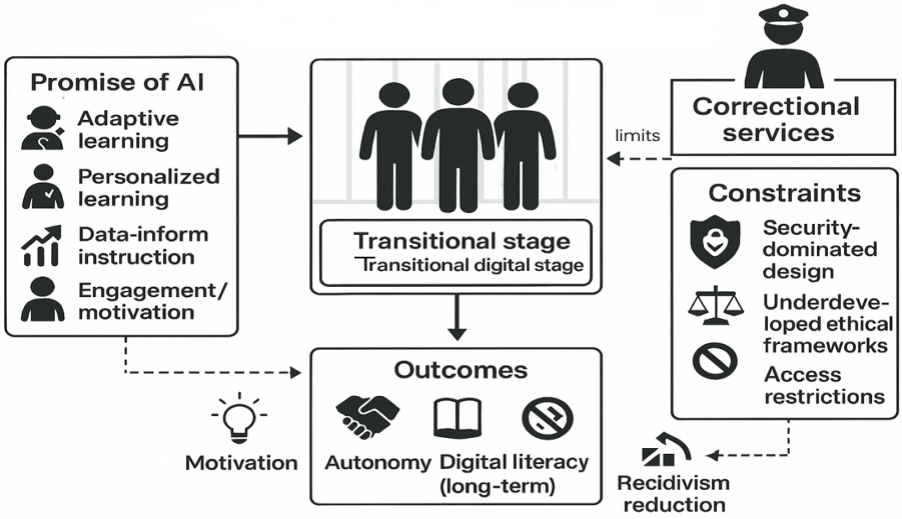


**Figure 3.** Conceptual framework of AI-enabled Learning in Correctional Centres.

This framework synthesizes evidence from 20 studies, illustrating five interconnected themes: secure systems, adaptive learning, ethics/legal considerations, learner engagement, and recidivism outcomes. The model highlights how security dominated design shapes all technological deployment, thereby constraining the development of

adaptive AI features. Ethical and legal principles provide oversight but remain underdeveloped for AI-specific risks. Positive learner engagement outcomes are consistently documented, yet direct evidence of recidivism reduction is limited. The framework positions correctional education at a transitional digital stage, where the promise of AI is mediated by institutional constraints and uneven translation into long-term rehabilitative outcomes.

### 3.4. Technologies implemented in correctional education.

E-learning platforms and digital literacy tools have been implemented in correctional centres across the world to enhance education and bridge the digital divide. The literature identifies four main categories of educational technologies implemented in correctional facilities, i.e., basic computing infrastructure, including desktop computers, laptops, projectors, and CD-ROMs [36], specialized learning management systems such as Portugal's dual-platform "Educonline@Pris" system [31] and Greece's encrypted CILMS with Privacy-ABCs authentication [52], advanced offline platforms including the PLEIADES project using locked-down eReaders and Making the Connection project with simulated online environments [44], [46], and security-focused access controls featuring whitelisted devices, ethernet-only connections, and content pre-loading systems [28]. While these technologies demonstrate innovation within correctional constraints and show positive engagement outcomes [14], they face significant implementation challenges such as inadequate infrastructure, digital skills gaps among users and staff [16], and scalability limitations. Most of these technologies remain pilot projects rather than system-wide deployments despite their potential for supporting rehabilitation and reducing recidivism [36].

### 3.5. How e-learning technologies address security, personalisation, and infrastructure constraints unique to correctional settings

Based on the available research on e-learning technologies in correctional settings, e-learning systems address the unique challenges of security, personalisation, and infrastructure constraints through innovative design approaches. These approaches balance educational needs with institutional requirements. E-learning technologies in correctional environments prioritize security through internet-independent systems that eliminate risks associated with unrestricted web access, as demonstrated by initiatives like the PLEIADES (Portable Learning Environments for Incarcerated Distance Education

Students) and Making the Connection projects. The PLEIADES project was specifically designed to provide incarcerated students with access to secure digital and mobile technologies that function without internet connectivity [44]. Pre-vetted educational material is loaded onto secure, locked-down devices (eReaders) that include monitoring capabilities for correctional staff oversight. Projects like Making the Connection utilize digital technologies such as server-based systems and notebook computers that operate independently of internet access within correctional centres. Such technologies allow the correctional centres to effectively prevent security breaches. These initiatives deploy simulated online learning environments that house digitized course content in an intranet-like setup, eliminating the need for real-time internet connectivity [28].

Infrastructure constraints, such as limited internet access and outdated technology, are mitigated by utilizing secure, standalone digital platforms where course materials are pre-loaded and accessible offline [61], [62], providing digital literacy training to inmates [63], [64] and having education officers download course content and resources to be loaded onto correctional facilities' computers [65]. This helps in bypassing direct internet access. Infrastructure constraints can also be managed through mobile tablet-based solutions that require minimal IT infrastructure [61], [62], simplified technical requirements that work with basic hardware, and cloud-independent operation using local storage and processing capabilities to reduce dependency on external networks.
Personalisation is achieved through adaptive learning platforms [66] that adjust content difficulty and pacing based on individual student progress and adaptive content. This will allow educational materials to adjust dynamically to each learner's needs [67].

### 3.6. Ethical, legal, and practical considerations involved in deploying AI-driven education in correctional centres.

Article 13 of the International Covenant on Economic, Social, and Cultural Rights (CESCR) [68] affirms that education is a right for all individuals, including incarcerated persons. It further emphasizes that higher education should be made equally accessible to everyone, based on individual capacity, through appropriate measures, with a particular focus on the gradual introduction of free education [69]. This is further supported by the South African Department of Correctional Services in terms of Section 29 (1) of the Constitution of the Republic of South Africa (Act No.108 of 1996) [57] that states "everyone has a right (a) to basic education, including adult basic education and (b) to further education, which

the state, through reasonable measures, must make progressively available and accessible".

AI is a developing set of digital technologies, rather than a single entity, designed to analyze large datasets quickly, generate insights and predictions, and automate tasks that once required human expertise [58]. There is no concise policy or legal framework that regulates the use of AI in correctional education, but the Council of Europe's Draft Recommendation [70] sets a regulatory framework that indirectly governs AI in correctional education. It permits AI as a tool to support rehabilitation, including digital literacy and personalized learning, but insists it must remain human-centered, human rights-based, and overseen by professionals. Importantly, AI should assist, not replace, correctional staff and educators. AI in correctional education must remain human-centric, support rather than replace teachers, automate only routine tasks, and ensure monitoring is ethical, transparent, and non-intrusive under clear legal frameworks (Council for Penological Co-operation [70] as cited in Nellis [58]). Legal frameworks should require AI to be used ethically [59], with transparency, fairness, and accountability, and inmates should be guaranteed the right to challenge and appeal decisions made by AI systems [71].

The deployment of AI educational technologies within correctional environments must be governed by a comprehensive legal and ethical framework that aligns with both national and international obligations [59]. This includes compliance with domestic legislation on data protection and privacy, as well as international standards such as the European Convention on Human Rights [72], which safeguards dignity, fairness, and the right to a fair process. International guidance, such as the Council of Europe's Draft Recommendation on the Use of AI in Prisons and Probation, further stresses that AI systems must operate transparently, proportionately, and under human oversight to prevent abuses [58]. Additionally, regulations governing surveillance and monitoring technologies are particularly relevant in correctional education and rehabilitation contexts, where digital tools may capture sensitive personal information. The General Data Protection Regulation (GDPR) within the European Union establishes principles of lawfulness, fairness, and purpose limitation in data use [73]. Globally, the United Nations Standard Minimum Rules for the Treatment of Prisoners [74] call for the responsible use of technologies that respect human dignity and rights. Authorities should develop clear

guidelines and protocols for the use of AI educational technologies in correctional centres, specifying who may access the data, how it can be used, and what safeguards are in place to protect it [59].

### 3.7. Related work: Case study on electronically mediated learning in Kgosi Mampuru II and Brandvlei correctional centres

Maloma's [75] research provides a detailed case study of electronically mediated learning at the Kgosi Mampuru II and Brandvlei Correctional Centres in South Africa. These centres host University of South Africa (UNISA) hubs, established under a 2017 memorandum of understanding between the Department of Correctional Services (DCS) and UNISA. The hubs were designed to expand incarcerated students' access to higher education through electronically mediated platforms. The hubs provide laptops, internet access, library resources, and administrative support to incarcerated students pursuing tertiary education with UNISA through distance learning. The study surveyed 45 incarcerated students who highlighted both the opportunities and challenges of engaging with distance learning from within a secure environment. Findings highlight systemic challenges such as restrictive internet policies, limited access hours, high data costs, technical problems with the MyUNISA LMS, and poor interaction with lecturers and library resources. While laptops and flash drives are allowed in sleeping quarters, more advanced devices such as tablets and smartphones are prohibited, limiting flexibility and engagement. Students also reported reliance on correctional staff for oversight, which reduced autonomy compared to non-incarcerated learners. Technical problems with MyUNISA and inadequate interaction with lecturers and library services further constrained the effectiveness of the initiative.

While the hubs broaden educational access and contribute to rehabilitation, correctional centres prioritize security and control over open learning. Motivation and engagement were the most frequently reported benefits, but measurable long-term outcomes such as reduced recidivism or improved employability were not investigated by the study. The study shows that South African correctional centres are still focused on securing basic digital access rather than adopting adaptive or AI-driven tools. The reliance on restricted platforms and limited connectivity reflects the global trend where security concerns dominate system design [5], [63]. The study further illustrates the gap between potential and practice, where AI promises personalisation and predictive learning support, but the

infrastructure and governance within correctional centres remain unprepared. The emphasis is on managing risks, controlling devices, and providing minimal access. This supports the argument that without robust regulation and investment, AI could reproduce existing inequalities rather than addressing them [34], [58].

The study resonates with wider research in correctional education that shows security concerns dominate system design, often at the expense of pedagogical innovation [5], [28], [44],. Similar findings have been reported in Namibia and Nigeria, where limited access to infrastructure and heavily controlled digital platforms shaped the learning experience more than the pedagogical potential of technology [14], [36]. The impacts measured were primarily motivational and engagement related. This resonates with broader trends in the literature where digital tools are valued for enhancing autonomy and self-efficacy but lack robust evidence of long-term outcomes such as employability or reduced recidivism [13], [15].

### 3.8. Discussion

#### 3.8.1. Why AI Remains Underdeveloped in Correctional Education

A consistent theme across studies is that security considerations dominate system design [7], [34], [59], [76], shaping how education can be delivered. AI adoption in correctional education remains limited due to overlapping barriers. Closed networks and restricted devices prevent the connectivity and processing power required for adaptive AI. Risk-averse institutional cultures embed security restrictions before pedagogy is considered, while ethical concerns about profiling and bias discourage experimentation. Underinvestment in low-income countries and political resistance in high-income contexts restrict resources, and the absence of empirical validation creates circularity: implementation requires evidence, but evidence requires implementation. These factors explain why correctional education has achieved digital transformation but not AI transformation. Security considerations consistently dominate system design, shaping how education can be delivered. Projects such as PLEIADES and Making the Connection demonstrate that secure offline platforms can expand higher education access while maintaining institutional safety. Yet this emphasis on restriction narrows digital exposure, limiting meaningful digital literacy development. Adaptive learning technologies are being piloted, but integration remains uneven due to infrastructure gaps, weak connectivity, and low digital literacy among staff and learners. From a multi-level perspective, AI

remains underdeveloped because of technical constraints (restricted networks, low device capacity), ethical and institutional barriers (privacy, bias, consent), and policy/funding limitations that prioritize basic digital inclusion over advanced AI functionality. Together, these factors explain the dominance of secure digital delivery over adaptive or intelligent systems.

Technological innovation can improve access while maintaining institutional safety. Yet the emphasis on restriction also narrows the scope of digital exposure, which prior research has identified as critical for developing meaningful digital literacy [28]. A major finding relates to the emerging role of adaptive learning. Although adaptive technologies are being piloted, their integration into correctional centres is uneven and limited by infrastructure gaps, weak connectivity, and low digital literacy among staff and learners [5], [16]. From the perspective of previous studies, this finding confirms that while correctional systems are open to incremental innovation, they are not yet ready for fully AI-driven personalized learning [14]. The hypothesis that AI could enhance educational outcomes through personalisation is therefore only partially supported, as existing deployments lack the technical sophistication and evaluation frameworks to test these claims [5], [7], [59],[60].

### 3.8.2. Comparison with Previous Reviews

Earlier reviews highlighted barriers but did not distinguish between digital and AI systems. Johnson [5] noted tensions between security and pedagogy but conflated online teaching with AI. Kabudi et al. [9] documented 67 AI studies in mainstream education but excluded correctional settings due to insufficient evidence, a decision confirmed by this review's finding of zero fully AI-enabled systems. Zivanai & Mahlangu [76] argued that reentry requires technology exposure; this review supports that, but adds that current offline platforms may inadequately prepare learners for AI-saturated workplaces. Pilot projects in Finland, the UK, and Australia illustrate incremental progress, but adoption remains fragmented. By categorizing implementations, this study advances scholarship by clarifying that correctional education lags mainstream AI adoption by more than a decade.

### 3.8.3. Digital vs. AI Distinction

Analysis of the 20 studies reveals four categories: basic digital delivery (n=11), interactive tools (n=6), AI-adjacent systems (n=3), and fully AI-enabled systems (n=0). While digital platforms improve access, engagement, and autonomy, none demonstrate the personalization or predictive analytics that define true AI. Correctional education has therefore achieved digital transformation, but not AI transformation. Conflating digital access with AI implementation obscures enabling conditions and prevents realistic planning. Recognizing this gap clarifies why much of the evidence base is AI-adjacent rather than AI-integrated, and why correctional education has achieved digital transformation but not AI transformation.

### 3.8.4. Implications for Policy and Research

Policy makers must distinguish between achievable digital platforms and aspirational AI systems. Digital platforms can be optimized now, but AI requires investment in infrastructure, ethical frameworks, and dedicated funding. Stakeholders face two paths: invest in enabling conditions for AI, accept long timelines, or optimize current digital platforms with realistic expectations. Future research should prioritize controlled comparisons of learning outcomes, longitudinal studies linking technology to post-release success, and correctional-specific AI ethics frameworks. Only then can correctional education move beyond digital transformation toward genuine AI-enabled personalization.

### 3.8.5. Limitation

This review is limited by the narrow evidence base available for AI in correctional education. Of the 623 records screened, only 20 peer-reviewed studies met the inclusion criteria, and none reported fully AI-enabled systems. Most evidence relates to digital or AI-adjacent platforms, meaning findings reflect the closest practical implementations rather than direct evaluations of intelligent tutoring or adaptive AI. Geographic coverage is uneven, with most studies concentrated in the Global North, limiting generalizability to low- and middle-income contexts. Finally, outcomes such as recidivism reduction remain theoretically supported but empirically undemonstrated, as longitudinal post-release evaluations were absent. These limitations highlight the need for more diverse, rigorous, and long-term research before firm conclusions can be drawn about AI's role in correctional education.

## 4. CONCLUSION

Correctional education has progressed digitally but has not yet reached mature AI-enabled implementation. Secure platforms and adaptive features provide important foundations, but full AI integration remains aspirational. Evidence suggests potential associations with improved motivation, autonomy, and digital literacy, but causal links to rehabilitation and recidivism reduction remain tentative. Future research should prioritize longitudinal studies, participatory design, and offline adaptive algorithms to ensure AI supports rehabilitation within secure environments.

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