



CRIMINOLOGY  
RESEARCH GRANT

# Digital service delivery applications in corrections: A scoping review

Stuart Ross  
Mark A Wood  
Ron Baird  
Kajsa Lundberg

Report to the Criminology  
Research Advisory Council  
Grant: CRG 08/20–21

August 2023

This project was supported by a Criminology Research Grant.  
The views expressed are the responsibility of the author and are not  
necessarily those of the Council.

*Celebrating*  
**50** years

© Australian Institute of Criminology 2023

Apart from any fair dealing for the purpose of private study, research, criticism or review, as permitted under the *Copyright Act 1968* (Cth), no part of this publication may in any form or by any means (electronic, mechanical, microcopying, photocopying, recording or otherwise) be reproduced, stored in a retrieval system or transmitted without prior written permission. Inquiries should be addressed to the publisher.

Published by the Australian Institute of Criminology

GPO Box 1936 Canberra ACT 2601

Tel: (02) 6268 7166

Email: [front.desk@aic.gov.au](mailto:front.desk@aic.gov.au)

Website: [www.aic.gov.au/crg](http://www.aic.gov.au/crg)

ISBN 978 1 922877 10 9 (Online)

<https://doi.org/10.52922/crg77109>

This research was supported by a Criminology Research Grant. The views expressed are those of the author and do not necessarily reflect the position of the Criminology Research Advisory Council or the Australian Government.

This report was reviewed through a double-blind peer review process.

Edited and typeset by the Australian Institute of Criminology.

# Contents

<b>v</b>	<b>Acknowledgements</b>	
<b>vi</b>	<b>Acronyms</b>	
<b>vii</b>	<b>Abstract</b>	
<b>viii</b>	<b>Executive summary</b>	
<b>1</b>	<b>Introduction</b>	
1	Digital technologies in corrections	
2	Project goal and aims	
<b>4</b>	<b>Methodology</b>	
5	Identifying the research question	
5	Identifying relevant studies	
6	Study selection	
8	Data extraction	
<b>9</b>	<b>Description of the sampled sources</b>	
11	Description of the digital applications in the scoping review	
<b>14</b>	<b>A typology of digital technologies in corrections</b>	
15	Communication technologies: Email, messaging and videoconferencing	
<b>32</b>	<b>Evidence about impact and effectiveness</b>	
33	Interventions to address substance misuse	
36	Interventions to address violence	
38	Digital education and learning platforms	
39	Telepsychiatry, telepsychology and telehealth	
41	Kiosks and in-cell tablets	
43	Digital prison visits	
44	Other rehabilitative interventions	
45	The impact and effectiveness of digital applications in corrections	
<b>47</b>	<b>Challenges and future research directions</b>	
<b>51</b>	<b>References</b>	

Figures

- 7 Figure 1: PRISMA flow diagram of articles included in and excluded from the academic literature review

Tables

- 9 Table 1: Article types
- 10 Table 2: Disciplines of journals
- 10 Table 3: Country of studies
- 11 Table 4: Study designs
- 12 Table 5: App purpose or function
- 12 Table 6: Stage of development
- 13 Table 7: Intended user group
- 16 Table 8: A typology of digital technologies in corrections



# Acknowledgements

The research reported here was conducted under a grant from the Criminology Research Advisory Council, with additional funding from the Corrective Services Administrators' Council. We greatly appreciate the support for this project provided by these two councils and, in particular, by the then Commissioner of New South Wales Corrective Services, Mr Peter Severin. In our preparation of the Criminology Research Grant application, we drew on the advice and experience of Mr Jason Morris of HM Prison and Probation Service and Dr Hannah Graham of the University of Stirling. Both Jason and Hannah have made important contributions to theory, research and practice in digital corrections, and we look forward to continuing to work with them on this important topic.



# Acronyms

BFO	Breaking Free Online (drug treatment program)
CAI	computer-assisted instruction
CASAS	Comprehensive Adult Student Assessment System
CAT	computer-assisted therapy
CBT	cognitive behavioural therapy
CDM	complementary digital media
CVTRQ	Corrections Victoria Treatment Readiness Questionnaire
DHI	digital health intervention
ICT	information and communication technologies
IPV	intimate partner violence
LMS	learning management system
MAPIT	Motivational Assessment Program to Initiate Treatment
RCT	randomised control trial
RoD/IPV	Reactions on Display/Intimate Partner Violence
RPM	Recovery Progression Measure
TES	Therapeutic Education System
VR	virtual reality
VRAPT	virtual reality aggression prevention therapy



# Abstract

This study employed a scoping review method to identify and analyse 171 publications that examined digital service delivery applications used by custodial and community corrections agencies. Sampled publications were analysed to generate a typology of digital service delivery applications used by corrections agencies and to assess the nature, extent and gaps in research evidence about the use and effectiveness of technologies categorised in this typology. Our results also detail strategies used by prisons and community corrections during the COVID-19 pandemic to develop new service delivery models or adapt existing ones, using a variety of digital platforms. Synchronous digital technologies to provide telepsychiatry, telepsychology and digital education for justice-involved people have received the most research attention to date; digital service provision technologies used to provide justice-involved people with general social support, release or re-entry support or video-supported communication with friends and family have received less research attention. There are some important gaps in the research literature. Relatively few studies have evaluated the outcomes or cost-effectiveness of digital service delivery applications employed within custodial and community corrections environments. The reviewed research identifies a variety of challenges about the nexus between technology, justice-involved people and correctional agencies, with many publications foregrounding digital inequalities stemming from a lack of access to technologies and/or a lack of digital skills.





# Executive summary

Digital service delivery technologies have an increasing presence in correctional systems around the world. In the last decade, a variety of mobile or web-based digital platforms have been developed or adapted to support correctional service delivery activities like order management; compliance monitoring; offender treatment, education, rehabilitation or release transition programs; prison visits; and staff training. The COVID-19 pandemic added dramatic impetus to this shift to digital service delivery. In a matter of weeks in March 2020, prisons and community corrections services suspended many of their standard operating arrangements and put into place new systems that minimised person-to-person contact. Digital platforms, particularly those based on videoconferencing technologies, were a key part of these new operating approaches.

The current study employed a scoping review method to identify and analyse 171 publications that examined digital service delivery applications used by corrections and community corrections agencies. Sampled publications were analysed, both to generate a typology of correctional digital service delivery applications and to assess the nature and extent of the research evidence about the use and effectiveness of these technologies. Our results also detail the strategies prisons and community corrections used during the COVID-19 pandemic to develop new service delivery models or adapt existing ones, using a variety of digital platforms.

This research revealed several key findings. Firstly, our findings suggest that technologies utilised to provide telepsychiatry, telepsychology and digital education for justice-involved people have received the most research attention to date. Less research attention has been paid to digital technologies to provide justice-involved people with general social support, release or re-entry support or to video-supported communication with friends and family.



Secondly, our scoping review identified relatively few studies that evaluated the effectiveness of digital service delivery applications in corrections. Digital interventions to address substance misuse represented the only area of digital development identified in this scoping review; there were multiple studies of comparable interventions involving a variety of participants and sites. There is the beginning of an evidence base relating to three digital technologies that are increasingly important to contemporary prison design and operations: tele-services and tele-visits; self-service via kiosks and tablets; and digital education. However, given the enormous variation in the size, inmate populations and operating regimes of prison systems, there is a pressing need for more outcome studies. The review also identified examples of innovative interventions that show ‘cautiously positive’ results. However, at this early stage in their development, it is premature to look for a substantial and consistent body of evidence.

Finally, the reviewed research identifies a variety of challenges relating to the nexus between technology, justice-involved people and correctional agencies. The findings of this scoping review highlight the need for future research evaluating the efficacy of digital service delivery in corrections, as well as the relative costs and benefits of providing services digitally rather than by non-digital means. Further, our findings highlight the need for further research examining how these technologies may change the ecology of correctional environments and services in unintended and unanticipated ways.



# Introduction

## Digital technologies in corrections

Digital technologies have an increasing presence in correctional systems around the world. In the last decade, a variety of mobile, networked and web-based digital service delivery platforms have been developed or adapted to support correctional activities. They include order management; compliance monitoring; offender treatment, education, rehabilitation or release transition programs; prison visits; and staff training. As with much development in the digital world, the pace of development of the platform technology is much faster than the development of the content itself, the policy and regulatory frameworks that govern the use of digital tools and services and the evidence base about their impacts and outcomes. The result has been a process of rapid but uncoordinated development.

The factors driving the introduction of digital service delivery technologies into corrections are diverse. Digital technologies can offer significant advantages in the delivery of human services, including modest development costs and lower delivery costs than conventional person-based services; improved accessibility to remote or disadvantaged populations; and the potential to combine a variety of functions into customisable, easy-to-use applications that are available to service users when and where they need them (KPMG 2016). Digital service delivery technologies can also offer enhanced functionality like remote alcohol testing, spatial tracking and video and biometric identification (Ogden & Horrocks 2001). The arrival of the COVID-19 pandemic in early 2020 gave added impetus to this shift to digital service delivery. Corrections agencies were forced to quickly find and implement ways to engage with staff and clients that were not dependent on face-to-face contact. A key feature of digital service delivery technology development is that much of it is driven by commercial providers looking to offer more cost-effective or flexible service options to corrections agencies. This has important implications for the visibility of development and implementation activity, partly because details of technology implementation and impact are subject to a very uneven degree of external scrutiny.

In many respects, the developments in digital corrections mirror the developmental path taken in eHealth (the application of digital technologies generally to healthcare) and mHealth (the use of mobile digital technologies to deliver healthcare; Free et al. 2013; Lupton 2017) and in the corresponding mental health sectors (Kip et al. 2018; Mucic & Hilty 2016). The links between these two service domains are both direct—corrections clients may be engaged with health and mental health apps as part of their treatment (Johnson et al. 2016; Murphy, Densley & Ross 2019)—and indirect, in the sense that the technology, policy and regulatory developments in the health sector are influential in shaping the pathways and features of digital service delivery more generally. We can also look to the health and mental health sectors to highlight some of the challenges that the corrections sector is likely to face. These challenges include difficulties in integrating digital technologies with existing service delivery and management systems; the presence of poor quality or ineffective apps, combined with limited capacity for users to make judgements about app quality based on reliable evaluation evidence; and the need to develop appropriate regulatory and practice systems (Barton 2012; Burns, Liacos & Green 2014; Institute of Medicine 2012; Ross 2018).

Corrections agencies face significant regulatory, policy and practice challenges in managing these developments. While the health and mental health sectors have made substantial progress in developing regulatory, quality assurance and practice frameworks to guide or manage the integration of digital service delivery technologies into their service systems, few resources are available yet to help corrections practitioners. If corrections agencies are to respond effectively to these developments, they need to be able to make informed assessments and decisions about the acquisition, adaptation, creation and use of digital technologies and digital content. We currently lack a commonly agreed language to describe and classify these digital tools, and there are limited opportunities to share knowledge and experiences about their use. The evidence base to inform assessments of quality or likely outcomes is sparse and unsystematic, and there are no agreed standards about what constitutes a good digital app for delivering services to corrections staff or clients.

## Project goal and aims

The aim of this project is to systematically examine the research literature on digital service delivery applications in corrections. To undertake this task, we used a scoping review methodology developed as a technique to map the extent of the literature in a defined field of inquiry, to map and clarify the field's key concepts and definitions and to assess the type of evidence in that field (Arksey & O'Malley 2005). Peters et al. (2015: 141) defined a scoping review as a 'reconnaissance' technique that can be used 'when a body of literature has not yet been comprehensively reviewed or exhibits a complex or heterogeneous nature not amenable to a more precise systematic review of the evidence'.

Our intention is to provide a systematic framework to describe digital service delivery applications that corrections and community corrections agencies use. We have created a typology of correctional service delivery technologies, in terms of their functions and mechanisms, and then applied this framework to assessing the research evidence about their use and effectiveness. We also identified gaps in this body of knowledge. The specific research issues addressed in this project were:

- What are the functional attributes of digital service delivery technologies targeting correctional staff, offenders or prisoners?
- How can digital service delivery technologies targeting correctional staff, offenders or prisoners be classified, based on their functional attributes (the intended goal of the app or the activity that was emulated or supported) and affordances (the possibilities or action or decision that the app affords to users)?
- What evidence exists about the impact and effectiveness of digital service delivery technologies in the corrections sector?
- What are the problems or challenges that are associated with digital service delivery technologies, and how do practitioners go about responding to them?
- What are the gaps in the current literature?



# Methodology

Researchers have used scoping reviews to map sectors of interest in terms of their functions and core activities (Burns, Liacos & Green 2014; Payne et al. 2015), to depict the predominant approaches and methodologies used (Risling et al. 2017) and to track the growth of the field and the challenges and benefits encountered (Morris & Kaur Bans 2018; Seko et al. 2014). The scoping review method is frequently used to identify gaps in the knowledge base, to contribute to the development of evaluation criteria and outcome measures (Bakker et al. 2016; Ellis et al. 2019) and to provide a summary of evidence about impact and outcomes. Scoping reviews are particularly useful in sectors where standard forms of meta-analysis of program effects are problematic, because of the paucity of evaluation studies or because the rapid pace of change quickly renders evaluation evidence out of date.

Our scoping review used the same criteria-driven literature search and review process as a systematic review, with a protocol developed according to the preferred reporting items of systematic review and meta-analyses (PRISMA) statement and checklist (Moher et al. 2009). We were concerned with both assessing the quality of academic and evaluation studies and mapping the key concepts, issues, gaps and extent of current research.

This scoping review generally followed the five-stage methodology set out by Arksey and O'Malley (2005). The search and selection protocol followed PRISMA guidelines (Moher et al. 2009), and the search results are presented in a PRISMA format. We used the Covidence app (<https://www.covidence.org/>) to organise the sources and to carry out the data extraction from the final set of primary sources. Extracted data were imported into SPSS Statistics (version 27) for analysis.

## Identifying the research question

The first stage in Arksey and O'Malley's (2005) scoping review methodology is to identify the research question that guides the literature search strategies. Our core concern was with digital applications that provide or support a core correctional service delivery function. Service delivery included treatment, social support, education, reintegration, supervision or order compliance, or a combination of these functions, where the service recipients were incarcerated individuals, persons under community corrections supervision or correctional staff. A fundamental issue with this research is that digital services and tools are ubiquitous in correctional administration; for example, correctional record keeping systems are usually digital in format, prison security is based on digital operations and monitoring systems, and many other correctional operations depend on some form of digital platform. Our concern was specifically with 'customer facing' apps that involved direct interaction between the application and the service recipient and that were intended to deliver a service, program or other intervention. For our purposes, a customer might be a prisoner or someone on a community corrections order who uses a service, or a staff member or service provider who interacts with the service recipients.

## Identifying relevant studies

Our strategy involved a search of electronic library databases, followed by a process of citation tracking from the sources identified in the library search. We searched two general databases covering the social sciences (Web of Science and Scopus) and one database with a specifically criminal justice focus (Criminal Justice Abstracts). We also searched Google Scholar, using a restricted set of search terms; Google Scholar is not a fully indexed academic library database, but it has the benefit of providing better identification of quasi-academic or other grey literature sources. We conducted the library database searches on 27 July 2021.

The search terms involved two primary constructs: the correctional domain of interest (including custodial and community corrections as well as post-release) and the digital form of the applications. This strategy yielded the following search string:

(App OR Smartphone OR Digital OR Computer OR mobile OR Web\* OR Virtual reality OR Tele\* OR video\* OR ehealth OR emental health) AND (probation OR parole OR reentry OR Prison OR Custody OR imprison\* OR inmate\* OR incarcerat\* OR jail\* OR gaol\*)

The searches took place a little over one year after the COVID-19 pandemic began. As the study selection and data extraction stages of the review progressed, it became apparent that the pandemic had initiated a distinct research literature documenting the responses of corrections agencies. A key feature of these responses was the adoption or adaptation of a range of digital platforms to provide services like prison visits, rehabilitative programs and supervision. We also tracked this rapidly developing literature using the following review process.

In May 2022, we undertook citation tracking (Greenhalgh & Peacock 2005) to identify research published since our searches began. This process identified a second wave of articles that were added to Covidence for review and data extraction. This citation-tracking wave identified a large number of articles specifically concerned with the impacts of, and responses to, the COVID-19 pandemic in corrections. The findings of these COVID-19 related publications are reviewed in a separate *Trends & issues* paper, which examines the use of digital service delivery technologies to deliver programs and services during the pandemic (Ross et al. 2023).

To identify additional articles that were not captured through these initial search strategies and which had been published since the previous search, we again searched Scopus, Web of Science and Google Scholar in June 2022. A feature of this literature is that sources relevant to the scoping review can be found in a wide variety of disciplinary areas. The ‘digital’ component of the search string also tends to generate large numbers of purely engineering or computer sciences results that are not relevant to our review. A key feature of the correctional digital technology sector is that much of the development of purpose-specific apps involves commercial developers; only limited information about the apps is available to anyone who is not in a contractual relationship with the provider, and the research literature is scant. A further complication is that some of the sources in the scoping review were written by the people or agencies responsible for developing the apps that were being reported on. As a result, this scoping review involved a series of judgements and compromises about what should be included and excluded, and we cannot give any assurances that the evidence reviewed is exhaustive.

## Study selection

The primary search and citation tracking yielded a total pool of 273 non-duplicate sources, including 25 identified by citation tracking. These were screened using the following inclusion and exclusion criteria.

### *Inclusion:*

- The article covered a digital service delivery application or system targeting correctional staff, offenders or prisoners.
- The function of the digital app or system was treatment, social support, education, reintegration, supervision or order compliance, or a combination of functions.
- The digital component involved standalone or networked tablets or computers or mobile devices.



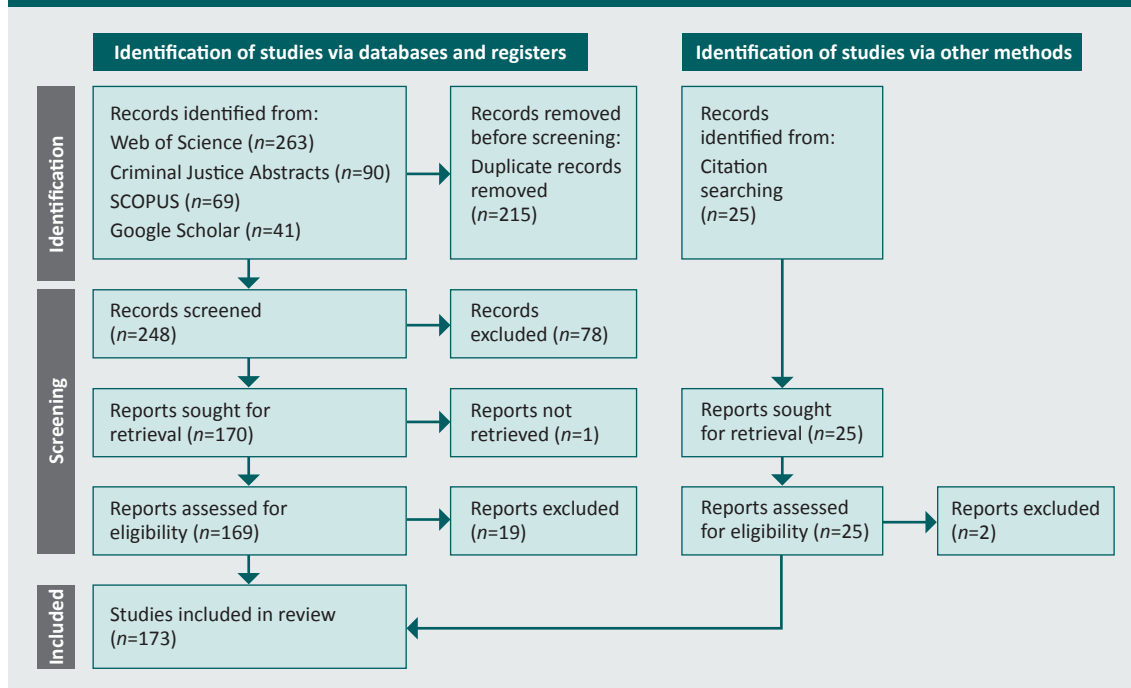
*Exclusion:*

- Articles where the digital app or system did not involve the delivery of one of the identified correctional service functions were excluded. These were primarily about investigative forensics, security, CCTV or biometrics.
- Articles where the service delivered was not a correctional function were excluded. These were primarily about remote court appearances, which may have occurred in a corrections location.
- We also excluded articles concerned with electronic monitoring of offenders, on the basis that this technology has been the subject of multiple systematic reviews (see Belur et al. (2020) for a summary of the review literature on electronic monitoring).
- There is a very large literature on telemedicine, including a number of recent systematic reviews of telemedicine in institutional settings (see, for example, Senanayake et al. 2018). We excluded sources that involved telemedicine in correctional settings.

Screening using information in the title and abstract identified 79 sources as irrelevant.

A second full-text screening resulted in the exclusion of a further 22 sources (including one source that could not be retrieved in full-text form). The remaining 173 sources constituted the data extraction pool for the scoping review. The full results of the source identification, screening and selection process are shown in the PRISMA diagram at Figure 1.

**Figure 1: PRISMA flow diagram of articles included in and excluded from the academic literature review**



Note: PRISMA=Preferred Reporting Items for Systematic reviews and Meta-Analyses. See Moher et al. 2009; Page et al. 2021

## Data extraction

Data were extracted from sampled texts using a combination of inductive and deductive thematic analysis (Fereday & Muir-Cochrane 2006). In line with this hybrid coding approach, our Covidence data extraction template included both (deductive) closed-ended fields and (inductive) open-ended fields. Closed-ended fields related to issues including: the country in which a study was conducted; study design; the purpose(s) of the technology or technologies discussed in the article (for example, professional interaction by video link, criminogenic program delivery, distance education); and the target group of the technology (for example, imprisoned individuals, correctional staff, individuals released from prison). Inductive open-ended items related to the aims of a study, its key findings and the names, features and designers of any technologies discussed in the app. Additionally, for the current review, articles were thematically coded to identify any challenges reported by a study in implementing or utilising a specific technology in response to COVID-19. Two authors coded each sampled text, and any coding discrepancies were discussed and resolved by consensus (Syed & Nelson 2015) using the consensus function of Covidence.

# Description of the sampled sources

Table 1 shows that the largest category of sources identified was journal articles (85% of the total). Book chapters made up a further six percent of sources, and conference papers a further five percent. It is worth noting that one of the two monographs identified is in the area of computer system design and deals only peripherally with the core topic of the review. To date, Carolyn Mackay's (2018) *The pixelated prisoner* remains the only long-form publication dedicated primarily to examining a form of digital service delivery within correctional environments.

**Table 1: Article types**

Article type	<i>n</i>	%
Journal article	147	85.0
Book chapter	11	6.4
Conference paper	9	5.2
Book	2	1.2
Doctoral dissertation	4	2.4
<b>Total</b>	<b>173</b>	<b>100.0</b>

When the journal articles are classified by discipline (see Table 2), the heterogeneity of the sources in the review becomes apparent. Just over one-third (35%) of articles are in criminology journals; this may partly reflect the choice of Criminal Justice Abstracts as a library database for the search. Criminology journals with multiple articles in the review include the *Probation Journal* (six sources) and *Criminal Justice and Behavior* (four sources). After criminology, three of the next four disciplinary categories are from the health sciences: psychiatry/psychology, healthcare technology, and general health and medical. The health sciences journals with the largest contribution to the review were the *Journal of Medical Internet Research* (seven sources) and *Frontiers in Psychiatry* (four sources). Articles in education journals comprise a small but distinct disciplinary category (7% of sources).

**Table 2: Disciplines of journals**

Discipline	<i>n</i>	%
Criminology	51	34.7
Psychiatry, psychology	23	15.6
Healthcare technology and computing	21	14.3
Interdisciplinary	13	8.8
Health, medical	13	8.8
Education	10	6.8
Media, communications	5	3.4
Nursing, forensic nursing	4	2.7
Other	7	4.8
<b>Total</b>	<b>147</b>	<b>100.0</b>

All sources were classified according to the site of the study or, in the case of theoretical or policy reports, the location of the authors. The largest source of studies was the United States (42% of sources), followed by the United Kingdom (19%) and Australia/New Zealand (15%).

**Table 3: Country of studies**

Country of study	<i>n</i>	%
United States	72	41.6
United Kingdom/Northern Ireland	33	19.1
Australia/New Zealand	25	14.5
Netherlands	8	4.6
Sweden	5	2.9
Other Europe	15	8.7
Other Americas	3	1.7
Asia/Africa	2	1.2
Multiple jurisdictions	10	5.8
<b>Total</b>	<b>173</b>	<b>100.0</b>

Sources were also classified by the primary research method or design. The largest group, comprising 75 sources (43%) were descriptive or implementation studies. There were 35 studies (21% of the total) that reported on the outcomes of a digitally based program or an evaluation of a trial or program. Studies based on a review of research literature, in the form of a systematic review, scoping review or a less formal literature review, accounted for 25 sources (15% of the total); it should be noted that some of these were reviews of a topic area (for example, prison education) that included digitally based programs rather than reviews specifically focused on digital interventions. Sources that addressed policy and regulatory aspects of digital developments in corrections comprised a further 17 sources (10%). There were also 11 sources (6%) that were classified as theoretical and 10 sources that described research protocols for studies not yet conducted or which could not be allocated to any of the study design categories.

**Table 4: Study designs**

Study design	<i>n</i>	%
Descriptive or implementation study	75	43.4
Evaluation or outcome study	35	20.2
Policy or regulatory	17	9.8
Systematic, scoping or literature review	25	14.5
Theoretical	11	6.4
Other	10	5.8
<b>Total</b>	<b>173</b>	<b>100.0</b>

## Description of the digital applications in the scoping review

The digital service delivery technologies in the scoping review sources were classified by the purpose or function of the technology or technologies (that is, the intended goal of the app or the activity that was emulated or supported). This classification by function forms the basis of the typology of digital technologies set out in the following section of this report.

Any given app may have multiple purposes or functions. The most common purpose or function was the use of synchronous video to deliver psychiatric, psychological or legal services, comprising 49 sources (28% of the total). In around half of these cases (26), the sole purpose or function that was considered was telepsychiatry/psychology/legal. The second most frequently identified function was eLearning or some form of digitally supported education, comprising 35 sources (20%), of which two-thirds (21) were solely concerned with digital education. There were 29 sources (17%) that examined the use of digital technology to deliver programs addressing the criminogenic needs that support offending behaviour (that is, sex offender, violence or drug and alcohol programs—referred to hereinafter as criminogenic programs) and that typically had the goal of reducing the likelihood of subsequent offending. Most of these sources also identified at least one other purpose or function, most commonly alcohol and drug support, mental health support or general social support (for example, providing access to supportive friends or family). Twenty-three sources identified alcohol and drug support, 21 were concerned with mental health support, and 18 involved general social support. These support functions were almost always combined with some other purpose or function. In-cell tablets were identified in 18 sources; because these tablets are themselves platforms for the delivery of other services, two-thirds identified some other function or purpose. Other forensic treatment (that is, some form of forensic treatment intervention not in the form of a tele-service or a criminogenic program) comprised 15 sources, and remote supervision or compliance management was identified as a function in 14 cases. Again, almost all the digital service delivery technologies with a forensic treatment or remote supervision function also included some other function or purpose. There were also 39 ‘other’ purposes identified, including health decision-making, digital literacy, providing internet access and job searching. Finally, four sources examined digital technology within correctional spaces in general but did not identify any specific function or purpose.

<b>Table 5: App purpose or function</b>		
<b>App purpose or function</b>	<b><i>n</i></b>	<b>%</b>
Telepsychiatry, telepsychology, tele-legal	49	28.3
eLearning, digital education	35	20.2
Criminogenic program delivery	29	16.8
Alcohol or drug support	23	13.3
Mental health support	21	12.1
In-cell tablets	18	10.4
General social support	18	10.4
Release or re-entry support	16	9.2
Other forensic treatment	15	8.7
Remote supervision or compliance management	14	8.1
Video-supported communications	13	7.5
Games or entertainment	5	2.9
Other purpose	39	22.5
Not applicable	4	2.3
<b>Total</b>	<b>173</b>	

Note: A digital application may have multiple purposes or functions; therefore, this table adds up to more than 100%

Most of the sources (100, or 58%) were concerned with digital technologies that were in use; 24 studies were reports of testing or trials of apps or systems, and a further 17 studies were development proposals of apps or technologies that had not proceeded to the point of formal trials.

<b>Table 6: Stage of development</b>		
<b>Stage of development</b>	<b><i>n</i></b>	<b>%</b>
Development	17	9.8
Testing	24	13.9
Use	100	57.8
Not applicable	32	18.5
<b>Total</b>	<b>173</b>	<b>100.0</b>

Technologies were classified by their intended target group. As with their functions and purposes, any given technology might have multiple target groups. The most commonly identified target group was incarcerated individuals, accounting for 71 percent of sources. To some extent, this arises from the predominant role played by forensic tele-services that are almost always delivered to persons in custody (see app functions and purposes above). Around one-quarter of sources (26%) involved an app that targeted persons under community supervision, and one-fifth (20%) had persons released from prison as the intended target. There was considerable overlap in these two groups. Corrections staff were the target of one in 10 apps (11%), but again, in most cases, this was in combination with another target group.

Table 7: Intended user group		
Intended user group	<i>n</i>	%
Incarcerated individuals	122	70.5
Persons under community corrections supervision	45	26.0
Persons released from prison	35	20.2
Corrections staff	19	11.0
Not applicable	4	2.3
<b>Total</b>	<b>173</b>	

Note: A digital application may have multiple purposes or functions; therefore, this table adds up to more than 100%





# A typology of digital technologies in corrections

A key challenge in dealing with digital technologies in corrections is finding the language to talk about these developments in a way that captures both their functional and technological aspects. To help capture both these dimensions, we developed a typology of digital service delivery technologies applied within correctional settings. A typology is a system for classifying things into types that share common attributes. Our typology (Table 8) is organised around two dimensions:

- *The technology's functional purpose within correctional or community settings.* Functions include prison education, mental health support, alcohol and drug support, games and entertainment, release and/or re-entry support, remote supervision and criminogenic program delivery. Importantly, some digital technologies introduced into corrections and community corrections environments are multifunctional and have a variety of uses relating to several of the listed domains. Prison cell tablets, for example, are a multipurpose platform, enabling incarcerated individuals to receive video visits, participate in further learning, play games and receive mental health support.
- *The technology's affordances* are the action possibilities it affords users (see Hutchby 2001; Norman 2013). While the function dimension considers the technology's purpose within a correctional or community corrections setting, the affordance dimension considers the specific action possibilities the technology enables for pursuing this purpose. For example, a learning management system's functional purpose is to facilitate learning. It is able to facilitate learning through providing affordances for collating digital learning resources, collaborating, discussing course content with peers and submitting assessments.

This typology captures both the functions of the digital applications and the degree to which they are dependent on the affordances of the digital platforms. The use of digital channels to facilitate written or verbal communication or visits by family and friends is the least digitally dependent element in the typology. The digital platform of email or videoconferencing makes communication faster and less reliant on the physical presence of the other party, but otherwise adds little to the process. At the other end of the typology are complex, multifunctional mHealth, criminogenic, therapeutic or rehabilitative programs delivered using mobile phones or, sometimes, desktop computers. Examples include the A-CHESS/eRecovery drug relapse prevention program (see Gustafson et al. 2014), the Breaking Free Online (BFO) drug treatment program (see Elison, Davies & Ward 2015b) and self-help, AI-based apps for people with mental health problems. These applications use a range of digital affordances, including geolocation monitoring, and often incorporate complex algorithms that guide the user to appropriate content or identify significant risks.

### **Communication technologies: Email, messaging and videoconferencing**

Various communication apps are applied in correctional settings, including emails, text messaging and visits and professional interaction via videoconferencing technologies. These technologies form part of what is often referred to as information and communication technologies (ICTs), facilitating various forms of communication. Accessibility is a key affordance of ICTs, increasing access to information. ICTs also facilitate communication and collaboration by, for example, connecting people through messages, emails or videoconferencing, but this is dependent on the e-literacy of the user. Immediacy is another important affordance made possible through the unprecedented speed with which information can travel via ICTs. However, this has also altered expectations around response time to emails, with associated social and professional pressures (Conole & Dyke 2004). Erhardt and Gibbs (2014: 156) note:

...while CTs such as email, mobile phones, instant messaging, and videoconferencing may offer greater flexibility and control over work through ubiquitous access and increased information-processing ability, these same affordances are also perceived as creating extra work, stress, and communication overload.

Finally, another important affordance associated with ICTs (especially in the correctional setting) is surveillance. ICTs present various new opportunities for surveillance and control (Conole & Dyke 2004) and for new business models built upon the ability of digital platforms to harvest behavioural data from users (Zuboff 2019).

**Table 8: A typology of digital technologies in corrections**

Technology	Function(s) in corrections	Affordances
Videoconferencing		Real-time audiovisual communication with individuals at different locations. Eye contact with interlocutors (Vidolov 2022). Ability to self-view (Vidolov 2022).
	Visitation	
	Psychological and psychiatric service provision	Enables group therapy for incarcerated individuals who pose a safety risk to practitioners (Batastini & Morgan 2016).
	Legal service provision	
	Remote supervision	
Email and text messaging		Asynchronous (non-real time) textual communication with individuals at different locations. Editability (Erhardt et al. 2016). Synchronicity (see Erhardt et al. 2016). Enables users to avoid transmitting ‘involuntary cues’ that might contradict their intended message (Walther 2007: 2541).
	Mental health support	Sending treatment reminders (Tolou-Shams et al. 2019).
	Criminogenic program delivery	
	Alcohol and drug support	
	Remote supervision	
Kiosks		Enabling users to order a product from a menu and/or book a service. Providing users with restricted internet browsing.
	Self-service	Enabling incarcerated individuals to check their spending accounts, shop in canteens, book family visits, read noticeboard messages, arrange healthcare appointments and make requests to attend education services (Jewkes & Reisdorf 2016; McDougall & Pearson 2020; McDougall et al. 2017).
	Remote supervision	Assisting individuals on probation or parole in meeting probation or parole conditions. Biometric scanners enable probation officers to verify the identity of kiosk users (Ogden & Horrocks 2001).

**Table 8: A typology of digital technologies in corrections (continued)**

Technology	Function(s) in corrections	Affordances
Tablets		Enabling users to order a product from a menu and/or book a service. Providing users with restricted internet browsing. Portability (Drennan & Moll 2018).
	Psychological and psychiatric service provision	Facilitating psychological assessments (King et al. 2017).
	Self-service	Enabling incarcerated individuals to order items from the prison canteen, schedule appointments, explore educational opportunities, access information and work opportunities and view their court records (Mufarreh 2022; Robberechts 2020).
	Education	Enables incarcerated individuals to learn and access education opportunities within their cells, rather than having to wait for access to digital learning technologies in a dedicated education wing of the prison (Bradley & Davies 2021).
	Entertainment	Providing incarcerated individuals with access to television, films and games.
Web-based treatment interventions		Social affordances for forming social relationships and communities. Cognitive affordances that facilitate learning, skill building and knowledge acquisition. Identity development affordances that facilitate an individual's alteration of their identity in relation to their own health. Affordances for emotional reactions and reflections. Functional affordances that increase the scalability and reach of a treatment intervention (Wong et al. 2020).
	Mental health support	
	Criminogenic program delivery	
	Alcohol and drug support	

**Table 8: A typology of digital technologies in corrections (continued)**

Technology	Function(s) in corrections	Affordances
Smartphone-based mHealth and mobile mental health apps		Portability (Drennan & Moll 2018). Perpetual contact: the ability to communicate with others anytime and anywhere (Katz & Aakhus 2002; Mascheroni & Vincent 2016). Providing real-time locational information using the geo-tracking affordances of smartphones. Biocueing technology that alerts users when certain physiological signals are in an 'at risk' range (Ter Harmsel et al. 2021).
	Mental health support	Goal setting and tracking functions. Resources for wellbeing support (Perdacher et al. 2022).
	Re-entry and reintegration support	Providing localised resources for healthcare services, substance-use disorder treatment, job searching, housing, financial support, child care, food and transportation (Zhang et al. 2022). Journal functionality for service users to fill with their own thoughts and reminders of how they are doing (McGreevy 2017).
	Remote supervision	Facilitating continuous case management between justice-involved individuals and probation managers (Zhang et al. 2022).
	Criminogenic program delivery	Goal setting and tracking functions. Resources for wellbeing support. Journal functionality for service users to fill with their own thoughts and reminders of how they are doing. Notifications of high-risk situations (Johnson et al. 2016; Ross et al. 2022). Social network features for sharing recovery stories and fostering relatedness with others (Ford et al. 2015; Johnson et al. 2016).
	Alcohol and drug support	
Computer-based learning programs	Incarcerated individuals' education and training	Facilitates easier and more efficient access to education and training that affords inmates ease of access to a range of education and training and support, including access to basic literacy and numeracy packages (Batchelder & Rachal 2000; McCulley, Gillespie & Murr 2014). Facilitates program delivery that uses digital technology to help reduce recidivism rates among offenders and support inmate reintegration back into the community (Chaple et al. 2016; Pfeifer 2019).
	Correctional staff education and training	Facilitates ease of access to staff training via the delivery of eLearning and computer-based end-of-life care training for prison healthcare staff (Loeb et al. 2021; Loeb et al. 2017; Myers et al. 2022). Training modules placed on available tablets for easy access (Loeb et al. 2021). Providing one-on-one tutorials in prison education for basic educational skills (Batchelder & Rachal 2000; McCulley, Gillespie & Murr 2014). Allowing applied learning to analyse their own life situation and what changes they would have to make (Pfeifer 2019).

**Table 8: A typology of digital technologies in corrections (continued)**

Technology	Function(s) in corrections	Affordances
Learning management systems	Incarcerated individuals' education and training	<p>StudyDesk is an offline Moodle-style university learning management system. The system allows incarcerated students to access distance education without direct access to the internet (Farley et al. 2017).</p> <p>Stand Alone Moodle is a learning management system that contains much of the same functionality as the regular Moodle platform, but without requiring internet access (Farley &amp; Doyle 2014; Hopkins &amp; Farley 2014).</p> <p>Virtual Campus is a firewall-protected learning management system that allows incarcerated learners to access a variety of courses and search for job vacancies via the internet (Pike &amp; Adams 2012).</p> <p>Allows inmates to participate in a range of further education programs, including undertaking higher education courses (Farley &amp; Doyle 2014; Farley et al. 2017; Hopkins &amp; Farley 2014; Pike &amp; Adams 2012).</p>
	Remote supervision	<p>Efficient use and access for remote monitoring, including staff safety function delivered via a Samsung smartphone (Fagan 2017).</p> <p>Allows for greater efficiency because a range of tasks, such as accessing information related to their case load, can be easily completed while community corrections staff are mobile in the field, reducing the need to return to the office to carry out these various tasks (Fagan 2017).</p>
Digital games	Entertainment	<p>Digital games can help with negative emotions via diversion that operates to help time pass more quickly as they are immersed in the game play (Ribbens &amp; Malliet 2015).</p> <p>Digital games provide prisoners with the opportunity for sociality and problem solving, while easing the social isolation and lag time of incarceration, and so can ultimately allow prisoners to better cope with negative emotions and thus ameliorate behavioural issues (Ribbens &amp; Malliet 2015).</p>
Virtual reality (VR)		<p>Non-immersive, semi-immersive or fully immersive virtual environments that individuals can interact with. Fully immersive virtual reality programs making use of virtual reality glasses or head mount displays can generate 'place illusion': the sense of being in a virtual environment (Slater 2009).</p>
	Psychological and psychiatric service provision	<p>Avatar-based therapy that revolves around clients creating visual representations of their world, which they can then explain to others (van Rijn et al. 2017).</p>

**Table 8: A typology of digital technologies in corrections (continued)**

Technology	Function(s) in corrections	Affordances
	Criminogenic program delivery	Provide a safe virtual environment for individuals to practise new and productive behaviours (Klein Tuentje et al. 2020).
	Incarcerated individuals' education and training	Virtual reality scenarios that may increase learners' engagement with educational programs (McLauchlan & Farley 2019). Allows learners to participate in remedial educational programs without fear of ridicule from other learners (McLauchlan & Farley 2019).
	Re-entry and reintegration support	Allows individuals to practise positive responses to stressful situations they may face after they are released from incarceration (Teng & Gordon 2021; Teng, Hodge & Gordon 2019). Enabling incarcerated individuals to develop skills required for undertaking job interviews through interactive simulations (Smith et al. 2020).

### Videoconferencing

Videoconferencing technologies allow for real-time audiovisual communication between individuals at different locations. Videoconferencing technologies are used in a variety of ways in correctional settings, including for medical and psychological treatment (Batastini et al. 2020; Bernhard, McDowell & Vincent 2021; Daffern et al. 2021; Drogin 2020); for virtual prison visits by inmates' family and friends (Duwe & McNeeley 2021); and for remote supervision (Lockwood, Viglione & Peck 2023; Viglione et al. 2020). Importantly, in the correctional setting (and outside it), videoconferencing technologies have made medical, psychological and psychiatric treatment and evaluations possible at a distance. Synchronous or 'real-time' telepsychiatry allows patients and clinicians to interact via videoconferencing, phone and chat technologies. (By contrast, asynchronous telepsychiatry refers to recorded videos and other documents sent to an expert for analysis; Barrera-Valencia et al. 2017). Vidolov has demonstrated how the capacity for eye contact between interlocutors during a video call is 'co-constitutive of emotional relational experiences' (2022: 1797). Further, the ability to self-view in most videoconferencing technologies, he continues, impacts the emotional and affective experience of the encounter. In contrast, McKay (2018: 181) reports that prisoners using videoconferencing were 'confused about where to focus their gaze' and avoided eye contact. Videoconferencing also makes forensic evaluation and clinical consultations possible. For example, it enables group therapy for incarcerated individuals who pose a safety risk to practitioners (Batastini & Morgan 2016). Videoconferencing can also be used to undertake group-based healthcare programs, such as smoking cessation treatment programs (Valera et al. 2021). Further, LaPlant et al. (2021) have demonstrated that this technology can facilitate the teaching of social problem-solving skills, similarly to classroom delivery.



### *Email and text messaging*

In contrast to videoconferencing or face-to-face interaction, email does not permit physical features such as appearance, eye contact, voice and tone to be transmitted. Rather, it forces users to rely completely on textual communication. Moreover, email is asynchronous, which means that users are able to edit the text and appearance of the message before sending it to the receiver; email is editable. As Erhardt et al. note, this asynchronicity 'allow[s] individuals more time to carefully think through a response, gather more evidence for arguments, address potential counter arguments, and engage in impression management' (2016: 7). Finally, the sender composing the email is typically located at a distance from the receiver, which means that they can avoid transmitting 'involuntary cues' that might contradict their intended message (Walther 2007: 2541). These features also apply to text messages. In the context of correctional program delivery, text messages are used, for example, as a treatment reminder. Tolou-Shams et al.'s (2019) focus group research found that juvenile justice staff commonly used texting to check in on their youth justice clients and to let them know that they were trying to contact them.

### *Self-service kiosks*

Self-service kiosks are interactive terminal systems that allow a customer or client to receive a service without engaging directly with service workers. Such self-standing kiosks belong to the family of self-service technologies, which Meuter et al. (2000: 50) define as 'technological interfaces that enable customers to produce a service independent of direct service employee involvement'. While the specific features and affordances of self-service kiosks vary, they typically feature touch screen monitors for selection (Kasavana 2008) that enable users to order a product from a menu or to book a service. Some kiosks may also offer users restricted internet browsing.

In the corrections and community corrections fields, self-service kiosks have primarily been used in two ways. Firstly, they enable incarcerated individuals to obtain basic necessities and schedule activities. Secondly, they assist individuals on probation or parole to meet probation or parole conditions. Within prison, kiosks may offer a number of affordances for obtaining basic necessities and scheduling. Kiosks can allow incarcerated individuals to check their spending accounts, shop in canteens, book family visits, read noticeboard messages, arrange healthcare appointments and make requests to attend education services (Jewkes & Reisdorf 2016; McDougall & Pearson 2020; McDougall et al. 2017).

In the probation field, kiosks may provide a number of affordances for client supervision (Ogden & Horrocks 2001). Utah's probation service used kiosks featuring vandal-resistant keyboards and an Identix biometric scanner, enabling probation officers to verify the identity of kiosk users. Using these kiosks, officers would firstly enrol individuals on parole and capture their fingerprints digitally with the kiosk's scanners. When individuals use the kiosk, a biometric sample is taken (via scanner) and compared with the one collected during enrolment. Once a match is established, the individual can interact with the kiosk by pressing buttons on the touch screen. Data are entered to verify address and employment status and to respond to questions defined by the probation officer. The probation officer may also send messages for an individual on parole, to be delivered the next time that person checks in at a kiosk. The individual can read the mail message and respond electronically. Written instructions are given on screen, and a digital photo of the face will be captured. When the session is completed, a receipt is generated for the defendant or offender's records.

### *In-cell tablets*

Tablet computers or tablets are mobile devices that usually feature a touch screen display. Although they usually have less memory, less computing power and somewhat fewer features than laptops, tablets are also generally cheaper and have longer battery life, while still providing many of the functions of a traditional desktop or laptop computer. They lack a physical keyboard, but most tablets can be connected via USB or bluetooth to an independent physical keyboard. One key affordance shared by all tablets is their portability (Drennan & Moll 2018). Their light weight and compact size make tablets easy to carry and move.

Corrections agencies have primarily used tablets in two ways: to provide personal in-cell devices for incarcerated individuals, and to facilitate psychological assessments (King et al. 2017). Like kiosks, in-cell tablets provide incarcerated individuals with affordances for obtaining basic necessities and scheduling appointments for services. However, in-cell tablets generally offer users a considerably greater functionality. In-cell tablets can allow prisoners to communicate with correctional staff and the outside world, order items from the prison canteen, schedule appointments, explore educational opportunities, access information and work opportunities, view their court records and access television, films and meditation audio (Mufarreh 2022; Robberechts 2020). Some in-cell tablets, such as PrisonCloud, also offer free games and access to books and legal materials, as well as restricted access to websites (Robberechts & Beyens 2020). Some tablet systems, such as the JPay system in the United States, are monetised, requiring incarcerated individuals to pay a fee for each email they send or videoconference they schedule (Johnson & Hail-Jares 2016; Reisdorf et al. 2021).

### *Web-based treatment interventions*

Web-based treatment interventions (sometimes referred to as computer-assisted therapy) are mental health, drug or other rehabilitative interventions delivered via internet or local networks. The therapeutic content can take a variety of forms, including digitised versions of treatment manuals, self-guided individual or group programs and purpose-designed interactive interventions. In their scoping review of digital health technologies, Wong et al. (2020) emphasise five affordance categories associated with these. They include affordances associated with the social, the cognitive, identity development, emotional reactions and reflections, and functional affordances. Social affordances refer to increased ability to interact and form social relationships and communities. Cognitive affordances are properties of an artefact that assist, aid, support, facilitate or enable cognitive processes such as thinking, learning, understanding and acquiring knowledge about a particular subject. Identity affordances involve the characteristics of a technology that offer users a way to participate in self-presentation strategies and construct identities that align with their values and perspectives regarding their health and overall wellbeing. Emotional affordances encompass the properties of a digital health platform that have the potential to elicit positive or negative emotional responses in users. Finally, functional affordances pertain to the enhanced accessibility, scalability and reach facilitated by the digital component (Wong et al. 2020: S26). These five categories align effectively with the diverse web-based treatment interventions we identified in our review.

One such example of a web-based intervention is Timewise, a 10-session cognitive behavioural therapy (CBT) based offending behaviour program aimed to assist self-management among people engaged in custodial violence. Timewise is used by His Majesty's Prison and Probation Service in the United Kingdom (Morris & Kaur-Bans 2018). In addition, Morris et al. (2021) have developed a digital toolkit for community-based staff. This program, they suggest, could be delivered as a rehabilitation activity requirement, or as a part of regular supervision with people who are unsuitable for an accredited program or unable to participate in one. The toolkit uses complementary digital media animated media clips, designed to enable the stories and voices of people with relevant lived experiences to help participants remain future-focused and improve their prosocial behavioural options in challenging situations (Morris et al. 2021). A system called Reactions on Display/Intimate Partner Violence (RoD/IPV) allows users to reflect, both visually and in written text, upon common feelings, thoughts, actions and consequences in a typical intimate partner violence (IPV) case and to practise desirable, non-violent responses (Sygel et al. 2014).

A second web-based intervention used by correctional agencies is BFO: a computer-assisted therapy (CAT) program designed to address both substance misuse and offending behaviours. The criminal justice-specific version of BFO is an adaptation of a program originally developed and delivered in community-based substance misuse programs in the United Kingdom. It is provided to prison-based participants via the 'Virtual Campus', the UK prisons IT infrastructure that supports education, training and employment programs. BFO incorporates multiple behavioural change techniques to support cognitive, behavioural and biopsychosocial change (Elison-Davies et al. 2021).

Another CAT targeting drug and alcohol dependency in the criminal justice system is the Therapeutic Education System (TES; Chaple et al. 2016, 2014). Like BFO, TES was originally developed in community settings and subsequently adapted for use in US custodial settings. It also incorporates multiple behaviour change techniques and is delivered in an interactive format. Finally, StaySafe draws from cognitive processing models to help users develop analytical thinking about health-related decisions such as drug use and other risky behaviours. It is 'an intervention that staff can deliver in community probation waiting rooms while clients are waiting for appointments or in residential settings, requiring little staff time or training' (Lehman et al. 2021: 2). The range of web-based intervention models outlined here corresponds well with the five affordances detailed by Wong et al. (2020), because they make various social, cognitive, emotional and identity-related processes possible. Meanwhile, the functional affordances are significant factors in rolling out these programs.

### *Smartphone-based mHealth and mobile mental health apps*

mHealth—an abbreviation of 'mobile health'—refers to medicine, mental health or public health services facilitated or supported by mobile devices. mHealth technologies include smartphone apps, short messaging service (SMS) messaging, mobile telemedicine or telecare devices, websites optimised for smartphones and wearable technologies, including fitness trackers and biocueing sensors (Abaza & Marschollek 2017). Abaza and Marschollek (2017) identify eight areas in which seven types of technology are applied: health monitoring and surveillance; health promotion and raising awareness; communication and reporting; assisting in data collection and creating medical records; telemedicine; emergency medical care; point of care support; and decision support.

Mobile mental health represents a subset of mHealth focused on mental health treatment and care. Like mHealth apps focused on supporting physical health, mobile mental health apps have a variety of application areas. Olf (2015: 1) explains that mobile mental health apps can:

...provide access to relevant information or psychoeducation (when and where needed), as well as help...individuals to self-identify symptoms, offer...screening and assessment tools, help...people manage their own mental health and wellness, identify...the need for treatment, encourag[e] help seeking, and provid[e] direct interventions.

Within the corrections and community corrections spaces, mHealth and mobile mental health technologies have been used to provide physical and/or mental health support to individuals on parole, probation or community corrections orders (Bath, Tolou-Shams & Farabee 2018; Kip, Oberschmidt & Bierbooms 2020). They have also been used as an adjunct to treat substance abuse issues among forensic populations (Johnson et al. 2016; Ross et al. 2022) and to provide re-entry and reintegration support for returning citizens (Zhang et al. 2022). Overwhelmingly, the mHealth interventions referred to in our sample took the form of smartphone apps. However, as Kip, Oberschmidt and Bierbooms (2021) emphasise, correctional agencies might avail themselves of a variety of different eHealth and mHealth technologies, including wearable technologies that collect data on physiological signals. For example, as Ter Harmsel et al. (2021) demonstrate, biocueing technology, which alerts users when certain physiological signals are in an 'at risk' range, might be used to foster emotional awareness among forensic clients with aggression-related issues.

Notably, several of the mHealth apps detailed in our sample were designed specifically for forensic populations and combined features often found in mental health support apps with affordances to support returning citizens' re-entry and reintegration. The Probation/Parole and Reentry Coach App (PARCA), for example, is designed specifically to provide re-entry and reintegration support (Zhang et al. 2022). This is a multifunctional re-entry support app with features falling into three areas. Firstly, the app provides localised resources for healthcare services, substance use disorder treatment, job searching, housing, financial support, child care, food and transportation. Secondly, it facilitates continuous case management between justice-involved individuals and probation managers. Thirdly, it facilitates treatment for substance use disorders through features such as a calendar and journalling (Zhang et al. 2022).

Similarly, the Changing Lives app, designed to help returning citizens in Northern Ireland desist from crime, incorporates features commonly found in mental health support apps alongside affordances to support returning citizens' re-entry and reintegration (McGreevy 2017). The app includes a journal function which service users fill with their own thoughts and reminders of how they are doing. It collates all relevant probation information for the user, including an explanation of what their order means and entails. Further, it provides resources and support to people who may be struggling with mental health issues or addiction and, in a victims section, provides relevant information about victim support services, because probation in Northern Ireland has a statutory duty to do so (McGreevy 2017).

In other cases, included in our sample, apps designed to provide mental health support to a specific population were adapted for forensic populations. One such example is Stay Strong, an app initially designed to provide culturally appropriate mental health support to Aboriginal and Torres Strait Islander people but also used to support incarcerated Indigenous Australians' mental health specifically (Perdacher et al. 2022). The Stay Strong app's range of functions includes goal setting, tips for wellbeing and support for issues such as substance abuse. The app also contains advice and resources about what can help the user to stay strong (family, health, spirituality, physical activity and leisure activities, among others). The app additionally incorporates motivational interviewing features and a strengths-based assessment and intervention tool developed specifically for First Nations Australians (Perdacher et al. 2022).

In addition to these apps designed to support mental health, corrections and community corrections have adopted and adapted a variety of mHealth apps designed to support forensic clients' physical health. These include apps designed to assist returning citizens to engage in care and services related to cardiovascular health, including around medications and health insurance (Surkan et al. 2021). For example, GeoPassport is an app designed to promote HIV prevention, substance use treatment and health service use among men who have sex with men and transgender women who have been released from prison (Edwards et al. 2020). Like many mHealth apps, GeoPassport features both client-facing and practitioner-facing tools. Its client-facing tools include features for tracking goals and progress towards meeting them, features for locating health services, reminders for appointments and taking medication, features for giving feedback on service providers and a reward feature designed to incentivise service use. The app's practitioner-facing tools—which are used by a peer mentor assigned to the client—include features that allow peer mentors to view clients' data (including geolocation data on service use); push notifications from participants; and a dashboard that enables peer mentors to follow up with their participants in real time (Edwards et al. 2020).

One notable subset of these mHealth apps used by corrections and community corrections agencies are apps designed to address substance abuse and prevent substance use lapses and relapses (Helseth et al. 2022). Unlike apps providing reintegration support, most of the apps designed to provide continuing care to people with substance use disorders were not designed specifically for forensic populations. For example, the Addiction–Comprehensive Health Enhancement Support System (A–CHESS) is a smartphone app that was initially designed by the Center for Health Enhancement Systems Studies at the University of Wisconsin to support recovery from alcoholism (Gustafson et al. 2014) but which has since been trialled to support recovery from criminalised drugs in drug courts in the United States, as well as the Neighbourhood Justice Centre in Melbourne (Johnson et al. 2016; Ross et al. 2022).

An important affordance is associated with criminogenic program delivery that uses both web-based and mobile digital technology to increase access to, or reduce the time required to conduct, standard therapeutic treatment and thus help to reduce recidivism rates among offenders. This represents a significant shift in thinking about how correctional institutions view digital technology, as Morris et al. (2019) demonstrate. They argue that digitally enabled content has the potential to change the way that change-oriented interventions and desistance-oriented conversations take place in criminal justice services.

### *Computer-based learning programs*

Educational and learner-centred digital technologies are an important and vital innovation in corrections settings. They provide a range of affordances for inmates and corrections staff alike. In the case of incarcerated individuals, the implementation and use of a range of computer-based learning programs aligns with Van De Steen and Knight's (2017: 3–4) moral driver, which stipulates: 'It is a human right to have access to technology on the part of inmates particularly within the realm of education and training whilst incarcerated.' The range of computer-based learning programs applied in the correctional setting includes training apps, basic literacy and numeracy packages, criminogenic and reintegration programs, learning management systems (LMSs) and digital games. The provision of educational and vocational training for prisoners is not a new concept, but the increasing reliance on digital technologies to deliver such training is. It relies on a range of digitally enhanced programs that can facilitate more efficient access to education and training. It also offers inmates ease of access to criminogenic programs and re-entry and reintegration support. The technologies offer a variety of educational programs, from peer-support training (Loeb et al. 2021) to LMSs, which facilitate inmate participation in higher education (Farley & Hopkins 2017). The digital affordances discussed below are largely focused on inmates; however, there is equally an affordance related to the provision of staff training to a range of corrections practitioners.

Using applied learning methods to support inmate reintegration into the community is another area of correctional services that is increasingly turning to digital applications. The italk Training Program, run in the Northern Territory, is one such program, using technology to leverage the affordances for supporting re-entry and reintegration. It is a 10-week training program that teaches its users skills such as word processing, recording sounds and digital animation (Pfeifer 2019). It also offers opportunity for more applied learning and for participants to analyse their own life situation and what changes they need in order to make a safe and sustainable transition back into the community (Pfeifer 2019). Pfeifer (2019) evaluates the italk Training Program through questionnaires to participants (a sample of 47 Indigenous men incarcerated in the Northern Territory). The purpose of this app is to contribute to making Indigenous Australians 'work ready'. It aims to improve their employment skills, including their English and computer literacy, interpersonal skills and psychological wellbeing and, ultimately, to help them develop respect for education and 'cultural strength'. Working directly with the inmates in the creation of computer-based stories aligns with the concept of co-production examined by Morris and Knight (2018). They demonstrate how employing co-production design principles can give service users a voice in criminal justice settings.



### *Learning management systems*

LMSs afford learning opportunities for incarcerated individuals by allowing them to participate in a range of further education programs, including higher education courses. The LMSs discussed here are largely non-internet connected LMS software, designed to mimic the functionality of internet connected LMS systems; for security reasons, incarcerated prisoners in most jurisdictions are not able to access the world wide web. StudyDesk is an offline Moodle-style university learning management system. The system allows incarcerated students to access distance education without direct access to the internet (Farley & Hopkins 2017).

Most of the computer-based systems and applications discussed here are inmate facing and designed to deliver a variety of training and educational programs in an efficient and cost-effective manner. Fagan (2017) details the introduction of Samsung smartphones to the New Zealand Department of Corrections' community corrections staff. Interestingly, this is the only study we identified during the data collection phase of the scoping review that focused specifically upon a digital technology designed to support corrections staff in the field. The Samsung smartphones are equipped with a purpose-designed Integrated Offender Management System that includes two digital applications used to improve the day-to-day operations and safety of the community corrections staff. The smartphones provide a number of features designed to improve staff efficiency; the contacts application currently enables staff to easily access information related to their case load while they are in the field. Community corrections staff can also review the 10 most recent case notes, see risk and alert information and make a phone call or send a message directly from the application. These affordances allow for greater efficiency, because staff can easily complete a range of tasks while mobile in the field, reducing the need to return to the office to carry out these tasks. Staff are also able to easily access address information and navigate through Google maps directly from the application, and they can create a list of people they interact with frequently.

A very important feature of the Integrated Offender Management System is the safety application; when activated, it sends a text message to three predetermined colleagues and a National Monitoring centre, which is available to respond between the hours of 7 am and 7 pm. It thus gives staff peace of mind in a safer working environment in the field. Fagan (2017) demonstrates that smartphones and their accompanying digital applications directly improved staff productivity and safety and enabled accurate information retrieval and use, providing community corrections staff with access to files that they did not have to bring with them to the field in a physical format.

### *Digital games*

Computer games are not a digital application designed specifically for use in corrections spaces, but they represent a digital technology that provides a number of affordances for incarcerated individuals. Ribbens and Malliet (2015) examine the value of digital games for long-term imprisoned men in Flanders, Belgium. They ‘explore how games can be used to cope with negative emotions or deal with problematic situations’ (Ribbens & Malliet 2015: 2). They argue that digital game play for male prisoners may provide a number of benefits. Specifically, their findings suggest that digital game play can provide inmates with a diversion that operates to help time pass more quickly. Digital game play also helps inmates with mental fitness; problem solving in the game environment provides an affordance that allows inmates to cope with the stress of imprisonment. The use of digital games also satisfies social interaction and a sense of self-satisfaction, because discussing the game play with other prisoners can reduce the sense of social isolation resulting from incarceration. There is also a sense of escapism through fantasy as a result of game play. This can help alleviate the feeling of deprivation of freedom and provide escapism through the procedural logic of the game play. The games can also operate as a positive arousal function; game play can provide a sense of control for the inmates and help them to calm down and manage negative emotions.

### *Virtual reality*

Virtual reality (VR) belongs to the family of extended reality systems, which, as Lighthart et al. (2022: 144) explain: ‘provide a digital simulation either of a complete environment, or of particular objects within the real world’. Central to all virtual reality applications are the concepts of immersion, presence and interaction. Immersion refers to the objective qualities of a virtual environment and the degree to which they maintain sensory fidelity to real-world environments and stimuli (Slater 2003). Highly immersive virtual reality programs produce ‘a sense of presence, or “being there,” in the user’s mind’ (Bowman & McMahan 2007: 36). If immersion refers to the objective level of fidelity to real-world environments a virtual reality provides, then the notion of presence refers to a virtual reality user’s subjective response to that level of immersion (Slater 2003). Interaction, by contrast, refers to the ability of users to ‘interact with not only the VE, but also with virtual objects within the environment’ (Bevilacqua et al. 2019: 2). Importantly, virtual reality programs differ in the degree of immersion they afford, leading some to categorise such programs as non-immersive, semi-immersive or fully immersive. In non-immersive virtual reality programs, individuals use a mouse, joystick or other interface to interact with a virtual environment that is contained in a screen. In semi-immersive virtual reality programs, users interact with a partially virtual environment, which is often generated using large projector systems (Martirosov, Bureš & Zítka 2022). Finally, through the use of virtual reality glasses or head mount displays, fully immersive virtual reality can create a great sense of ‘place illusion’—the sense of being *in* a virtual environment (Slater 2009)—by isolating users from their physical environment while they are interacting with the virtual environment.

Correctional agencies have used fully immersive virtual reality programs for a variety of functions. These include providing virtual reality based forensic treatments (Kip, Kelders & Van Gemert-Pijnen 2019; Sygel & Wallinius 2021; Tereso et al. 2022); criminogenic program delivery (Klein Tuente et al. 2020; Smeijers et al. 2021); facilitating education in correctional environments (McLauchlan & Farley 2019); and offering programs to support the reintegration of incarcerated individuals (Smith et al. 2020; Teng & Gordon 2021; Teng, Hodge & Gordon 2019).

Demonstrating the use of tailored virtual reality applications for criminogenic program delivery, Smeijers et al. (2021), for example, detail an aggression management program using an immersive virtual reality program called the Virtual Reality Game for Aggressive Impulse Management (VR-GAIME). VR-GAIME is a serious game that uses virtual reality to deliver treatment for aggressive behaviour. The game revolves around users acting as couriers who have to collect parcels and interact with individuals who act agreeably and disagreeably (Smeijers et al. 2021). Through allowing users to face virtual situations that have previously triggered aggression or other antisocial behaviours, such virtual reality programs may provide a safe environment for individuals to practise new and productive behaviours (Klein Tuente et al. 2020). Additionally, by allowing users to create visual representations of their world which they can then explain to others, virtual reality can, as van Rijn et al. (2017) detail, be used in avatar-based therapy.

Beyond delivering innovative forms of therapy and criminogenic program delivery, corrections agencies have used fully immersive virtual reality programs in numeracy and literacy programs. In one example, detailed by McLauchlan and Farley (2019), the New Zealand Department of Corrections worked with the Methodist Mission Southern and Animation Research Limited to create the Unity virtual reality program: an intensive virtual reality based numeracy and literacy program for individuals imprisoned in one of the country's correctional facilities (McLauchlan & Farley 2019). The Unity program featured a number of virtual reality scenarios designed to increase users' engagement with numeracy and literacy education and to address several of the barriers to participation in such prison programs—including the fear of ridicule from other learners—that limit participation in group classes (McLauchlan & Farley 2019). The Unity program's virtual reality activities included participating in a numeracy scavenger hunt, exploring an engine block, identifying hazards in the VR mechanic's workshop and participating in an adding game. Learners could also learn practical tasks, such as assembling and disassembling a brake calliper or fixing faulty brakes while receiving a mini-lesson and learning associated vocabulary. Participants were able to walk around the mechanic's workshop and even walk out of the workshop and onto the virtual street (McLauchlan & Farley 2019; see also Collins, Langlotz & Regenbrecht 2020).

Finally, corrections agencies have used fully immersive virtual reality programs to help incarcerated individuals develop skills to assist in their re-entry and reintegration. Teng and Gordon (2021) and Teng, Hodge and Gordon (2019), for example, detail the development and testing of a virtual reality program designed to assist incarcerated women to navigate stressful situations they may face after they are released. The program consists of guided, first-person 3D–360 video episodes depicting psychologically stressful situations which formerly incarcerated women commonly face when returning home. It allows users to practise positive responses to these situations (Teng & Gordon 2021; Teng, Hodge & Gordon 2019). Another example of a virtual reality program focused on developing skills for re-entry after incarceration is Virtual Reality Job Interview Training: a virtual reality program simulating job interviews (Smith et al. 2020). Designed to assist incarcerated individuals to develop skills required for undertaking job interviews, it is an interactive simulation that incorporates video, speech recognition and non-branching logic. The application challenges users to navigate the social cues involved in job interviews and to respond appropriately to interpersonal exchanges (Smith et al. 2020).



# Evidence about impact and effectiveness

The principle that new programs or innovations should be judged on the strength of empirical evidence about their effectiveness is widely accepted in contemporary governance. So-called evidence-based policy assists those ‘who want to know what works under what conditions’ and also ‘those professionals concerned with improving information bases and improving the techniques for analysis and evaluation’ (Head 2010: 13).

The scoping review identified 33 studies that were intended to evaluate the digital system or intervention under investigation or otherwise measure the outcomes or impacts that could be attributed to the system or intervention. Nine of these programs were intended to address substance misuse; four had violent or aggressive behaviour as their target; four examined some form of digital education; three were evaluations of tele-services; four examined prisoners’ use of tablets or kiosks; and there were single studies of health risk decision-making, games, mindfulness meditation, video visitation and tablet-based assessments.

There were also 26 studies in the scoping review that were classified as systematic, scoping or literature reviews. However, nearly half of these were topical reviews (such as reviews of prisoner education or support for incarcerated parents) that included reference to digital interventions or general reviews of a digital technology that mentioned justice contexts or applications or literature or scoping reviews that did not attempt to provide an assessment of outcome evidence. Of the 16 articles that did provide a comprehensive assessment of outcome evidence, more than half ( $n=10$ ) were focused on some form of tele-service (telepsychiatry, telepsychology, telehealth).

It should be noted that the boundary between studies that were classified as being *evaluation or outcome* and those that were classified as *descriptive or implementation* is not always well defined. Evaluation studies almost always include consideration of whether the system or intervention was implemented as intended. Studies that are mainly concerned with describing the implementation of a system or intervention may include commentary on issues that bear on the outcomes or impacts generated.

## Interventions to address substance misuse

Many digital health, mental health and substance abuse treatments provided to people in prison or on community corrections orders are variants of interventions originally developed for, and delivered to, the wider community. Assessments about the effectiveness of treatment interventions in corrections, therefore, also need to take into account the evidence derived from studies of their mainstream counterparts. This issue is illustrated in Weekes et al.'s (2017) review of technology-enhanced interventions to address substance misuse. Their review sets out how a range of CAT approaches addressing substance misuse (including CBT4CBT; Self-Help for Alcohol and other Drug use and Depression (SHADE), BFO and the TES) have shown positive results in community settings for individuals with a range of substance abuse problems. That includes people with a 'dual diagnosis' (substance misuse and comorbid mental health problems). A second systematic review of CAT treatments by Moore et al. (2011) concluded that this treatment modality resulted in reduced rates of substance use as well as enhanced knowledge, coping skills and motivation surrounding recovery, compared with treatment as usual. However, these findings are derived from studies of non-offending populations and involve treatment delivered in community settings, and researchers need to determine whether these results also apply to offenders treated in correctional settings.

A more recent scoping review of digital health interventions (DHIs) for mental health, substance use and concurrent disorders in criminal justice populations was conducted by Leach et al. (2022). The scope of this review included CATs, treatment delivered by videoconferencing and other digital treatment approaches (eg games, wearables). The review found that most interventions were directed at substance use disorders (as opposed to mental health or concurrent disorders); involved the integration of DHIs with treatment as usual, as opposed to use as standalone interventions; and used relatively basic DHI technology (telehealth or computer-assisted interventions). Interventions using mobile phones or apps were uncommon, and no identified studies used wearable or other non-invasive sensors. Generally, the level of outcome data in the sampled studies was poor: most studies found evidence of benefit for participants, but no studies were found that reported on recidivism or long-term justice outcomes.

The most intensively researched digital treatment intervention intended for correctional populations is BFO, a CAT for drug and alcohol dependence. In 2016, BFO was made available to people in UK prisons via Virtual Campus—a prison education IT platform. BFO was originally developed and tested in community settings. The first outcome studies involved 300 service users at alcohol treatment facilities (Elison, Davies & Ward 2015b) and 393 service users at specialist substance use services who were referred by health or social service practitioners or through the police or probation service (Elison, Davies & Ward 2015a). Both studies used a pre- and post-intervention comparison methodology. The first study, involving an alcohol dependent sample, reported significant reductions in alcohol consumption and dependence (Recovery Progression Measure (RPM) and the Severity of Dependence Scale for alcohol) and in symptoms of depression and anxiety (PHQ-9 and GAD-7), and a significant increase in quality of life (WHOQOL-BREF). The second study, involving a substance dependent sample, also found significant improvements in the quality of life and reductions in the severity of alcohol and drug dependence, depression and anxiety ( $p \leq 0.001$  across all aspects of functioning). While the data were not separately analysed by the referral pathway of participants, there were significant improvements for both males and females and for a subsample of persons reporting opiate and crack dependence.

In 2016, Elison, Weston et al. reported the results of a mixed methods prison-based trial of BFO. Pre- and post-intervention psychometric test data from 85 persons who completed BFO was supplemented by interviews with 16 participants. This study reported significant quantitative improvements to quality of life and reduced severity of substance dependence. While there were improvements in RPM scores, these were not statistically significant. However, there were statistically significant improvements in some of the RPM subscores, in the domains of negative thoughts, emotions, physical sensation and ability to cope with difficult situations. In all three of these studies, BFO participants were initially anxious about the digital format of BFO, but exposure to the platform reduced these concerns (Weekes et al. 2017). Additional data for a sample of 151 participants from the implementation of BFO in UK prisons confirmed these findings in 2017 (Davies et al. 2017). Psychometric data from a large ( $n=1,107$ ) community sample of persons presenting to UK addiction services provided further support for BFO, showing reductions in opioid use, opioid dependence, mental health issues and biopsychosocial impairment and improvement in quality of life (Elison-Davies et al. 2021).

These outcome studies provide robust evidence that the BFO intervention can yield ‘significant reductions in opioid use and dependence, severity of mental health symptoms, improvements in quality of life, and reductions in biopsychosocial impairment’ (Elison-Davies et al. 2021: 370). In the correctional context, this treatment approach also provides a way to deliver continuity of care between prison-based treatment and community-based treatment.



A second CAT targeting drug and alcohol dependency in the criminal justice system is TES (Chaple et al. 2016, 2014). Like BFO, TES was originally developed and trialled in community settings and proved superior to standard treatment in promoting drug abstinence among clients (Bickle et al. 2008). TES was made available to incarcerated persons with low to moderate drug or alcohol dependency in 10 prisons in four US states. This group was targeted because persons with more severe substance use disorders are prioritised for prison-based intensive outpatient or residential treatment. Trial participants were randomly assigned either to the experimental condition, the TES ( $n=249$ ), or to standard care as the control condition ( $n=245$ ). Standard care was not identical across all the study sites, and psychoeducational treatment generally focused on relapse prevention. TES participants had a slightly higher completion rate than control participants and rated their treatment experience more favourably. However, the study showed no differences between TES and standard treatment in subsequent criminality (re-incarceration and criminal activity), relapse to substance use and HIV risk behaviour (all self-report measures).

Both BFO and TES are comprehensive drug treatment programs that are intended to provide an alternative to conventional, person-based treatments. Digital apps have also been used to deliver brief treatment interventions intended to improve motivation for, and engagement in, conventional substance abuse treatment. MAPIT (Motivational Assessment Program to Initiate Treatment) is a web-based application designed to be delivered to persons on probation. It aims to improve treatment initiation and engagement, probation compliance and HIV testing and care. MAPIT consists of two 45-minute modules and was the subject of a randomised control trial (RCT) with 316 drug-involved probationers in two US states (Lerch et al. 2017; Walters et al. 2014). The trial compared MAPIT with in-person motivational interviewing and standard probation intake. MAPIT participants showed increased rates of treatment initiation, compared with standard probation services alone, but the application did not have an impact on reported rates of substance use. The largest effects were two months after delivery of MAPIT and diminished by six months. In-person motivational interviewing had no impact on either treatment initiation or substance use, compared with the standard intake condition. A cost-effectiveness analysis of this trial showed that MAPIT could be delivered for 60 percent of the cost of in-person motivational interviewing and, relative to standard probation intake, cost \$6.70 per percentage point increase in the probability of initiating treatment (Cowell et al. 2018).

The MAPIT trial was also used as the basis to test of the efficacy of sending participants electronic text or email reminders about their probation and treatment goals (Spohr, Taxman & Walters 2015). Probationers who agreed to receive electronic goal reminders selected more probation and treatment specific goals when doing the MAPIT modules and were more likely to attend treatment sessions. Reminder frequency and total number of goals selected significantly related to the number of days of reported substance use.



Cigarette smoking has also been the subject of digital interventions intended to support cessation and relapse treatment. A six-week group-based smoking cessation treatment program delivered mainly by videoconferencing was the subject of a small ( $n=20$ ) trial in a rural US prison (Valera et al. 2021). Participants were tested for exhaled carbon monoxide levels during the first and final treatment sessions and at a one-month follow-up. The small sample size means that no meaningful outcome conclusions could be reached.

StaySafe is a health risk decision app intended to help people under community supervision to make better decisions regarding health risk behaviours associated with substance use. Its focus is on the risks associated with HIV, viral hepatitis and other sexually transmitted infections. Users of the app are guided through a series of steps, questions and exercises that promote critical thinking about the health risks associated with substance use and unprotected sex. Lehman and colleagues (2021) conducted an RCT to compare 12 weekly StaySafe sessions with standard practice (attending probation meetings, groups and other probation activities as normally scheduled). Participants were 511 persons under community supervision in Texas who were in either community or residential treatment. When compared with standard practice participants, StaySafe participants showed greater improvement in their knowledge, confidence and motivation about HIV and HIV services, in avoiding sex risks and in risk reduction skills. They had higher scores on rational decision-making.

## Interventions to address violence

Digital platforms have been used in a variety of novel interventions targeting violent behaviour, including virtual reality based aggression treatment (Klein Tunte et al. 2020; Smeijers et al. 2021); biocueing (wearable biofeedback combined with just-in-time behavioural support; Ter Harmsel et al. 2021); interactive simulations of domestic violence scenarios (Morris et al. 2019; Sygel et al. 2014); and the assessment and treatment of child sexual abusers (Fromberger, Jordan & Müller 2018). Most of these trials have been concerned with feasibility or implementation issues, and only three have been the subject of outcome trials.

Three of these trials took place at Dutch forensic psychiatric centres. Klein Tunte and colleagues developed and tested a virtual reality aggression prevention therapy (VRAPT) that consisted of 16 hour-long sessions combining instructions, VR exercises and post-session evaluations (Klein Tunte et al. 2020). The VR exercises involved facial emotion recognition and recognising aggressive behaviour in other people. The RCT study randomly allocated inpatients with aggressive behaviour to VRAPT ( $n=64$ ) or a waiting list control group ( $n=64$ ). VRAPT did not significantly decrease self-reported or observed aggressive behaviour, compared with the control condition. However, hostility, anger control and non-planning impulsiveness improved significantly in the VRAPT group compared with the control group post-treatment. However, these improvements were not maintained at a three-month follow-up. Patients and therapists were positive about VRAPT; therapists reported that patients were immersed in the VR environment, and patients were able to recall specific elements of the therapy.

Smeijers and colleagues translated an anger regulation training intervention into a VR game that simulated avatars who acted in either an agreeable or disagreeable manner (Smeijers et al. 2021). An RCT examined the effects of training using the VR-GAIME on Netherlands forensic psychiatric outpatients with aggression regulation problems ( $n=30$ ), compared with a control group who played a VR game without any anger-relevant training elements. Both groups also received treatment as usual, which consisted of Aggression Replacement Training. While participants' levels of aggressive behaviour generally reduced over the course of treatment, there was no difference between participants who were exposed to the VR-GAIME and those in the control condition. In both the experimental and control condition, participants reported that the VR environment assisted them to gain more insight into their own behaviour and that of others.

The third aggression regulation study, conducted in the Netherlands, was an evaluation of a biocueing app (Ter Harmsel et al. 2021). Biocueing is the provision of personalised biofeedback to assist users to modify their physiological responses to stimuli—in this case, increasing users' awareness of high-risk situations and supporting them in practising behavioural skills to avoid escalation into aggressive incidents. Ter Harmsel and colleagues evaluated an updated version of the Sense-IT app (a smartwatch-based biofeedback app) with 10 forensic outpatients who used the app for two weeks (Ter Harmsel et al. 2021). The small sample size meant that the results of the trial, in the form of moderate acceptability and adequate usability by participants and decreases in trait aggression, were 'cautiously positive'.

The fourth outcome study targeting violence was the pilot study of the RoD/IPV interactive computer system, reported by Sygel and colleagues (2014). The RoD/IPV system is designed to 'facilitate change in the participant's violent behavior by allowing him to, both visually and in written text, reflect upon common feelings, thoughts, actions, and consequences in a typical IPV case and to practise desirable, non-violent responses' (Sygel et al. 2014: 371). The pilot study compared 24 male offenders who engaged in a single two-hour simulation session with a control group of 10 non-offenders. There were no significant differences between the feedback provided by the participants in the offender and non-offender groups, with most participants reporting that they found the RoD/IPV system 'comprehensible, realistic, emotionally engaging, and that it could be of use for treating IPV' but also that they were 'negatively affected' when using it (Sygel et al. 2014: 377).

The use of VR technologies in forensic practice was the subject of a systematic review by Sygel and Wallinius (2021). Their review examined the use of VR in the treatment of general aggression and the assessment of sexual offenders against children (four articles), as well as a larger number ( $n=10$ ) in 'adjacent' fields (mainly the treatment of psychosis). They paired some of the VR interventions with conventional forms of treatment. The authors noted that the studies in their review were predominantly small scale, used non-randomised evaluation methods and focused on immediate or short-term outcomes rather than long-term follow-up; the result was that they were unable to conclude whether VR interventions are effective or ineffective. However, they did note that the theoretical arguments in favour of VR were 'compelling' and that all the interventions in their study were 'at the very least acceptable and harmless to the patients and their environment' (Sygel & Wallinius 2021: 9). Tereso et al. (2022) reported another general review of VR in forensic practice. Again, the scope of this review included a variety of treatment and assessment applications, and the review focuses on the advantages of and barriers to VR in forensic practice rather than an assessment of outcomes.

## Digital education and learning platforms

Although studies on the use of digital platforms to support education and learning in corrections make up the second largest component of sources in the scoping review, relatively few of these studies report outcome data comparing digital and traditional learning modes. This gap needs to be seen in the context of the evaluation literature on prisoner education generally. There have been many systematic reviews of prisoner education: the rapid evidence assessment conducted by Ellison et al. (2017) summarises six systematic reviews conducted in the 10 years to 2017. Most of these reviews examined the impact of prison education on recidivism and employment outcomes and found strong evidence that delivering education in prisons has a positive impact on both outcomes. However, Ellison et al. reported that very few studies provided details of subject content, delivery modalities or duration. In part, this is a function of the heterogeneity of prison education, encompassing adult basic education, secondary and postsecondary education, vocational training and employment preparation. While Ellison et al. acknowledge that digital systems are crucial for delivering high-quality prison education, the advantages of digital platforms over standard classroom methods for delivering prison education are much harder to determine.

This scoping review only identified one study that set out to test the difference between computer-assisted instruction (CAI) and traditional learning. Batchelder and Rachal (2000) randomly assigned prisoners to either CAI or standard teaching with a teaching time of 80 hours over four weeks. Progress was measured by comparing pre- and post-instruction scores on the Comprehensive Adult Student Assessment System math and reading tests. There were no significant differences between the groups in post-test scores. It should be noted that this study is now more than 20 years old, and CAI methods and technologies have changed greatly in the subsequent period.

A more recent study by McCulley, Gillespie and Murr (2014) examined the impact of an adaptive digital technology intended to support prisoner education—text-to-speech software. The trial involved 24 persons with low literacy skills at two US prisons, using the text-to-speech computer software to support literacy teaching for a five-month period. The study reported a statistically significant difference between pre-test and post-test literacy scores on the Comprehensive Adult Student Assessment System literacy assessment.

Two evaluation studies of computer-based learning for prison staff were identified, targeting correctional nursing education (Almost et al. 2019) and geriatric and end-of-life care (Myers et al. 2022). The first of these studies was a qualitative evaluation involving 22 nurses from three correctional settings in Canada who did an online intervention that focused on mental health and addictions. The evaluation reported positive responses about the convenience of online learning but dissatisfaction with presentation style, access to and comfort with the technology, time to attend, lack of education space within the work setting, and lack of internet access. The second study was a trial of interactive computer-based learning at six state prisons and one prison healthcare vendor in the United States, involving 241 staff who were recruited; 173 completed the post-tests. The trial demonstrated significant improvements in knowledge acquisition about care for aging and dying incarcerated persons and about attitudes, motivations and values for providing care.

## Telepsychiatry, telepsychology and telehealth

Tele-services (telepsychiatry, telepsychology and telehealth) are the subject of a substantial body of research literature and several comprehensive systematic reviews and meta-analyses. As with much of the research literature on digital corrections, this literature is predominantly descriptive, with relatively few empirical studies. A key feature of this literature is that telemedicine is widely practised in the United States and Australia but is only used to a limited extent in the United Kingdom, and its use in European countries is ‘dismal’ (Latifi et al. 2021). Most review articles identified focused on implementation or practice issues rather than outcomes (see, for example, Mars, Ramlall & Kaliski 2012; Sales et al. 2018; Senanayake et al. 2018).

The systematic review most directly relevant to this scoping review was conducted by Batastini et al. (2016) with a focus on telepsychology interventions for either substance abuse clients or those involved in the justice system. The authors identified five studies appropriate for inclusion in a meta-analysis and excluded most sources from their review because they did not include a control or comparison group, measured outcomes in a way that precluded the calculation of effect sizes or reported insufficient statistical detail. Their analysis concluded that telepsychology services are cost effective, acceptable to clients (in that they do not negatively affect clients’ willingness to participate and engage in services) and yield outcomes that are ‘equivalent to traditional in-person approaches’ (Batastini et al. 2016: 27).

A more recent general review of prison telemedicine (telehealth, telepsychiatry and telepsychology) by Edge et al. (2021) reported on a variety of outcomes, including productivity measures, user assessments, cost-effectiveness and clinical outcomes. Unlike the strict meta-analytic approach adopted by Batastini et al., the Edge et al. review used a hybrid methodology, combining elements of a scoping review with thematic analysis of the selected articles, and therefore included a wide range of sources. The authors reported that, compared with in-person medical services, telemedicine offered equivalent or improved care quality at an acceptable cost and was acceptable to—or even preferred by—patients. Staff and medical professionals reported that telemedicine provided a convenient and low-stigma way to deliver prison healthcare and could offer ‘a more conducive atmosphere for patient disclosure’ (Edge et al. 2021: 328).

Three outcome studies involving the delivery of professional services by video were identified, two of which were cost–benefit studies. Farabee, Calhoun and Veliz (2016) conducted a randomised field experiment that compared telepsychiatry with in-person psychiatric sessions. The study included a group of participants who were California parolees undergoing outpatient psychiatric treatment for a duration of six months. The telepsychiatry condition consisted of 20 individuals, while the control condition comprised 40 individuals. The study showed no significant group differences in medication adherence or psychological functioning. Participants in the telepsychiatry group reported generally high levels of satisfaction with this service mode but lower levels of therapeutic alliance.

The two cost–benefit studies concerned specific aspects of tele-services rather than the cost-effectiveness of the technology in general. Barrera-Valencia and colleagues (2017) examined the relative costs of synchronous versus asynchronous versions of telepsychiatry. Synchronous telepsychiatry is the most widely used version: patient and psychiatrist interact directly via a video link. The asynchronous (or delayed time) condition involves a general practitioner gathering and sending information (data, audio or video) to a psychiatrist, who provides a second opinion on the diagnosis and management of the patient. Patients with confirmed depression in a Colombian prison ( $n=106$ ) were randomly allocated to the synchronous or asynchronous condition. The study found that clinical effectiveness with the asynchronous model was higher than with the synchronous model, while costs were found to be much higher in the synchronous model. In the second cost study, Taylor and colleagues (2017) carried out economic modelling of telehealth versus face-to-face specialist outpatient consultations for correctional facilities in Queensland. The study was concerned specifically with the cost consequences of transporting prisoners to and from non-urgent specialist outpatient consultations. It found that using telehealth within correctional facilities could potentially result in cost savings of around \$1m each year. The modelling assumed that health outcomes were equivalent for telehealth and face-to-face consultations.

## Kiosks and in-cell tablets

The introduction of digital self-service platforms to prisons, in the form of kiosks in common areas or tablets in cells, is a key transformation in prison operations in several countries. Prisoner self-service technology was first introduced to a small number of UK prisons in the early 2010s, and there has been a gradual rollout of this technology in the form of kiosks in common areas and in-cell laptop computers. In Belgium, PrisonCloud provides an in-cell digital platform for a variety of administrative and communication functions (Robberechts & Beyens 2020). In Finland, digital services were part of the design of the Hämeenlinna women's smart prison, which opened in autumn 2020 (Rantanen, Järveläinen & Leppälahti 2021). The introduction of tablet technology in European prisons is driven partly by the view that prisoners should have the same rights to digital healthcare and social welfare services as other citizens (Van De Steene & Knight 2017). In contrast, the introduction of tablet technology in the United States has been driven partly by commercial companies (JPay, GTL). They provide 'corrections-grade tablets' that prisoners can use on a fee-for-service basis, although public benefit corporations (Edovo, APDS) also provide educational tablets in some jurisdictions (Mufarreh 2022; Mufarreh, Waitkus & Booker 2021).

McDougall and colleagues studied the introduction of self-service kiosk technology into UK prisons over several years (McDougall & Pearson 2020; McDougall et al. 2017). The kiosks allow prisoners to order food, buy items from the prison shop, check account balances, book personal visits and healthcare appointments and apply for education, employment or rehabilitation programs. The research was a multi-site evaluation that examined staff and prisoner experiences using the kiosks, prison performance measures and reoffending rates.

Prison staff reported a range of benefits, including savings in staff time, reduced food waste and reduced reliance on paper-based processes. They also nominated a variety of 'soft' benefits, such as increased prisoner responsibility, improved prisoner life skills, reduced frustration of prisoners, reduced stress on staff and fewer assaults. Prisoners reported that they found the kiosks easy to use, and around half reported that the kiosks had given them more control over their life in prison. Four in 10 reported that relationships with family and friends were better following the introduction of the kiosks, and a similar proportion said that using the kiosks had given them more confidence in dealing with technology-enabled services in the outside world.

There were statistically significant reductions in disciplinary procedures, although these gradually returned to pre-installation levels over a period of three years. Rates of offending behaviour completions (a proxy measure of commitment to rehabilitation) were inconclusive. The recidivism analysis examined rates of proven reoffending in the year after release for prisoners released from 'self-service' prisons, compared with releases from a sample of prisons with similar characteristics. In each sample, recidivism rates were measured over a six-month pre-kiosk and a six-month post-kiosk phase. The comparison prisons showed a small reduction between baseline and post-kiosk reoffending of 0.78 percent. For the self-service prisons, the reduction was 5.36 percent, a difference of 4.58 percentage points.



Robberechts and Beyens (2020) examined the introduction of the PrisonCloud system in three prisons in Belgium in what they described as an ethnographic study. The researchers focused on the impact of the technology on the prison regime and the social interactions of prisoners. They found that PrisonCloud had had ‘unforeseen and somewhat contradictory effects’ (Robberechts & Beyens 2020: 291). Although prisoners generally welcomed PrisonCloud, because it gave them in-cell access to facilities and services, it enabled vulnerable prisoners to ‘withdraw from the public life of the prison’ (Robberechts & Beyens 2020: 292) by spending most of their time in their cells. Especially in closed wings, ‘tendencies toward isolation were more marked’ (Robberechts & Beyens 2020: 294). The researchers concluded: ‘paradoxically, the possibility of greater virtual communication has the potential to create physical and social isolation’ (Robberechts & Beyens 2020: 299). PrisonCloud saved custodial staff time and effort, because they were no longer required to complete paper applications on behalf of prisoners who wanted access to programs and services; but it also meant that they were less able to monitor the emotional state of prisoners. The self-service approach enabled by PrisonCloud also impacted the structure of power relations in the prisons. Previously, prisoners were dependent on custodial staff; in the self-service environment, this dependency shifted to virtual forms of communication. PrisonCloud also created a new set of problems for prison staff in the form of an ‘overload of messages from prisoners’ (Robberechts & Beyens 2020: 296).

A more specialised application of digital tablets in correctional settings is their use to administer structured assessments or questionnaires. King and colleagues conducted an RCT that compared traditional paper and pencil administration of two assessment instruments, with the same instruments presented in digital format via a tablet computer (King et al. 2017). The assessment instruments were the Risk Need Perception Survey (a criminogenic needs assessment) and the Corrections Victoria Treatment Readiness Questionnaire Attitudes and Motivation subscale. Participants were 212 persons in secure community corrections facilities in New Jersey (including 158 males and 44 females from the general population and 27 men with mental health treatment needs). The study showed that participants in the paper and pencil condition completed the assessments around four minutes faster than those in the tablet condition (mean completion times of 11’23” vs 15’29”) but omitted items more frequently or recorded unscorable responses. The tablet format was rated more favourably for ease of use, understandability and enjoyability, and participants generally indicated that they preferred to use a tablet. From a clinician’s perspective, there were very substantial time savings in data entry and checking when tests were administered by tablet.

## Digital prison visits

One of the functions provided by kiosks and tablets is virtual visits with prisoners' families and friends, although virtual visits are more commonly provided through dedicated synchronous video platforms like Zoom or Facetime. Mufarreh (2022) conducted a cross-sectional study of tablet use by prisoners in Ohio prisons over the period of the COVID-19 pandemic. It focuses on the use of tablets for virtual visits, although the tablets were also used for music, movies and games. It examined two key outcomes associated with virtual visitation: whether tablets impacted on the frequency of in-person visits, and how the use of technology and tablets impacted relationships with prisoners' families and communities. The study involved a survey of 78 persons currently incarcerated in Ohio prisons, supplemented by interviews with 15 formerly incarcerated persons. Tablet access and use was subject to complex and restrictive procedures (for example, messages cannot be sent directly from the tablet, but only when it is connected to a kiosk in a common area). Tablets may be confiscated or access restricted as a result of 'disrespectful' behaviour or misconduct. The constraints on use mean that access to a tablet has a limited impact on the pains of imprisonment. Participants also complained of frequent technical problems, including issues with wi-fi signal strength and bandwidth, and video visits that were cancelled by the tablet company. The costs of buying a tablet and the transaction costs for accessing music or movies were significant access barriers. Costs were often paid by family members (although some of these costs were waived or discounted during the pandemic). Prisoners valued tablets as a way to have easy and quick contact with people outside prison, in contrast to the long and potentially violent queues to access a telephone. Most interviewees preferred in-person visits to virtual visits via tablet, and tablets were generally regarded as a supplement to in-person visits. However, during the COVID-19 pandemic, tablets offered the only means for visits. Tablets were sometimes shared with other prisoners, and could thereby strengthen relationships, but they could also be a target for theft. Interviewees reported that access to a tablet was helpful in improving digital literacy and made them 'feel as though they were in society' (Mufarreh 2022: 96).

Duwe and McNeeley (2021) examined the impact of video visitation on recidivism. In a matched comparison study, they compared recidivism outcomes (general reconviction, felony reconviction, violent reconviction and technical violation revocations) between a group of 885 inmates who had at least one video visit and a group of 885 who did not receive any virtual visits. Propensity score matching was used to match the members of the two groups, and Cox regression was used to determine the impact of the independent variables on recidivism. Video visits were conducted via the JPay tablet and kiosk system that was the basis of Mufarreh's research. Receiving at least one video visit significantly reduced the hazard ratio for general and felony reconviction (by 22% and 21% respectively) but did not have a significant effect on violent reconvictions or technical violation revocations. More generally, the likelihood of reoffending was related to the number of visits a person received: the more visits, the greater the decrease in general and felony reconvictions.



## Other rehabilitative interventions

### *iTalk Indigenous prisoner work readiness program*

While the stated purpose of iTalk is to provide a ‘culturally responsive, technology-based, work readiness program’ (Pfeifer 2019: 35), the program content and delivery include components aimed at positively impacting Indigenous and English literacy, computer literacy, respect for education, interpersonal skills, cultural strength and psychological wellbeing. For this reason, iTalk is reviewed here under *Other rehabilitative interventions* rather than in the *Digital education* section. iTalk is delivered to classes of 10 to 15 incarcerated Indigenous participants over a 10-week period and is segmented into three phases: skills acquisition in the use of computer technology to create and record stories; creation of work stories by translating institutional documents (prison protocols or procedures) into a digital narrative in the person’s primary Indigenous language; and creation of a personal digital narrative that reflects on who they are and how they can best encourage a change in themselves. iTalk was evaluated using a pre and post questionnaire, to identify impacts on participants’ abilities, motivations and beliefs. Pfeifer’s (2019) evaluation sampled 47 incarcerated Indigenous participants. It found significant improvements in participants’ ratings of their ability to communicate in their primary Indigenous language and in spoken and written English, their motivation to enrol in post-release education, computer literacy and cultural identity scores.

### *Thinking for a Change CBT program*

LaPlant et al. (2021) conducted an RCT to test the impact of delivering Thinking for a Change using videoconferencing technology or inmate co-facilitated formats, compared with the traditional classroom delivery mode. Thinking for a Change is a CBT intervention that focuses on cognitive restructuring, prosocial skills training and new methods of problem solving. It was developed in 1997. In its conventional delivery mode (classroom based group delivery), it has been shown to yield improvements in prosocial cognitive skills and reduced rates of recidivism (Lowenkamp et al. 2008). Participants were randomly assigned into a treatment or control (traditional classroom) group, using a stratified randomisation procedure, and outcomes were measured using the Social Problem-Solving Inventory-Revised. In the videoconferencing condition, trained facilitators taught sessions that were transmitted from a remote location to a projection screen in the prisons. The facilitators were also able to interact with participants remotely. The study found that videoconferencing delivery yielded significant improvements in social problem solving and equivalent outcomes to traditional classroom administration. On average, participants who received greater program dosage showed greater improvements.

### *Mindfulness meditation in youth custody*

In a study of mindfulness meditation apps, Evans-Chase (2015) addressed the problem of transferability of rehabilitative tools and skills between institutional and community settings. She conducted an RCT involving 60 young people in juvenile detention, to test whether internet-based mindfulness meditation yielded better self-regulation of behaviour and emotions than a control condition of guided relaxation. Outcome measures were derived from the 5-Facet Mindfulness Questionnaire, open-ended post-test questions and analysis of journal entries. The researcher observed no significant differences between the mindfulness meditation and guided relaxation groups but reported that journal entries provided qualitative support for the ability of internet-based mindfulness meditation instruction to increase mindfulness and self-regulation of behaviour and emotions.

### *Digital games in prison*

Ribbens and Malliet (2015) studied the role of digital games as a way to cope with negative emotions or deal with problematic situations in prison. The research used a retrospective think-aloud process to examine the subjective experiences of 17 long-sentence prisoners in Belgian prisons while playing digital games. Boredom alleviation emerged as a key motive; participants reported that games made time pass more rapidly, which made prison life feel easier. In particular, the ‘immersive experience’ of game play was a way to forget about the daily frustrations of prison life and to ‘deal with the negative emotions imposed by the prison regime’ (Ribbens & Malliet 2015: 15). Another participant concern was mental deterioration as a consequence of long-term imprisonment. They perceived digital games as a way to ‘sharpen or train one’s mental capabilities’ (Ribbens & Malliet 2015: 10). Participants also reported that the availability of game consoles provided a basis for collaborative social interaction with other inmates and improved the social atmosphere of the prison.

## **The impact and effectiveness of digital applications in corrections**

Evidence is critical to making judgements about the impact and effectiveness of digital applications in corrections. Ideally, this evidence should be generalisable, which requires it to be derived from multiple studies of comparable interventions, involving different groups of participants, at a variety of sites or contexts. The only area of digital development identified in this scoping review that meets those criteria is that of interventions to address substance misuse. In relation to three digital technologies that are increasingly important to contemporary prison design and operations—tele-services and tele-visits, self-service via kiosks and tablets, and digital education—there is the beginning of an evidence base. However, given the enormous variation in the size, inmate populations and operating regimes of prison systems, there is a pressing need for more outcome studies. The review also identified examples of innovative interventions that show ‘cautiously positive’ results, but at this early stage in their development it is probably premature to look for a substantial and consistent body of evidence.

A series of methodologically robust studies show that the BFO program yields promising results regarding participants' quality of life, mental health and severity of substance dependence. Neither the CBT-based substance abuse treatment, TES, nor the digital motivational interviewing intervention, MAPIT, resulted in positive outcomes in substance dependency or recidivism, although both these interventions produced comparable outcomes to conventional face-to-face delivery modes. In addition, both BFO and TES have shown positive outcomes in non-correctional delivery settings. StaySafe, another digital intervention targeting substance users, showed positive outcomes, but this result was relative to standard probation where no specific health risk support was provided.

The delivery of health and mental health services via synchronous video is possibly the most commonly adopted digital strategy in corrections, and the evidence from systematic and other reviews consistently shows that the outcomes from these services are no worse than, and in some cases slightly better than, in-person therapeutic services. Our scoping review identified only one study that compared therapeutic outcomes from this mode of service delivery with conventional face-to-face delivery. No significant differences were identified, a finding that accords with meta-analytic analysis of the therapeutic impacts of video-delivered and in-person psychotherapy across a range of settings (Fernandez et al. 2021). There are well designed studies of self-service systems in the UK and Belgian prison systems, and more limited studies in a small number of US states. All these studies show mixed results, with some tangible benefits for both prisoners and staff but also significant challenges. Similarly, digital platforms and methods are the basis for much prison education and training, but only one study was identified that compared digital and conventional education outcomes, and that study is more than 20 years old.

Many of the most-studied interventions represent digital variations of conventional forms of treatment or support. In the case of interventions that target aggressive behaviour, the four digital interventions that were the subject of outcome studies are therapeutically innovative and have no direct counterpart in standard aggression treatment approaches. This review also identified single studies of rehabilitative interventions, some of which showed promising results.

The gaps in this evidence base are also noteworthy. The review found no outcome studies of remote supervision or compliance monitoring, both rapidly developing areas of practice. Given that much digital development involves delivering existing programs and services via digital channels, the relative costs and benefits of these delivery modes is a key question. However, this review identified only three outcome studies that examined cost metrics of digital delivery, and only one of these involved a full cost–benefit analysis. These gaps in the literature are further discussed in the next section of this report.



# Challenges and future research directions

This scoping review reveals an uneven research landscape. Some aspects of the digitisation of corrections have been extensively researched, and others have received scant research attention. Research on telepsychiatry, telepsychology and digital education made up nearly half of all the sources identified in this review. Notably, in each of these areas, corrections developments are variants of digital practices that are well established in mental health and education. In contrast, developments in remote supervision and in digital tablets in prison made up only one in five of the sources we examined. These developments in remote supervision and the use of digital tablets have the potential to be genuinely transformative for correctional practice, and we can look to few, if any, cognate (non-correctional) practice models for guidance. In the light of this, it could be argued that there is something of a mismatch between the significance of the digital challenges facing corrections in the short and medium term and the degree of research effort being directed at these challenges.

Our scoping review identified relatively few studies that have evaluated the effectiveness of digital service delivery applications used in corrections and community corrections environments. Further, only one area of digital development—digital interventions to address substance abuse—has an evidence base derived from multiple studies of comparable interventions involving different groups of participants at a variety of sites. This relative dearth of evaluative studies has not gone unnoticed by scholars working in the field. Morris and Graham (2019), for example, note that few empirical studies have evaluated the effectiveness of apps designed to promote reintegration. Further, much of the evidence that has been put forward for using such technologies has been generated in health, rather than justice, settings, and there may be key differences in the way justice agencies employ these technologies in practice (see Ross 2018). There is, therefore, a need for future research to evaluate the efficacy of digital technologies in meeting the ends they are implemented to fulfil in correctional and community corrections services.

Any assessment of the digitisation of corrections is hampered by the paucity of substantial outcome studies that compare digitally delivered and traditional (in-person) programs and services. Where it is possible to directly compare programs and services (mainly in the areas of tele-services and drug and alcohol treatment), there are few significant differences in therapeutic or reoffending outcomes. Pre-pandemic concerns that introducing digital services at scale would result in unacceptable security risks have not been realised. Thus, a key argument for or against digitisation is in the realm of cost–benefit analysis. The high cost of delivering person-based services is an important limiting factor in correctional program provision. While it would seem to be methodologically fairly straightforward to conduct this kind of analysis, to date there have only been very limited attempts to examine the relative costs and benefits of providing services digitally over traditional means (Barrera-Valencia et al. 2017; Cowell et al. 2018; Taylor et al. 2017).

In addition to evaluating the effectiveness (or cost-effectiveness) of digital technologies in bringing about one or more intended functions, it is essential that future studies examine how introducing digital service-provision technologies to correctional environments may change the ecology of these environments, both through mediating the relationships between incarcerated people and staff (Robberechts & Beyens 2020) and by changing the routines and temporalities of prison life (Kaun & Stiernstedt 2020). Here, it is crucial to avoid regarding technologies as either neutral means, ‘solutions’ to complex social problems (see Morozov 2013), or tools that simply extend human capabilities. While technologies do, of course, extend our capabilities, as we have emphasised in our typology, technologies mediate human interactions with their environments—and one another (Verbeek 2015). Through foregrounding technological mediation, future research examining correctional environments might further examine the unintended and unanticipated consequences of introducing digital technologies into correctional environments in a way that avoids lapsing into technological determinism. Here, qualitative—and particularly ethnographic—research may have an important role to play in providing accounts that capture the social, architectural and institutional specificities of the environments in which such technologies are introduced. Providing such accounts is critical to understanding the social, architectural and institutional conditions in which particular digital technologies yield benefits for justice-involved people. Through understanding these conditions, we are much better placed to avoid preferring one-size-fits-all models for introducing technologies into correctional environments.

One of the challenges most frequently identified in the sampled literature was incarcerated people's lack of access to digital technologies. Numerous scholars have shown that preventing or limiting incarcerated individuals' access to digital technologies may exacerbate the digital inequalities these individuals face and thus undermine their reintegration and re-entry as returning citizens (Barreiro-Gen & Novo-Corti 2015; Harrison 2014; Knight & Van De Steene 2020; Monteiro, Barros & Leite 2015; Reisdorf & Jewkes 2016; Reisdorf & Rikard 2018; Toreld, Haugli & Svalastog 2018). By corollary, scholars have argued that providing such access may be essential to ensuring the digital inclusion of incarcerated individuals (Järveläinen & Rantanen 2021; Monteiro, Barros & Leite 2015; Reisdorf & Rikard 2018). The issue of digital inequality is not limited to prison environments and incarcerated individuals. In an increasingly digital society (Powell, Hyatt & Link 2018), where digital technologies are required for meaningful participation in economic, cultural, social, personal and health fields (Reisdorf & Rikard 2018), many individuals on probation, parole or community corrections orders similarly face digital inequalities stemming from a lack of access to such technologies. Like a number of challenges, this issue has been thrown into sharp relief by the COVID-19 pandemic. A number of studies undertaken during the pandemic have demonstrated that many returning citizens or individuals on community corrections orders lacked the digital technologies required to engage in the remote supervision practices necessitated by disease containment and mitigation measures (Cohen & Starr 2021; Galleguillos et al. 2022; Jackson et al. 2021).

Another key unintended consequence that warrants future research attention is the environmental impact of justice digitisation. The literature we reviewed lacked attention to the environmental harms associated with rolling out additional technologies and transitioning traditionally in-person services online. Green criminologists and design researchers emphasise that devices such as cell phones, kiosks, tablets and computers often require some rare minerals and metals to produce and a large amount of energy to run (Bedford et al. 2022). Further, such products contribute to a growing issue associated with e-waste and its disposal (Bedford et al. 2022). We suggest that research should centre these more-than-human harms and consider them in future cost-benefit analyses.

Finally, there is scope to further our understanding of the industry and the political economy of software developers selling to, and designing products for, correctional agencies. The digitisation of corrections offers commercial opportunities, which are a key driver in the development of apps and related technologies. This is particularly evident in certain sectors: prisoner email and video communication (see Maass 2015), remote supervision, and drug and other therapies. These developments are rarely the subject of academic research and were thus largely invisible in a scoping review examining published academic literature. In the past decade, however, an enormous volume of scholarship has examined new forms of capitalism borne from the affordances of platforms as a service. Despite this influx of studies charting the nature and implications of these new modes of capitalism—variously conceptualised as surveillance capitalism (Zuboff 2019) and platform capitalism (Langley & Leyshon 2017; Srnicek 2017)—relatively little research to date has examined their implications for the correctional agencies that have increasingly integrated digital platforms into their infrastructures and regimes. Bringing work on contemporary forms of platform capitalism (Srnicek 2017) into conversation with work examining crime control as an industry (Christie 2016), future research may explore what we might term the ‘prison media complex’ (Stiernstedt & Kaun 2022) or platform carceralism: the political economy of software as a crime control industry.



# References

*URLs correct as at May 2023*

Abaza H & Marschollek M 2017. mHealth application areas and technology combinations. *Methods of Information in Medicine* 56(S 01): e105–e122

Almost J, Gifford WA, Doran D, Ogilvie L, Miller C, Rose DN et al. 2019. The acceptability and feasibility of implementing an online educational intervention with nurses in a provincial prison context. *Journal of Forensic Nursing* 15(3): 172–182

Arksey H & O'Malley L 2005. Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology* 8(1): 19–32

Bakker D, Kazantis N, Rickwood D & Rickard N 2016. Mental health smartphone apps: Review and evidence-based recommendations for future developments. *JMIR Mental Health* 3(1): e7. <https://doi.org/10.2196/mental.4984>

Barreiro-Gen M & Novo-Corti I 2015. Collaborative learning in environments with restricted access to the internet: Policies to bridge the digital divide and exclusion in prisons through the development of the skills of inmates. *Computers in human behavior* 51: 1172–1176

Barrera-Valencia C, Benito-Devia AV, Vélez-Álvarez C, Figueroa-Barrera M & Franco-Idárraga SM 2017. Cost-effectiveness of synchronous vs. asynchronous telepsychiatry in prison inmates with depression. *Revista Colombiana de Psiquiatría* (English ed.) 46(2): 65–73

Barton A 2012. The regulation of mobile health applications. *BMC Medicine* 10(46). <https://doi.org/10.1186/1741-7015-10-46>

Batastini AB, King CM, Morgan RD & McDaniel B 2016. Telepsychological services with criminal justice and substance abuse clients: A systematic review and meta-analysis. *Psychological Services* 13(1): 20

Batastini AB & Morgan RD 2016. Connecting the disconnected: Preliminary results and lessons learned from a telepsychology initiative with special management inmates. *Psychological Services* 13(3): 283–291

Batastini AB, Pike M, Thoen MA, Jones AC, Davis RM & Escalera E 2020. Perceptions and use of videoconferencing in forensic mental health assessments: A survey of evaluators and legal personnel. *Psychology, Crime & Law* 26(6): 593–613. <https://doi.org/10.1080/1068316X.2019.1708355>



- Batchelder JS & Rachal JR 2000. Effects of a computer-assisted-instruction program in a prison setting: An experimental study. *Journal of Correctional Education* 51(4): 324–332
- Bath E, Tolou-Shams M & Farabee D 2018. Mobile health (mHealth): Building the case for adapting emerging technologies for justice-involved youth. *Journal of the American Academy of Child and Adolescent Psychiatry* 57(12): 903
- Bedford L, Mann M, Walters R & Foth M 2022. A post-capitalocentric critique of digital technology and environmental harm: New directions at the intersection of digital and green criminology. *International Journal for Crime, Justice and Social Democracy* 11(1): 167–181. <https://doi.org/10.5204/ijcjsd.2191>
- Belur J, Thornton A, Tompson L, Manning M, Sidebottom A & Bowers K 2020. A systematic review of the effectiveness of the electronic monitoring of offenders. *Journal of Criminal Justice* 68: 101686. <https://doi.org/10.1016/j.jcrimjus.2020.101686>
- Bernhard PA, McDowell L & Vincent GM 2021. Forensic practitioners' use and perceptions of telepsychology before and during COVID-19. *Law and Human Behavior* 45(5): 468. <https://doi.org/10.1037/lhb0000464>
- Bevilacqua R, Maranesi E, Riccardi GR, Di Donna V, Pelliccioni P, Luzi R et al. 2019. Non-immersive virtual reality for rehabilitation of the older people: A systematic review into efficacy and effectiveness. *Journal of Clinical Medicine* 8(11): 1882
- Bickle WK, Marsch LA, Buchhalter AR & Badger GJ 2008. Computerized behavior therapy for opioid-dependent outpatients: A randomized controlled trial. *Experimental and Clinical Psychopharmacology* 16(2): 132–143
- Bowman DA & McMahan RP 2007. Virtual reality: How much immersion is enough? *Computer* 40(7): 36–43
- Bradley A & Davies B 2021. Devastation and innovation: Examining prison education during a national pandemic. *Journal of Criminal Psychology* 11(3): 173–187. <https://doi.org/10.1108/JCP-12-2020-0051>
- Burns J, Liacos G & Green F 2014. *Advice on innovative technologies in e-Mental Health: Briefing paper for the National Mental Health Commission*. [https://www.researchgate.net/publication/283010660\\_NMHC\\_Advice-on-Innovative-Technologies-in-eMental-Health](https://www.researchgate.net/publication/283010660_NMHC_Advice-on-Innovative-Technologies-in-eMental-Health)
- Chaple M, Sacks S, McKendrick K, Marsch LA, Belenko S, Leukefeld C et al. 2016. A comparative study of the therapeutic education system for incarcerated substance-abusing offenders. *The Prison Journal* 96(3): 485–508
- Chaple M, Sacks S, McKendrick K, Marsch LA, Belenko S, Leukefeld C et al. 2014. Feasibility of a computerized intervention for offenders with substance use disorders: A research note. *Journal of Experimental Criminology* 10(1): 105–127
- Christie N 2016. *Crime control as industry: Towards gulags, Western style*. Routledge

- Cohen TH & Starr VL 2021. Survey of US probation and pretrial services agencies' adaptations to COVID-19. *Federal Probation* 85(1): 14–23
- Collins J, Langlotz T & Regenbrecht H 2020. Virtual reality in education: A case study on exploring immersive learning for prisoners. In *2020 IEEE International Symposium on Mixed and Augmented Reality Adjunct (ISMAR-Adjunct)*: 110–115. IEEE
- Conole G & Dyke M 2004. What are the affordances of information and communication technologies? *ALT-j* 12(2): 113–124
- Cowell AJ, Zarkin GA, Wedehase BJ, Lerch J, Walters ST & Taxman FS 2018. Cost and cost-effectiveness of computerized vs. in-person motivational interventions in the criminal justice system. *Journal of Substance Abuse Treatment* 87: 42–49
- Daffern M, Shea D, Dunne A, Papalia N, Thomson K, Simmons M et al. 2022. Psychologists and psychiatrists' experiences of threats to wellbeing whilst providing forensic tele-service work during the COVID-19 pandemic. *Journal of Forensic Psychiatry & Psychology* 33(3): 323–334. <https://doi.org/10.1080/14789949.2022.2067583>
- Daffern M, Shea DE & Ogloff JR 2021. Remote forensic evaluations and treatment in the time of COVID-19: An international survey of psychologists and psychiatrists. *Psychology, Public Policy, and Law* 27(3): 354. <https://doi.org/10.1037/law0000308>
- Davies G, Ward J, Elison S, Weston SK, Dugdale S & Weekes J 2017. Implementation and evaluation of the Breaking Free Online and Pillars of Recovery treatment programs for substance-involved offenders. *Advancing Corrections* 3: 95–113
- DLA Piper 2020. *A global analysis of prisoner releases in response to COVID-19*. <https://www.dlapiper.com/en/canada/news/2021/03/swift-targeted-action-to-reduce-prison-population-during-covid-19/>
- Drennan G & Moll I 2018. A conceptual understanding of how educational technology coaches help teachers integrate iPad affordances into their teaching. *Electronic Journal of E-Learning* 16(2): 122–133
- Drogin EY 2020. Forensic mental telehealth assessment (FMTA) in the context of COVID-19. *International Journal of Law and Psychiatry* 71: 101595–101595
- Duwe G & McNeeley S 2021. Just as good as the real thing? The effects of prison video visitation on recidivism. *Crime & Delinquency* 67(4): 475–497
- Edge C, Black G, King E, George J, Patel S & Hayward A 2021. Improving care quality with prison telemedicine: The effects of context and multiplicity on successful implementation and use. *Journal of Telemedicine and Telecare* 27(6): 325–342. <https://doi.org/10.1177/1357633X19869131>
- Edwards GG, Reback CJ, Cunningham WE, Hilliard CL, McWells C, Mukherjee S et al. 2020. Mobile-enhanced prevention support study for men who have sex with men and transgender women leaving jail: Protocol for a randomized controlled trial. *JMIR Research Protocols* 9(9): e18106

- Elison S, Davies G & Ward J 2015a. An outcomes evaluation of computerised treatment for problem drinking using Breaking Free Online. *Alcoholism Treatment Quarterly* 33: 185–196
- Elison S, Davies G & Ward J 2015b. Sub-group analyses of a heterogeneous sample of service users accessing computer-assisted therapy (CAT) for substance dependence using Breaking Free Online. *Journal of Medical Internet Research* 2: e13
- Elison S, Weston S, Davies G, Dugdale S & Ward J 2016. Findings from mixed-methods feasibility and effectiveness evaluations of the 'Breaking Free Online' treatment and recovery programme for substance misuse in prisons. *Drugs: Education, Prevention and Policy* 23(2): 176–185
- Elison-Davies S, Märtens K, Yau C, Davies G & Ward J 2021. Associations between baseline opioid use disorder severity, mental health and biopsychosocial functioning, with clinical responses to computer-assisted therapy treatment. *The American journal of drug and alcohol abuse* 47(3): 360–372
- Ellis LA, Augustsson H, Grødahl AI, Pomare C, Churrua K, Long JC et al. 2019. Implementation of e-mental health for depression and anxiety: A critical scoping review. *Journal of Community Psychology* 48(3): 904–920
- Ellison M, Szifris K, Horan R & Fox C 2017. A rapid evidence assessment of the effectiveness of prison education in reducing recidivism and increasing employment. *Probation Journal* 64(2): 108–128
- Erhardt N & Gibbs JL 2014. The dialectical nature of impression management in knowledge work: Unpacking tensions in media use between managers and subordinates. *Management Communication Quarterly* 28: 155–186
- Erhardt N, Gibbs J, Martin-Rios C & Sherblom J 2016. Exploring affordances of email for team learning over time. *Small Group Research* 47(3): 243–278
- Evans-Chase M 2015. If they like it they can take it with them: A mixed methods look at the use of Internet-based instruction of mindfulness meditation with incarcerated youth. *Advances in Social Work* 16(1): 90–106
- Fagan D 2017. Enhancing probation practice and safety with smartphone applications. *Probation Journal* 64(3): 282–285
- Farabee D, Calhoun S & Veliz R 2016. An experimental comparison of telepsychiatry and conventional psychiatry for parolees. *Psychiatric Services* 67(5): 562–565
- Farley H & Doyle J 2014. Using digital technologies to implement distance education for incarcerated students: A case study from an Australian regional university. *Open Praxis* 6(4): 357–363
- Farley H & Hopkins S 2017. The prison is another country: Incarcerated students and (im) mobility in Australian prisons. *Critical Studies in Education* 58(2): 150–167

- Fereday J & Muir-Cochrane E 2006. Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods* 5(1): 80–92
- Fernandez E, Woldgabreal Y, Day A, Pham T, Gleich B & Aboujaoude E 2021. Live psychotherapy by video versus in-person: A meta-analysis of efficacy and its relationship to types and targets of treatment. *Clinical Psychology & Psychotherapy* 28(6): 1535–1549
- Ford II JH, Alagoz E, Dinauer S, Johnson KA, Pe-Romashko K & Gustafson DH 2015. Successful organizational strategies to sustain use of A-CHESS: A mobile intervention for individuals with alcohol use disorders. *Journal of Medical Internet Research* 17(8): e3965
- Free C, Phillips G, Watson L, Galli L, Felix L, Edwards P et al. 2013. The effectiveness of mobile-health technologies to improve health care service delivery processes: A systematic review and meta-analysis. *PLoS Med* 10(1): e1001363
- Fromberger P, Jordan K & Müller JL 2018. Virtual reality applications for diagnosis, risk assessment and therapy of child abusers. *Behavioral Sciences & the Law* 36(2): 235–244
- Galleguillos S, Sánchez Cea M, Koetzle D, Mellow J, Piñol Arriagada D & Schwalbe C 2022. The COVID-19 pandemic and probation in Chile: Remote supervision and regional differences. *International Criminology* 2(1): 70–83
- Greenhalgh T & Peacock R 2005. Effectiveness and efficiency of search methods in systematic reviews of complex evidence: Audit of primary sources. *BMJ* 331(7524): 1064–1065
- Gustafson DH, McTavish FM, Chih MY, Atwood AK, Johnson RA, Boyle MG et al. 2014. A smartphone application to support recovery from alcoholism: A randomized clinical trial. *JAMA Psychiatry* 71(5): 566–572
- Harrison L 2014. Prisoners and their access to the internet in the pursuit of education. *Alternative Law Journal* 39(3): 159–162
- Head B 2010. Evidence-based policy: Principles and requirements. In P Commission (ed), *Strengthening evidence based policy in the Australian Federation, Volume 1: Proceedings*. Canberra: Productivity Commission
- Helseth SA, Guigayoma J, Price D, Spirito A, Clark MA, Barnett NP et al. 2022. Developing a smartphone-based adjunct intervention to reduce cannabis use among juvenile justice-involved adolescents: Protocol for a multiphase study. *JMIR research protocols* 11(3): e35402
- Hopkins S & Farley H 2014. A prisoners' island: Teaching Australian incarcerated students in the digital age. *Journal of Prison Education and Reentry* 1(1): 42–51
- Hutchby I 2001. Technologies, texts and affordances. *Sociology* 35(2): 441–456
- Institute of Medicine 2012. *Health IT and patient safety: Building safer systems for better care*. [https://www.ncbi.nlm.nih.gov/books/NBK189661/pdf/Bookshelf\\_NBK189661.pdf](https://www.ncbi.nlm.nih.gov/books/NBK189661/pdf/Bookshelf_NBK189661.pdf)

- Jackson BA, Vermeer MJD, Woods D, Banks D, Goodison SE, Russo J et al. 2021. *Promising practices from community corrections organizations' COVID-19 response: Ensuring safety in the community*. [https://www.rand.org/pubs/research\\_briefs/RBA108-4.html](https://www.rand.org/pubs/research_briefs/RBA108-4.html)
- Järveläinen E & Rantanen T 2021. Incarcerated people's challenges for digital inclusion in Finnish prisons. *Nordic Journal of Criminology* 22(2): 240–259
- Jewkes Y & Reisdorf BC 2016. A brave new world: The problems and opportunities presented by new media technologies in prisons. *Criminology & Criminal Justice* 16(5): 534–551
- Johnson K, Richards S, Chih MY, Moon TJ, Curtis H & Gustafson DH 2016. A pilot test of a mobile app for drug court participants. *Substance Abuse: Research and Treatment* 10, SART-S33390
- Johnson R & Hail-Jares K 2016. Prisons and technology: General lessons from the American context. In Y Jewkes, J Bennett & B Crewe (eds), *Handbook on prisons*. Routledge: 284–305
- Kasavana ML 2008. The convergence of self-service technology. *Hospitality Upgrade*: 122–128
- Katz J & Aakhus M 2002. Conclusion: Making meaning of mobiles: A theory of Apparatchgeist. In J Katz & M Aakhus (eds), *Perpetual contact: Mobile communication, private talk, public performance*. Cambridge University Press: 301–318
- Kaun A & Stiernstedt F 2022. Prison tech: Imagining the prison as lagging behind and as a test bed for technology advancement. *Communication, Culture and Critique* 15(1): 69–83
- Kaun A & Stiernstedt F 2020. Doing time, the smart way? Temporalities of the smart prison. *New Media & Society* 22(9): 1580–1599
- King CM, Heilbrun K, Kim NY, McWilliams K, Phillips S, Barbera J et al. 2017. Tablet computers and forensic and correctional psychological assessment: A randomized controlled study. *Law and Human Behavior* 41(5): 468–477
- Kip H, Bouman YHA, Kelders SM & van Gemert-Pijnen YJEW 2018. eHealth in treatment of offenders in forensic mental health: A review of the current state. *Frontiers in Psychiatry* 9(42)
- Kip H, Kelders SM & Van Gemert-Pijnen LJ 2019. Putting the value in VR: How to systematically and iteratively develop a value-based VR application with a complex target group. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, pp. 1–12. <https://doi.org/10.1145/3290605.3300365>
- Kip H, Oberschmidt K & Bierbooms JJ 2020. Ehealth technology in forensic mental healthcare: Recommendations for achieving benefits and overcoming barriers. *International Journal of Forensic Mental Health* 20(1): 31–47
- Klein Tuente S, Bogaerts S, Bulten E, Keulen-de Vos M, Vos M, Bokern H et al. 2020. Virtual reality aggression prevention therapy (VRAPT) versus waiting list control for forensic psychiatric inpatients: A multicenter randomized controlled trial. *Journal of Clinical Medicine* 9(7): 2258
- Knight V & Van De Steene S 2020. The digital prison: Towards an ethics of technology. In P Birch & S Sicard (eds), *Prisons and community corrections: Critical issues and emerging controversies*, pp 57–71. Routledge

- KPMG 2016. The power of mobile apps: Human services from the citizen's perspective. @gov. <https://home.kpmg.com/sg/en/home/campaigns/2016/04/gov-inspiring-innovative-government.html>
- Latifi R, Osmani K, Kilcommons P & Weinstein RS 2021. Telemedicine for prisons and jail population: A solution to increase access to care. In R Latifi, CR Doarn & RC Merrell (eds), *Telemedicine, telehealth and telepresence: Principles, strategies, applications, and new directions*, pp. 419–428. Springer Nature
- Langley P & Leyshon A 2017. Platform capitalism: The intermediation and capitalization of digital economic circulation. *Finance and society* 3(1): 11–31
- LaPlant EG, Bellair PE, Kowalski BR, Addison D & Starr S 2021. Assessing the delivery of the Thinking for a Change program in modified formats: An experimental approach. *International Journal of Offender Therapy & Comparative Criminology* 65(8): 832–857
- Leach R, Carreiro S, Shaffer PM, Gaba A & Smelson D 2022. Digital health interventions for mental health, substance use, and co-occurring disorders in the criminal justice population: A scoping review. *Frontiers in Psychiatry* 12: 2455
- Lehman WE, Pankow J, Muiruri R, Joe GW & Knight K 2021. An evaluation of StaySafe, a tablet app to improve health risk decision-making among people under community supervision. *Journal of Substance Abuse Treatment* 130: 108480
- Lerch J, Walters ST, Tang L & Taxman FS 2017. Effectiveness of a computerized motivational intervention on treatment initiation and substance use: Results from a randomized trial. *Journal of Substance Abuse Treatment* 80: 59–66
- Ligthart S, Meynen G, Biller-Andorno N, Kooijmans T & Kellmeyer P 2022. Is virtually everything possible? The relevance of ethics and human rights for introducing extended reality in forensic psychiatry. *AJOB neuroscience* 13(3): 144–157
- Lockwood A, Viglione J & Peck JH 2023. COVID-19 and juvenile probation: A qualitative examination of emergent challenges and useful strategies. *Criminal Justice and Behavior* 50(1): 56–75. <https://doi.org/10.1177/00938548211046977>
- Loeb SJ, Murphy JL, Kitt-Lewis E, Wion RK, Jerrod T & Myers VH 2021. Inmates Care: Computer-based training for geriatric and end-of-life care in prisons. *Journal of Correctional Health Care* 27(2): 132–144. <https://doi.org/10.1089/jchc.20.03.0016>
- Loeb SJ, Penrod J, Myers VH, Baney BL, Strickfaden SM, Kitt-Lewis E et al. 2017. Enhancing care of aged and dying prisoners: Is e-learning a feasible approach? *Journal of Forensic Nursing* 13(4): 178–185. <https://doi.org/10.1097/JFN.0000000000000168>
- Lowenkamp CT, Hubbard D, Makarios MD & Latessa EJ 2008. A quasi-experimental evaluation of thinking for a change: A 'real-world' application. *Criminal Justice and Behavior* 36(2): 137–146. <https://doi.org/10.1177/0093854808328230>
- Lupton D 2017. *Digital health: Critical and cross-disciplinary perspectives*. Routledge. <https://doi.org/10.4324/9781315648835>



- Maass D 2015. The hidden cost of JPay's prison email service. *Electronic Frontier Foundation*. <https://www.eff.org/deeplinks/2015/05/hidden-cost-jpays-prison-email-system>
- Mars M, Ramlall S & Kaliski S 2012. Forensic telepsychiatry: A possible solution for South Africa? *African Journal of Psychiatry* 15(4): 244–247. <https://doi.org/10.4314/ajpsy.v15i4.31>
- Martirosov S, Bureš M & Zítka T 2022. Cyber sickness in low-immersive, semi-immersive, and fully immersive virtual reality. *Virtual Reality* 26(1): 15–32
- Mascheroni G & Vincent J 2016. Perpetual contact as a communicative affordance: Opportunities, constraints, and emotions. *Mobile Media & Communication* 4: 310–326
- McCulley Y, Gillespie C & Murr AH 2014. Assessing the effectiveness of text-to-speech software in incarcerated adult literacy education. *Journal of Correctional Education* 65(2): 2–19
- McDougall C & Pearson DA 2020. Technology as a means of rehabilitation: A measurable impact on reducing crime. In TJ Holt & AM Bossler (eds), *The Palgrave handbook of international cybercrime and cyberdeviance*. Palgrave: 183–206
- McDougall C, Pearson DA, Torgerson DJ & Garcia-Reyes M 2017. The effect of digital technology on prisoner behavior and reoffending: A natural stepped-wedge design. *Journal of Experimental Criminology* 13(4): 455–482
- McGreevy G 2017. 'Changing Lives': Using technology to promote desistance. *Probation Journal* 64(3): 276–281
- McKay C 2018. *The pixelated prisoner: Prison video links, court 'appearance' and the justice matrix*. Routledge
- McLauchlan J & Farley H 2019. Fast cars and fast learning: Using virtual reality to learn literacy and numeracy in prison. *Journal for Virtual Worlds Research* 12(3)
- Meuter ML, Ostrom AL, Roundtree RI & Bitner MJ 2000. Self-service technologies: Understanding customer satisfaction with technology-based service encounters. *Journal of marketing* 64(3): 50–64
- Moher D, Liberati A, Tetzlaff J, Altman DG & Group P 2009. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine* 6: e1000097
- Monteiro A, Barros R & Leite C 2015. Lifelong learning through e-learning in European prisons: Rethinking digital and social inclusion. *INTED2015 Proceedings*. Madrid: IATED: 1038–1046
- Montenegro DA 2021. Reaching at-risk student populations during a pandemic: The impacts of Covid-19 on prison education. *Frontiers in Communication* 6: 1–7
- Moore BA, Fazzino T, Garnet B, Cutter CJ & Barry DT 2011. Computer-based interventions for drug use disorders: A systematic review. *Journal of Substance Abuse Treatment* 40: 215–223
- Morozov E 2013. *To save everything, click here: The folly of technological solutionism*. Public Affairs Books

- Morris J, Gibbs CA, Jonah OT, Bloomfield S, Weatherstone PH & Ireland JL 2019. Developing content to promote desistance in men who have committed intimate partner violence in same-sex relationships. *European Journal of Probation* 11(2): 96–113
- Morris J & Graham H 2019. Using technology and digitally enabled approaches to support desistance. In P Ugwu-dike, H Graham, F McNeill, P Raynor, FS Taxman & C Trotter (eds), *The Routledge companion to rehabilitative work in criminal justice*. Routledge: 179–192
- Morris J & Kaur Bans M 2018. Developing digitally enabled interventions for prison and probation settings: A review. *Journal of Forensic Practice* 20(2): 134–140
- Morris J & Knight V 2018. Co-producing digitally-enabled courses that promote desistance in prison and probation settings. *Journal of Criminological Research, Policy and Practice* 4(4): 269–279
- Morris J, Raducu AA, Fuller M, Wylie S & Watson SJ 2021. Towards a desistance-focused approach to probation supervision for people who have committed Intimate Partner Violence: A digital toolkit pilot study. *Probation Journal* 68(2): 261–281
- Mucic D & Hilty DM (eds) 2016. *e-Mental Health*. Switzerland: Springer
- Mufarreh A 2022. *Tablets as a vehicle for imprisoned people's digital connection with loved ones* (Doctoral thesis). City University of New York
- Mufarreh A, Waitkus J & Booker TA 2021. Prison official perceptions of technology in prison. *Punishment & Society*. <https://doi.org/10.1177/1462474521990777>
- Murphy J, Densley F & Ross S 2019. Service Design Evaluation Model (SDEM). A practical model to organise and visualise evaluation of a mobile application to support forensic clients with drug and alcohol addiction. Paper presented at the OZCHI'19: Proceedings of the 31st Australian Conference on Human-Computer-Interaction, Fremantle, Western Australia, December 2019
- Myers VH, Loeb S, Kitt-Lewis E & Jerrod T 2022. Large-scale evaluation of a computer-based learning program to increase prison staff knowledge on geriatric and end-of-life care. *International Journal of Prisoner Health* 18(2): 185–199
- Norman D 2013. *The design of everyday things: Revised and expanded edition*. Basic books.
- Ogden TG & Horrocks C 2001. Pagers, digital audio, and kiosk: Officer assistants. *Federal Probation Journal* 65: 35–37. <https://www.uscourts.gov/federal-probation-journal/2001/09/pagers-digital-audio-and-kiosk-officer-assistants>
- Olf M 2015. Mobile mental health: A challenging research agenda. *European journal of psychotraumatology* 6(1): 27882
- Page MJ et al. 2021. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ* 372: n71. <https://doi.org/10.1136/bmj.n71>



- Payne HE, Lister C, West JH & Bernhardt JM 2015. Behavioral functionality of mobile apps in health interventions: A systematic review of the literature. *JMIR mHealth uHealth* 3(1): e20
- Perdacher E, Kavanagh D, Sheffield J, Healy K, Dale P & Heffernan E 2022. Using the Stay Strong App for the well-being of Indigenous Australian prisoners: Feasibility study. *JMIR formative research* 6(4): e32157
- Peters MDJ, Godfrey CM, Khalil H, McInerney P, Parker D & Soares CB 2015. Guidance for conducting systematic scoping reviews. *International Journal of Evidence-Based Healthcare* 13: 141–146
- Pfeifer JE 2019. Education, technology and Indigenous prisoners: Examining the impact of a culture-specific program on work readiness, skill development and cultural identity. *Journal of Australian Indigenous Issues* 22(1–2): 31–44
- Pike A & Adams A 2012. Digital exclusion or learning exclusion? An ethnographic study of adult male distance learners in English prisons. *Research in Learning Technology* 20(4): 363–376
- Powell K, Hyatt JM & Link NW 2022. Implementing reforms in community corrections: Lessons learned during the COVID-19 pandemic. *Crime and Delinquency*. <https://doi.org/00111287211061722>
- Rantanen T, Järveläinen E & Leppälahti T 2021. Prisoners as users of digital health care and social welfare services: A Finnish attitude survey. *International Journal of Environmental Research and Public Health* 18(11): 5528
- Reisdorf BC, DeCook J, Foster M, Cobbina J & LaCourse A 2021. Digital reentry: Uses of and barriers to ICTs in the prisoner reentry process. *Information, Communication & Society* 25: 1–18
- Reisdorf BC & Jewkes Y 2016. (B)Locked sites: Cases of internet use in three British prisons. *Information, Communication & Society* 19(6): 771–786
- Reisdorf BC & Rikard RV 2018. Digital rehabilitation: A model of reentry into the digital age. *American Behavioral Scientist* 62(9): 1273–1290. <https://doi.org/10.1177/0002764218773817>
- Ribbens W & Malliet S 2015. Exploring the appeal of digital games to male prisoners. *Poetics* 48: 1–20
- Risling T, Martinez J, Young J & Thorp-Frosbie N 2017. Evaluating patient empowerment in association with eHealth technology: Scoping review. *Journal of Medical Internet Research* 19(9): e329
- Robberechts J 2020. Digital privacy behind bars. *Prison Service Journal* 10(248): 10–16
- Robberechts J & Beyens K 2020. PrisonCloud: The beating heart of the digital prison cell. In J Turner & V Knight (eds), *The prison cell*. London: Palgrave Macmillan: 283–303
- Ross S 2018. Policy, practice and regulatory issues in mobile technology treatment for forensic clients. *European Journal of Probation* 10(1): 44–58

- Ross S, Wood MA, Baird R & Lundberg K 2023. Corrections agencies' use of digital service delivery applications during COVID-19. *Trends & issues in crime and criminal justice* no. 677 Canberra: Australian Institute of Criminology. <https://doi.org/10.52922/ti77093>
- Ross S, Wood MA, Murphy J, Johns D, Alford B & Baird R 2022. Understanding engagement with forensic smartphone apps: The Service Design Engagement Model. *International Journal of Offender Therapy and Comparative Criminology*. Advance online publication. <https://doi.org/10.1177/0306624X221106323>
- Sales CP, McSweeney L, Saleem Y & Khalifa N 2018. The use of telepsychiatry within forensic practice: A literature review on the use of videolink: A ten-year follow-up. *Journal of Forensic Psychiatry & Psychology* 29(3): 387–402. <https://doi.org/10.1080/14789949.2017.1396487>
- Seko Y, Kidd S, Wiljer D & McKenzie K 2014. Youth mental health interventions via mobile phones: A scoping review. *Cyberpsychology, Behavior, and Social Networking* 17(9): 591–602
- Senanayake B, Wickramasinghe SI, Eriksson L, Smith AC & Edirippulige S 2018. Telemedicine in the correctional setting: A scoping review. *Journal of Telemedicine and Telecare* 24(10): 669–675
- Slater M 2009. Place illusion and plausibility can lead to realistic behaviour in immersive virtual environments. *Philosophical Transactions of the Royal Society B: Biological Sciences* 364(1535): 3549–3557
- Slater M 2003. A note on presence terminology. *Presence connect* 3(3): 1–5
- Smeijers D, Bulten EH, Verkes RJ & Koole SL 2021. Testing the effects of a virtual reality game for aggressive impulse management: A preliminary randomized controlled trial among forensic psychiatric outpatients. *Brain sciences* 11(11): 1484
- Smith MJ, Mitchell JA, Blajeski S, Parham B, Harrington MM, Ross B et al. 2020. Enhancing vocational training in corrections: A type 1 hybrid randomized controlled trial protocol for evaluating virtual reality job interview training among returning citizens preparing for community re-entry. *Contemporary Clinical Trials Communications* 19. <https://doi.org/10.1016/j.conctc.2020.100604>
- Spohr SA, Taxman FS & Walters ST 2015. The relationship between electronic goal reminders and subsequent drug use and treatment initiation in a criminal justice setting. *Addictive Behaviors* 51: 51–56
- Srnicek N 2017. *Platform capitalism*. Polity
- Stiernstedt F & Kaun A 2022. The prison media complex: Labour, technology and communication infrastructures in the prison system. *Journal for a Global Sustainable Information Society* 20(1): 1–18. <https://doi.org/10.31269/triplec.v20i1.1270>
- Surkan PJ, Puglisi LB, Butler K, Elmi N & Zachary WW 2021. A roadmap for cardiovascular care after release from incarceration: Uses of a smartphone application. *Journal of the American Medical Informatics Association* 28(9): 1849–1857

- Syed M & Nelson SC 2015. Guidelines for establishing reliability when coding narrative data. *Emerging Adulthood* 3(6): 375–387
- Sygel K, Kristiansson M, Furberg R & Fors U 2014. Reactions on display/intimate partner violence (ROD/IPV): A study of a new interactive computer simulation program for the treatment of men convicted of intimate partner violence. *International Journal of Forensic Mental Health* 13(4): 369–380
- Sygel K & Wallinius M 2021. Immersive virtual reality simulation in forensic psychiatry and adjacent clinical fields: A review of current assessment and treatment methods for practitioners. *Frontiers in Psychiatry* 804
- Taylor M, Caffery LJ, Scuffham PA & Smith AC 2017. Economic modelling of telehealth substitution of face-to-face specialist outpatient consultations for Queensland correctional facilities. *Australian Health Review* 42(5): 522–528
- Teng MQ & Gordon E 2021. Therapeutic virtual reality in prison: Participatory design with incarcerated women. *New Media & Society* 23(8): 2210–2229
- Teng MQ, Hodge J & Gordon E 2019. Participatory design of a virtual reality-based reentry training with a women's prison. In *Extended Abstracts of the 2019 CHI Conference on Human Factors in Computing Systems*: 1–8
- Ter Harmsel A, van der Pol T, Swinkels L, Goudriaan AE, Popma A & Noordzij ML 2021. Development of a wearable biocueing app (Sense-IT) among forensic psychiatric outpatients with aggressive behavior: Design and evaluation study. *JMIR Formative Research* 5(11): e29267
- Tereso IM, Ramos ALG, Santos BR & Costa JPM 2022. Virtual reality and forensic mental health. In A Marques & R Queirós (eds), *Digital therapies in psychosocial rehabilitation and mental health*. IGI Global: 245–260
- Tolou-Shams M, Yonek J, Galbraith K & Bath E 2019. Text messaging to enhance behavioral health treatment engagement among justice-involved youth: Qualitative and user testing study. *JMIR mHealth and uHealth* 7(4): e10904
- Toreld EM, Haugli KO & Svalastog AL 2018. Maintaining normality when serving a prison sentence in the digital society. *Croatian Medical Journal* 59(6): 335
- Valera P, Malarkey S, Smith N & McLaughlin C 2021. Exploring the role of telehealth: A novel approach to group-based smoking cessation treatment for men incarcerated in a rural state prison. *Journal of Telemedicine and Telecare*. Advance online publication. <https://doi.org/10.1177/1357633X211034734>
- Van De Steene S & Knight V 2017. Digital transformation for prisons: Developing a needs-based strategy. *Probation Journal* 64(3): 256–268
- van Rijn B, Cooper M, Jackson A & Wild C 2017. Avatar-based therapy within prison settings: Pilot evaluation. *British Journal of Guidance & Counselling* 45(3): 268–283

Verbeek PP 2015. Beyond interaction: A short introduction to mediation theory. *Interactions* 22(3): 26–31

Vidolov S 2022. Uncovering the affective affordances of videoconference technologies. *Information Technology & People* 35(6): 1782–1803. <https://doi.org/10.1108/ITP-04-2021-0329>

Viglione J, Alward LM, Lockwood A & Bryson S 2020. Adaptations to COVID-19 in community corrections agencies across the US. *Victims & Offenders* 15(7–8): 1277–1297

Walters ST, Ondersma SJ, Ingersoll KS, Rodriguez M, Lerch J, Rossheim ME et al. 2014. MAPIT: Development of a web-based intervention targeting substance abuse treatment in the criminal justice system. *Journal of Substance Abuse Treatment* 46(1): 60–65

Walther JB 2007. Selective self-presentation in computer-mediated communication: Hyperpersonal dimensions of technology, language, and cognition. *Computers in Human Behavior* 23: 2528–2557

Weekes JR, Elison S, De Moor C & de Loë K 2017. Technology-enhanced innovations for addressing substance-misusing offenders' treatment needs. In J Ireland, C Ireland, M Fisher & N Gredecki (eds), *The Routledge international handbook of forensic psychology in secure settings*. Routledge: 164–177

Wong CA, Madanay F, Ozer EM, Harris SK, Moore M, Master SO et al. 2020. Digital health technology to enhance adolescent and young adult clinical preventive services: Affordances and challenges. *Journal of Adolescent Health* 67(2): S24–S33

Zhang L, Tulu B, Jenkins S, Richardson N, Shoptaw S & Taxman F 2022. Design and evaluation of the probation/parole and reentry coach app (PARCA): A platform to support a successful reentry into community. In *Proceedings of the 55th Hawaii International Conference on System Sciences*

Zuboff S 2019. *The age of surveillance capitalism: The fight for a human future at the new frontier of power*. Profile books

CRG reports  
**CRG 08/20–21**

Stuart Ross is an Enterprise Professor of Criminology at the University of Melbourne.

Mark Wood is a Senior Lecturer in Criminology at Deakin University.

Ron Baird is a Lecturer in Education Studies and Sociology at Victoria University.

Kajsa Lundberg is a Melbourne Centre for Cities Research Fellow in Urban Innovation at the University of Melbourne.

[www.aic.gov.au/crg](http://www.aic.gov.au/crg)

